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Announcement Effect of Primary Seasoned Equity Offerings of Common Stock

Evidence from the Swedish Stock Market

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Abstract

This study investigates the abnormal returns associated with announcements of primary seasoned equity offerings of common stock on the Swedish stock market. It provides a comprehensive discussion on equity offerings and their related theories, in addition to a thorough review of existing empirical research. Based on our event study analysis of data on rights and directed offerings for firms listed on Nasdaq Stockholm from 2018 to 2022, we identify a significant positive abnormal return of 1.09% during the three-day period surrounding the event day, on average. Our analysis further suggests that investors exhibit a tendency to overreact to seasoned equity announcements. Our cross-sectional regression analysis provides evidence in support of the Wealth Transfer hypothesis. Specifically, we observe that firms with higher debt-to-asset ratios experience a significantly reduced positive market reaction around the announcement date. Furthermore, our findings do not provide support for the Unanticipated Announcement hypothesis, the Signaling hypothesis, the Agency Costs of Free Cash Flow hypothesis, nor the Price Pressure hypothesis.

Keywords: Seasoned equity offering, Swedish stock market, primary offering, equity issue, financing, increase in share capital, wealth transfer

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1. Introduction

This study investigates the stock market reaction to equity financing and explores the underlying causes. Companies seek financing for various purposes, for instance, to fund expansion and improvements or to pay debt. While profits from ongoing business operations may suffice, seeking external funding through debt or equity may sometimes be necessary (Myers, 1984). Equity financing involves companies selling ownership stakes in the form of shares through primary offerings. It is important to differentiate between primary and secondary offerings, as the latter refers to existing shareholders selling their shares to new investors. Explicitly, primary offerings lead to an increase in the number of outstanding shares, resulting in dilution, and allow for the raising of external capital. This is in contrast to secondary offerings. This study focuses on primary Seasoned Equity Offerings (SEOs) which involve any subsequent offering of primary shares to an Initial Public Offering (IPO).

The market reaction to SEOs is the subject of numerous empirical research studies.[1] The documented diverse market reaction,[2] resulting from a management's voluntary decision, is motivated by multiple theories, including the Signaling hypothesis (Leland & Pyle, 1977), the Agency Costs of Free Cash Flow hypothesis (Jensen, 1986), the Price Pressure hypothesis (Scholes, 1972), the Unanticipated Announcement hypothesis (Smith, 1986), and the Wealth Transfer hypothesis (Kalay & Shimrat, 1987). However, previous literature does not provide conclusive evidence on the primary driver of the varied market response following SEOs. Many studies focus on some of these hypotheses separately or collectively. To the best of our knowledge, no research simultaneously includes a proxy variable for all five hypotheses mentioned above, as done in our cross-sectional regression. Akhigbe and Harikumar's (1996) study comes closest as it includes a proxy variable for four of the hypotheses, excluding the Wealth Transfer hypothesis. Readily available research on this topic in European markets is scarce, specifically in Nordic

[1] Asquith and Mullins (1996), Mikkelson and Partch (1986), Bøhren, Eckbo and Michalsen (1997), Botta and Colombo (2019), Cai and Loughran (1998), Shahid, Xia, Mahmood and Usman (2010), and Stehle, Ehrhardt and Przyborowsky (2000) provide evidence on various aspects of stock market reaction to SEOs.

[2] Gajewski and Ginglinger (2002), Kolodny and Suhler (1985), Akhigbe and Harikumar (1996), Hess and Frost (1982), Mann and Sicherman (1991), Masulis and Korwar (1986) and McDaniel, Madura and Akhigbe (1994) find a negative market reaction to SEOs. Cooney and Kalay (1993), Dhatt, Kim and Mukherji (1996), and Tsangarakis (1996a) find a positive market reaction to SEOs.

markets, with some studies documenting a positive market response to SEOs,[3] while others show a negative response.[4] As an exemplification of research conducted on European markets, Gajewski and Ginglinger (2002) and Tsangarakis (1996a, 1996b) focus solely on rights offerings,[5] where existing shareholders of a company are offered the right to buy additional shares directly from the company at a discounted price before a specified date. When examining equity offerings in the Swedish stock market from 2018 to 2022, a considerable amount of equity issues are carried out through a directed offering, which is not included in the aforementioned studies on European markets. The purpose of this study is to provide empirical evidence on the reaction of stock prices to primary SEOs on the Swedish stock market, including both rights and directed offerings. The primary objective is to answer the research question: "What is the short-term impact of announcements of primary SEOs on stock returns for Nasdaq Stockholm?" This analysis yields valuable insights and serves as a vital indicator for understanding market reactions and the underlying factors driving them.

The research is conducted using event study analysis in addition to a cross-sectional regression to reveal how the results support different hypotheses. Six hypotheses are presented: Firstly, proposed primary SEOs cause abnormal returns in the short-run due to the interplay of the aforementioned hypotheses, which are further discussed in the following chapters. Secondly, the predictability of the proposed primary SEOs affects the magnitude of its announcement's impact on stock returns, aligning with the Unanticipated Announcement hypothesis. Thirdly, the higher the relative magnitude of the increase in share capital to the outstanding equity, the greater the impact on stock returns upon the announcement of proposed primary SEOs, which is consistent with both the Signaling hypothesis and Price Pressure hypothesis. Fourthly, firms with more potential for positive future investments experience more favorable stock price reactions, supporting the Agency Costs of Free Cash Flow hypothesis. Fifthly, consistent with the Wealth Transfer hypothesis, the more leveraged a firm is, the greater the negative impact on stock returns upon the announcement of proposed SEOs due to the reduction in the overall risk of the firm.

[3] Tsangarakis (1996a), Bøhren, Eckbo and Michalsen (1997), and Adaoglu (2006) find a positive market reaction to announcements of SEOs in European markets.
[4] Stehle, Ehrhardt and Przyborowsky (2000), Gajewski and Ginglinger (2002), Kabir and Roosenboom (2003), and Botta and Colomba (2019) find a negative market reaction to announcements of SEOs in European markets.
[5] Bøhren, Eckbo and Michalsen (1997), Cai and Loughran (1998), Stehle, Ehrhardt and Przyborowsky (2000), and Loderer and Zimmermann (1987) also study the announcement effect of exclusively rights offerings in European markets.

Lastly, we test the Efficient Market hypothesis and posit the hypothesis that no abnormal returns are observed around the date of the final announcement pertaining to SEOs.

Our findings indicate that the Swedish market reacts positively to announcements of SEOs. Specifically, a significant positive three-day abnormal return of 1.09% is observed surrounding the announcement of proposed primary SEOs, on average. In addition, significant negative abnormal returns following the initial increase in stock prices are observed, suggesting that investors exhibit a tendency to overreact to SEOs. No empirical evidence in support of the Signaling hypothesis, the Price Pressure hypothesis, or the Agency Costs of Free Cash Flow hypothesis is found. Furthermore, we find inconclusive evidence of the Unanticipated Announcement hypothesis. However, we do find evidence consistent with the Wealth Transfer hypothesis and the Efficient Market Hypothesis. The findings of our research can assist investors in making more informed investment decisions and provide companies with an understanding of how their equity issues may be perceived by the market. Additionally, our analysis holds considerable value in providing bondholders with insights into the potential implications of equity issuances on their vested interests.

The remainder of the thesis consists of five sections. In Chapter 2, we provide a comprehensive discussion and interpretation of the concepts and theories related to our hypotheses regarding the market's reaction to SEOs. Chapter 3 comprises a literature review of earlier research on the stock market reaction to primary SEOs. In Chapter 4, we detail the research we conduct, including the methodology and data employed, as well as defining and justifying the variables used to test each hypothesis. Subsequently, in Chapter 5, we present our findings and provide an analysis, inclusive of comparisons and contrasts with previous literature. The last section, Chapter 6, offers a concise summary of our findings as well as suggestions for further studies.

2. Theoretical framework

In this section, we discuss the relevant theories and the five hypotheses proposed to explain the market reaction to announcements of primary SEOs.

2.1 Efficient Market hypothesis

When stock prices reflect all available information, it is said that the market is efficient, and investors cannot outperform it (Fama, 1970). This means that through market transactions, an investor cannot generate abnormal profits compared to other investors (Fama, 1970). This fundamentally implies that investing in higher-risk assets is the only way of obtaining abnormal profits (Fama, 1965). Fama (1970) was among the first to divide the Efficient Market hypothesis (EMH) into three categories: Weak form efficiency, semi-strong form efficiency, and strong form efficiency. His definition of the weak form efficiency states that market prices exclusively reflect historical prices while the semi-strong form states that market prices reflect the entirety of public information, along with historical prices. The strong form of efficiency assumes that both public and private information reflect market prices in addition to historical prices, while also assuming that trading costs, as well as information costs, are equal to zero (Fama, 1970). However, Grossman and Stiglitz (1980) argue that the strong form cannot be entirely true since information is costly. Research on the EMH has been conducted for decades (Fama, 1965, 1970, 1991).[6] Hess and Frost (1982) analyze the announcement effect of seasoned securities issuance on stock prices. They conclude that according to the EMH, stock prices should remain unchanged around the issue day since firms announce new offerings long before the issue day.

2.2 Information asymmetry

Asymmetric information refers to differences in information between two parties. For example, borrowers have an advantage over lenders as they have better knowledge of their own characteristics than the lenders do. Leland and Pyle (1977) argue that poorly performing markets are to be expected when asymmetric information is present, specifically, the market will become

[6] Jensen (1978), Grossman and Stiglitz (1980), Hess and Frost (1982), Aitsahlia and Yoon (2016), Sánchez-Granero, Balladares, Ramos-Requena and Trinidad-Segovia (2020), and Urquarth and McGroarty (2016) research the efficiency of markets.

inefficient. They argue that information transfer must transpire for markets to perform well. Akerlof's (1970) paper, "The market for 'Lemons': Quality uncertainty and the market mechanism", has been a pivotal contribution to the information asymmetry issue. Akerlof (1970) provides an example of the automobile market. He fundamentally states that the buyers have less information than the sellers and only the sellers know the true characteristics of the automobile, which leads to buyers not wanting to pay any additional money for a better vehicle. This solely benefits individuals who are selling a low-quality car and is evidently a disadvantage for individuals selling a high-quality car.

Information asymmetry forms the basis of the Signaling and the Unanticipated Announcement hypotheses as they share a fundamental assumption, which is that investors are faced with asymmetric information. In the presence of such asymmetry, investors must employ various means to determine whether to respond positively or negatively to SEO announcements. In the subsequent two chapters, 2.2.1 and 2.2.2, we will delve deeper into the Signaling hypothesis and the Unanticipated Announcement hypothesis, respectively.

2.2.1 Signaling hypothesis

The Signaling hypothesis states that individuals can use signals when making financial decisions in situations with information asymmetry (Bergh, Connelly, Ketchen & Shannon, 2014). The hypothesis essentially states that in situations where asymmetric information is present, individuals will value projects based on the information transfer that comes from signals (Leland & Pyle, 1977). For instance, if a firm needs financing for a project and an individual with inside information invests in the firm, that may act as a signal to the lending market implying that the project is of good quality (Leland & Pyle, 1977). Kolodny and Suhler (1985) investigate whether positive signals regarding announcements of equity issuance lead to an increase in the firm's stock price and contrariwise. Their empirical results support the Signaling hypothesis as they state that conveyed signals determine the changes in stock prices.

The Pecking Order hypothesis seeks to rationalize why firms tend to avoid issuing equity to raise capital and relates the avoidance to signaling problems (Myers, 1984). As stated in Seifert and Gonenc's (2008) paper, the Pecking Order hypothesis concerns a hierarchy of financial choices a firm makes where primarily, internal funds are preferred to external funds. If external funds are needed, the firm will issue its safest security, which is debt, and as a last resort, issue

equity (Seifert & Gonenc, 2008). A study by Myers and Majluf (1984) concludes that in the presence of information asymmetry, it is more favorable for a firm to use debt for external financing rather than equity. Myers (1984) relates the Pecking Order hypothesis to signaling and states that stock prices decrease with announcements of a stock offering due to asymmetric information. Conversely, the announcement of a default-risk debt issue will not affect stock prices negatively (Myers, 1984).

2.2.2 Unanticipated Announcement hypothesis

The Unanticipated Announcement hypothesis states that when firms announce a new equity issue, changes in stock prices depend mainly on whether the announcement is anticipated or not (Smith, 1986). A large change in the stock price should indicate that the announcement is unanticipated (Smith, 1986). This offers a potential explanation for the frequent equity issuances observed among numerous firms. When a firm has a reputation as a frequent issuer, the announcement of new issuance of equity should be expected. Consequently, the market reaction should be minimal, and stock prices should remain relatively unchanged. Multiple studies have been conducted that support the Unanticipated Announcement hypothesis.[7] For instance, McDaniel, Madura, and Akhigbe (1994) conclude that the predictability of an announcement of a new equity issue depends largely on whether the firm is a frequent issuer.

2.3 Agency Costs of Free Cash Flow hypothesis

Managers are essentially agents of shareholders, which can create a conflict of interest (Jensen, 1986). When shareholders receive a cash payout, managers may suffer a decrease in power and control due to the reduction of resources available to them (Jensen, 1986). Jensen (1986) states that the relationship between shareholders and managers becomes increasingly intricate when the firm has significant free cash flow. This situation allows managers to potentially regain control by investing the free cash flow into projects with a negative net present value (Jensen, 1986). Jensen and Meckling (1976) classify agency costs into three categories: Monitoring costs, bonding costs, and residual loss. Monitoring costs involve ensuring that agents act in the best interest of shareholders (Jensen & Meckling, 1976). Bonding costs guarantee that shareholders are

[7] Bayless (1994) and McDaniel, Madura and Akhigbe (1994) find evidence in support of the Unanticipated Announcement hypothesis.

reimbursed if agents take actions that are not in the best interest of the shareholders (Jensen & Meckling, 1976). Residual loss is defined as the discrepancy that arises between the agents' decisions and decisions that would maximize shareholder value (Jensen & Meckling, 1976).

2.4 Price Pressure hypothesis

According to the Price Pressure hypothesis proposed by Scholes (1972), a large trade in the stock market will cause stock prices to fall, thereby encouraging investors to purchase additional shares. According to Scholes (1972), as the demand for shares increases, the price of shares will decrease since the demand curve is downward sloping. However, the demand curve is not perfectly elastic, and there will be periods where trading activity increases which leads to the share price deviating from the equilibrium price (Scholes, 1972). Chang and Ke (2014) suggest that the Price Pressure hypothesis holds if there is a negative correlation between market returns and flows while holding other factors constant. This implies that purchasing stocks leads to negative returns. Akhigbe and Harikumar (1996) establish a direct theoretical linkage between the Price Pressure hypothesis and SEO announcements. They posit that, under the assumption of the hypothesis, an excess supply of shares will lead to a decrease in stock prices. This occurs when there are no perfect substitutes for a firm's stock, particularly when the demand curve exhibits a downward slope (Akhigbe & Harikumar, 1996). Consequently, announcements of SEOs are expected to elicit a negative market reaction due to the excess supply (Akhigbe & Harikumar, 1996). Researchers hold divergent views on this specific hypothesis, with some scholars providing support for it,[8] while others remain unconvinced.[9]

2.5 Wealth Transfer hypothesis

The examination of wealth redistribution has been a subject of extensive study across diverse contexts.[10] Kalay and Shimrat's (1987) research marks an early exploration of the Wealth Transfer hypothesis among bondholders and stockholders, examining its implications for SEOs. They argue that the Wealth Transfer Hypothesis occurs when one class of security holders benefits at the

[8] D'Mello, Ferris and Hwang (2003), Harris and Gurel (1986), Kumar's (2007), and Gajewski and Ginglinger's (2002) findings support the Price Pressure hypothesis.
[9] Chang and Ke (2014) and Warther (1995) reject support the Price Pressure hypothesis.
[10] Chang, Lord and Rhee (1985), Galai and Masulis (1976), Datta, Iskandar-Datta and Zychowicz (1995), and Asquith and Kim (1982) research the redistribution of wealth among security holders.

expense of another. Additionally, Elliot, Prevost and Rao (2009) state that when the purpose of an SEO is to reduce the overall risk of a firm, the value of the common stock will decrease, resulting in a transfer of wealth from equity holders to debt holders. This transfer occurs because the risk for the debt holders decreases as the overall risk of the firm diminishes (Elliott, Prevost & Rao, 2009). They conclude that when firms publicly announce SEOs, the bondholders experience significant positive abnormal returns, whereas shareholders experience significant negative abnormal returns (Elliott, Prevost & Rao, 2009). On the contrary, some studies do not find support for the Wealth Transfer hypothesis (Kalay, 1987; Tsangarakis, 1996a).

3. Literature review of the effect of primary SEOs

Seasoned equity offerings on the stock market have been of scholars' interest for decades, and a substantial amount of research has been conducted to examine the stock market's reaction to them. The vast majority of readily available studies employ event study methodology on stock exchanges in the United States,[11] with some studies also conducted in Europe,[12] and Asia.[13] The research conducted on the stock exchanges in the United States primarily report negative reactions to SEOs, while studies conducted on Asian stock exchanges generally find positive reactions to SEOs. In Europe, the findings are more varied. This is further detailed in the subsequent chapters.

3.1 Negative announcement effect of primary SEOs

Asquith and Mullins (1986) and Masulis and Korwar (1986) examine the reaction of American stock markets to primary SEOs of common stock for established industrial firms and public utilities from 1960 to 1980 and 1981, respectively. Both studies employ event study methodology, where the announcement date is the day the news of an announcement is published in the Wall Street Journal (WSJ). Masulis and Korwar (1986) exclude rights offerings from their sample, while Asquith and Mullins (1986) include them but do not explore the differences in the alternative methods of issuing equity. Masulis and Korwar (1986) report a significant negative abnormal return of 3.25% on average during the announcement period for industrial firms and a significant negative 0.68% for public utilities on average. Meanwhile, Asquith and Mullins (1986) observe a significant negative abnormal return of 2.7% on average for industrial firms and a significant negative 0.9% for utility firms on the event day. Both Masulis and Korwar (1986) and Asquith and Mullins (1986) find that, for industrial firms, larger equity offerings are associated with larger price reductions, supporting the Signaling hypothesis. As the size effect is also consistent with the Price Pressure hypothesis and neither research distinguishes between explanations based on these two hypotheses, one can argue that their results for industrial firms provide support for either or

[11] Akhigbe and Whyte (2015), Asquith and Mullins (1986), Hess and Frost (1982), McDaniel, Madura and Akhigbe (2004), Mann and Sicherman (1991), Masulis and Korwar (1986), and Akhigbe and Harikumar (1996) analyze the announcement effect of SEOs on US stock markets, using event study methodology.
[12] Bøhren, Eckbo and Michalsen (1997), Tsangarakis (1996a, 1996b), Stehle, Ehrhardt and Przyborowsky (2000), Gajewski and Ginglinger (2002), and Loderer and Zimmermann (1987) analyze the announcement effect of SEOs on European stock markets, using event study methodology.
[13] Cai and Loughran (1998), Tan, Chng and Tong (2002), Dhatt, Kim and Mukherji (1996), and Kang and Stulz (1996) analyze the announcement effects of SEOs on Asian stock markets, using event study methodology.

both hypotheses. Their findings concerning utility issues are incongruent. Asquith and Mullins (1986) reveal no evidence of a relationship between the market reaction and the issue size, whereas Masulis and Korwar (1986) do find a positive relationship. While Asquith and Mullins (1986) infer that these differences between utility issues and industrial issues are not apparent, they, similar to Masulis and Korwar (1986), argue that public utilities offer seasoned equity more frequently than industrial firms. Thus, they suggest that higher negative abnormal returns can be expected for the latter. This finding is consistent with McDaniel, Madur and Akhigbe's (1994) research on the matter, all of which support Smith's (1986) hypothesis of Unanticipated Announcements.

Akhigbe and Harikumar (1996) analyze stock returns of equity-only industrial firms listed on US stock exchanges from 1975 to 1988. The two-day average abnormal return around the first public announcement of the SEOs in their sample is significantly negative at 0.82%. They apply a cross-sectional regression on several variables to test specific hypotheses and conclude that the size of the issue is negatively related to the abnormal returns, similar to the findings of Asquith and Mullins (1986) and Masulis and Korwar (1986). However, Akhigbe and Harikumar (1996) expand the analysis by adding another variable to their cross-sectional regression to distinguish between the Signaling hypothesis and the Price Pressure hypothesis, finding evidence in support of the former. To test the Agency Costs of Free Cash Flow hypothesis, they utilize the market value of equity, to book value of equity ratio (market-to-book ratio), hypothesizing that a high ratio indicates that the firm will use the proceeds from the equity issue to finance a positive net present value investment, while a low ratio indicates the opposite. They reason that since the market-to-book ratio is not correlated with the abnormal returns, their results do not support the Agency Costs of Free Cash Flow hypothesis.

Gajewski and Ginglinger (2002) study the French stock market and declare it to be a rather closely held market. Their sample contains announcements of SEOs from 1986 to 1996, including rights issues and public offerings. Contrary to Asquith and Mullins (1986), they explore the differences in results between rights issues and public offerings but do not differentiate between different types of firms. Gajewski and Ginglinger (2002) conclude that the average abnormal return for the two days around the first announcements of a rights issue is significantly negative, approximately 1%, while the average abnormal return around the first announcement of public offerings is negative at 0.33%, but statistically insignificant. Furthermore, they investigate the stock market reaction at the beginning of the subscription period, using the issue date as the event,

and find the market reaction to be significantly negative for both rights and public offerings. They provide some speculations but do not offer a precise explanation for this reaction. In the context of a study conducted by Hess and Frost (1982), who examine SEOs of utility firms listed on NYSE from 1975 to 1977, they report that in an efficient market, there should essentially be no post-announcement effects of a new issue. One could interpret the results of Gajewski and Ginglinger (2002) as a rejection of the hypothesis of Market Efficiency. Gajewski and Ginglinger (2002) observe the market reaction to be more positive when the proceeds of the issue are reported to be used for an acquisition or an investment. This is in support of Jensen's (1986) Agency Costs of Free Cash Flow hypothesis and aligns with the findings of Mann and Sicherman's (1991) study, which includes announcements of SEOs of common stock from firms listed on US stock exchanges from 1982 to 1984. They find that investors exhibit a more negative reaction to announcements of SEOs when they originate from firms with no track record of favorable acquisitions compared to firms with a track record of favorable acquisitions. This corresponds to Kim and Purnanandam's (2014) findings in their examination of the market response to announcements of SEOs on the US stock market from 1982 to 2006.

Kabir and Roosenboom (2003) study how SEO announcements affect stock prices in the Dutch stock market. They examine announcements of rights issues, excluding firms in the security, insurance, and banking industries, from 1984 to 1995. They find that stock prices decline significantly following an announcement of a rights offering, observing a significant negative abnormal return of 2.55% on average. They conclude their study to support both the Signaling hypothesis and the Agency Costs of Free Cash Flow hypothesis. They find that firms with greater information asymmetry, measured by the relative size of the issue and the offer price discount, endure a greater negative stock price reaction and firms with a higher market-to-book ratio experience a less negative stock price reaction compared to the firms with a lower market-to-book ratio (Kabir & Roosenboom, 2003).

Botta and Colomba (2019) investigate how the market reacts to announcements of SEOs that are made by European banks, contrary to Kabir and Rosenboom (2003) who exclude banks from their sample. Not only do Botta and Colomba (2019) study how stock returns are affected by SEOs, but they also examine the reaction of bond returns, by 39 different European banks from 2008 to 2014. They find that at the announcement of SEOs, the returns of both stocks and bonds react negatively. Specifically, their findings suggest a negative correlation between the size of the

issue itself and stock returns. They claim that these results provide support for the Signaling hypothesis. This assertion is consistent with the findings reported by Akhigbe and Harikumar (1996) more than a decade earlier. However, Botta and Colomba (2019) do not clearly distinguish between the Signaling and the Price Pressure hypothesis, similar to Masulis and Korwar (1986) and Asquith and Mullins (1986). Consequently, it can be inferred that their findings offer support for one or both of these hypotheses. Furthermore, Botta and Colomba (2019) find that the bond returns and stock returns are not correlated. Thus, they conclude their results are not in favor of the Wealth Transfer hypothesis. This finding corresponds to Kolodny and Suhler's (1985) results on the matter as they conclude, based on an examination of changes in debt values within subsets of an equity sample, that there is no correlation between the firms' debt values and the returns during the announcement period. On the contrary, Elliot, Prevost and Rao (2009) find evidence in support of the Wealth Transfer hypothesis. They find that bondholders experience slight positive abnormal returns on the announcement day. According to their study, bondholders gain at the expense of shareholders, since for the latter, negative returns were observed following the announcement of SEO.

3.2 Positive announcement effect of primary SEOs

Tsangarakis (1996a) analyzes how the Greek stock market reacts to initial public announcements of rights issues, from 1981 to 1990. He observes a significantly positive abnormal return of 2.45% on the announcement day on average. His empirical results suggest that rights issues by Greek firms convey positive information about their prospects. Moreover, his results are not in favor of the Price Pressure hypothesis nor the Wealth Transfer hypothesis. These results are almost identical to the ones of Dhatt, Kim and Mukherji (1996), who examine the announcement effect of rights issues on the Korean stock market from 1977 to 1991. A collective trait of Korean and Greek firms, according to these separate research studies, is that they are closely held. Both papers conclude that in such institutional settings, offerings are likely to be perceived as evidence of positive prospects for firms. This is further supported by the findings of Bøhren, Eckbo and Michalsen (1997) who test the market reaction to announcements of rights offerings on the Oslo Stock Exchange from 1980 to 1993. They state that the Norwegian market is a closely held equity market and claim that their results, which show a significant positive two-day average abnormal

return of 2% around the announcement of uninsured rights issues, are consistent with a growing number of studies on smaller markets.

Shahid et al. (2010) analyze the announcement effect of public and rights offerings in China from 1998 to 2008. The process of announcing equity issues in China is strictly different from the process in the US and Europe due to its regulatory nature. Nonetheless, the compilation of the results in their research is comparable to the others as they examine three event dates to ensure the inclusion of the overall and general effect of SEO announcements. Their results indicate that rights offerings are associated with a positive market reaction, in line with Tsangarakis' (1996a) result, whereas public offerings convey negative signals to the market. Adaoglu (2006) also documents a positive market reaction to announcements of what he refers to as "sweetened rights issues", that is rights issues that are accompanied by bonus issues, on the Turkish stock market, from 1994 to 1999. He finds significant positive abnormal returns of 2%, on average, surrounding the first announcement of SEO. Additionally, he observes a gradual, but insignificant, decline in abnormal returns starting three days after the initial announcement of the SEO.

As discussed above, the literature reveals a wide range of reactions to announcements of SEOs. The market's response, as documented in the various research, depends on factors such as the method of issuing equity, as well as the characteristics of the market, the issuer, and the issue itself. To further highlight this diversity, Marisetty, Marsden and Veeraraghavan (2008) conclude that the market reaction to announcements of rights issues in Indian firms from 1997 to 2005 can be deemed neutral. There is no conclusive evidence on what contributes the most to abnormal returns, and scholars hold differing opinions on this matter, as evidenced in this literature review.

4. Research design

We analyze the stock market's reaction to primary SEOs in a class of shares previously traded on Nasdaq Stockholm using quantitative methods on hand-collected data. Our data analysis involves Microsoft Excel, MATLAB, and Gretl.

4.1 Methodology

In the following four subchapters, we provide a detailed description of our approach using event study methodology and cross-sectional regression analysis.

4.1.1 The event study method

The event study method is a well-established technique in the applied finance literature used to measure the impact of events on the value of firms by analyzing stock price changes around the event. Scholars in finance have conducted event studies on a variety of firm-specific and economy-wide events for decades (Dolley, 1933; Fama, Fisher, Jensen & Roll, 1969; Thompson, 1988).[14] The standardized methodology developed by MacKinlay (1997) serves as the paradigm of the methodology employed in this study. Event studies test whether returns during the period around an event, known as the event window, are significantly different from the predicted returns that are normally estimated using the period preceding the event window, known as the estimation window.

4.1.2 The estimation window, the event window, and the event

Estimation windows are typically longer than event windows (MacKinlay, 1997). Our estimation window spans 75 days, beginning 100 days before the event and ending 25 days before the event. This duration is chosen to sufficiently capture both the normal behavior of the market and the stock and is similar to the approach used by McDaniel, Madura & Akhigbe (1994). Our event window starts 23 days after the end of the estimation window, that is 1 day before the event itself. The gap between the estimation window and the event window, shown in Figure 1, serves to prevent potential contamination of the estimation window from the possible effects of information leakage.

[14] Ashley (1962), Botta and Colomba (2019), Krishnaswami, Spindt and Subramaniam (1999), Myers and Bakay (1948), and Tan, Chng and Tong (2002) have also conducted event studies.

To minimize the impact of other uncontrollable events on the abnormal returns, we choose an event window of [-1,+1], while still accounting for potential announcement leaks by including one day before the event, and late responses from investors by including one day after the event. To further analyze the market reaction, we also extend the event window to five days after the event, [-1,+5], and explore the event window [+2,+5] within it. This enables us to determine the reaction to SEOs more precisely, specifically for thinly traded shares. In addition, it enables us to determine whether the market takes a few days to apprehend the news or whether it tends to overreact.

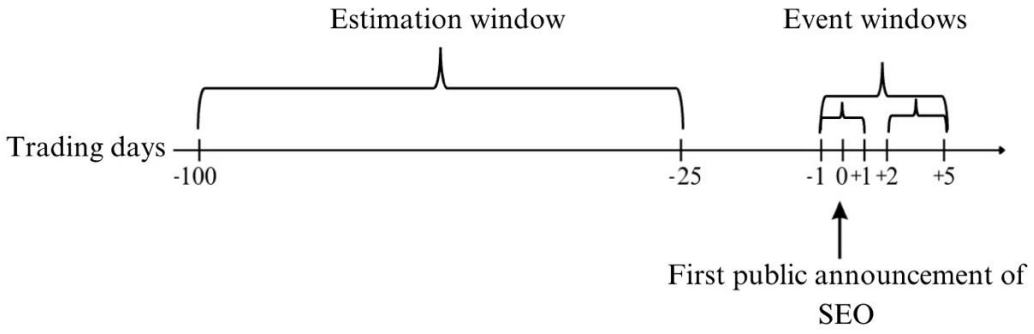

Figure 1. Timeline for the event study

Previous studies on the announcement effect of share capital issues use different dates as event dates. Nelson (1965) uses the first day of trading, Kolodny and Suhler (1985) use the day before the Wall Street Journal (WSJ) announces an offering, and McDaniels, Madura and Akhigbe (1994) analyze the data using the date of registration and the offering date separately, while Masulius and Korwar (1985) take the event date to be the former. White and Lusztig (1980) use the first date on which the offering is mentioned, which is the approach we adopt in this research. Berkman and Truong (2008) emphasize the importance of accounting for after-hours announcements in event studies related to earnings announcements. It can be argued that this principle applies to all types of company announcements that hold informative value. Therefore, if the announcement was published during a time the market was closed, we consider the following trading day as the event date.

The event in this study is when an issuer publishes an announcement regarding the Board of Directors' proposal of a share capital offering, either with authorization from the General Meeting or subject to the approval of the General Meeting. However, it is important to note that the Annual General Meeting (AGM) often grants the Board general authorization for one or more share issues, typically limited to no more than 10% of the registered share capital. This information

is made public with the results of the AGM. In practise, these authorizations are frequently not utilized, and no issue is carried out pursuant to it. As the share issue is far from guaranteed following this type of announcement, it is not informative and is not used as an event date in our analysis. On the contrary, none of the Board's share issue proposals in this sample were denied by the General Meeting. It is assumed that the market places greater significance to the announcement of the Board's proposal on a share capital issue, as it represents the initial disclosure of information related to the share issue. We choose this announcement to ensure consistency and ascertain that the impact of the announcement is not overlooked. Following this announcement, the share issue is typically carried out on the same day or within a few days, sometimes within several weeks. Subsequently, the issuer publishes another announcement regarding the number of shares issued. Finally, an announcement is made pertaining to the registration of the share capital, in accordance with the Swedish Financial Instruments Trading Act (1991). Both of these announcements are expected.

We draw inspiration from Hess and Frost (1982) and test the EMH by conducting an additional event study where we test whether there are any systematic price effects around the latest public announcement related to each issue. The event day in this case corresponds to the date of the registration announcement, and since new equity offerings are announced well in advance of the last announcement, the EMH suggests that there should be no significant abnormal returns around that final announcement. The estimation windows and event windows are identical in terms of their length to those described in the previous event study.

4.1.3 The normal- and abnormal return

The daily return of each stock at time *t*, denoted as $R_{nt,}$ is calculated using dividend-adjusted daily closing prices. The daily market rate of return, denoted as R_{mt}, is approximated using the daily closing prices of OMX Stockholm 30 Index. To determine the abnormal return, denoted as AR_{nt}, resulting from the announcement of SEO, the predicted stock return during the event window if the event had not occurred, denoted as R_{nt_p}, is subtracted from the observed stock return, $R_{nt,}$ during the event window. If the announcement of a proposed SEO has no impact on the stock return, there should be no significant difference between the predicted return and the actual return during the event window, resulting in insignificant abnormal returns. The market model, as described by MacKinlay (1997), is utilized to model the predicted return. The model assumes a

stable relationship between the market return and the stock return, employing the singular index model presented in equation 1.

$$R_{nt} = \alpha_n + \beta_n R_{mt} + \varepsilon_{nt} \qquad \varepsilon_{nt} \sim N(0, \sigma^2_{\varepsilon_{nt}}) \qquad \text{t} \in \text{estimation window} \qquad \textbf{(1)}$$

Ordinary least squares (OLS) regression is employed to estimate the parameters, denoted as β_n, and α_n. The estimated parameter values are $\hat{\beta}_n$ and $\hat{\alpha}_n$, as presented in equation 2. The predicted normal returns for observations within the event window are obtained by applying the estimated parameters derived from the estimation window to the market returns observed during the event window.

$$R_{nt_p} = \hat{\alpha}_n + \hat{\beta}_n R_{mt} \qquad \text{t} \in \text{event window} \qquad \textbf{(2)}$$

To test for robustness, we also employ the constant mean return model and the adjusted market model. The methodology remains largely consistent, with the exception that the constant mean return model assumes that the mean return of the stock during the estimation window remains constant, while the adjusted market model assumes that the intercept, denoted as α, is 0 and the beta, denoted as β, is 1.

Equation 3 presents the cumulative abnormal return of observation *n*, denoted as CAR_n, over the time interval from s_1 to s_2 within the event window.

$$CAR_n[s_1, s_2] = \sum_{t=s_1}^{s_2} AR_{nt} \qquad \textbf{(3)}$$

To measure the sample average abnormal return at time *t*, the abnormal returns of individual observations are aggregated and divided by the number of observations, as shown in equation 4.

$$\overline{AR}_t = \frac{1}{N} * \sum_{n=1}^{N} AR_{nt} \qquad \textbf{(4)}$$

To analyze the cumulative abnormal return for the sample, the cumulative abnormal returns of the individual observations are aggregated and divided by the number of observations, as shown in equation 5.

$$\overline{CAR}[s_1, s_2] = \frac{1}{N} * \sum_{n=1}^{N} CAR_n[s_1, s_2] \qquad \textbf{(5)}$$

The *t*-statistic in equation 6 is computed to test the null hypothesis that the event has no impact on the behavior of stock returns, against the alternative hypothesis that the mean return during the event window is different from zero. This is done using a two-tailed t-test.

$$t = \frac{\overline{CAR}[s_1,s_2]}{var(\overline{CAR}[s_1,s_2])^{1/2}} \sim N(0,1) \qquad var(\overline{CAR}[s_1,s_2]) = \frac{1}{N} var(CAR_n[s_1,s_2]) \qquad \textbf{(6)}$$

4.1.4 Cross-sectional regression analysis

A cross-sectional regression analysis is conducted to investigate the relationship between the magnitude of the abnormal returns around primary SEO announcements and specific event characteristics. The dependent variable used in the analysis is the three-day cumulative average abnormal return, $\overline{\text{CAR}}$[-1,+1], calculated using the market model. For further robustness, we also consider the three-day cumulative average abnormal returns from the constant mean return model and the adjusted market model. Five explanatory variables, RSIZE, FREQ, M/B, PPRESS, and D/A are included in the regression as proxies for the Signaling hypothesis, the Unanticipated Announcement hypothesis, the Agency Costs of Free Cash Flow hypothesis, the Price Pressure hypothesis, and the Wealth Transfer hypothesis, respectively.

Barclay and Litzenberger (1988) argue that, according to the Signaling hypothesis, when external investors have asymmetric information regarding the firm's cash flow, an SEO will lead to a decline in stock prices, proportional to the size of the issue itself. Kolodny and Suhler (1985) state that whether investors interpret SEOs as a positive or negative signal, the price decline or increase will be more significant for larger issue sizes. To empirically test the Signaling hypothesis we, therefore, define a variable RSIZE as the proceeds of each issue in Swedish Krona (SEK) divided by the market value of the common stock at the year-end prior to the offering announcement. Based on the aforementioned rationale, a negative correlation between abnormal returns and RSIZE supports the Signaling hypothesis if investors interpret SEOs as a negative signal. Similarly, a positive correlation between abnormal returns and RSIZE supports the Signaling hypothesis if investors interpret SEOs as a positive signal. It is important to note that for the variable RSIZE, we utilize the SEK amount of the SEOs outcomes for simplification, even though the exact amount is not known at the time of the first announcement. However, it typically provides a close approximation to the final results.

To empirically test the Unanticipated Announcement hypothesis, we introduce a dummy variable, FREQ, which takes a value of one if the issuer conducted an SEO at least once in the two years preceding the event, and zero otherwise. This approach aligns with the methodology employed by Masulis and Korwar (1986) in their study on SEOs, where they examine the Unanticipated Announcement hypothesis. If the hypothesis is supported, then issuers who have conducted an SEO at least once in the two years prior to the event should display a diminished market response to SEO announcements.

Kabir and Roosenboom (2003) and Akhigbe and Harikumar (1996) state that, according to the Agency Costs of Free Cash Flow, firms with a higher quantity of free cash flows are presumed to invest in projects with a negative net present value or overinvest. They argue that as a result, these firms have a lower market-to-book ratio. They further argue that firms with a low market-to-book ratio will therefore receive more negative market reaction to announcements of SEOs. Conversely, when firms with a high market-to-book ratio announce an SEO, the market reacts more positively as it interprets the SEO as a means to finance good investment opportunities (Akhigbe & Harikumar, 1996; Kabir & Roosenboom, 2003). Fama and French (1992) also state that the market-to-book ratio can be used as an indicator of the prospects of firms. Therefore, we utilize M/B, representing the year-end market-to-book ratio prior to the offering announcement, as a proxy for the Agency Costs of Free Cash Flow hypothesis. A positive correlation between abnormal returns and M/B would be consistent with the hypothesis.

To isolate the price pressure in the RSIZE variable, we follow the approach of Akhigbe and Harikumar (1996) and define a variable, PPRESS, as a proxy for the Price Pressure hypothesis. In alignment with both Scholes (1972) and Akhigbe and Harikumar (1996), PPRESS is calculated as the number of shares offered divided by the total number of shares outstanding before the offering. A negative correlation between PPRESS and abnormal returns would support the hypothesis.

Tsangarakis (1996a) states that wealth transfer resulting from SEOs, particularly from shareholders to bondholders, can be quantified by using the firm's debt-to-asset ratio. He argues that firms with a high debt-to-asset ratio have a greater likelihood of default. Therefore, an SEO will benefit bondholders at the expense of shareholders more in firms with a higher debt-to-asset ratio compared to those in firms with a lower ratio. This is attributable to the fact that firms facing a risk of default are likely to utilize the proceeds primarily for debt reduction, with debt repayment

taking priority over shareholder remuneration. To test the Wealth Transfer hypothesis we, therefore, define the variable D/A, denoting the debt-to-asset ratio calculated from the latest annual financial statement. According to the Wealth Transfer hypothesis, a negative correlation between abnormal returns and D/A is expected.

The cross-sectional regression model is defined in equation 7.

$$\overline{CAR_n}[-1,+1] = b_{0t} + b_{1t}RSIZE_{nt} + b_{2t}(M/B)_{nt} + b_{3t}(D/A)_{nt} + b_{4t}FREQ_{nt} + b_{5t}PPRESS_{nt} + \varepsilon_{nt} \quad \textbf{(7)}$$

4.2 Data

Our research is based on a dataset of 439 companies listed on Nasdaq Stockholm between 2018 and 2022. The dataset is obtained from Nasdaq Inc. and includes daily information on the number of listed shares and dividend-adjusted closing prices (personal communication, 27 March 2023). We link each of the 2,263 positive changes in the number of shares to a company's announcement on the Nasdaq Nordic Company News source, recording the date and time of each announcement (Nasdaq, 2023a). We exclude changes that we cannot link to an announcement or that have material inconsistencies. According to a senior surveillance specialist at Nasdaq, these inconsistencies can be attributed to systematic changes in Nasdaq or to issuers' breaches of obligations to inform the market (personal communication, 30 March 2023). To ensure the accuracy of our analysis of SEOs, we exclude the increases in share capital related to listings and IPOs, the exercise of warrants and options, the conversion of stocks and bonds, incentive programs, and stock splits. Additionally, we exclude firms with multiple classes of listed shares and offerings that had other simultaneous announcements within 10 days prior to the event and 10 days following the event, as those could affect stock prices. This leaves us with a total of 89 announcements of rights and directed offerings. Finally, we obtain the historical data for the market index, Nasdaq Stockholm 30 Index, from Nasdaq Inc's website (Nasdaq, 2023b).

For the variable RSIZE, we determine the price per share in each issue by extracting information from the official announcement issued by the company regarding the outcome of the offering. In cases where the price per share is provided in a currency other than Swedish Krona (SEK), we employ the historical exchange rate from Sveriges Riksbank to convert it to SEK (Sveriges Riksbank, n.d.). The market capitalization is sourced from CapitalIQ, and the quantity of shares issued is obtained from the relevant SEO announcements. Furthermore, the market

capitalization is utilized for the variable M/B, and the total book value of equity at the year-end preceding each offering is likewise acquired from CapitalIQ. Concerning the variable FREQ, we examine whether each issuer has undertaken SEO within the preceding two years. For issues that are announced in 2018 or 2019, we extend our comprehensive review of all announcements made by the specific firm during the two years preceding the selected announcement, specifically from the years 2016 and 2017. The source utilized to obtain this information is Nasdaq Nordic Company News (Nasdaq, 2023a). As for the variable PPRESS, the total number of shares offered in each issue is acquired from the initial announcement related to each SEO (Nasdaq, 2023a). Additionally, the total number of outstanding shares is procured from CapitalIQ. Regarding the variable D/A, the book value of the total debt and assets for each firm in the sample is acquired from CapitalIQ for each year preceding the SEO. It is worth noting that the required data is not available from CapitalIQ for a total of 16 announcements. As a result, our total sample consists of 73 announcements of proposed SEOs from 55 issuers. The majority of announcements occur in the latter years, as shown in Table 1.

Table 1. Frequency distribution of SEOs among the sample firms
This table presents the frequency distribution of our sample, specifically indicating the years in which the first announcement pertaining to each SEO is published.

Year	Number of offerings	Fraction of sample (%)
2018	7	10%
2019	3	4%
2020	12	16%
2021	29	40%
2022	22	30%
Total	73	100%

Of the directed issues, 53% are related to payments for acquisitions, while the rest is directed to institutional investors for general corporate purposes, such as increasing working capital, investment purposes, or paying off short-term debt. The summary statistics for the explanatory variables are presented in Table 2.

Table 2. Summary statistics of the explanatory variables
This table shows the distribution information of the explanatory variables.

Explanatory variables	Min	Max	Mean	Median	Std. deviation
RSIZE	0.0001	0.68	0.12	0.08	0.13
FREQ	0.00	1.00	0.34	0.00	0.48
M/B	0.64	30.26	4.57	3.39	4.40
PPRESS	0.0004	1.00	0.16	0.08	0.21
D/A	0.00003	27.41	0.79	0.25	3.34

To test the EMH, we record the date and time of each observation's last announcement related to the SEO (Nasdaq, 2023a). We eliminate all announcements that coincide with other announcements from the respective company within 10 days prior to the last announcement and 10 days following it. This leaves us with 35 observations to test the EMH.

5. Findings and analysis

The findings provide empirical support for our hypothesis that proposed primary SEOs generate abnormal returns in the short-run. However, we do not find evidence linking the other aforementioned hypotheses to the positive abnormal returns as depicted in the subsequent chapters.

5.1 Event study on the announcement effect of proposed primary SEOs

The three-day cumulative abnormal return, $\overline{CAR}$[-1,+1], is significantly positive at 1.09% (at the 10% level), 1.04% (at the 10% level), and 1.23% (at the 5% level) when calculated using the market model, the constant mean return model and the adjusted market model, respectively, as the predicted return measure. The results exhibit some heterogeneity, as shown in Table 3 by the proportion of observations displaying positive abnormal returns, which will be further discussed in Chapter 5.2.

Table 3. Cumulative abnormal returns for announcements of proposed primary SEOs
This table shows the cumulative abnormal returns and the proportion of observations that yield positive stock returns for event windows [-1,+1], [-1,+5], and [+2,+5], derived from the market model, constant mean return model, and adjusted market model. One asterisk (*) denotes significance at the 10% level and two asterisks (**) denote significance at the 5% level.

Event window	Fraction of positive abnormal stock returns (%)	$\overline{CAR}$	t-statistic
Market model			
$\overline{CAR}$ [-1,+1]	56.20%	1.09%*	1.80
$\overline{CAR}$ [-1,+5]	41.10%	-0.29%	-0.32
$\overline{CAR}$ [+2,+5]	35.62%	-1.38%*	-1.88
Constant mean return model			
$\overline{CAR}$ [-1,+1]	57.53%	1.04%*	1.67
$\overline{CAR}$ [-1,+5]	43.84%	-0.57%	-0.62
$\overline{CAR}$ [+2,+5]	36.98%	-1.61%**	-2.21
Adjusted market model			
$\overline{CAR}$ [-1,+1]	54.79%	1.23%**	2.09
$\overline{CAR}$ [-1,+5]	47.94%	0.51%	0.68
$\overline{CAR}$ [+2,+5]	42.47%	-0.71%	-1.06

As evident from Figure 2, the returns exhibit a gradual decline after reaching their peak on the day following the announcement. This pattern suggests that as time passes by, the market starts to reevaluate the information and adjusts its expectations accordingly. This reevaluation process offers a potential explanation for the lack of significant returns observed within the seven-day window, $\overline{\text{CAR}}$[-1,+5], regardless of the model used for the predicted return measure. As evident in Appendix A, the only individual day within the event window [-1,+5] that exhibits significant returns is the fourth day following the event, showing a negative 0.69% (at the 5% level), 0.73% (at the 5% level) and 0.54% (at the 10% level), on average, for the market model, constant mean return model and the adjusted market model, respectively. Moreover, the event window [+2,+5] demonstrates significant negative returns of 1.38% (at the 10% level) and 1.61% (at the 5% level), on average, for the market model and the constant mean return model, respectively. However, the results from the adjusted market model are insignificant, with a negative 0.71% return on average. Several potential explanations can be considered to account for these findings and it is important to acknowledge that this significant decrease in stock prices could potentially be unrelated to the SEO and attributed to macroeconomic events, as the likelihood of such occurrences increases with the length of the event window and we do not have the means to control for this possibility. Nonetheless, as previously implied, it can also indicate that investors are prone to overreacting to announcements of SEOs, thereby deviating from the weak-form of market efficiency. This overreaction could be attributed to herd mentality, where investors tend to follow the decisions of other investors and are influenced by them, rather than making independent investment decisions based on their evaluation and judgement. Additionally, Daniel, Hirshleifer and Subrahmanyam (1998) propose that overreaction may occur when investors overestimate the information value of their private signals regarding the equity issue.

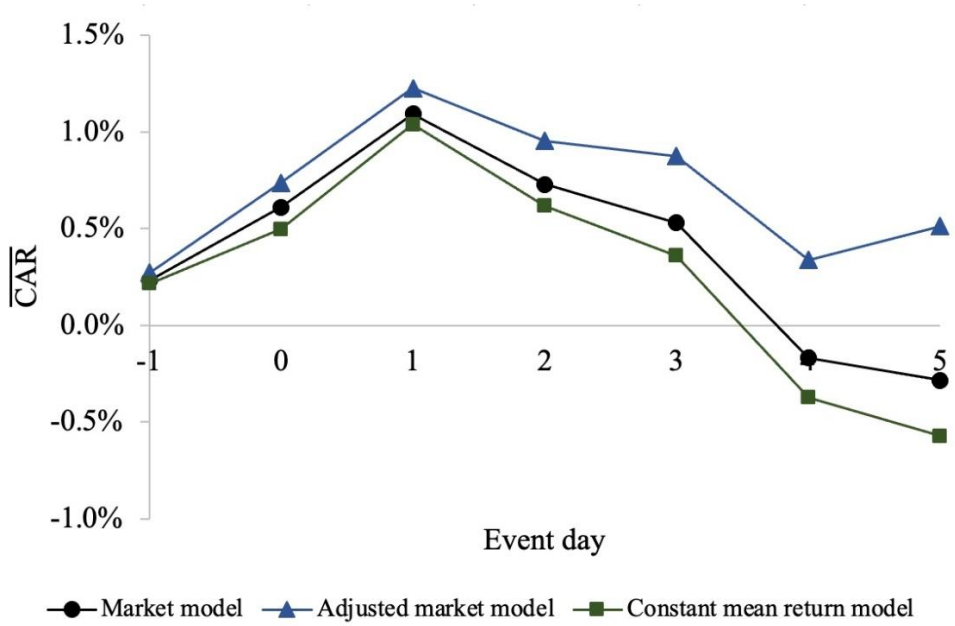

Figure 2. Cumulative abnormal returns for announcements of proposed primary SEOs

A relatively close similarity across the models underscores the robustness of our findings. However, it is important to acknowledge that the three models exhibit distinct assumptions that elucidate the marginal divergences observed in the abnormal returns. Specifically, the adjusted market model posits an intercept (α) of 0 and a beta (β) of 1, indicating that it assumes the firm's stock price exclusively mirrors the overall market movement. Essentially, this model assumes that stock prices exhibit equal volatility to that of the market, specifically the Nasdaq Stockholm 30 Index in our context. The differences in results from the market model and the adjusted market model may suggest that the firms included in our sample may not serve as an accurate representation of the overall market. Considering the relative size of our sample in relation to the overall market, it is prudent to approach the assumption of its representativeness with caution. This suggests that the firms in our sample may exhibit higher levels of risk or possess other specific characteristics that deviate from the market average. In contrast, the market model provides a higher level of flexibility in estimating beta as it incorporates not only market factors but also firm-specific characteristics and risk profiles to drive the stock's performance. This aspect highlights the market model's potential to capture, for instance, industry-specific trends and as detailed in Appendix B, our sample comprises firms from diverse industries. This may also contribute to the disparities observed between the results obtained from the market model and the adjusted model. Furthermore, the findings from the constant mean return model closely correspond with those of

the market model. The constant mean return model assumes constant expected returns for each stock over time. This is in direct contrast to the adjusted market model, as it implies that market conditions or other specific factors during the event window are not considered when estimating the predicted returns. This assumption indirectly enables the capture of firm-specific trends, potentially leading to variations in the abnormal returns compared to those observed in the adjusted market model, which completely disregards firm-specific trends.

To further enhance the robustness of our findings and validate the reliability of our results, we conduct an additional event study by utilizing the last announcement pertaining to each SEO as the event date. We hypothesize that this event should not exhibit significant abnormal returns. The findings from this study do not provide evidence to reject the Efficient Market hypothesis (EMH), as we do not observe significant abnormal returns around the event, irrespective of the length of the event window. This observation implies that the market is efficient in terms of promptly incorporating new information into stock prices.

5.2 Cross-sectional regression analysis on the announcement effect of proposed primary SEOs

We now proceed to investigate whether the frequently mentioned hypotheses can provide an explanation for the earlier documented initial rise in stock returns by performing a cross-sectional regression analysis on the three-day cumulative abnormal returns, $\overline{\text{CAR}}$[-1,+1] calculated from the market model. It is worth noting that, apart from the evident correlation between PPRESS and RSIZE, the highest correlation coefficient among the explanatory variables is found to be less than 17%, indicating a low to moderate correlation. To assess the distinction between the effects of the variable PPRESS and RSIZE, we include Model 6, which excludes the variable PPRESS but includes RSIZE, and Model 7, which excludes the variable RSIZE but includes the variable PPRESS. To address the presence of conditional heteroscedasticity, we employ robust standard errors in the regression analysis. Furthermore, normal probability plots of the residuals of the models reveal that the residuals follow a normal distribution. To test the robustness of the results against variations in model specification, we perform a Ramsey RESET test of the cross-sectional regression model defined in equation 7. The outcomes of this test provide no evidence of omitted variable bias in the regression model, thereby suggesting that the functional form of the model is correctly specified ($p = 0.67$). We further conduct a sensitivity analysis by incorporating the type

of offering as dummy variables: Directed offering to pay for an acquisition, directed offering to institutional investors, and the reference variable, rights offering. While the significance and magnitude of certain coefficients change slightly, the overall results and conclusions remain unchanged. Moreover, the additional variables do not demonstrate a significant impact.

The findings, presented in Table 4, suggest that certain explanatory variables used to predict the market reaction to stock offering announcements possess limited discriminatory power. Nevertheless, our cross sectional regression model presented in equation 7 exhibits an R-squared value of 16% and is significant at the 1% level, as seen in Model 8. Among the variables examined, two variables, namely FREQ and D/A, demonstrate statistical significance at the 5% level.

Table 4. Results from a cross-sectional regression from the market model
The table shows the results of the cross-sectional regression model of $\overline{CAR}[-1,+1]$. RSIZE quantifies the proceeds of each issue in Swedish Krona (SEK) divided by the market value of the common stock at the year-end prior to the offering announcement. FREQ is a dummy variable that takes a value of one if the issuer conducted an SEO at least once in the two years prior to the event, and zero otherwise. M/B signifies the year-end market-to-book ratio prior to the offering announcement. PPRESS is the number of shares offered divided by the total number of shares outstanding before the offering. Lastly, D/A is the debt-to-asset ratio calculated from the latest annual financial statement prior to the offering. The t-statistics are presented within the parentheses. One asterisk (*) denotes significance at the 10% level, two asterisks (**) denote significance at the 5% level, and three asterisks (***) denote significance at the 1% level.

Explanatory variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	0.02*	0.0003	0.02**	0.02**	0.01*	0.02	0.02*	0.02*
	(1.99)	(0.04)	(2.26)	(2.34)	(1.99)	(1.55)	(1.82)	(1.85)
RSIZE	-0.06					-0.06		-0.01
	(-0.82)					(-0.81)		(-0.09)
FREQ		0.03**				0.03**	0.03**	0.03**
		(2.57)				(2.11)	(2.09)	(2.05)
M/B			-0.002			-0.002	-0.002	-0.002
			(-1.29)			(-1.48)	(-1.65)	(-1.65)
PPRESS				-0.05			-0.05	-0.05
				(-1.28)			(-1.25)	(-0.71)
D/A					-0.002***	-0.002**	-0.002***	-0.002***
					(-2.81)	(-2.30)	(-2.72)	(-2.72)
R-squared	0.02	0.08	0.03	0.04	0.01	0.14	0.16	0.16
Adjusted R-squared	0.01	0.07	0.02	0.02	0.0001	0.09	0.11	0.09
F-value	0.67	6.66	1.67	1.63	7.92	4.12	4.94	4.05
	(p = 0.4153)	(p = 0.0122)	(p = 0.1999)	(p = 0.2057)	(p = 0.0001)	(p = 0.0048)	(p = 0.0015)	(p = 0.0029)

The results reveal a significant negative relationship between the debt-to-assets ratio (D/A) and abnormal returns. In a univariate analysis, the magnitude of the D/A coefficient remains consistent with that of Models 6, 7, and 8, providing robust support for our findings. As predicted, this result is consistent with the Wealth Transfer hypothesis, as it reflects the redistribution of wealth from shareholders brought about by the equity issue. This suggests that when companies with a high D/A ratio issue equity, bondholders benefit at the expense of shareholders. This finding offers a plausible explanation for the observed heterogeneity in the results, wherein 43.8% of observations exhibit negative abnormal returns during the event window.

The abnormal returns demonstrate a significant positive relationship (at the 5% level) with the frequency of offerings. These results indicate that frequent issuers experience a more pronounced reaction to announcements of equity offerings, compared to firms that have not issued equity recently, which differs from prior studies conducted by Asquith and Mullins (1986), Masulis and Korwar (1986), and McDaniel, Madura and Akhigbe (1994), where the Unanticipated Announcement hypothesis is not rejected. Conversely, this finding aligns with the research conducted by Akhigbe and Harikumar (1996), who propose that this observation may indicate that the market perceives frequent issuers as having a favorable reputation for acting in the best interest of new shareholders. This proposition provides a potential explanation for the observed positive correlation. However, when we switch the dummy reference group, the abnormal returns demonstrate a significant negative relationship (at the 5% level) with firms that have not issued equity two years prior to the announcement of SEO, suggesting that unanticipated issues cause a more pronounced negative stock market reaction than the foreseeable ones, thereby providing support for the Unanticipated Announcement hypothesis. It is evident that further investigation is warranted to thoroughly examine the relevance of the explanatory variable employed to test this hypothesis. Akhigbe and Harikumar‘s (1996) proposition implies that the variable FREQ can serve as a suitable proxy for the Agency Costs of Free Cash Flow hypothesis; however, it is crucial to approach the interpretation of this relationship with caution, as we acknowledge that it may be overly general and speculative. One potential avenue for further exploration would be to simulate the approach proposed by Kabir and Roosenboom (2003) and conduct a cross-sectional regression analysis of excess operating performance measures, incorporating our chosen proxy explanatory variables. This would allow for a more comprehensive examination of the variables‘ relevance within the specific context of our study. Despite employing the established proxy for the Agency

Costs of Free Cash Flow hypothesis, namely the market-to-book ratio (M/B), our findings do not provide support for the hypothesis of Agency Costs of Free Cash Flow. Specifically, we do not observe a significant relationship between abnormal returns and M/B. This suggests that the Swedish market's reaction to SEO announcements is not influenced by the firm's potential growth opportunities or the expected profitability of future investments.

The absence of a significant correlation between abnormal returns and the variable RSIZE implies a lack of support for the Signaling hypothesis. Consequently, it can be inferred that the Swedish stock market does not perceive SEO announcements as neither a negative nor positive signal, in contrast to the perception of SEOs in the US stock market.[15] Furthermore, our findings diverge from those of Gajewski and Ginglinger (2002), who find that the French market perceives SEOs as a negative signal, and Kabir and Roosenboom (2003), who report similar findings in the Dutch stock market. Additionally, Tsangarakis (1996a) finds that the Greek stock market perceives SEOs as a positive signal and Bøhren, Eckbo and Michalsen (1997) find analogous results in their study on the Norwegian stock market. These findings suggest the presence of information asymmetry in the US, French, Greek, Dutch, and Norwegian stock markets. In contrast, our findings indicate that investors in the Swedish stock market are not subject to the same extent of information asymmetry, as no concrete evidence supporting the Signaling hypothesis or the Unanticipated Announcement hypothesis is found. This may be attributed to potential institutional differences between the Swedish market and others, warranting further investigation. It is worth noting that Model 7, which excludes the variable RSIZE, exhibits a slightly higher adjusted R-squared compared to Model 8. This observation implies that the variable RSIZE does not make a substantial contribution to explaining the abnormal returns, further reinforcing our conclusion that there is no evidence of information asymmetry in the Swedish stock market.

Even though the variable PPRESS exhibits a negative coefficient, it is insignificant. This result aligns with those of Akhigbe and Harikumar (1996) in that larger equity issues do not necessarily result in an immediate decline in stock prices, contrary to what the Price Pressure hypothesis suggests.[16] This finding implies that within the Swedish stock market, there are close

[15] The findings of Asquith and Mullins (1986), Masulis and Korwar (1986), Akhigbe and Harikumar (1996), and Kolodny and Suhler (1985) all support the Signaling hypothesis in the context of announcements of SEOs on US stock markets.

[16] Our results also align with those of Chang and Ke (2014) and Warther (1995) in that larger equity issues do not necessarily lead to immediate decline in stock prices.

substitutes, and the demand curve exhibits a high degree of elasticity. Consequently, this indicates that an increase in the supply of shares alone does not result in a significant decrease in the stock price.

To ensure the robustness of our findings, we extend our analysis to include cross-sectional regressions with the three-day cumulative abnormal returns from the constant mean return model and the adjusted market model, respectively, as the dependent variables. The results obtained from employing the three-day cumulative abnormal returns from the constant mean return model as the dependent variable are consistent with those obtained from the market model, as illustrated in Table 5. This reinforces the reliability of our findings derived from the cross-sectional regression analysis using the market model's result as the dependent variable. The similarity in results between the two models is expected, given the nearly identical outcomes observed from the event study.

Table 5. Results from a cross-sectional regression from the constant mean return model
The table shows the results of the cross-sectional regression model of $\overline{CAR}$[-1,+1]. RSIZE quantifies the proceeds of each issue in Swedish Krona (SEK) divided by the market value of the common stock at the year-end prior to the offering announcement. FREQ is a dummy variable that takes a value of one if the issuer conducted an SEO at least once in the two years prior to the event, and zero otherwise. M/B signifies the year-end market-to-book ratio prior to the offering announcement. PPRESS is the number of shares offered divided by the total number of shares outstanding before the offering. Lastly, D/A is the debt-to-asset ratio calculated from the latest annual financial statement prior to the offering. The t-statistics are presented within the parentheses. One asterisk (*) denotes significance at the 10% level, two asterisks (**) denote significance at the 5% level, and three asterisks (***) denote significance at the 1% level.

Explanatory variable	Model 6	Model 7	Model 8
Intercept	0.02*	0.02*	0.03**
	(1.68)	(1.93)	(2.00)
RSIZE	-0.07		-0.02
	(-0.96)		(-0.16)
FREQ	0.02*	0.03*	0.02*
	(1.79)	(1.77)	(1.72)
M/B	-0.002	-0.003	-0.003
	(-1.44)	(1.61)	(1.61)
PPRESS		-0.06	-0.05
		(-1.39)	(-0.76)
D/A	-0.002**	-0.002***	-0.002***
	(-2.58)	(-3.13)	(-3.13)
R-squared	0.13	0.15	0.15
Adjusted R-squared	0.08	0.10	0.09
F-value	3.99	5.17	4.34
	(p = 0.0059)	(p = 0.0011)	(p = 0.0018)

The results show some discrepancies when comparing the findings of the regression analysis using the adjusted market model's $\overline{CAR}$ with those derived from employing the market model's $\overline{CAR}$. As depicted in Table 6, the findings convey a sense of resemblance, in terms of the lack of supporting evidence for the Signaling hypothesis, the Price Pressure hypothesis, and the Unanticipated Announcement hypothesis. Additionally, the models present supporting evidence for the Wealth Transfer hypothesis when employing the adjusted market model's $\overline{CAR}$. A notable distinction lies in the discovery of a significant negative correlation (at the 10% level) between the

market-to-book ratio and abnormal returns in Model 7 and Model 8. This implies that firms with greater potential for positive future investment elicit less favorable market reactions to SEO announcements, thereby contradicting the Agency Costs of Free Cash Flow hypothesis. The disparity in findings is further highlighted by the notably lower adjusted R-squared values observed when employing the $\overline{\text{CAR}}$ from the adjusted market model suggesting the potential presence of omitted variable bias and inadequate model specification. Therefore, it becomes evident that the incorporation of additional firm-specific variables is imperative to achieve a more comprehensive understanding of how specific firm characteristics influence abnormal returns when utilizing the cumulative abnormal returns from the adjusted market model. This highlights the limitations of the model in effectively capturing the complexity of the relationship between firm characteristics and abnormal returns. In contrast, the market model, which allows for the consideration of firm-specific factors in abnormal returns, may offer a more accurate portrayal of the relationship between the market-to-book (M/B) and abnormal returns, thus yielding more reliable results regarding their association. Nevertheless, there is a potential value in enhancing the analysis by incorporating alternative proxies to better capture the nuances of the Agency Costs of Free Cash Flow hypothesis. Examining additional proxies could provide valuable insights into the robustness and generalizability of our findings. A potential avenue for further exploration could involve adopting an approach similar to that of Mann and Sicherman (1991), who examine the market's reaction to SEO announcements by contrasting firms with a history of favorable acquisition against those without such a track record. Additionally, it could be valuable to adopt the approach suggested by Jensen and Meckling (1976) and investigate the changes in managers‘ shareholding. They propose that the conflict of interest between managers and shareholders can be minimized if managers possess shares in the company. Consequently, as the number of outstanding shares increases and gradually dilutes the percentage of managers‘ shareholding, negative changes in the stock price are expected to occur unless managers subscribe for shares (Jensen & Meckling, 1976).

Table 6. Results from a cross-sectional regression from the adjusted market model
The table shows the results of the cross-sectional regression model of $\overline{CAR}$[-1,+1]. RSIZE quantifies the proceeds of each issue in Swedish Krona (SEK) divided by the market value of the common stock at the year-end prior to the offering announcement. FREQ is a dummy variable that takes a value of one if the issuer conducted an SEO at least once in the two years prior to the event, and zero otherwise. M/B signifies the year-end market-to-book ratio prior to the offering announcement. PPRESS is the number of shares offered divided by the total number of shares outstanding before the offering. Lastly, D/A is the debt-to-asset ratio calculated from the latest annual financial statement prior to the offering. The t-statistics are presented within the parentheses. One asterisk (*) denotes significance at the 10% level, two asterisks (**) denote significance at the 5% level, and three asterisks (***) denote significance at the 1% level.

Explanatory variable	Model 6	Model 7	Model 8
Intercept	0.02*	0.03**	0.03**
	(1.87)	(2.26)	(2.21)
RSIZE	-0.04		0.006
	(-0.53)		(0.06)
FREQ	0.01	0.014	0.01
	(1.19)	(1.13)	(1.13)
M/B	-0.002	-0.003*	-0.003*
	(-1.52)	(-1.69)	(-1.68)
PPRESS		-0.04	-0.04
		(-1.02)	(-0.64)
D/A	-0.002**	-0.002***	-0.002***
	(-2.63)	(-3.14)	(-3.12)
R-squared	0.09	0.11	0.11
Adjusted R-squared	0.04	0.06	0.04
F-value	3.11	4.15	3.34
	(p = 0.0207)	(p = 0.0046)	(p = 0.0094)

6. Conclusion

Our findings reveal a positive market reaction to announcements of equity offerings. Specifically, we observe a significant positive three-day cumulative abnormal return of 1.09%, on average, surrounding the announcement day when using the market model. We find evidence suggesting that investors tend to overreact to the initial announcement of SEOs, as indicated by a gradual decline in abnormal returns observed after the first day following the announcement. Our results do not support the validity of the Signaling hypothesis, the Price Pressure hypothesis, or the Agency Costs of Free Cash Flow hypothesis in explaining the observed market reaction. Furthermore, we find indecisive evidence on the Unanticipated Announcement hypothesis, emphasizing the necessity for further investigation. However, we do find supportive evidence for the Wealth Transfer hypothesis, indicating wealth transfer from shareholders resulting from the announcement of SEOs. To gain a more comprehensive understanding of the effect of the Wealth Transfer hypothesis and enhance its validity, it could be valuable to extend our analysis to include the Swedish bond market's reaction to SEOs. In this context, research conducted on the US stock and bond market by Elliot, Prevost and Rao (2009) and Botta and Colomba (2019) can serve as useful references.

Our observations give rise to the inquiry of the underlying factors that may contribute to the positive market response to SEO announcements on the Swedish stock market. The disparity in findings regarding the reaction of European markets to announcements of SEOs further offers an opportune avenue for examining the factors that drive the observed heterogeneous market reactions. It is imperative to recognize that despite Nasdaq having a unified rulebook for all issuers in the Nordic markets (Nasdaq 2023c), it is not necessarily indicative of identical investor behavior, market structure, or industry composition. This is evident from the disparity between our findings and those of Bøhren, Eckbo & Michalsen (1997) who conduct a study on the Norwegian market. It would be informative to extend our investigation to other Nordic markets in order to assess the presence of a corresponding positive market reaction to SEO announcements and to examine whether these markets also exhibit a similar trend of directed issues for equity offerings, as observed in the Swedish market.

Our study is subject to certain limitations that should be acknowledged. Firstly, we rely on daily closing prices, which may not occur simultaneously, potentially introducing nonsynchronous

trading biases. Furthermore, previous studies conducted on the US stock market have highlighted the significance of firm type influencing market reactions to SEO announcements. To enhance the comprehensiveness of our analysis, it would be beneficial to conduct a comparative investigation of market reactions specifically between utility and non-utility firms. Such an examination could provide valuable insights into potential divergences in market responses based on firm characteristics.

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Appendices

Appendix A: Abnormal returns from the announcements of proposed primary SEOs

This table shows the abnormal returns calculated derived from the market model, adjusted market model, and the constant mean return model. The t-statistics are presented within the parentheses. One asterisk (*) denotes significance at the 10% level and two asterisks (**) denote significance at the 5% level.

Event day	Fraction of positive stock returns (%)	$\overline{AR}$	t-statistic
	Market model		
-1	55%	0.23%	0.76
0	51%	0.38%	1.03
1	50%	0.49%	1.37
2	33%	-0.37%	-1.08
3	41%	-0.19%	-0.56
4	34%	-0.69%**	-2.14
5	45%	-0.11%	-0.44
	Constant mean return model		
-1	50.68%	0.22%	0.7
0	47.94%	0.28%	0.76
1	54.79%	0.54%	1.52
2	31.51%	-0.42%	-1.24
3	39.73%	-0.26%	-0.72
4	31.51%	-0.73%**	-2.22
5	38.36%	-0.20%	-0.81
	Adjusted market model		
-1	58.90%	0.27%	0.84
0	56.16%	0.47%	1.21
1	50.69%	0.49%	1.38
2	38.36%	-0.27%	-0.79
3	42.47%	-0.08%	-0.22
4	39.73%	-0.54%*	-1.71
5	50.69%	0.18%	0.64

Appendix B: Sample firms' industries
This table shows the industries of the firms in our sample

Industry	Number of sample firms
Aerospace and Defense	1
Alternative Carriers	1
Apperal Retail	1
Application Software	3
Asset Management and Custody Banks	2
Automotive Retail	1
Biotechnology	15
Building Products	1
Construction and Engineering	4
Electrical Components and Equipment	3
Electronic Equipment and Instruments	2
Health Care	8
Home Improvement Retail	1
Industrial Conglomerates	3
Industrial Machinery and Supplies and Components	1
Interactive Home Entertainment	2
Interactive Media and Services	2
IT Consulting and Other Services	4
Life Sciences Tools and Services	3
Paper and Plastic Packaging Products and Materials	1
Pharmaceuticals	2
Real Estate Operating Companies	8
Security and Alarm Services	1
Semiconductors	1
Systems Software	1
Technology Hardware, Storage and Peripherals	1
Total	73