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Competitive Effects of Intra-Industry Public Equity Offerings on Stock Repurchases and Bond Issuance Decisions of Rival Firms: Empirical evidence from the Nordic Region.

by

Candidate No: 204166

Supervisor: Professor Tore Leite

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EXECUTIVE SUMMARY

There are numerous studies that demonstrate the tendency for rival firms to repurchase their stocks in response to the competitive threat of intra-industry initial public equity offerings (IPOs) and/or seasoned equity offerings (SEOs). However, these research works are characterized by empirical limitations because they had mostly been undertaken using the United States data. Additionally, even though the repurchase of stocks implies the adjustment of a firms' leverage, no existing theory of debt has considered the possibility that firms would issue debt securities reactively, in response to the competitive threat of intra-industry public equity offerings (PEOs) and probably in the absence of a profitable investment opportunity in the imminent future.

Considering the challenges and opportunities identified above, my research questions and goals would emanate from the empirical limitations of the prevailing theories on the application of stock repurchases as a strategic response to intra-industry PEOs; the implicit assumptions of the extant theories of debt, which specifies that debt securities are always issued proactively; and the research opportunities made available by the Nordic region. The mix of these empirical limitations, implicit assumption and Nordic research opportunity unequivocally mandates that a further evaluation of this subject of research be implemented. I seek to do so and contribute to the literature on the strategic choices that firms adopt in response to IPOs and SEOs along the aforementioned dimensions, which are further elaborated upon in this essay.

In order to execute this study, I utilized relevant securities and accounting data for publicly listed Nordic firms for the period ranging from 1990 to 2021. The data applied originated from highly reliable and reputable sources including Wharton data research services, Thompson Reuters DataStream and other credible websites. Methodologically, I applied the Tobit, Probit and multiple linear regression models where appropriate for the implementation of data analysis. The models were developed to include independent variables that have been established to be determinants of stock repurchases and bond issuances behaviors of firms as the case may be from other related preceding economic studies.

The results of the data analysis suggest that for firms in the Nordic region, intra-industry PEOs possess a weak effect on stock repurchase behavior of rival firms, but on the other hand intra-industry PEOs have a strong impact on the willingness of rival firms to issue bonds. The results of the extended study, in which I decomposed the combined effects of PEOs into those of IPOs

and SEOs, demonstrated that IPOs executed within an industry do not have a causative effect on neither stock repurchase decisions nor bond issuance decisions for rival publicly-listed Nordic firms. However, I observed that intra-industry SEOs have a causative effect on rival firms' stock repurchase behavior. Moreover, it was observable that the number of intra-industry seasoned equity offerings (SEON) had a deterministic impact on the probability of rival firms' bond issuance decisions.

These findings are valid under alternative specifications, including incorporation of interaction terms, between the main dependent variables on one hand and industry concentration and historical returns on the other hand, as well as when controlling for extraordinary economic periods. Finally, I deliberated elaborately in the discussion section on the factors that could potentially account for firms' preference for stock repurchases over bond issuances and/or vice versa and their greater sensitivity to SEOs over IPOs in the Nordic region.

1.0 INTRODUCTION

A number of strategic financial events can transform the competitive landscape and dynamics of an industry. The most significant of such events include but are not limited to initial public offerings (IPOs), seasoned public offerings (SEOs), mergers and acquisitions, leveraged buyouts (LBOs) and divestitures. In this write-up, my primary focus is on initial public offerings (IPOs) and seasoned equity offerings (SEOs) and I would denote the combination of initial public offerings (IPOs) and seasoned equity offerings (SEOs) as public equity offerings (PEOs). I would argue that PEOs are distinctive in the category of events capable of metamorphosizing the realities of an industry because it results in the significant expansion of the financial capabilities of a firm and therefore possess the capacity for consolidating the firms' strategic position in its product markets and transforming its valuation in financial markets. In this essay, the terms; PEOs and public equity offerings; IPOs and initial public offerings; as well as SEOs and seasoned equity offerings shall be respectively used interchangeably.

In recognition of the possible primacy of IPOs and SEOs among the league of strategic financial events that have transformative tendencies on industry competition, numerous researchers have devoted an appreciable level of efforts to study both categories of public equity offerings (PEOs) as a likely origin of competitive threat within an industry. Prior research has demonstrated that IPOs and SEOs may constitute a source of competitive threat for rival firms in the same industry. Hsu, Reed, and Rocholl (2010) observed that rival firms experience negative stock price in response to the completion of an IPO in their industries, amounting to an average loss of -$3.27 million for an incumbent firm around the time of the IPO event. Analogously, research undertaken by Slovin, Sushka, and Ferraro (1995) as well as Akhibe, Borde, and Whyte (2003) also demonstrates the negative impact of IPOs on industry rivals. Virtanen (2016) established that SEO pronouncements culminate in contagion as rival firms, on the average, encounter substantially negative revisions on their stock prices. He further posited that peer-valuation consequences are on the average substantially more unfavorable for primary offerings of SEOs than it is for secondary offerings of SEOs.

In the face of a competitive threat resulting from IPOs and SEOs, firms are at liberty to respond in distinctive ways subject to their dynamic capabilities and managerial flexibility. In the next section, I will review relevant theories and hypothesis in addition to presenting evidence to demonstrate that firms can respond to PEOs in a number of ways including; regulating their

conduct towards competition for market share; manipulating their strategic financial reporting; embarking on aggressive earnings management; initiating or accelerating their IPO and SEO plans and finally by repurchasing their shares.

In this project, my goal is to extend the study on the application of stock repurchases as a strategic response to IPOs and/or SEOs of rival firms along a number of dimensions. Firstly, I intend to examine the effect of PEOs (or the combined effect of IPOs and SEOs) on the stock repurchasing behavior of rival firms, thereby contributing empirically to prior related studies by using recent and extensive data about publicly listed Nordic companies. Combining IPOs and SEOs into PEOs is plausible for the reason that both types of offerings have substantial similarities. Shares offered by IPOs and/or SEOs are executed to generate funds and furnish individual liquidity to initial investors and insiders (Woolley,2022). Additionally, equity stocks sold either by way of IPOs or SEOs are frequently discounted or underpriced (Cline, Fu, Tang and Wiley, 2012).

Secondly, I would examine the possibility that rival firms issue bonds rather than repurchase equity in response to competitive threats resulting from PEOs of competing firms within the same industry, thereby contributing theoretically to this growing body of knowledge. This secondary investigation emanates from the understanding that both stock repurchases and debt issuances can increase the leverage ratio of a firm, however either strategic financial action spells distinct results for shareholders and for the firm because of market imperfections such as taxes and costs of financial distress (Modigliani and Miller, 1958,1963). The outcome of stock repurchases may not necessarily carryover to debt issuances. Therefore, I intend to examine whether debt issuances have been used as a strategic response to the competitive threats posed by aggregate PEOs. In this study, I would proxy for debt capital using bonds.

Finally, I will extend this study in section seven of this article by decomposing the effects of PEOs into IPOs and SEOs and examining the individual impacts of IPOs and SEOs on both stocks repurchase behavior and bond issuance tendencies of rival firms. While there are similarities between IPOs and SEOs, justifying its combination into PEOs, decomposing PEOs into IPOs and SEOs is also important because of the plethora of differences between the two offerings. Woolley (2022) accounted for the differences between IPOs and SEOs, including the following. IPOs are undertaken only once in the history of a firm and is a more crucial strategic financing event in the life of a firm than SEOs, which are undertaken on numerous occasions subsequent to the company going public. Moreover, given the fact that the firm has

been previously public prior to undertaking an SEO, more extensive information regarding the risks and prospects of company has already become public knowledge, making room for a less extensive marketing timespan than what can be required in IPOs (Woolley,2022), and reducing the risks of underpricing.

The rest of this project is structured as follows. Section two presents a review of extant theories and hypothesis on the usage of equity and/or debt in the capital and an overview of the unique features as well as the research opportunity provided by Nordic markets. Section three furnishes descriptions of sample data and variables. Section four provides a summary of useful statistics. Section five presents results of univariate tests. Section six depicts the results of regressions and robustness checks. In section seven, I extended the research by decomposing the analysis of the effects of PEOs into IPOs and SEOs and examining the individual impacts of IPOs and SEOs on stock repurchase behavior of rival firms. Section eight presents a discussion of the significance of the results and Section nine provides a brief conclusion. Finally, a list of all referenced materials and theories are presented in section ten while other supplementary materials are presented in the appendices section, comprising section eleven.

2.0 REVIEW OF APPLICABLE THEORIES AND HYPOTHESES

Intra-industry IPOs and SEOs have competitive repercussions for rival firms both in the asset market space and the product market landscape. Hsu, Reed, and Rocholl (2010) observed that stock prices of rival firms respond unfavorably to completed IPOs in their industries, amounting to an average loss of -$3.27 million for existing firms about the timespan of an IPO occurrence. In line with this logic, research by Slovin, Sushka, and Ferraro (1995) disclosed that rival firms endure a negative capital adequacy ratio (CAR) of -0.93% in the course of the two-day duration of an IPO declaration in a similar industry. Virtanen (2016) established that SEO pronouncements culminate in contagion as rival firms, on the average, encounter substantially negative revisions on their stock prices. He further posited that peer-valuation consequences are on the average substantially more unfavorable for primary offerings of SEOs than it is for secondary offerings of SEOs. So overall, IPOs and SEOs within the same industry can have substantial consequences for the performance of competing firms

2.1 Theories and Hypothesis of Strategic Responses to the Threat of IPOs & SEOs

Having established the fact that intra-industry IPOs and SEOs have consequences for the behavior, performance of the securities, and operations of rival firms, a logical next step is to understand the strategic decisions firms adopt and implement in response to the competitive threats of IPOs and SEOs.

In response to the fallouts of intra-industry public equity offerings (PEOs), rival firms undertake appropriate actions to adjust their competitive positions in their product markets. Following the effects of intra-industry IPOs, Spiegel & Tookes (2016) demonstrated that firms react by decreasing their expenditures on customer acquisition in accordance with the impact of an IPO on the valuation it places on a customer or unit of market share. For example, if prior to an IPO, a single unit of market share was valued at ten dollars, firms will respond to competition by expending up to ten dollars for acquiring a customer in a bid to capture more market shares. If subsequent to the IPO, the value of the same unit of market share plummets to eight dollars, firms will respond by diminishing expenditures for the acquisition of customers accordingly (Spiegel and Tookes, 2016). Intra-industry SEOs can compel rivals to enhance their competitive positions. Wei (2021) demonstrated that the yearly growth in sales, assets and capital expenditures of rivals usually exhibit growth rates that are consistent with those of the yearly SEO activity levels of their industries in the longer-term. Notwithstanding

the conclusions reached in these theories, one shortcoming is that changing competitive behavior can be induced by broad macroeconomic factors that contemporaneously affect all firms in an industry and whose occurrences correlates with post IPO periods. Billett, Ma, and Yu (2021) noted that many peers going public during the peak of an IPO wave might subsequently correlate with a decline in incumbents' earnings performance due to diminishing growth opportunities post industry peak. Overall, even when we consider the impact of macroeconomic factors on firm performance and its correlation with business cycles, the findings by Spiegel and Tookes (2016) and Wei (2021) suggests the presence of a relationship between the impact of PEOs and firm behavior in their product markets.

Intra-industry IPOs and SEOs may compel rival firms to manipulate their strategic financial reporting and embark on aggressive earnings management. Billett, Ma, and Yu (2021) observed that incumbent firms manage their earnings downwards, issue more negative management forecasts, and use a more negative disclosure tone when industry peers file for an IPO. They further posited that firms initiate this response in order to mitigate the threat associated with rival firm's initial public offering (IPO), which usually creates negative externalities for industry competitors. They also observed that as a result of these tendencies, IPO firms obtain lower offer prices, raise less capital, and are more likely to pull out from the offering. Additionally, IPO firms invest less, hoard more cash, and experience lower profitability post IPO, while incumbents experience higher profitability and market share growth. From other research works, it can be understood that, given that firms considering SEOs in the subsequent year do manage their earnings specifically when they exhibit relatively poor performances at least as observed among korean firms (Yoon & Miller, 2002) and the fact that choices for the issuance of equity for financially constrained firms are dependent on recent SEO events of peers (Billett, Garfinkel & Jiang, 2017), it may seem sufficiently plausible to conclude that firms may embark on earnings management in response to SEOs events of competing firms. In a nutshell, the findings, enumerated in this paragraph, underscore the possibility of the existence of a favorable relationship between intra-industry PEOs and earnings management.

Intra-industry IPOs and SEOs may induce rival firms to initiate or accelerate their SEO and IPO plans and quickly go public following their peer in a bid to maintain their competitive position. Aghamolla and Thakor (2020) provide evidence to demonstrate that generally the IPO decisions of a firm's direct competitors significantly shapes firm's IPO propensity and this is specifically the case for firms which are in level competition to originate innovations

and such firms seek to undertake an IPO shortly after their competitor in order to maintain their competitive position. Analogously, Billett, Garfinkel and Jiang (2017) found that equity issuance choices of financially constrained firms are dependent on recent SEO events of peers. They further posited that financially constrained firms respond favorably to peer SEO pronouncements, and that coverage by analysts and ownership by institutions of constrained firms grows in the aftermath of SEOs of peer firms. Additionally, numerous researchers including, Ritter (1984), Lowry and Schwert (2002) as well as Benveniste, Wilhelm, and Yu (2003) have shown that IPOs often cluster in time and industry. In the final analysis, the rapid succession of IPOs and SEOs as has been observed by researchers, in addition to the clustering of IPOs across time and industry provides evidence in support of the execution of PEOs in reaction to PEOs by competing firms.

There are frequent occurrences of an overvaluation of SEOs and IPOs across time, industries and countries. Shu & Chiang (2014) observed that on the average there is an upward overvaluation of stocks to the magnitude of 11.31% in an SEO. Spiess and Affleck-Graves (1995) found that firms implementing SEOs in the course of the period ranging from 1975 to 1989 substantially fared worse than a specimen of parallel similarly-sized firms from a similar industry that disembarked from issuing equity, suggesting that firm managers exploit overvaluation of securities prevelant in both the markets for IPOs and SEOs. Ritter and Welch (2002) observed that IPOs are overpriced on the first day of trading subsequent to an IPO and the associated stocks accomplish poorly in the long-run. They noted that over a period of three years, the average IPO underachieved market benchmarks by 23.4 percent and underperformed organizations that were matched on the premise of book-to-market ratios as well as size by 5.1 percent. Purnanandam and Swaminathan (2004) depicted that IPOs were issued at an overvaluation range of approximately 14% to 50% in comparison to the market value of their industry peers. They argued that the overvaluation is caused by IPO investors placing too much emphasis on optimistic growth forecasts and too little on current profitability in their valuation of firms for the purpose of executing an IPO. Nguyen, Sutton, and Pham (2014) argued that given the common incidence of disproportionately favorable market sentimentality to IPOs as well as the associated negative market interpretations in relation to the diminished competitive positions of rival firms, competing firm managers are prone to believe that the unfavorable impacts on the price of their stock is not justified and as a consequence these competing firms may embark on stock repurchases to signal the imminent prospects and quality of the firm and to potentially correct the overreaction of the financial

market to the unfavorable news. Overall, the findings by several authors mentioned in this paragraph and the conclusions drawn by Nguyen, Sutton, and Pham (2014) seems to lend substantial credence to the postulation that the overvaluation of intra-industry SEOs and IPOs and the negative impact on competing firms (non-issuing entities) may induce them to repurchase their shares in order to enhance its value.

In addition to overvaluation, broader characteristics and competitive effects of intra-industry SEOs and IPOs may induce rival firms to repurchase their stocks. Pham, Nguyen, Adhikari, and Pham (2020) demonstrated that announcements of stock repurchases that were anteceded by SEOs of rival firms within an identical industry in the previous six months were more likely the consequences of deficient investment chances than indicating undervaluation, particularly in industries with substantial degree of concentration. Nguyen, Sutton, and Pham (2014) demonstrated that rival firms increase their stock repurchases given the existence of imminent competitive threat from IPOs. In particular, they implemented Tobit and Probit models, which generated evidence that a rival firm increases its share repurchase volume by around 15% and 11.1% respectively on the average, when confronted by the competitive effects of IPOs in the same industry. They further asserted that this finding was more established in situations in which firms have recent poor stock performance and/or have a presence in a concentrated industry, culminating in an additional increase in the volume of their stock repurchase by about 29.2% or an increase in the probability of equity repurchases by about 37.1%. I would argue that the tendency to repurchase own stock, and more so when a firm lacks profitable growth opportunities, in close proximity to intra-industry PEOs is likely executed to maintain a similar level of valuation as rivals and ensure a competitive ability in raising capital when desirable in financial markets. Therefore, one can deduce that general competitive effects of PEOs can be a determining factor in firm's stock repurchasing activities.

2.2 Theories and Hypothesis of The Driving Forces of Stock Repurchases

In the previous paragraphs, we could observe that firms have an incentive to repurchase their stocks in response to overvaluation of PEOs and the competitive threats of IPOs and SEOs. Nevertheless, firms do exhibit a stock repurchasing behavior in a bid to achieve a number of other objectives. In this section, I will attempt to delineate a more comprehensive description of the most significant driving forces and important theories that may account for firms' tendency to initiate stock repurchasing programs.

To begin with, firms may repurchase their stocks in order to return excess cash to shareholders with an ultimate goal of enhancing the value of the firm. This motivation is referred to as the free cash flow hypothesis. Theoretical research supports the fact that substantial benefits can accrue to a firm that seeks to reduce its excess cash by repurchasing its stocks. Jensen (1986) posited that a firm with excess cash but limited investment opportunities may seek to mitigate the agency costs of free cashflows by disgorging excess cash to the shareholders of the firm. Moreover, both the financial markets and the management of firms share a consensus belief that excess cash can be detrimental to value creation in a firm. Grullon and Michaely (2004) demonstrated that financial markets respond more favorably to repurchase announcements for those firms that have a greater propensity to overinvest in line with the prediction of the free cash flow hypothesis. Stephen and Weisbach (1998) as well as Dittmar (2000) demonstrate that the stock-repurchase behavior of a firm is positively correlated to the cashflows of the firm. Notwithstanding the advantages associated with returning excess cash to the shareholders of the firm, it is also arguable and worth mentioning that a firm stands to achieve an even higher value by maintaining excess cash within the firm as long as it has a responsible management. This is because such a firm would be more financially and strategically flexible, would have a greater financial preparedness to exploit emerging opportunities such as acquisitions and would have a greater capacity to respond to economic shocks that can arise from unforeseen events in the macroenvironment.

Secondly, stock repurchases may be used to signal the future prospects and earnings potential of the firm**.** This motivation for stock repurchases can be referred to as the signaling hypothesis. According to Nguyen, Sutton, and Pham (2014), in a situation in which managers have positive information about their firms' future profitability that is not readily accessible to the public, the stock prices of their firms might not reflect its true value and may be undervalued. Under these circumstances, the firm's managers have an incentive to send a credible signal of their optimism about the firms' future earnings prospects by paying out cash through a dividend or embarking on a stock repurchase program (Vermaelen. 1981; Miller and Rock, 1985).

In the third instance, firms may repurchase their stock to intentionally enhance, maintain or support its market price. This motivation for stock repurchases is known as the undervaluation hypothesis. Nguyen, Sutton, and Pham (2014) noted that this happens; when firms believe that the firm's securities are undervalued in the market; when their share prices collapse far below its fundamental value; when financial markets overreact to news that is unfavorable to a firm

prior to the repurchase; or when the stock price is subjected to selling pressures that can be initiated by financially constrained investment management funds (Dudley and Manakyan. 2011). Stephens and Weisbach (1998) as well as Chan, Ikenberry and Lee, (2004) demonstrated evidence of undervaluation as a uniform motivation for stock repurchases. Massa et al. (2007) argue that in the event of a firm repurchasing its shares, the announcement will send a favorable signal about itself and an unfavorable signal about its rivals within the same industry. Therefore, the rival firms have an incentive to also execute repurchase programs to mitigate this negative signal. Hong, Wang, and Yu (2008) argue that firms can prop up their share prices when it drops far below its fundamental value. They observed that firms with a lower burden of financial constraints execute repurchase programs to support their stock prices in the course of challenging economic times. This measure has the proclivity to increase the liquidity for the stocks and decrease the volatility of the stock over time. Peyer and Vermaelen (2009) demonstrated that firms use stock repurchases as responses to significant analyst downgrades combined with excessively pessimistic forecasts of long-term earnings.

Finally, firms may repurchase their stocks to in a bid to increase their leverage. This motivation for stock repurchases is also christened the leverage hypothesis. Dittmar (2000) posited that firms can embark on stock repurchases during specific periods in a bid to adjust their leverage ratio, offset the dilutive impacts of employee equity options and resist takeovers. Aramonte (2020) posited that stock buybacks seem to be contributory in achieving leverage targets and equity buybacks are of deep concern generally because of their capacity as tools for leverage management. Numerous other research works on the determinants of leverage ratios mostly posit that firms endeavor to sustain target financial structures (Titman and Wessels, 1988; Hovakimian, Opler, and Titman, 2001; Rajan and Zingales, 1995). Nevertheless, the extant pragmatic evidence on targeted leverage is varied. More or less contrary to his earlier suggestion, Hovakimian (2004) posited that equity repurchases have no substantial enduring impact on capital structure.

2.3 Theories and Hypothesis of The Driving Forces of Debt Issuance

Firms may issue debt in order to take advantage of the tax benefits of debt, ultimately culminating in maximizing the value of the firm in consistency with the static tradeoff theory. This is a potentially realistic phenomenon because research works demonstrate that a single optimal capital structure exists at least at the industry level (Miller,1977), and firms have a

substantial predisposition to navigate their capital structure towards the industry optimum (Bowen, Daley and Huber, 1982). In accordance with the static tradeoff theory, an optimal financial structure is attained when the tax benefits from debt capital is marginally balanced by financial distress costs (Myers, 1984). To further buttress the significance of the static tradeoff theory, Ai, Frank, and Sanati (2021) furnished a comprehensive review of the static trade-off theory, including a demonstration of its empirical relevance.

The signaling theory of debt asserts that debt can be used as a tool for conveying information and signaling the future prospects of the firm. I would argue that this signaling potential of debt follows from the fact that debt has been empirically proven to be favorably related to stock returns. Bhandari (1988) posited that expected common stock returns are positively related to the ratio of debt to equity, after controlling for the size of the firm and beta. Muradoglu and Whittington (2001) demonstrated that UK firms with moderately low level of debt generate buy and hold abnormal returns to the tune of twenty percent within three years. In close proximity to the propositions above, debt, whose informational effects are two folds, creates the information that can be applied by investors to evaluate substantial operational decisions including liquidations (Harris and Raviv,1990). In the first effect, the mere ability of the firm to fulfil its contractual obligations to debtholders generates information. A second informational effect is that, in default, the firm's management must pacify creditors to preclude liquidation either through informal negotiations or through formal bankruptcy proceedings (Harris and Raviv,1990). However, it is noteworthy to emphasize that the use of debt merely to signal the prospects of the firm has its drawbacks. I would argue that for debt signaling to be effective, the firms' leverage ratio may have to exceed its industry average otherwise the firm might not be viewed differently from the average firm in the industry. Effective debt signaling may lead to excessive leverage in a firm with attendant consequences (Hovakimian, 2004). Therefore, there may be other benefits associated with debts that a firm may seek that exceeds or matches the associated costs.

Debt can be incorporated into the capital structure to reap the agency benefits of debt or mitigate the agency costs of equity or free cashflows. Jensen (1986) strives to provide explanations on the benefits of debt in reducing the agency costs of free cash flows. Jensen (1986) specified several empirical predictions of the free cash flow theory. Jensen posited that substantial free cash flow can be a source of conflicts of interest between shareholders and managers over payout policies and that supplementary debt elevates efficiency by compelling organizations with large cash flows but few high-return investment projects to disgorge cash

to investors. The debt aids to prevent such firms from wasting resources on low-return projects. Harris and Raviv (1990) postulated that debt performs the role of a disciplining device because default avails the creditor the alternative to force the firm into liquidation. While the use of debt can be advantageous to a firm by increasing the value of the levered firm, on the flip side, the existence of debt in the capital structure can create significant direct and indirect costs in the event of the firm experiencing a financial distress (Berk and Demazo,2019). We understand that a firm can be in financial distress regardless of its capital structure. However, the use of leverage can exponentially increase the risk of bankruptcy because the firm is obligated to make payments of interests and repayments of capital borrowed notwithstanding its liquidity and profitability. If the firm is fully financed with equity, it will face a lower risk of financial distress because it is not obligated to make payments of any kind to shareholders. I would argue that given the agency costs of debt, agency benefits of debt do not fully account for the use of leverage in the capital structure of a firm.

Moreover, Debt can be used to strengthen the effectiveness of corporate governance in a firm. Triantis and Daniels (1995) posited that a large chunk of the literature on corporate governance is based on the belief that the interests of various stakeholder groups conflict and that managerial loyalty is more likely to be beneficial to shareholders than to any other constituency. They went further to assert that regardless of the fact that shareholders stand a greater opportunity of benefiting from sound corporate governance practices, stakeholder interests do interact or converge in the goal of controlling managerial slack and debt can have significant influence over the choices of the firm. The ability of debts to positively enhance the effectiveness of corporate governance is achieved through the use of debt covenants. Spyridopoulos (2016) found that more stringent loan covenants engender an increase in firm profitability and a decrease in operational cost. Tougher covenants advance performance solely in firms with weak corporate governance, including those firms; devoid of a major equity ownership; with feebler rights of shareholders; confronting less aggressive competition in their product markets, or where insider or internal directors have a dominating presence in their boards.

2.4 Implicit Assumptions of The Extant Theories of Debt Issuance

The prevailing theories of debt specify only a proactive ground for debt issuances including; maximizing the value of the firm; signaling the prospects of the firm; taking advantage of the

agency benefits of debt; mitigating the agency costs of free cash flows; and strengthening the effectiveness of corporate governance in a firm. On the contrary, these theories fail to account for the possibility that debt can be issued reactively against any relevant and significant force or threat that originates within a firm's industry or that arises from the larger macroenvironment including but not limited to the threats of competitive actions and strategic financing activities (PEOs) initiated by rivals within the same industry. The possibility that debt can be issued reactively in response to PEOs is incontrovertible for the reason that firms have been proven to adjust their leverage by initiating stock repurchase programs (Dittmar, 2000). Therefore, it will not be surprising if firms also choose to adjust their leverage by directly issuing new debt securities in the absence of imminent profitable investment opportunities and in direct response to significant externalities. So, by jointly failing to account for the possibility of a responsive issuance of debt, these extant theories of debt issuance implicitly assume that firms do not issue debt reactively.

2.5 Research Opportunity Provided by Nordic Markets

The general research on the competitive effects of initial public offerings on the stock repurchase decisions of rival firms is based for the most part on evidence and empirical data that emanates from the United States of America and to a lesser degree from other countries such as China. Given the fact that America has the largest and probably the most developed financial markets across the globe and arguably the most influential, one could suggest that there is reason to be confident that results, conclusions and assumptions about the American financial markets would be valid in and extendable to smaller markets. However, there are likely to be differences in the fundamental nature of the macroenvironment within which markets operate in different jurisdictions. Cultural, economic, legal, social, technological, ecological and political circumstances, which in combination make up the macroenvironment, may provide grounds for variations in outcomes across diverse markets. Therefore, it will not be astonishing to find unique features in the macroenvironment within which the Nordic market exists and attendant outcomes. Given this leeway, the Nordic region may furnish a distinctive research opportunity and may generate differing manifestations or results. There are supplementary factors that vindicate the categorization of the Nordic region as a singular and coherent market. The concept of Nordic elicits indisputably positive associations for the vast majority of people living in Nordic homelands, giving them a sense of a community and values that surpasses the limitations of language, ethos and culture (Østergaard, 2002). As a consequence of the resemblances and geographical proximity of the Nordic countries, which

all have similar welfare systems based on economic structures such as high taxation, elevated degree of social security programs, and wide-ranging public service, it is plausible to regard the Nordic region as a solitary coherent market (Spliid,2013). The related culture and languages and economic ties generates an extensive degree of credibility among the states, and as a consequence, cross-border investments within the Nordic region are perceived as less perilous (Spliid,2013). Finally, to regard the Nordic region as a single market has become even more vindicated sequel to the amalgamation of the stock markets of Sweden, Finland, and Denmark into the OMX-integrated markets, leading to converging institutional characteristics that distinguishes them from those of the continental European markets (Westerholm ,2006).

2.6 Research Objectives and Hypothesis

In this section, I would more formally specify the goals of this study. My research objectives emanate from the empirical limitations of the prevailing theories on the application of stock repurchases as a strategic response to intra-industry PEOs; the implicit assumptions of the theories of debt issuance stated above; and the research opportunities provided by the Nordic region. The mix of these empirical limitations, implicit assumption and Nordic research opportunity unequivocally mandates that a further evaluation of this subject of research be implemented. I seek to do so and contribute to the literature on the strategic choices that firms adopt in response to IPOs and SEOs along the following number of dimensions.

Firstly, I would test the hypothesis that firms respond to intra-industry PEOs by implementing programs of stock repurchases. I would implement this by incorporating more recent data and complement prior related studies by using data from the Nordic markets, thereby evaluating whether similar outcomes are obtainable in the Nordic region and contributing empirically to this extant theory.

Secondly, existing theory does not account for the potential role of new debt issuances in fending off the competitive effects of PEOs. Given this situation, I would examine the possibility that firms issue bonds (as a proxy for debts) rather than repurchase equity in response to competitive threats resulting from PEOs of rival firms, thereby extending the theories on the driving forces of bond issuances. This secondary investigation emanates from the understanding that both stock repurchases and debt issuances increases the leverage ratio of a firm. Nevertheless, either financial action spells distinct results for shareholders and for the firm because of market imperfections such as taxes and costs of financial distress (Modigliani and Miller,1958). The outcome of stock repurchases may not necessarily

carryover to debt issuances. Therefore, I intend to examine whether debt issuances have been used as a strategic response to the competitive threats posed by PEOs.

Finally, I will extend this study in section nine of this article by decomposing the effects of PEOs into IPOs and SEOs and examining the individual impacts of IPOs and SEOs on both stocks repurchase behavior and bond issuance tendencies of rival firms. While there are similarities between IPOs and SEOs justifying its combination into PEOs, decomposing PEOs into IPOs and SEOs is also important because of the plethora of differences between the two offerings. IPOs are undertaken only once in the life time of a firm and is a more crucial strategic financing event in the evolution of a firm than SEOs, which are undertaken on numerous occasions subsequent to the company going public. Moreover, given that the firm is previously public in the course of an SEO, more extensive information regarding the risks and prospects of company has remained circulated, making room for a less extensive marketing timespan than what can be required in IPOs (Woolley,2022).

3.0 DATA

The basic data consist of amount of stock repurchase, proceeds of bond issuances, proceeds of public equity offerings, stock returns, stock prices, common shares outstanding and other relevant accounting data of the firms used in the study. The data on annual Nordic bond issuances and public equity offerings are obtained from Thompson Reuters DataStream over the period from 1990 to 2021. The data on annual stock returns are computed from stock prices, which are obtained from the Center for Research in Security Prices (CRSP) NYSE/ AMEX/NASDAQ monthly file, over the period January 1990–December 2021. Each year the market capitalization of every stock is computed by multiplying the year-end stock price by the number of shares outstanding. The accounting data are obtained from Compustat-global annual data over the period from 1990 to 2021. Data on accounting variables that were generated from compustat were reported using ISO currencies of the specific Nordic country. For example, data for Norwegian firms were reported in Norwegian Krones and similarly for the other four Nordic countries including Sweden, Denmark, Finland and Iceland.

Given my previous argument about the Nordics being a single coherent market, implementing an empirical study about the Nordics makes necessary a conversion of the individual and distinct currencies of the various Nordic countries into a uniform currency. For the sake of convenience, I would prefer to convert their separate currencies to the United States Dollar. To do the conversion, one must also consider the likely variability in the price level of consumer goods across countries in the Nordics and its consequences for the real exchange rate in consistency with the stipulations of Sarno and Taylor (2002). The differences between the price level of consumer goods in the Nordic countries and the European average seems to be closely equal across the Nordic countries and available data across the following referenced sources demonstrates that the price gap has been substantially stable (Konkurransetilsynet, 2005 and Statista Inc,2022). Given this phenomenon, I would assert that the nominal exchange rates between the Nordic countries and the United States closely approximates the real exchange rate or the purchasing power parity. The purchasing power parity is the applicable exchange rate between two national currencies that would equalize the two pertinent country price levels if stated in a uniform currency at that applicable rate, enabling the purchasing power of one unit of a single currency to be similar in both national economies (Sarno and Taylor, 2002). Given the approximate equality of the available nominal rates to ideal purchasing power parity, I converted the currency of the data for firms from each respective Nordic state to the United States Dollars using historical exchange rates accessible from the

IMF website and complemented by rates found on the website of the central bank of each respective Nordic state. The historical exchange rates applied are shown on Table 1 in Appendix I. For the period 1990 to 1994, historical exchange rate data is not available on the IMF website for some countries. For countries with years of missing data, I applied the exchange rate that was prevalent in 1995 to the accounting data for the period 1990 to 1994.

Data was collected for firms and I aggregated them to generate industry data as the case may be using the general industry classification (GIC) codes. However, I excluded the financial industry because it is exceptionally highly leveraged compared to the average industry**.** Including the financial industry will amount to the presence of outliers in the regression with undesirable consequences such as having spurious regressions (Wooldridge, 2002). Overall, the data needed comprises of data for the proceeds of bond issuance variable, stock repurchase variable, IPO threat variables and control variables.

For each year, stock repurchases is individually measured as the annual repurchase of common and preferred stock less any reduction in preferred stock, consistent with Dittmar and Dittmar (2008) as well as Yook (2010). Data on equity buybacks overlooks tender-offers and repurchases executed by way of private exchanges given that they are distinct from open-market repurchases on the premise of flexibility and costs in consonance with the approach adopted in prior related studies such as Nguyen, Sutton, and Pham (2014). Data for computing stock returns are generated from the combined Compustat and Center for Research in Security Prices (CRSP) database. I computed yearly stock returns using monthly stock prices by subtracting the year-beginning prices from year-end prices and dividing the result by year-beginning price. I have a preference for the use of yearly returns to ensure consistency with other industry data that are available on a yearly basis. The final sample for accounting data comprises of 10,610 firm-year observations of 352 firms and spans from 1990 to 2021. The data generated was aggregated into industry data, which formed the basis of the regression analysis.

In the final analysis, I merge Compustat-global data on stock repurchase as well as other accounting variables together with data, from Thompson Reuters DataStream, on Nordic IPOs based on fiscal year and four-digit general industry classification (GIC) code to generate all the data required for the study. In the ensuing paragraphs, I will provide a more detailed description of the variables of econometric regression model together with their vindications and/or motivations for their inclusion.

3.0.1 Descriptive Statistics

In table 3 below, I present the descriptive statistics for all variables employed in this study. The unconditional mean of the repurchase ratio is 0.024, which I would argue is judiciously consistent with the specifications of Massa et al (2007), who posited that the mean stock repurchases of the typical firm is approximately 2.8% of the market value of its equity. The average number of PEOs in an industry in the previous one year is about 8 and the maximum is 78. For any given year, the mean value for an industry's PEOs is $1.02 Billion and the maximum is $13.68 billion. The average number of IPOs and SEOs in the entire market in the previous one year are respectively 25 and 72, while the maximum numbers are correspondingly 109 and 258. For any given year, the mean value for the aggregate IPOs and SEOs are respectively $4.06 and $20.85 billion and the maximum values are correspondingly $9.38 and $34.23 billion.

In moving forward, I will apply the data, whose summary is presented in Table 2 below, in assessing the competitive effects of intra-industry PEOs on the stock repurchase and bond issuance decisions of rival firms. In implementing that, I will basically set up different regression models and undertake separate analysis and also present the results separately. So, while the detail data analysis and results for the stock repurchase decision is presented in part A below, that of bond issuance decisions is presented in part B. In parts C and D of this essay, in which the effects of PEOs are decomposed into those of IPOs and SEOs, I will present the data analysis of the extended study.

As part of the data analysis or regression analysis, I will seek to control for extraordinary economic periods. The extraordinary economic periods that I refer to include the bubble years of 1999 and 2000, the financial crises period of 2007 and 2008 and finally the COVID-19 crisis period of 2020 and 2021.

TABLE 2
DESCRIPTIVE STATISTICS

Variable	Abbreviation	No. of Firm-Year Observations	Mean	Std. Dev	Min	Max
Dependent Variables						
Stock Repurchase as a % of Mkt Cap.	SREP_PERCENT	10610	0.024	0.099	0	0.889
Bond Issuances	BI	10610	1323.92	2462.5	0	2270
Dummy for main Dependent Variables						
Stock Repurchase Proceeds Dummy	SREP_DUMMY	10610	0.3267	0.470	0	1
Bond Issuances Dummy Variable	BI_DUMMY	10610	0.1989	0.399	0	1
Variables for PEOs						
Public Equity Offerings Proceeds	PEO	10610	1020.6	1638.6	0	13675
Number of PEOs Issued	PEON	10610	7.901	10.05	0	78
Adjusted Number of PEOs Issued	ADJPEON	10610	0.314	0.363	0	3
Variable for IPOs and SEOs						
Initial Public Equity Offerings Proceeds	IPO	10610	4091.69	4487	28.7	20853
Number of IPOs Issued	IPON	10610	24.91	21.18	1	109
Seasoned Equity Offerings Proceeds	SEO	10610	9379.32	6973	926	34230
Number of SEOs Issued	SEON	10610	72.31	57.35	11	258
Number of Bonds Issued	BIN	10610	4.18	7.58	0	64
Dummy Variables for PEOs						
Dummy for High PEO Proceeds	HIGH_PEO	10610	0.198	0.399	0	1
Dummy for High Number of PEOs Issued	HIGH_PEON	10610	0.198	0.399	0	1
Dummy for High Adjusted No. of PEOs	HIGH_ADJPEON	10610	0.205	0.404	0	1
Dummy Variables for IPOs and SEOs						
Dummy for High IPO Proceeds	HIGH_IPO	10610	0.219	0.414	0	1
Dummy for High Number of IPOs Issued	HIGH_IPON	10610	0.219	0.414	0	1
Dummy for High SEO Proceeds	HIGH_SEO	10610	0.219	0.414	0	1
Dummy for High Number of SEOs Issued	HIGH_SEON	10610	0.219	0.414	0	1
Control Variables						
Number of Firms in an Industry	NFIRMS	10610	30.14	34.19	1	171
Dividends	DIVIDENDS	10610	1663.17	4382.39	0	61561
Dividends Ratio	DIVRATIO	10610	3.06	30.54	0	309.8
Past Stock Returns	PAST_RETURN	10610	20.04	80.99	-134	1279
Capital Expenditures	CAPEX	10610	3032	4810	0	24747
Market to Book Ratio	MKTBK	10610	42.83	335.27	0	4869
Cash	CASH	10610	5249	29143	0	527653
Cash Flow	CASHFLOW	10610	533	3113	-3199	46425
Long-term Debt	LONGDEBT	10610	12283	29096	0	428353
Debt Equity Ratio	DEBTEQUITY	10610	7.45	17.28	-79	180
Operating Income	OPINCOME	10610	2849.43	6692.38	-7868	85927
Non-Operating Income	NONOPINCOME	10610	2758	8852	-1412	144981
Price Earnings Ratio	PE	10610	315.19	3359.13	0	51351
Number of Shares Outstanding	OUTSHARES	10610	3989	11078	0	151464
Size	SIZE	10610	57478	193276	0	3307060
Industry Concentration	CONCENTRATION	10610	0.342	0.286	0	1
No of Firms Issuing Bonds in an Industry	BIN	10610	4.18	7.58	0	64

This Table shows the summary statistics for all dependent and independent variables applied in the entirety of this study including in the extensions.

PART A: Data Analysis for The Competitive Effects of Intra-Industry Public Equity Offerings (PEOs) on Stock Repurchase Decisions of Rival Firms

3A Description of Independent Variables for the Econometric Model where Stock Repurchases is the Dependent Variable

3A.1.1 Dependent Variable

In the Tobit models, I would employ percentage stock repurchases (SREP_PERCENT) as the dependent variable, which is equal to stock repurchases at year t divided by market value of stock at the end of year t-1. This approach is consistent with the practice in prior related studies such as Nguyen, Sutton, and Pham (2014).

In the Probit models, I would employ a dummy variable denoted as SREP_DUMMY as a dependent variable equal to one when a firm repurchases shares that amounts to at least 0.25% of its market value of equity and zero otherwise. This approach is consistent with the practice in prior related studies such as Nguyen, Sutton, and Pham (2014).

3A.1.2 Main Explanatory Variable

For the main explanatory variable, I will apply basically two approaches to capture the market's perception of the competitive effects of intra-industry PEOs, including the total proceeds of public equity offerings (PEOs), and the number of public equity offerings (PEONs). In the first case, I would encapsulate the competitive impact of intra-industry PEOs on rival firms using the total proceeds of new issues in consistency with the propositions of Ritter (1991); Pagano, Panetta and Zingales (1998); in addition to Baker and Wurgler (2006; 2007) that firms choose to conduct IPOs when valuations of comparable firms are most favorable and market sentiments are most elevated. Given this tendency PEOs are likely to reflect the intensity of rivalry within an industry.

The application of PEO proceeds to evaluate the impact of PEOs on competitive conditions within an industry have some advantages. Firstly, in consistency with the reasoning of Akhigbe, Borde and Whyte (2003) as well as Hsu et al. (2010), the usage of proceeds of IPOs by issuing firms will increase the competitiveness of IPOs, given that issuing firms become empowered to execute new projects, reduce their debt liabilities, implement growth strategies and/or finance major expansions. Other advantages include the reduction in the challenge of accounting for the quantity of PEOs, which may include very small PEOs. This is in addition

to the understanding that the application of the quantity of proceeds implicitly presumes that each PEO enforces an equal competitive effect as any other notwithstanding the magnitude of proceeds of the individual PEO.

In the second instance, and for each fiscal year, I determine the number of public equity offerings (PEON) which occurred within the previous twelve months in the same four-digit GIC-code industry with the incumbent firm. This is consistent with the approach adopted by Nguyen, Sutton, and Pham (2014), who posited that an increased number of IPOs entering an industry will lead to a stronger perception of competitive threats to existing firms. The dummy variable, HIGH_PEON, equals one if it is in the top 20th percentile of the PEON distribution and zero otherwise in line with methods in preceding related studies such as Nguyen, Sutton, and Pham (2014). I also computed a ratio of the number of PEOs (PEON) in an industry to the number of firms in the industry to be denoted as ADJPEON. The dummy variable, HIGH_ADJPEON, equals one if it is in the top 20th percentile of the ADJPEON distribution and zero otherwise.

I did not apply the first-day return subsequent to a PEO in my analysis, contrary to the practice by numerous researchers, who believe that concept of first-day return is a tool for assessing the competitive effects of intra-industry PEOs on stock repurchase programs of rival firms, including but not limited to Nguyen, Sutton, and Pham (2014). They have argued that, because the quantity of IPOs and/or SEOs as well as IPO and/or SEO first-day returns are both favorably connected to market sentiment, the first-day return of an IPO is a substitute assessor of the competitive threat of intra-industry IPOs on competing firms in the course of hot IPO financial markets. The challenge with adopting first-day returns as an appropriate assessor is that several researchers including; Derrien and Kecskes (2007); Hansen and Jorgensen (2010); Mola and Loughran (2004); and Rock (1986), also has construed first-day returns as an indicator of IPO or SEO underpricing, which is a by-product of valuation uncertainty. Therefore, I would argue that adopting first-day returns as a measure of the competitive effects of PEOs may suggest conflicting conclusions with respect to whether stock repurchases is been determined by competitive effects of PEOs or by valuation uncertainties of IPOs and SEOs.

Ultimately, I would anticipate that the coefficients of the proxies for the PEO competitive threat adopted to be statistically significant and positive in both tobit and probit models, demonstrating that the greater reason competing firms embark on stock repurchases is to

underpin their equity prices when subjected to market pressure emanating from a substantial entry of new firms into the capital markets.

3A.1.3 Other Control variables:

In this section, I would provide theoretical grounds to account for several other explanatory variables that I incorporated in the regression model to control for a number of other reasons that has been documented as possible justifications for stock repurchases in response to competitive pressure generally.

Prior studies have shown that a firm's past performance has a substantial impact on the firm's buyback decision. Comment and Jarrell (1991); Peyer and Vermaelen (1999); Stephens and Weisbach (1998); as well as Dudley and Manakyan (2011) demonstrated that a firm's equity repurchases are negatively associated with its preceding stock price performance. Analogous to the approach adopted by Dittmar (2000), I computed the firm's market-adjusted return as the equivalent of the return of the previous year minus the return of the CRSP equally-weighted portfolio. I include past returns variable in the regressions to potentially control for the effect of the observed undervaluation in the previous year on a firm's stock repurchase activity.

The range of profitable investment opportunities available to a firm may impact on its stock repurchase behavior. Boudry, Kallberg and Liu (2013) found that meager investment opportunities are associated with more intense degree of stock repurchases. They further posited that, given the set of available investment opportunities, the amount of cash accessible to the firm is not a strong determinant for stock repurchases except when firms have a low investment opportunity set. Dittmar (2000) posited that firms with superior investment opportunities (characterized by high market-to-book ratios) might possess a propensity not to pay out cash in the form of stock repurchases even when the stock appears to be undervalued. This is because there are greater expectations of such firms having other projects or investment opportunities for a more profitable utilization of their retained earnings or cash than repurchasing the firm's own stock. Therefore, incorporating market-to-book ratio variable in the econometric regression model to control for the effect of investment opportunities on share repurchase behavior seems plausible.

Innumerable studies of firms in the United States provide some, although inconclusive, evidence about the fact that firms' inclination to payout cash to shareholders, including the

use of dividends and stock repurchases, is related to capital expenditures to a certain extent. Gutierrez and Philippon (2016) demonstrated that investments or capital expenditures by US firms has fallen below levels indicated by Tobin's Q, a measure of the potential profitability of investment projects and they further stipulated that the shortfall in investments is partly attributable to developments in corporate governance that encourages share repurchases at the expense of capital expenditures. Almeida, Fos and Kronlund (2016) demonstrated that firms' preference for share repurchases are related to reduced investments. Additionally, Lee,Shin and Stultz (2016) observed that the connection between Tobin's Q and external financing has collapsed for firms in the United States, and they further posited that industries with a high-Q have a tendency to display substantial share repurchases and insignificant investment expenditures. Obviously, stock repurchases can affect the tendency or the level of resources that are available for capital expenditures. Additionally, when firms execute the distribution of their excess cash using more of dividends, they would do so applying less of stock repurchases. Given this situation and the preceding theories, I would include capital expenditures and dividend ratios in the regression model. This is to control for the effect of a firms' desire to implement their payout policies using stock repurchases on dividends payout and capital expenditures.

Previous research has demonstrated the existence of a favorable relationship between firms' stock repurchasing activities and their cash position. Stephens and Weisbach (1998), observed that firm's management employ stock repurchases to distribute unexpected cash flows. Boudry, Kallberg and Liu (2013) found that the amount of cash accessible to the firm is a strong determinant for stock repurchases when firms have a low investment opportunity set. In a similar vein, Guay and Harford (2000) demonstrated that managers apply stock repurchases in distributing temporary cash flows and use dividends to payout more enduring cash flows. Jensen (1986) specified several empirical predictions of the free cash flow theory. Jensen posited that substantial free cash flow can be a source of conflicts of interest between shareholders and managers over payout policies and that additional debt increases efficiency by forcing organizations with large cash flows but few high-return investment projects to disgorge cash to investors. Given that the cash flow position of firms can motivate their desire to embark on stock repurchases, it makes sense to incorporate cash-related variables, including cash holdings and cash flows, in the regressions in order to control for the effect of cash flows on stock repurchases, consistent with the postulations of Dudley and Manakyan (2011).

Firms may repurchase their shares in a bid to maximize the value of firm as has been mentioned previously in this paper. The static tradeoff theory predicts that firms would seek to adjust their leverage ratio in a bid to attain the optimal capital structure (Myers,1984). Bagwell and Shoven (1988) together with Opler and Titman (1994) posited that firms may utilize share repurchases as a means of adjusting their capital structure. Therefore, stock repurchase decisions is likely to be correlated to the firms' current debt level and the leverage ratio. Therefore, I include both debt and debt to equity variables in the regression to control for the effect of firms' tendencies to repurchase shares in order to adjust their capital structure and for the effects of debt levels in the firms' capital structure on share repurchases.

Previous studies observed that intra-industry effects are stronger in concentrated industries (Lang and Stulz,1992; Massa, Rehman and Vermaelen,2007). I would speculate that a competing firm in a concentrated industry has a greater propensity and would be more incentivized to buy back its equity in response to the occurrence of a strong IPO or SEO activity within its industry, in comparison to a firm in a less concentrated industry in consistency with the findings of Nguyen, Sutton, and Pham (2014). In line with Massa et al. (2007), I would apply the Herfindahl Index to assess the degree of concentration in each industry. The Herfindahl index is a well-established tool for the assessment of the degree of an industry's concentration. The Herfindahl index is measured as the total of the squares of market shares of all the firms in a particular industry for a particular year. Market share is defined as the total sales of the firm in a given year divided by the total turnover of the industry in the year. The value of this index is confined between zero and one, where industries with the highest level of competition or least degree of concentration possess a value of zero while those industries with the highest possible level of concentration or monopoly power possess a value of one.

Operating income can be a contributory factor to a firm's decision to repurchase its stocks. Lie (2005a) deduced that firms' choices to modify the level of payout seems to carry information about simultaneous fluctuations in operational risks and income. Lie (2005b) demonstrated that operational performance of firms progresses subsequent to pronouncements of stock repurchase agendas. Additionally, he demonstrated that financial markets respond positively to earnings declarations after the announcements of stock repurchases. Croce, Daminelli and Giudici (2008) found that some companies exhibit a significant decline in their operational performance following the announcement of stock repurchase programs, including both in unqualified terms and when benchmarked with a sample of identical firms. Although there

appears to be some level of incongruity in the theories above, nevertheless, I would argue that firms may repurchase their stock in response to its expectations of its future earnings potential, which can better or worse than the current situation. Overall, given these findings, it seems basically plausible to account for operating earnings as a potential determinant of firm stock repurchases by including it as a control variable.

Non-operating income can be a contributory factor to a firm's stock repurchase decisions. Ho, Liu and Ramanan (1997) found that, for a sample of 335 open-market stock repurchase pronouncements in the course of 1978 to 1992, the reaction of the market to the declaration is substantially connected to the growth of the firm's revenue and the firm's earnings in preceding periods. Al Sharawi (2022) examined the effect of stock repurchase programs and the associated incentives on firms' financial performance and demonstrated the existence of a favorable impact of share repurchases on firms' financial performance as measured by return on equity (ROE) and enterprise value added (EVA). Earnings is the sum of operating and non-operating income (CFI Team, 2020). Therefore, the significance of revenue and the associated earnings implies that non-operating income can also be fundamental to a firm's decision to repurchase its stocks. Thus, the findings in this paragraph are suggestive of a potential role of non-operating income in the determination of the stock repurchasing behavior of firms. I would therefore include non-operating income as a control variable for the purpose of accounting for the factors impacting on a firm's stock repurchase decisions.

The enhancement of the earnings per share (EPS) of business entities is a factor that is frequently cited in press releases of firms and executive surveys as the rationale for the growing usage of stock repurchases (Grullon and Ikenberry,2003). Other researchers such as Young and Yang (2011) have demonstrated the existence of a strong positive relationship between stock repurchases and EPS-dependent compensation provisions. On the other hand, Oded & Michel (2008) asserted the spuriousness of a common belief, held among both academics and practitioners, which specifies that value can be created for firms' shareholders from the increased EPS that is associated with a stock repurchase. Notwithstanding these conflicting theories, it is certain that stock repurchases is somehow connected to EPS outcomes. Given that EPS is an integral part of PE ratio, it makes sense to account for the potential role of PE ratio in a firm's stock repurchase decisions by incorporating PE ratio as a control variable.

A number of researchers has established the role of capital expenditures in firms' stock repurchase decisions. I had tried to explain, earlier in this essay, the grounds for the inclusion of capital expenditures as a control variable earlier. Nevertheless, in this paragraph, I would provide a more extensive theoretical framework supporting the potential role of capital expenditures in a firm's stock repurchasing behavior. In examining the works of related studies, I could observe that Kulchania (2016) examined the impacts of firms' percentage of variable and fixed costs on their payout policy and found that business entities with more extensive fixed costs possess substantially higher volatility in their impending cash flows and less stable future operating profits. These firms expend a lesser fraction of their operating income for the payment of dividends and execution of share repurchases. Additionally, Kulchania (2016) established that these firms' payout higher proportions of their distributions to shareholders through share repurchases for the reason that this method proffers superior flexibility. Chen, Ho and Shih (2007) investigated how pronouncements of business capital investments in one firm impact the share prices of its rivals and they found that on the average, competitors experience a substantially unfavorable valuation outcome. Additionally, Chen, Ho and Shih (2007) established that competitors' stock prices are more unfavorably impacted when the firm that makes the pronouncement experiences a greater declaration effect or possesses first-mover advantages in the industry. Given the fact that a firm's level of capital expenditures has a bearing on its stock repurchase behavior, it is reasonable to include capital expenditures as a control variable in our model.

4A.0 Empirical Methodology

4A.1 Establishing the Econometric Model

In this section, I will present and describe applicable econometric models that would form the analytical tool and basis for examining the unique predictive ability of the effects of intra-industry PEOs on stock repurchase decisions of rival firms in the Nordic region. To move further, I provide a detailed explanation of the circumstances that would warrant the use of Tobit and Probit model. Wooldridge (2002) recommended that in circumstances where the dependent variable is non-negative (such as in the instance of equity repurchases), utilizing a linear model would probably generate negative fitted values, which results in negative predictions for the dependent variable. Moreover, the assumption that an explanatory variable appearing in level form possess a constant partial effect on E(y|x) can be spurious. So, all inference would have only asymptotic vindication, as with the linear probability model. In such cases, it is imperative to have a model that implies nonnegative fitted values for the dependent variable, and which has reasonable partial effects over a wide variety of the independent variables. The Tobit model appears to be convenient for these purposes. In regression analysis using the Tobit model and Probit model, the dependent variable is basically continuous over strictly positive values but also take on a value of zero with positive probability. The Tobit and Probit models imply nonnegative predicted values for the dependent variable, and which has sensible partial effects over a wide range of the explanatory variables, x. On this premise, I find the Tobit and Probit models to be suitable for estimating the causal relationship between the threat of intra industry public equity offerings and stock repurchases of rival firms.

In the initial steps, I would apply a basic Tobit and Probit models, devoid of any interaction terms between the PEO variable on one hand and either the Concentration or the Past_return variable on the other hand. This approach and subsequent ones, described in this section, are consistent with the methods applied in prior related studies such as Nguyen, Sutton, and Pham (2014).

Tobit:

$$SR\_Percentage_{t+1} = \beta_0 + \beta_1 PEO\_Threat + \beta_2 Control\ Variables_t + Year\ Dummies$$

Probit:

$$SR\_Dummy_{t+1} = \beta_0 + \beta_1 PEO\_Threat + \beta_2 Control\ Variables_t + Year\ Dummies$$

In interpreting the coefficients of the Tobit and/or Probit model, the study reports the marginal effect of a one standard deviation change in an independent variable while keeping all other independent variables at their means. This can be achieved by standardizing all continuous independent variables to have a mean of zero and a standard deviation of one. The marginal effects for the binary independent variables are assessed as the effect of moving from a value of 0 to a value of 1. In the above regressions, the parameter for the threat of public equity offerings, β_1, will measure the marginal effect of the competitive threat of PEOs on the stock repurchase decisions of rival firms. I anticipate that β_1 will be positive and significant after controlling for other factors, suggesting that PEO's competitive threat increases the probability as well as the volume of repurchases of rival firms.

In the next step, I interact the PEO competitive threat variable with the Concentration variable as well as with the Past_return variable. In the regressions stated below, the total of, β_1, β_2, and β_3 represents the impact of the PEO's competitive threat on the rival firm's repurchase decision when both the Past_return and concentration are one standard deviation from their means, keeping other variables at their means. Marginal effects are computed following the prescriptions of Ai and Norton (2003) as well as Norton, Wang, and Ai (2004).

Tobit:

$$SR\_Percentage_{t+1} = \beta_0 + \beta_1 PEOThreat_t + \beta_2 PEOThreat_t * Concentration_t + \beta_3 PEOThreat_t * PastReturns_t + \beta_4 Concentration_t + \beta_5 PastReturns_t + \beta_6 Control\ Variables_t + Year\ Dummies$$

Probit:

$$SR\_Dummy_{t+1} = \beta_0 + \beta_1 PEOThreat_t + \beta_2 PEOThreat_t * Concentration_t + \beta_3 PEOThreat_t * PastReturns_t + \beta_4 Concentration_t + \beta_5 PastReturns_t + \beta_6 Control\ Variables_t + Year\ Dummies$$

4A.2 Verification of the assumptions of the econometric model

I verified that the model is properly specified by incorporating the linktest in the regression. Given that stock repurchase activities of firms vary by year and by industry and also the likelihood that a firm may repurchase its stocks numerous times, I applied cluster standard errors for each industry observation to account for correlation of residuals within industries across years.

5A UNIVARIATE TESTS

In Table 5A.1 underneath, I furnish a summary of the mean values, the difference in mean values and the outcome of the tests of statistical significance of the difference in the mean between the group of firms who issue equity and those who do not issue equity within a one-year period. The group of stock repurchasers identified in this study buy back their equity in quantities as low as the least amount of stocks' value possible (in order words, I choose a cut-off point of 0%), while the group of non-repurchasers do not buy back any stocks. Choosing a cut-off point is consistent with the findings of Nguyen, Sutton and Pham (2014) who observed that, although prior related studies opt for a cut-off point that range from 0.25% to 1% to scrutinize for substantial or actual stock repurchase activities, results of their study did not alter when they vary the cutoffs from 0% to 1%. Specifically, repurchasers, on average, repurchased 2.95% of their market value, whereas non-repurchasers solely repurchased $0 million, or 0% of their market value. The mean differences for PEO related variables and PEO dummies are positive and significant, showing robust PEO activity prior to stock repurchase events. This preliminary discovery is consistent with my speculation that the competitive threat of PEOs could play a role in the equity buyback decision of the rival firms. In the Table 5A.1 below, we can observe that the market-adjusted historical stock return of the normal repurchaser of stocks is approximately 3%, constituting less than half of the historical returns of the usual non-repurchaser of equity. This suggestion is consistent with the undervaluation hypothesis which posits that firms have a greater tendency to repurchase their stocks after they have suffered a meager stock performance. This argument also stresses the benefit of controlling for historical equity returns in a bid to witness the net impact of PEO's competitive threat together with the interaction term between PEOs' threat and the past equity returns.

Moreover, the average equity repurchaser is characterized by a dividend ratio, which at 1.373, is of greater magnitude than that of the usual non-repurchaser of equity, standing at 1.277. In Table 5A.1.0 below, we can also observe that the size of the typical repurchaser of equity, at 27,972.89, is smaller than that of the average non-repurchaser at 28062.93. However, the average equity repurchaser possesses a larger market-to-book ratio in comparison with that of the average non-repurchaser. These explanations are also in uniformity with the predictions of prior related research activities, including those of Ikenberry et al, 1995; Nguyen, Sutton, and Pham (2014); Peyer and Vermaelen, 2009; as well as Skinner, 2008. Cash-related variables including Cash and Cash flows informs us that equity repurchasers maintain more cash and possess greater cash flow in contrast to non-repurchasers of stocks. This phenomenon has also

been observed in preceding studies (for example in Stephens and Weisbach,1998; Boudry, Kallberg and Liu, 2013; Guay and Harford, 2000)

Table 5A.1.0

Univariate Tests to Assess Whether There are any Statistically Significant Differences Between the Groups of Repurchasers of Equity and Non-Repurchasers of Equity

	UNIVARIATE TESTS					
	REPURCHASERS OF EQUITY		NON-REPURCHASERS OF EQUITY			
Variable	Number	Mean(1)	Number	Mean(2)	(1) - (2)	t-statistic
Stock Repurchases as a Percentage of Historical Equity Returns	352	14.36	352	26.79	-12.43	2.03
Dividends	352	49.99	352	73.44	-23.45	-3.0451
Dividends Ratio	352	1.373	352	1.277	0.096	0.0579
Size	352	27972.89	352	28062.13	-89.24	-0.0412
Debt Equity Ratio	352	2.525	352	3.444	-0.919	-2.2175
Operating Income	352	2322.16	352	2861.45	-539.29	-2.1296
Non-Operating Income	352	-123.35	352	98.41	-221.76	-2.1296
Price Earnings Ratio	352	91.48	352	6.4	85.08	8.1862
Capital Expenditures	352	1226	352	1328.29	-102.29	-0.869
Market to Bok Ratio	352	82.92	352	46.68	36.24	1.621
Cash	352	2738.44	352	2583.62	154.82	0.4619
Cashflow	352	265.42	352	177.9	87.52	0.8844

This table shows the results of univariate tests on groups of repurchasers of equity and non-repurchasers of equity within a one-year period for publicly listed firms in the Nordic region

6A.0 MAIN RESULTS

6A.1 The Effects of PEOs on Stock Repurchase Decision

6A.1.1 The Effects of PEOs on Stock Repurchase Decision Using Tobit Models without Interaction Terms

Table 6A.1.1 below shows the results of the maximum likelihood estimation involving a Tobit regression model. In the table, I report the marginal effects of Tobit models with changing standards of measurement for the threat of PEOs. Models (1) – (6) uses a mix of both binary or dummy variables and non-binary variables. Models (1) – (6) uses PEOs, HIGH_PEOs, PEONs, HIGH_PEONs, ADJPEONs and HIGH_ADJPEONs respectively. Of these variables, HIGH_PEOs, HIGH_PEONs, and HIGH_ADJPEONs are dummy variables. The dependent variable is SREP_PERCENT, which is the monetary amount of equity buybacks at year t divided by the market value of stocks at year t-1, and it is circumscribed between zero and one. The independent variable that we care about is the threat of PEOs represented in this study by distinct standards of measurement and both as dummy and also as non-binary variables. The coefficient of the main explanatory variable assesses the typical increment in the stock repurchase percentage of a rival firm when threatened by the competitive effects of intra-industry PEOs.

The outcome of the regression analysis demonstrated in the Table 6A.1.1 below reveals that the coefficient of the threat variable, PEOs, is statistically significant and positive for none of the alternative specifications. The outcome of the regression emerges after controlling for other variables which have been documented as determinants of equity buyback decisions. There is no statistically significant evidence to support the claim that rival firms in the Nordic region repurchase their shares as a response to the threat of intra-industry PEOs.

The coefficients of past returns, industry concentration and dividend ratio are significant at the 5% level for all specifications of the regression model. On the other hand, the coefficients of other control variables including past return, book-to-market ratio and the cash related variables are not significant at the 5% level for all of our five specifications. For the Tobit model using Nordic data, the vast majority of the control variables do not have coefficient signs that are consistent with previous studies, including Dittmar (2000), Massa et al. (2007), as well as Dudley and Manakyan (2011). Tables 6A.1.1 and 6A.1.2 are shown below.

TABLE 6A.1.1
THE EFFECT OF PEOs ON STOCK REPURCHASE DECISIONS IN A TOBIT REGRESSION MODEL WITHOUT INTERACTION TERMS

	(1) SRPP	(2) SRPP	(3) SRPP	(4) SRPP	(5) SRPP	(6) SRPP
STOCK REPURCHASE PERCENTAGE (SRPP)						
PEO	0.0000117					
	(0.81)					
PAST_RETURNS	0.0000889***	0.0000867***	0.0000703*	0.0000864***	0.0000762***	0.0000801***
	(3.98)	(3.90)	(2.06)	(3.83)	(3.75)	(3.69)
CONCENTRATION	-0.226**	-0.223**	-0.219**	-0.224**	-0.212**	-0.214**
	(-2.91)	(-3.11)	(-2.61)	(-2.99)	(-2.62)	(-2.75)
DIVIDEND RATIO	0.000178**	0.000131***	0.000205***	0.000137***	0.000120***	0.000134***
	(2.90)	(3.57)	(4.09)	(4.73)	(3.54)	(4.71)
PE	0.000000262	0.000000400*	0.000000764***	0.000000479	0.000000546	0.000000407
	(0.56)	(2.00)	(3.57)	(1.49)	(1.76)	(1.42)
OP INCOME.	0.000000618	0.00000111	0.000000437	0.000000946	0.000000969	0.00000139
	(0.25)	(0.48)	(0.16)	(0.45)	(0.39)	(0.53)
NONOPINCOME	0.00000168	0.00000116	0.00000182	0.00000128	0.00000145	0.00000200
	(0.84)	(0.49)	(1.02)	(0.73)	(0.98)	(1.22)
DEBTEQUITY	-0.000686	-0.000665	-0.000883	-0.000700	-0.000689	-0.000722
	(-1.13)	(-1.20)	(-1.58)	(-1.29)	(-1.15)	(-1.27)
CAPITAL EXPEND.	0.00000641	0.00000767	0.00000680*	0.00000741*	0.00000709*	0.00000711*
	(1.71)	(1.84)	(1.99)	(2.07)	(2.21)	(2.18)
BOOK MKT VALUE.	-0.00000421	-0.00000618	-0.0000127	-0.00000674	-0.00000962	-0.00000691
	(-0.38)	(-0.76)	(-1.63)	(-0.83)	(-1.20)	(-0.83)
CASH	-0.000000166	-0.000000155	-4.88e-08	-0.000000132	-0.000000217	-0.000000443
	(-0.26)	(-0.24)	(-0.08)	(-0.23)	(-0.41)	(-0.84)
CASHFLOW	-0.00000418	-0.00000360	-0.00000586	-0.00000392	-0.00000368	-0.00000355
	(-0.66)	(-0.52)	(-0.79)	(-0.56)	(-0.58)	(-0.54)
HIGH_PEO		-0.00712				
		(-0.20)				
PEON			0.00275			
			(1.75)			
HIGH_PEON				0.00513		
				(0.11)		
ADJPEON					-0.0365	
					(-0.55)	
HIGH_ADJPEON						-0.0365
						(-1.05)
_cons	-0.00734	0.00161	-0.0184	0.000515	0.0135	0.00507
	(-0.24)	(0.06)	(-0.54)	(0.02)	(0.50)	(0.21)
/ var(e.SRE~1	0.0211**	0.0214**	0.0209*	0.0214**	0.0178*	0.0212**
	(2.62)	(2.72)	(2.52)	(2.70)	(2.25)	(2.70)
N	328	328	328	328	314	328

This table shows the results of tobit regression in which stock repurchase percentage is the dependent variable and PEO is the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

The regression above does not suffer from model misspecification as revealed in Figure 6A.1.1 in appendix II, where we can observe that the coefficient of hatsq is not statistically significant at the 5% level. Therefore, hatsq does not possess any explanatory power, evidencing the case of a properly specified model.

6A.1.2 The Effects of PEOs on Stock Repurchase Decision Using Tobit Models with Interaction Terms

Table 6A.1.2 below shows the results of the maximum likelihood estimation involving a Tobit regression model and including interaction terms. In the table, I report the marginal effects of Tobit models with varying measures for the threat of PEOs. As an extension of the regression in section 6A.3.1, when I run regressions including interaction terms of the PEO variable with industry concentration and past equity returns, the results of the regression show positive coefficients for the main explanatory variables that are statistically significant at the 5% level. However, we cannot rely on the results of the econometric regression because the associated linktest fails to validate that the model upon which the regression was implemented is properly specified. Thus, taking into consideration the linktest in figure 6A.1.2 in appendix II, there seems to be a spurious regression.

6A.1.3 The Effects of PEOs on Stock Repurchase Decision Using Tobit Models without Interaction Terms when Controlling for Extraordinary Economic Periods.

In this section the goal is to control for extraordinary economic periods in our regression. The results of the regression are not statistically significant for all specifications when we regress stock repurchases against the threat of PEOs alongside other relevant explanatory variables. The regression results without interaction terms are as demonstrated in Tables 6A.1.3 below.

6A.1.4 The Effects of PEOs on Stock Repurchase Decision Using Tobit Models with Interaction Terms when Controlling for Extraordinary Economic Periods.

In this section the goal is to control for extraordinary economic periods in our regression together with the inclusion of interaction terms. The results of the regression are not statistically significant for all specifications when we regress stock repurchases against the threat of PEOs alongside other relevant explanatory variables. The regression results without interaction terms are as demonstrated in Tables 6A.1.4 below. We can observe that the

marginal effects of our tobit models when interaction variables are incorporated into the model are not statistically significant at the 5% level.

TABLE 6A.1.2
THE EFFECTS OF PEOs ON STOCK REPURCHASE DECISION WITH INTEREACTION TERMS IN A TOBIT MODEL

	(1) SRPP	(2) SRPP	(3) SRPP	(4) SRPP	(5) SRPP	(6) SRPP
STOCK REPURCHASE PERCENTAGE (SRPP)						
PEO	-0.0000363**					
	(-3.05)					
c.PEO#c.CON	0.000130***	0.0000784*				
	(4.43)	(2.04)				
c.PEO#c.PA~S	0.000000150	0.000000198				
	(1.03)	(1.19)				
PAST RETURNS	0.0000854	0.0000612	0.0000873	0.000105***	-0.00000283	0.0000802**
	(0.79)	(1.00)	(1.52)	(3.62)	(-0.03)	(3.13)
CONCENTRATION	-0.356***	-0.285**	-0.343*	-0.289**	-0.349	-0.261*
	(-5.63)	(-2.91)	(-2.55)	(-2.61)	(-1.76)	(-2.37)
DIVIDEND RATIO	0.0000129	0.0000778**	0.0000753	0.0000687	0.0000697	0.000125***
	(0.05)	(2.65)	(0.83)	(1.46)	(1.05)	(3.39)
PE	0.00000127	0.000000235	0.000000772	0.000000111	0.000000641	0.000000434
	(0.28)	(0.82)	(1.89)	(0.26)	(1.60)	(1.37)
OPINCOME	0.00000143	0.00000174	0.000000845	0.00000195	0.000000890	0.00000149
	(0.51)	(0.92)	(0.42)	(1.53)	(0.34)	(0.57)
NONOPINCOME	-0.00000108	-0.00000177	0.000000506	-0.00000178	0.00000143	0.00000182
	(-0.29)	(-0.63)	(0.18)	(-0.73)	(0.87)	(1.13)
DEBTEQUITY	-0.000249	-0.000290	-0.000673	-0.000190	-0.000851	-0.000860
	(-0.43)	(0.47)	(-1.08)	(-0.31)	(-1.17)	(-1.36)
CAPEX	0.00000780**	0.00000837*	0.00000793	0.00000862*	0.00000662*	0.00000695*
	(2.70)	(2.06)	(1.95)	(2.17)	(2.44)	(2.44)
MKTBK	-0.0000209	-0.00000945	-0.0000127	-0.00000819	-0.0000151	-0.0000107
	(-0.38)	(-1.12)	(-1.60)	(-0.88)	(-1.28)	(-0.98)
CASH	0.000000245	0.000000338	4.22e-08	0.000000459	-0.000000245	-0.000000515
	(0.22)	(0.41)	(0.05)	(0.86)	(-0.44)	(-0.98)
CASHFLOW	-0.00000205	-0.00000145	-0.00000340	-0.00000310	-0.00000336	-0.00000254
	(-0.30)	(-0.20)	(-0.51)	(-0.54)	(-0.53)	(-0.39)
HIGH_PEO		-0.0970**				
		(-2.69)				
PEON			-0.00207			
			(-0.59)			
c.PEON#c.C~N			0.0129			
			(1.70)			
c.PEON#c.P~S			0.00000626			
			(0.28)			
HIGH_PEON				-0.119		
				(-1.41)		
c.HIGH_PEO~N				0.377*		
				(1.99)		
c.HIGH_PEO~S				0.000617		
				(1.07)		

ADJPEON					-0.210	
					(-1.43)	
c.ADJPEON#~N					0.456	
					(1.22)	
c.ADJPEON#~S					0.000512	
					(0.74)	
HIGH_ADJPEON						-0.121
						(-1.96)
c.HIGH_ADJ~N						0.206
						(1.42)
c.HIGH_ADJ~S						0.000386
						(0.88)
_cons	0.0341	0.00969	0.0245	0.0168	0.0622	0.0196
	(1.56)	(0.37)	(0.69)	(0.58)	(1.10)	(0.61)
/						
var(e.SRE~1)	0.0195***	0.0191**	0.0197**	0.0206**	0.0174*	0.0211**
	(9.00)	(2.64)	(2.59)	(2.85)	(2.31)	(2.70)
NO. of OBSERVATIONS	328	328	328	328	314	328

This table shows the results of tobit regression in which stock repurchase percentage is the dependent variable and PEO is the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

TABLE 6A.1.3

THE EFFECTS OF PEOs ON STOCK REPURCHASE DECISION IN A TOBIT MODEL WITHOUT INTERACTION TERMS WHEN CONTROLLING FOR EXTRAORDINARY ECONOMIC PERIODS

	(1) SRPP	(2) SRPP	(3) SRPP	(4) SRPP	(5) SRPP	(6) SRPP
STOCK REPURCHASE PERCENTAGE						
PEO	-0.00000115					
	(-0.29)					
PAST RETURNS	0.0000970***	0.0000958***	0.000103**	0.0000991**	0.0000943***	0.0000893***
	(3.47)	(3.37)	(3.09)	(3.14)	(3.53)	(3.62)
CONCENTRATION	-0.275**	-0.271**	-0.288*	-0.281*	-0.265**	-0.264*
	(-2.67)	(-2.72)	(-2.51)	(-2.56)	(-2.64)	(-2.59)
DIVRATIO	0.000223***	0.000219***	0.000177	0.000224***	0.000208***	0.000225***
	(3.69)	(3.99)	(1.74)	(3.79)	(3.50)	(4.28)
PE	0.000000563	0.000000451	0.000000440	0.000000168	0.000000513	0.000000539
	(1.39)	(1.70)	(1.60)	(0.59)	(1.53)	(1.61)
OPINCOME	0.000000358	0.000000870	0.00000124	0.00000153	0.000000593	0.000000927
	(0.09)	(0.24)	(0.41)	(0.53)	(0.15)	(0.23)
NONOPINCOME	0.00000114	0.000000387	0.00000132	0.00000199	0.00000188	0.00000190
	(0.71)	(0.20)	(0.75)	(1.12)	(0.96)	(1.00)
DEBT EQUITY	-0.000860	-0.000820	-0.000738	-0.000576	-0.000903	-0.000885
	(-1.41)	(-1.44)	(-1.37)	(-1.18)	(-1.40)	(-1.40)
CAPEX	0.00000836	0.00000910	0.00000845	0.00000825	0.00000772*	0.00000776
	(1.92)	(1.83)	(1.91)	(1.79)	(2.00)	(1.91)
MARKET BOOK	-0.0000112	-0.0000108	-0.00000810	-0.00000781	-0.0000115	-0.0000113
	(-1.31)	(-1.39)	(-1.18)	(-1.08)	(-1.44)	(-1.39)
CASH	-9.27e-08	-4.88e-08	-0.000000230	-0.000000417	-0.000000255	-0.000000317
	(-0.15)	(-0.08)	(-0.36)	(-0.63)	(-0.36)	(-0.47)
CASHFLOW	-0.00000326	-0.00000240	-0.00000382	-0.00000452	-0.00000427	-0.00000420
	(-0.33)	(-0.22)	(-0.41)	(-0.49)	(-0.45)	(-0.41)
HIGH_PEO		-0.0283				
		(-1.04)				
PEON			-0.00186			
			(-0.84)			
HIGH_PEON				-0.0481		
				(-0.97)		
ADJPEON					-0.0567	
					(-0.81)	
HIGH_ADJPEON						-0.0304
						(-0.91)
_cons	0.0177	0.0185	0.0303	0.0217	0.0310	0.0188
	(0.87)	(0.96)	(1.12)	(1.01)	(1.13)	(0.97)
var(e.SRE~1)	0.0122	0.0121	0.0121	0.0120	0.0121	0.0122
	(1.42)	(1.44)	(1.44)	(1.45)	(1.42)	(1.41)
NO. of OBSERVATIONS	274	274	274	274	261	274

This table shows the results of tobit regression in which stock repurchase percentage is the dependent variable and PEO is the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

TABLE 6A.1.4
THE EFFECTS OF PEOs ON STOCK REPURCHASE DECISIONS WITH INTEREACTION TERMS IN A TOBIT MODEL WHEN CONTROLLING FOR EXTRAORDINARY ECONOMIC PERIODS

	(1) SRPP	(2) SRPP	(3) SRPP	(4) SRPP	(5) SRPP	(6) SRPP
STOCK REPURCHASE PERCENTAGE						
PEO	-0.0000198					
	(-1.53)					
c.PEO#c.CONCENTRATION	0.0000669	0.0000363				
	(1.84)	(1.24)				
c.PEO#c.PAST RETURNS	-0.000000156	-0.000000116				
	(-0.89)	(-1.01)				
PAST RETURNS	0.000139	0.000127*	0.000121*	0.000109**	0.0000743	0.0000976**
	(1.57)	(2.50)	(2.50)	(2.76)	(0.75)	(3.12)
CONCENTRATION	-0.331***	-0.299*	-0.379*	-0.307*	-0.393	-0.301*
	(-5.24)	(-2.48)	(-1.97)	(-2.32)	(-1.95)	(-2.38)
DIVRATIO	0.000186	0.000227***	0.000114	0.000193***	0.000185*	0.000225***
	(0.78)	(4.80)	(0.81)	(3.64)	(2.49)	(4.57)
PE	0.000000867	0.000000327	0.000000468	-3.18e-08	0.000000588	0.000000560
	(0.25)	(1.55)	(1.43)	(-0.11)	(1.57)	(1.71)
OPINCOME	0.00000102	0.00000103	0.00000179	0.00000183	0.000000720	0.000000941
	(0.38)	(0.30)	(0.73)	(0.81)	(0.19)	(0.23)
NONOPINCOME	-0.000000782	-0.00000101	-0.00000172	-0.00000117	0.00000135	0.00000138
	(-0.21)	(-0.44)	(-0.49)	(-0.30)	(0.78)	(0.84)
DEBT EQUITY	-0.000708	-0.000739	-0.000559	-0.000253	-0.00104	-0.00102
	(-1.42)	(-1.37)	(-1.26)	(-0.58)	(-1.46)	(-1.53)
CAPEX	0.00000950***	0.00000960	0.00000914	0.00000954	0.00000740*	0.00000789*
	(3.59)	(1.86)	(1.89)	(1.75)	(2.25)	(2.12)
MKTBK	-0.0000157	-0.0000105	-0.00000676	-0.00000816	-0.0000156	-0.0000139
	(-0.36)	(-1.39)	(-1.19)	(-1.17)	(-1.52)	(-1.48)
CASH	-5.78e-08	1.72e-08	0.000000387	0.000000313	-0.000000130	-0.000000315
	(-0.06)	(0.03)	(0.48)	(0.39)	(-0.21)	(-0.50)
CASHFLOW	0.00000105	0.000000903	-0.00000215	-0.00000351	-0.00000440	-0.00000270
	(0.14)	(0.07)	(-0.23)	(-0.40)	(-0.50)	(-0.26)
HIGH_PEO		-0.0480				
		(-1.33)				
PEON			-0.00490			
			(-1.15)			
c.PEON#c.CONCENTRATION			0.0171			
			(1.11)			
c.PEON#c.PAST RETURNS			0.00000106			
			(0.10)			
HIGH_PEON				-0.129		
				(-1.26)		
c.HIGH_PEO~N				0.264		
				(1.19)		
c.HIGH_PEO~S				0.000702		
				(1.26)		
ADJPEON					-0.216	
					(-1.37)	

c.ADJPEON#~N					0.467	
					(1.27)	
c.ADJPEON#~S					0.000197	
					(0.31)	
HIGH_ADJPEON						-0.0998
						(-1.62)
c.HIGH_ADJ~N						0.198
						(1.49)
c.HIGH_ADJ~S						0.000131
						(0.35)
_cons	0.0334	0.0220	0.0490	0.0273	0.0726	0.0293
	(1.70)	(1.10)	(1.25)	(1.11)	(1.38)	(1.23)
var(e.SRE~1)	0.0120***	0.0120	0.0119	0.0117	0.0118	0.0121
	(8.38)	(1.46)	(1.47)	(1.50)	(1.46)	(1.42)
NO. OF OBSERVATIONS	274	274	274	274	261	274

This table shows the results of tobit regression in which stock repurchase percentage is the dependent variable and PEO is the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

6A.2 The Effects of PEOs on the Probability of Stock Repurchase Decisions

6A.2.1 The Effects of PEOs on the Probability of Stock Repurchase Decisions in a Probit Model without Interaction Terms

I apply the Probit model to estimate the probability that rival firms repurchases its stock in the occurrence of the competitive threat of PEOs. The dependent variable is a dummy variable denoted as SREP_DUMMY. SREP_DUMMY equals one when a firm repurchases at least 0.25% of the market value of its outstanding equity. Analogous to my analysis using Tobit models, I run Probit models applying distinct specifications for measures of the competitive threat of PEOs. Table 6A.2.1 provides a report on the marginal effects of Probit models. The coefficients of the threat of PEOs are not statistically significant for both the PEO and ADJPEON specifications.

6A.2.2 The Effects of PEOs on the Probability of Stock Repurchase Decisions in a Probit Model with Interaction Terms

When we incorporate interaction terms of the threat of PEOs with industry concentration as shown in Table 6A.2.2, we can observe positive statistically significant coefficients of 0.000304 and 2.346 respectively for the interaction terms PEO*CONCENTRATION and HIGH_PEON*CONCENTRATION. Having a coefficient of 0.000304 can be interpreted to

mean that a one unit increase in the monetary proceeds of public equity offerings for concentrated industries is likely to bring about a 0.000304 increase in the probability of stock repurchases. Also having a coefficient of 2.346 can be interpreted to mean that the probability of a stock repurchase can be 2.346 higher when the number of public equity offerings is high versus when it is low for concentrated industries. I verified the validity of the results by implementing the linktest together with the Probit regression. Given the results in figure 6A.2.2 in Appendix II, I fail to reject the null hypothesis of no omitted variables. This is because the coefficient of hatsq is not statistically significant and therefore does not possess any explanatory powers confirming the existence of a properly specified model.

From the results of a prediction of the probability of a stock repurchase emanating from the threats of PEOs, we can observe from figure 6A.3.2, in appendix II, that there is an average probability of 0.33 that a rival firm will repurchase its stock given the presence of high proceeds from PEOs or high number of PEOs (PEONs) in concentrated industries.

6A.2.3 The Effects of PEOs on the Probability of Stock Repurchases in a Probit Model without Interaction Terms when Controlling for Extraordinary Economic Periods

In this section the goal is to control for extraordinary economic periods in our regression. The results of the regression are not statistically significant for all specifications when we regress stock repurchases against the threat of public equity offerings alongside other relevant explanatory variables when controlling for extraordinary economic periods. Also, the regression outcome does not improve when we examine the effects of the threat of public equity offering in the presence of industry concentration and past returns of firms' equity. The results are demonstrated in Table 6A.2.3 below.

6A.2.4 The Effects of PEOs on the Probability of Stock Repurchase Decisions in a Probit Model with Interaction Terms when Controlling for Extraordinary Economic Periods

In Table 6A.2.4 below, we can observe that the results of the regression are not statistically significant for all specifications when we regress stock repurchases against the threat of public equity offerings alongside other relevant explanatory variables when controlling for extraordinary economic periods when we incorporate interaction terms of both threats of public equity offerings and industry concentration on one hand as well as stock past returns on the other hand. The marginal effects of our Tobit models when interaction variables are incorporated into the model are not statistically significant at the 5% level.

TABLE 6A.2.1
THE EFFECTS OF PEOs ON THE PROBABILITY OF STOCK REPURCHASES WITHOUT INTERACTION TERMS IN A PROBIT REGRESSION MODEL

	(1) SRPD	(2) SRPD	(3) SRPD	(4) SRPD	(5) SRPD	(6) SRPD
STOCK REPURCHASE DUMMY(SRPD)						
PEO	0.0000736					
	(1.49)					
PAST_RETURNS	-0.000455	-0.000452	-0.000896	-0.000498	-0.000391	-0.000391
	(-0.47)	(-0.50)	(-0.94)	(-0.62)	(-0.42)	(-0.44)
CONCENTRATION	-1.469**	-1.476**	-1.421*	-1.448**	-1.438*	-1.439*
	(-2.59)	(-2.59)	(-2.39)	(-2.62)	(-2.49)	(-2.55)
DIVRATIO	-0.00401**	-0.00409**	-0.00406***	-0.00425***	-0.00426**	-0.00428**
	(-3.15)	(-3.12)	(-3.49)	(-3.50)	(-3.09)	(-3.18)
PE	-0.0000578	-0.0000568	-0.0000547	-0.0000558	-0.0000561	-0.0000560
	(-1.65)	(-1.58)	(-1.58)	(-1.56)	(-1.62)	(-1.62)
OPINCOME	0.0000406	0.0000410	0.0000399	0.0000410	0.0000426	0.0000441
	(1.18)	(1.19)	(1.25)	(1.31)	(1.25)	(1.23)
NONOPINCOME	-0.0000232	-0.0000217	-0.0000239	-0.0000273	-0.0000276	-0.0000237
	(-0.50)	(-0.47)	(-0.52)	(-0.62)	(-0.63)	(-0.54)
DEBTEQUITY	0.00614	0.00620	0.00459	0.00502	0.00611	0.00563
	(0.62)	(0.62)	(0.46)	(0.49)	(0.63)	(0.58)
CAPEX	0.0000401	0.0000399	0.0000439	0.0000457	0.0000464	0.0000458
	(0.79)	(0.77)	(0.85)	(0.90)	(0.91)	(0.91)
MARKET BOOK	0.000458	0.000449	0.000410	0.000437	0.000432	0.000431
	(0.90)	(0.87)	(0.80)	(0.85)	(0.86)	(0.86)
CASH	0.00000483	0.00000485	0.00000550	0.00000586	0.00000560	0.00000424
	(0.32)	(0.33)	(0.37)	(0.42)	(0.40)	(0.29)
CASHFLOW	-0.0000220	-0.0000272	-0.0000280	-0.0000208	-0.0000196	-0.0000191
	(-0.18)	(-0.23)	(-0.22)	(-0.17)	(-0.16)	(-0.16)
HIGH_PEO		0.208				
		(0.80)				
PEON			0.0184			
			(1.24)			
HIGH_PEON				0.161		
				(0.36)		
ADJPEON					0.126	
					(0.26)	
HIGH_ADJPEON						-0.0920
						(-0.28)
_cons	-0.276	-0.238	-0.350	-0.237	-0.244	-0.206
	(-0.95)	(-0.86)	(-1.35)	(-0.90)	(-0.85)	(-0.74)
N	339	339	339	339	325	339

This table shows the results of tobit regression in which stock repurchase dummy is the dependent variable and PEO is the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

TABLE 6A.2.2
THE EFFECTS OF PEOs ON THE PROBABILITY OF STOCK REPURCHASES WITH INTERACTION TERMS IN A PROBIT REGRESSION MODEL

	(1) SRPD	(2) SRPD	(3) SRPD	(4) SRPD	(5) SRPD	(6) SRPD
STOCK REPURCHASE DUMMY(SRPD)						
PEO	-0.0000706					
	(-0.81)					
c.PEO#c.CONCENTRATION	0.000420	0.000304*				
	(1.73)	(1.98)				
c.PEO#c.PAST RETURNS	0.000000592	0.000000591				
	(0.96)	(0.83)				
PAST_RETURNS	-0.000774	-0.000774	-0.00141	-0.000481	-0.00139	-0.000839
	(-0.73)	(-0.72)	(-0.77)	(-0.47)	(-1.63)	(-0.63)
CONCENTRATION	-1.899*	-1.767**	-2.251**	-1.881**	-2.419*	-1.957*
	(-2.53)	(-2.78)	(-2.93)	(-2.88)	(-2.01)	(-2.14)
DIVIDEND RATIO	-0.00444**	-0.00432**	-0.00471***	-0.00498***	-0.00509**	-0.00473***
	(-3.14)	(-3.11)	(-4.00)	(-3.34)	(-3.22)	(-3.44)
PE	-0.0000579	-0.0000583	-0.0000549	-0.0000584	-0.0000560	-0.0000574
	(-1.54)	(-1.60)	(-1.57)	(-1.63)	(-1.57)	(-1.60)
OPINCOME	0.0000433	0.0000428	0.0000433	0.0000496	0.0000432	0.0000454
	(1.25)	(1.24)	(1.45)	(1.71)	(1.23)	(1.24)
NONOPINCOME	-0.0000317	-0.0000307	-0.0000331	-0.0000462	-0.0000283	-0.0000257
	(-0.69)	(-0.63)	(-0.70)	(-0.98)	(-0.66)	(-0.60)
DEBTEQUITY	0.00756	0.00716	0.00636	0.00891	0.00481	0.00407
	(0.77)	(0.73)	(0.57)	(0.79)	(0.47)	(0.42)
CAPEX	0.0000429	0.0000427	0.0000478	0.0000499	0.0000440	0.0000449
	(0.87)	(0.83)	(0.90)	(0.94)	(0.90)	(0.94)
MKTBK	0.000456	0.000460	0.000419	0.000445	0.000416	0.000433
	(0.84)	(0.87)	(0.82)	(0.85)	(0.79)	(0.82)
CASH	0.00000637	0.00000615	0.00000730	0.0000100	0.00000557	0.00000362
	(0.43)	(0.40)	(0.49)	(0.72)	(0.40)	(0.25)
CASHFLOW	-0.0000172	-0.0000172	-0.0000229	-0.0000237	-0.0000186	0.00000972
	(-0.15)	(-0.15)	(-0.20)	(-0.21)	(-0.16)	(-0.08)
HIGH_PEO		-0.116				
		(-0.38)				
PEON			-0.0124			
			(-0.65)			
c.PEON#c.C~N			0.0998			
			(1.81)			
c.PEON#c.P~S			0.000104			
			(1.04)			
HIGH_PEON				-0.601		
				(-1.47)		
c.HIGH_PEO~N				2.346**		
				(2.93)		
c.HIGH_PEO~S				0.00383		
				(1.21)		
ADJPEON					-1.046	
					(-1.62)	

c.ADJPEON#~N					3.071 (1.44)	
c.ADJPEON#~S					0.00465 (1.00)	
HIGH_ADJPEON						-0.885 (-1.74)
c.HIGH_ADJ~N						1.903 (1.62)
c.HIGH_ADJ~S						0.00461 (0.98)
_cons	-0.148 (-0.49)	-0.199 (-0.71)	-0.0989 (-0.45)	-0.134 (-0.55)	0.0973 (0.30)	-0.0432 (-0.13)
NO OF OBSERVATIONS	339	339	339	339	325	339

This table shows the results of tobit regression in which stock repurchase dummy is the dependent variable and PEO is the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

TABLE 6A.2.3
THE EFFECTS OF PEOs ON THE PROBABILITY OF STOCK REPURCHASES IN A PROBIT MODEL WITHOUT INTERACTION TERMS WHEN CONTROLLING FOR EXTRAORDINARY ECONOMIC PERIODS

	(1) SRPD	(2) SRPD	(3) SRPD	(4) SRPD	(5) SRPD	(6) SRPD
STOCK REPURCHASE DUMMY(SRPD)						
PEO	0.0000984*					
	(2.22)					
PAST_RETURNS	-0.000407	-0.000399	-0.000316	-0.000251	-0.000268	-0.000405
	(-0.32)	(-0.34)	(-0.38)	(-0.29)	(-0.26)	(-0.37)
CONCENTRATION	-1.709*	-1.707*	-1.720**	-1.725**	-1.621*	-1.652*
	(-2.29)	(-2.35)	(-2.61)	(-2.58)	(-2.16)	(-2.38)
DIVRATIO	0.000375	0.000274	0.0000922	0.000321	-0.0000606	0.0000850
	(0.27)	(0.20)	(0.06)	(0.21)	(-0.04)	(0.06)
PE	-0.0000604	-0.0000588	-0.0000590	-0.0000597	-0.0000577	-0.0000573
	(-1.62)	(-1.55)	(-1.58)	(-1.60)	(-1.57)	(-1.58)
OPINCOME	0.0000802	0.0000841	0.0000896	0.0000953*	0.0000875	0.0000907
	(1.49)	(1.52)	(1.86)	(1.97)	(1.60)	(1.61)
NONOPINCOME	-0.0000784	-0.0000768	-0.0000805	-0.0000772	-0.0000774	-0.0000733
	(-1.61)	(-1.61)	(-1.66)	(-1.57)	(-1.48)	(-1.35)
DEBT EQUITY	0.00430	0.00431	0.00461	0.00620	0.00388	0.00366
	(0.38)	(0.37)	(0.40)	(0.48)	(0.35)	(0.33)
CAPEX	0.0000403	0.0000440	0.0000493	0.0000487	0.0000463	0.0000464
	(0.70)	(0.79)	(0.85)	(0.83)	(0.80)	(0.79)
MARKET BOOK	0.000508	0.000495	0.000497	0.000494	0.000471	0.000468
	(0.96)	(0.94)	(0.95)	(0.94)	(0.90)	(0.92)
CASH	0.0000219	0.0000214	0.0000212	0.0000201	0.0000208	0.0000193
	(1.55)	(1.56)	(1.58)	(1.51)	(1.42)	(1.23)
CASHFLOW	-0.000117	-0.000122	-0.000119	-0.000127	-0.000120	0.000122
	(-0.60)	(-0.63)	(-0.61)	(-0.65)	(-0.61)	(-0.61)
HIGH_PEO		0.165				
		(0.93)				
PEON			-0.00425			
			(-0.15)			
HIGH_PEON				-0.273		
				(-0.44)		
ADJPEON					-0.264	
					(-0.43)	
HIGH_ADJPEON						-0.221
						(-0.51)
_cons	-0.325	-0.285	-0.250	-0.262	-0.207	-0.253
	(-1.06)	(-0.96)	(-0.91)	(-0.94)	(-0.58)	(-0.82)
NO OF OBSERVATIONS	279	279	279	279	266	279

This table shows the results of tobit regression in which stock repurchase dummy is the dependent variable and PEO is the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

TABLE 6A.2.4
THE PROBABILITY OF STOCK REPURCHASE: PROBIT REGRESSION WITH INTERACTION TERMS WHEN CONTROLLING FOR EXTRAORDINARY ECONOMIC PERIODS

	(1) SRPD	(2) SRPD	(3) SRPD	(4) SRPD	(5) SRPD	(6) SRPD
STOCK REPURCHASE DUMMY(SRPD)						
PEO	0.000108					
	(0.70)					
c.PEO#c.CO~N	0.0000827	0.000319**				
	(0.23)	(3.02)				
c.PEO#c.PA~S	-0.00000274	-0.00000226				
	(-1.48)	(-1.71)				
PAST RETURNS	0.000467	0.000404	0.000286	-0.00000186	0.000939	-0.000463
	(0.71)	(0.55)	(0.23)	(-0.00)	(0.99)	(-0.37)
CONCENTRATION	-1.789*	-1.938*	-3.037**	-1.882*	-2.301*	-1.973*
	(-2.16)	(-2.50)	(-2.99)	(-2.53)	(-1.97)	(-2.05)
DIVRATIO	0.000706	0.000502	-0.000362	0.000589	-0.000212	0.0000205
	(0.45)	(0.36)	(-0.21)	(0.31)	(-0.14)	(0.01)
PE	-0.0000614	-0.0000608	-0.0000631	-0.0000617	-0.0000573	-0.0000580
	(-1.63)	(-1.55)	(-1.66)	(-1.64)	(-1.53)	(-1.55)
OPINCOME	0.0000838	0.0000886	0.000109*	0.000109*	0.0000913	0.0000952
	(1.57)	(1.59)	(2.37)	(2.54)	(1.65)	(1.64)
NONOPINCOME	-0.0000775	-0.0000878	-0.000127	-0.000112	-0.0000789	-0.0000796
	(-1.35)	(-1.76)	(-1.81)	(-1.71)	(-1.65)	(-1.61)
DEBT EQUITY	0.00387	0.00488	0.00845	0.00905	0.00304	0.00233
	(0.36)	(0.43)	(0.72)	(0.73)	(0.28)	(0.22)
CAPEX	0.0000437	0.0000480	0.0000546	0.0000552	0.0000426	0.0000457
	(0.72)	(0.85)	(0.89)	(0.86)	(0.78)	(0.82)
MARKET BOOK	0.000522	0.000516	0.000553	0.000509	0.000459	0.000470
	(0.99)	(0.96)	(1.10)	(0.96)	(0.86)	(0.88)
CASH	0.0000188	0.0000206	0.0000300	0.0000271	0.0000206	0.0000195
	(1.34)	(1.49)	(1.73)	(1.72)	(1.56)	(1.37)
CASHFLOW	-0.0000896	-0.0000861	-0.000102	-0.000121	-0.000121	-0.000112
	(-0.44)	(-0.43)	(-0.58)	(-0.69)	(-0.63)	(-0.56)
HIGH_PEO		0.0249				
		(0.10)				
PEON			-0.0491			
			(-1.52)			
c.PEON#c.C~N			0.250			
			(1.89)			
c.PEON#c.P~S			-0.000123			
			(-0.60)			
HIGH_PEON				-0.786		
				(-1.10)		
c.HIGH_PEO~N				2.302*		
				(2.04)		
c.HIGH_PEO~S				-0.000392		
				(-0.06)		
ADJPEON					-1.055	
					(-1.40)	
c.ADJPEON#~N					2.633	
					(1.38)	

c.ADJPEON#~S					-0.00592 (-0.74)	
HIGH_ADJPEON						-0.814 (-1.46)
c.HIGH_ADJ~N						1.699 (1.37)
c.HIGH_ADJ~S						0.000643 (0.10)
_cons	-0.312 (-0.93)	-0.260 (-0.87)	0.00415 (0.02)	-0.243 (-0.87)	0.000190 (0.00)	-0.159 (-0.48)
NO. OF OBSERVATIONS	279	279	279	279	266	279

This table shows the results of tobit regression in which stock repurchase dummy is the dependent variable and PEO is the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

PART B: Data Analysis for The Competitive Effects of Intra-Industry Public Equity Offerings (PEOs) on Bond Issuance Decisions of Rival Firms

3B Variable Description for the Econometric Model where Bond Issuance Decisions is the Major Dependent Variable

3B.1.1 Dependent Variable

In assessing whether or not intra-industry PEOs have a causal effect on bond issuance decisions of firms, I would set up an econometric model in which bond issuance proceeds would be the dependent variable.

3B.1.2 Main Explanatory Variable

For the main explanatory variable, I will apply basically two approaches to capture the market's perception of the competitive threats of intra-industry PEOs on incumbent competing firms within the same industry in a short period of time, including the total proceeds of intra-industry PEOs and the number of PEOs (PEON).

3B.1.3 Other Control variables:

I would incorporate numerous other explanatory variables to control for a number of other reasons that has been documented as possible justifications for bond issuances in response to competitive pressure generally. In the ensuing paragraphs, I will provide theoretical justifications for the variables considered as control variables. These will be a synthesis of theories that delineate the variables that have been established to be an influencing or determining factor for the decision of corporations to issue bonds.

Debt capital may be positively correlated with capital expenditures. Chatterjee and Eyigungor (2022) as well as Pagano, Panetta and Zingales (1998) demonstrated that larger firms (either by employment or sales) have a greater leverage. Harris and Raviv (1990), summarizing a number of empirical studies from US firms, suggest that leverage surges with fixed assets, investment opportunities, size of the firm and non-debt tax shields. Morri and Beretta (2008) demonstrated that Real Estate Investment Trusts (REITs) with more opportunities for growth have bigger leverage ratios in addition to the fact that investments in tangible assets exhibit a positive correlation with leverage. These evidences imply that the ability of a firm to grow and expand in size will invariably require investments in fixed assets or capital expenditures. Thus, the

presence of a positive relationship between firm size, which is proxied by either sales or fixed assets, and leverage, also suggests that capital expenditures is positively related to leverage. Therefore, I would argue that a firm's tendency to undertake capital expenditures could impact on its bond issuance decisions as against raising capital through equity issuance given that cost of debt is usually lower than the cost of equity (Modigliani and Miller,1958, 1963). As a result, I would include capital expenditures to control for its effects on a firm's tendency to issue bonds.

A firm's decision to undertake new debt issuances may be premised on the existing level of debt capital. Harris and Raviv (1990) postulated that debt creates the information that can be used by investors to evaluate significant operating decisions including liquidations. As has been previously discussed, debt capital can serve a variety of purposes for a firm, including signaling the future prospects of the firm, and optimizing the capital structure of the firm. Therefore, new bond issuance decisions are likely to be correlated with the firms' current debt level and the leverage ratio. Harris and Raviv (1990), summarizing a number of empirical studies from US firms, suggest that leverage increases with fixed assets, non-debt tax shields, investment opportunities and firm size and on the other hand, it decreases with volatility, advertising expenditure, the probability of bankruptcy, profitability and uniqueness of the product. Given that leverage decreases with the probability of bankruptcy, firms are likely to consider existing leverage in the light of the risks of bankruptcy in making bond issuance decisions. Therefore, taking into consideration the empirical observations highlighted in this paragraph, I include long-term debt and debt to equity ratio variables in the regression model to control for the effect of the risks of bankruptcy on firms' bond issuance decisions.

As previously noted, debt can be incorporated into the capital structure to reap agency benefits of debt or mitigate agency costs of equity or free cashflows. Jensen (1986) postulated a theory of the 'the agency costs of free cash flow', which strives to provide explanations on the benefits of debt in reducing agency costs of free cash flows. Given that a firm may issue debt in order to mitigate the agency costs of free cash flows, it seems plausible to view cash and cash flows as a potential determinant of debt issuance. Therefore, I will include cashflow and cash variables to control for the effects of agency costs of free cashflows on bond issuance decisions. Moreover, previous research also finds a positive relationship between a firm's stock repurchases and its cash position. In particular, Stephens and Weisbach (1998), among others, find that managers use repurchases to distribute unexpected cash flows. In a similar vein, Guay and Harford (2000) document that managers use repurchases to distribute transient

cash flows and use dividends to payout more permanent cash flows. Given that stock repurchases affects leverage ratio of a firm, we have additional justifications for Cash holdings and Cashflows, in our regressions in order to control for the effect of cash on bond issuances.

Previous studies find that intra-industry effects of IPOs are stronger in concentrated industries (Lang and Stulz,1992; as well as Massa, Rehman and Vermaelen,2007), and the tendency for a firm to repurchase its stocks and by implication increase its leverage in response to the competitive effects of IPOs is increasing in the intensity of industry concentration (Nguyen, Sutton and Pham, 2014). Thus, I would conjecture that a rival firm in a concentrated industry is more likely to issue bonds in order to adjust its capital structure in the presence of significant activities of PEOs in its industry, as compared to a firm in a less concentrated industry. As a result, I include the concentration variable to control for the impact of industry concentration on bond issuance decision of firms. Analogous to Massa, Rehman and Vermaelen (2007), I apply the Herfindahl Index to measure the degree of concentration in each industry. The Herfindahl index is measured as the sum of the squares of market shares of all the firms in a particular industry for a particular year. Market share is defined as the total sales of the firm in a given year divided by the total sales of the industry in the year. The value of this index is bounded between zero and one, where the value of zero is for industries with the highest level of competition and the value of one is for industries with the highest level of monopoly power.

The ability of a firm to efficiently and effectively implement new debt issuances may be at variance with the business cycle. Francisco and Haan (2011) demonstrated that debt and equity issuance are procyclical for the most part among categories of US listed firms that were selected based on size. Živanović (2019), using a dynamic stochastic general equilibrium model involving two financial sectors performed an analysis of the role of corporate debt composition (with respect to financing using bank loans versus raising capital by issuing bonds) in the propagation of economic shocks. He observed that given the existence of monetary and financial shocks, there are not only cyclical changes in corporate debt composition but also the correlation of the changes with adverse impacts on investment and output. Hickman (1952) observed that the volume of bond issuance in the financial markets are negatively correlated with the business cycle. In other words, as the speed of general economic activity accelerates, the size of bonds offered in the financial market falls on the average; on the contrary, as the speed of general economic activity slows down, the size or volume of bonds issued rises on the average. He further posited that the same behavior is associated with the gross cash proceeds generated by corporations from issuance of bonds. In

addition, Hickman (1952) also demonstrated that, on the flip side, aggregate liquidation of bonds, repayment of bonds (total extinguishments after subtracting refunds), and corporations' gross payment of cash upon liquidations all demonstrate the reverse behavioral pattern. Fama and French (1989) demonstrated that expected returns on long-term bonds and ordinary shares encompass both a risk and maturity premium that are correlated with patterns of business cycles, including being low when adjoining peaks and high when close to troughs. They further posited that the premium-related discrepancy through time is more robust for low-grade bonds than it is for high-grade bonds in addition to being sturdier for stocks than it is for bonds. Ultimately, Fama and French (1989) demonstrated that expected returns are lesser in times characterized by strong economic conditions and greater in periods associated with weak economic conditions. Given the prevalence of a lower expected returns in times of robust economic activities, one would expect a weakening interest of the investment community in buying long-term bonds during that period and an associated reduced tendency for firms to issue bonds. Therefore, I would assert that business cycles can be a determinant of firms' bond issuance decisions as demonstrated above. Firms' revenue and the rate of bond issuances vary with business cycles. As a consequence, it would be plausible to proxy for business cycles using the size of the firm (which in turn is based on sales) and the number of firms issuing bonds in a particular year in the regression model. These variables would control for the effect of business cycles on firms' bond issuance decisions.

Firms' debt issuance tendencies may have some connections with the firm's operational efficiency and operating income. Obu (2022) demonstrated that the optimal capital structure of an industry, and by implication the maximum amount of debt the average firm within an industry can optimally apply to its investment activities and projects would partly determine its profitability. Thakur (2022) accounted for the role of non-operating income in a firm's reputation in the financial markets. It explained that the greater the percentage of the non-operating income in a firm's total profit, the less confidence investors are likely to have in the management of the firm and in the firm's ability to apply its operations in creating value. Morri & Beretta (2008) demonstrated that Real Estate Investment and Trust firms (REITs), which are characterized by high operating risks, have a preference for lesser financial risks and accordingly a lesser gearing. Operating profits would evolve from a firm's or an industry's operating activities, whose profitability is increasing in leverage (Obu, 2022). A lower industry optimal capital structure would imply a lower potential firm operating profit, which in turn reduces a firm's ability to raise debt capital given the financial market's preference for

firms with strong operating profits (Thakur, 2022). All these suggests that the proportion of a firm's non-operating profits is likely to affect how it may choose to finance its operations. Such a firm is likely to prefer the use of retained earnings consistent with the predictions of the pecking order hypothesis (Myers, 1984). Therefore, I would incorporate non-operating income in the econometric model to account for the potential impact of non-operating income on firms' decision to issue bonds.

Srivastav (2022) accounted for the role of the number of shares outstanding of a firm in a firm's behavior and/or outcomes. It posited that given a higher price stability, a higher number of stocks outstanding implies a more stable firm because it requires a greater number of shares to be transacted to generate a tremendous movement in the stock price. On the other hand, the stock with a significantly lower number of shares outstanding is likely to be more susceptible to price manipulation because it requires a smaller number of shares to be bought or sold in order to create a major movement in the stock price. Large institutional ownership may contribute to reducing the number of tradeable shares, resulting in larger bid-ask spreads. Schnatterly, Shaw and Jennings (2008) found that the more extensive the quantity of shares possessed by the largest institutional owner, the bigger the bid-ask spread in the prices of shares. On the contrary, the fraction of equity possessed by smaller institutional investors is associated with lesser bid-ask spreads. The reduction in the number of tradeable shares may create highly priced shares. Dyl and Elliott (2006) found that firms owned principally by small investors are characterized by lesser prices of shares and vice versa, and those owned by big, eminent firms possess higher prices of shares and vice versa. I would conjecture that firms in a bid to maximize the value of their firms would prefer to have a smaller number of outstanding shares, thereby providing additional motivation for issuing debt or bonds. Therefore, it would make sense to conclude that a firm's number of shares outstanding or a firm's inclination to keep the number of shares outstanding at the minimum possible level could impact on its bond issuance decisions as against raising capital through equity issuance. As a result, I would incorporate number of shares outstanding, in the regression model, to control for its effects on a firm's tendency to issue bonds.

4B.0 Empirical Methodology

4B.1 Establishing the econometric model

In this section, I will present and describe applicable econometric models that would form the analytical tool and basis for examining the unique predictive ability of the effects of intra-industry PEOs on bond issuance decisions of rival firms in the Nordic region.

The proceeds of bond issuance are substantially a non-negative value. However, callable and putable bonds exist. I would argue that one way to account for the callable and putable features of bonds is to specify that bonds can assume both negative and non-negative values. In other words when firms or investors respectively invoke the callable or puttable features of their bonds, it may be construed as been analogous to a negative bond issue at the time such invocation is implemented. Also, the issuance of putable and callable bonds is somehow related to having a bank's overdraft loan account, which gives the bank customer the privilege of over drawing or bringing the account balance to negative values and restoring the balance to at least zero within the period for which the bank provides such privilege. Furthermore, as a matter of fact in the event of a firm's inability to honor its bond obligations, the firm can be engrossed in bankruptcy proceedings during which period bonds actually assume negative values from the perspective of the firm and the firm's assets must be sold to offset the outstanding debt. These assertions can be further buttressed by the reality that, for bonds with an embedded option, important characteristics, such as convexity and duration, can assume negative values under certain circumstances for example when the bond is near the money. The convexity will be negative for a callable bond, demonstrating that the upside for a callable bond is considerably lesser than the downside, and will be positive for a putable bond, demonstrating that the advantage for a putable bond is far greater than the disadvantage (CFA Institute, 2022). The convexity of a bond tells us how the duration of a bond transforms with changes in the interest rate. While the duration of a Bond is a means of assessing the extent to which bond prices change whenever rates of interest changes. Given that bond prices can rise and fall, then anything that makes the bond to be initially valued at a price close to zero, implies that the bond can actually become negative in the event of an unfavorable shift in the interest rate (CFA Institute, 2022).

Considering the sum of the analysis above, I find linear regression model to be suitable for estimating (by pooled OLS) the causal relationship between the threat of intra industry public

equity offerings and bond issuance decisions of rival firms. To test for the predictive ability of intra-industry PEOs, I first estimate the following regression for which I included the necessary variables on the basis of established economic relationships as explained above:

$$\text{Bond Issuances}_{t+1} = \beta_0 + \beta_1 \text{PEOThreat}_t + \beta_2 \text{Control Variables}_t + \text{Year Dummies}$$

In other words, PEOs over the last one year are used to predict the bond issuances among rival firms in the following year. The coefficients of the multiple linear regression model can be interpreted as the causal effects of the explanatory variables on the dependent variable under the classical linear regression assumptions. The study reports the effect of a one-unit change in the independent variable on the dependent variable, all other factors held constant. The marginal effects for the binary independent variables are assessed as the effect of moving from a value of 0 to a value of 1.

In the above regressions, β_1 will measure the marginal effect of the competitive threat of PEOs on the bond issuance activities of rival firms. I expect that β_1 will be positive and significant after controlling for other factors, suggesting that the competitive threat of PEOs increases the probability as well as the volume of firms' bond issuance decisions.

4B.2 Verifying the assumptions of the econometric model

We test the model to assess its validity in terms of whether it is likely to suffer from omitted variable bias and the possibility that it violates the homoskedasticity assumption (Wooldridge, 2002). We can implement these tests in STATA by executing the Ramsey RESET test for omitted variable bias or functional form specification and the Breusch-Pagan test respectively (Wooldridge, 2002). I initially will test for homoskedasticity and if the assumption of homoskedasticity is violated, I will implement the regression using robust standard errors.

5B UNIVARIATE TESTS

In Table 5B.1.0 below, I present the results of the univariate test for bond issuers and non-bond issuers. The bond issuers include firms that raised capital using bonds while non-bond issuers did not raise capital for a particular year. Precisely, bond issuers, on average, raised $1546.48 million by offering bond securities in the market, while non-bond issuers did not issue any bond securities. The mean difference for PEO variable is positive and statistically significant, showing stronger PEO activity before Bond issuance events. This initial discovery is analogous with my conjecture that the competitive threat of PEOs could exert a causative effect on the bond issuance decisions of the rival firms. The finding is also consistent with the implied results that firms can alter their leverage in response to the competitive effects of IPOs (Nguyen, Sutton and Pham, 2014).

The average bond issuer has higher sales, capital expenditures, long-term debt and debt-to-equity ratio than the average non-bond issuer. However, the average bond issuer has lower non-operating income and shares outstanding than the average non-bond issuer.

Table 5B.1.0

Univariate Tests to Assess Whether There are any Statistically Significant Differences Between the Groups of Bond Issuers and Non-Bond Issuers.

		UNIVARIATE TESTS					
		BOND ISSUERS		NON-BOND ISSUERS			
Variable	Abridged form of Variable	N	Mean(1)	N	Mean(2)	(1) - (2)	t-statistic
Bond Issuances	BIT	320	1546.48	352	0	1546.48	8.39
Size	SIZE	325	27524.44	325	28734.7	-1210.26	-0.57
Non Operating Income	NONOPINCOME	331	225.68	331	100.6	125.09	1.52
Capital Expenditures	CAPEX	326	1615.07	326	1347.38	267.69	1.51
Cash	CASH	326	2438.61	326	2620.16	-181.56	-1.07
Number of Bond Issuances	BIN	352	4.19	351	0	4.19	10.34
Long Term Debt	LONGDEBT	326	6277.18	326	4712.165	1565.018	3.1264
Shares Outstanding	OUTSHARES	325	1799.44	325	1919.59	-120.158	-0.8255
Debt Equity Ratio	DEBTEQUITY	325	4.46	325	3.41	1.04	1.9626

This table shows the results of univariate tests on groups of issuers of bonds and non-issuers of bonds within a one-year period for publicly listed firms in the Nordic region

6B.0 MAIN RESULTS

6B.1.1 The Effects of PEOs on Bond Issuance Decisions Using Multiple Linear Regression Models without Interaction Terms

Table 6.1B below shows the results of the pooled OLS analysis involving a multiple linear regression model. In the regression model, the dependent variable is aggregate bond issuance proceeds, where it serves as proxy for debt issuance decisions. The independent variable of interest is the threat of PEOs, which in this study is represented in Models (1) – (6) below using a mix of both binary or dummy variables and non-binary variables. Models (1) – (6) uses PEOs, HIGH_PEOs, PEONs, HIGH_PEONs, ADJPEONs and HIGH_ADJPEONs respectively. Of these variables, HIGH_PEOs, HIGH_PEONs, and HIGH_ADJPEONs are dummy variables. We can observe that for every one unit increase in the volume or proceeds of PEOs, there is a resulting 0.196 unit increase in the volume of bonds issued.

The outcome of the regression analysis demonstrated in the Table 6.1B below reveals that the coefficient of the measure of the threat of PEOs is significantly positive only for the PEO specification. The coefficients of PEO and HIGH_PEO are respectively 0.196 and 931.8. Having a coefficient of 0.196 can be interpreted to mean that a one unit increase in the proceeds from public equity offerings is likely to result in a 0.196 increase in the proceeds from bond issuances for an average firm all other factors held constant. Additionally, having a coefficient of 931.8 can be interpreted to signify that the difference in the proceeds of bond issuances is likely to be 931.8 between when the proceeds of public equity offerings are high and when they are low all other factors held constant. Overall, we have sufficiently strong evidence to demonstrate that the average rival firm in the Nordics issue bonds in the event of the presence of competitive threats from PEOs. This effect holds after controlling for other variables which have been documented as determinants of bond issuance decisions.

The coefficients of other control variables including size(sales), capital expenditures, cash and the number of firms issuing bonds in the previous year (BIN) are significant at the 5% level for all of our six specifications.

TABLE 6B.1.1

THE EFFECTS OF PEOs ON BOND ISSUANCE DECISIONS USING A MULTIPLE LINEAR REGRESSION MODEL WITHOUT INTERACTION TERMS

	(1) BOND ISS	(2) BOND ISS	(3) BOND ISS	(4) BOND ISS	(5) BOND ISS	(6) BOND ISS
BOND ISSUANCES IN YEAR t + 1(BOND ISS)						
PEO	0.196***					
	(3.92)					
SIZE	-0.0197***	-0.0198***	-0.0197***	-0.0196***	-0.0195***	-0.0199***
	(-3.91)	(-3.85)	(-3.77)	(-3.59)	(-3.66)	(-3.64)
NONOPINCOME	0.0535	0.0631	0.0480	0.0452	0.0405	0.0394
	(0.62)	(0.73)	(0.55)	(0.53)	(0.48)	(0.49)
CAPEX	0.234***	0.225***	0.248***	0.249***	0.251***	0.254***
	(5.28)	(4.95)	(5.58)	(5.61)	(5.66)	(5.78)
CASH	0.0806***	0.0789***	0.0794***	0.0798***	0.0797***	0.0828***
	(3.72)	(3.49)	(3.48)	(3.44)	(3.47)	(3.60)
BIN	83.57***	80.02***	82.88***	84.02***	83.17***	83.45***
	(6.08)	(6.10)	(5.76)	(5.53)	(5.55)	(5.51)
LONGDEBT	0.0218	0.0225*	0.0231*	0.0224	0.0226	0.0228*
	(1.91)	(1.97)	(1.99)	(1.91)	(1.93)	(2.00)
OUTSHARES	0.0333	0.0296	0.0393	0.0406	0.0420	0.0415
	(1.76)	(1.61)	(1.81)	(1.88)	(1.93)	(1.94)
CONCENTRATION	473.6	451.9	501.7	477.5	504.2	417.2
	(1.79)	(1.71)	(1.84)	(1.65)	(1.60)	(1.61)
DEBTEQUITY	-1.845	-2.512	-2.691	-2.780	-1.584	-1.406
	(-0.17)	(-0.23)	(-0.24)	(-0.26)	(-0.14)	(-0.12)
HIGH_PEO		931.8**				
		(2.76)				
PEON			9.946			
			(1.05)			
HIGH_PEON				154.9		
				(0.55)		
ADJPEON				316.4		
					(0.66)	
HIGH_ADJPEON						286.0
						(0.95)
_cons	-76.11	-3.800	-7.584	45.52	-19.81	24.41
	(-0.56)	(-0.03)	(-0.05)	(0.31)	(-0.10)	(0.16)
OBSERVATIONS	324	324	324	324	311	324

This table shows the results of multiple linear regression in which bond issuances in the next year is the dependent variable and PEO in the current year is the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

The regression above was undertaken using robust standard errors and I implemented the Ramsey RESET test for this regression to further verify that the underlying assumptions necessary to establish a causal effect are not violated. The results of the Ramsey RESET test, stated in figure 6.2B in Appendix II, demonstrates that the p-value of the F test is 0.0982. This

is evidence that is in support of the null hypothesis of no omitted variables at the 5% level of significance.

6B.1.2 The Effects of PEOs on the Probability of Bond Issuance Decisions Using Probit Models without Interaction Terms

The results of the Probit model in Table 6B.1.2 below lends further credence to the results established in Table 6B.1.1 above. The coefficients of the independent variables, including PEOs and ADJPEONs, are 0.000134 and 0.595 respectively, which are statistically significant at the 5% level. These values can be interpreted in the first instance to mean that a one unit increase in the size of PEOs can bring about a 0.000134 increase in the probability of bond issuance all other factors held constant. In the second case we could adjudge that for a given industry with a high number of firms issuing bonds there is likely to be a 0.595 gap between the probability of bond issuance if the number of firms issuing bonds where high as against if they were low. These results satisfy the applicable robustness checks as shown in figure 6B.2.2 in Appendix II. In figure 6B.2.2 in appendix II, we can see that hatsq has a coefficient of 1.55 but which is not statistically significant at the 5%, demonstrating that hatsq does not possess any predictive or explanatory capabilities. As a result, we can fail to reject the null hypothesis of no omitted variables. Furthermore, from figure 6B.2.2b in appendix II, we can predict that the probability of bond issuance given the threats of public equity offerings is on the average about 0.20.

TABLE 6B.1.2

THE EFFECTS OF PEOs ON THE PROBABILITY OF BOND ISSUANCE DECISIONS USING A PROBIT MODEL WITHOUT INTERACTION TERMS

	(1) BI_DUMMY	(2) BI_DUMMY	(3) BI_DUMMY	(4) BI_DUMMY	(5) BI_DUMMY	(6) BI_DUMMY
BOND ISSUANCES DUMMY(BI_DUMMY)						
PEO	0.000134**					
	(2.69)					
SIZE	-0.0000292***	-0.0000296***	-0.0000294***	-0.0000292***	-0.0000290***	-0.0000293***
	(-5.39)	(-5.21)	(-5.25)	(-5.14)	(-6.49)	(-6.17)
NONOPINCOME	0.00000758	0.00000593	0.00000370	0.00000469	-0.0000159	-0.00000734
	(0.12)	(0.10)	(0.06)	(0.07)	(-0.30)	(-0.12)
CAPEX	0.000240***	0.000245***	0.000249***	0.000248***	0.000249***	0.000251***
	(3.72)	(3.97)	(3.85)	(3.82)	(4.25)	(4.18)
CASH	0.0000721	0.0000726	0.0000834	0.0000829	0.0000870	0.0000961
	(1.08)	(1.05)	(1.20)	(1.20)	(1.36)	(1.50)
BIN	0.237***	0.232***	0.231***	0.231***	0.238***	0.230***
	(7.86)	(8.20)	(8.16)	(8.10)	(7.88)	(7.25)
LONGDEBT	0.0000653***	0.0000667***	0.0000640***	0.0000639***	0.0000636***	0.0000603***
	(4.41)	(3.97)	(3.86)	(3.80)	(4.67)	(4.37)
OUTSHARES	0.0000155	0.0000162	0.0000163	0.0000163	0.0000171	0.0000180
	(0.99)	(1.01)	(0.98)	(0.99)	(1.01)	(1.04)
CONCENTRAT~N	-0.773	-0.696	-0.657	-0.649	-0.160	-0.815
	(-1.05)	(-1.03)	(-0.98)	(-0.95)	(-0.23)	(-1.08)
DEBTEQUITY	-0.00907	-0.00785	-0.00820	-0.00806	-0.00537	-0.00690
	(-1.27)	(-1.08)	(-1.18)	(-1.18)	(-0.64)	(-0.99)
HIGH_PEO		0.243				
		(1.07)				
PEON			-0.00126			
			(-0.15)			
HIGH_PEON				-0.0664		
				(-0.33)		
ADJPEON					0.549	
					(1.14)	
HIGH_ADJPEON						0.595*
						(2.43)
_cons	-2.598***	-2.497***	-2.454***	-2.462***	-2.751***	-2.554***
	(-7.17)	(-6.88)	(-6.55)	(-6.48)	(-7.76)	(-7.26)
OBSERVATIONS	332	332	332	332	318	332

This table shows the results of probit model regression in which bond issuances dummy variable in the next year is the dependent variable and PEO in the current year is the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

6B.1.3 The Effects of PEOs on Bond Issuance Decisions in a Multiple Linear Regression Model when Controlling for Extraordinary Economic Periods.

Table 6B.1.3 below shows the results of the pooled OLS analysis involving a multiple linear regression model. We can observe that for every one unit increase in the volume or proceeds of public equity offerings, there is a resulting 0.210 unit increase in the volume of bonds issued. The outcome of the regression analysis demonstrated in the Table 6B.1.3 below reveals that the coefficient of the threat of public equity offering is significantly positive only for PEO specification. This finding is consistent with the postulation that firms can embark on strategic financial activities which can result in an adjustment of their leverage (Dittmar, 2000), in response to the threat of intra-industry IPOs (Nguyen, Sutton, and Pham, 2014). The coefficients of PEOs and HIGH_PEOs are respectively 0.210 and 978.1. Having a coefficient of 0.210 can be interpreted to mean that a one unit increase in the proceeds from public equity offerings is likely to result in a 0.210 increase in the proceeds from bond issuances for an average firm all other factors held constant. Additionally, having a coefficient of 978.1 can be interpreted to signify that the difference in the proceeds of bond issuances is likely to be 978.1 between a situation in which the proceeds of public equity offerings are high and when they are low all other factors held constant. Overall, we have sufficiently strong evidence to demonstrate that the average rival firm in the Nordics issue bonds in the event of the presence of competitive threats from public equity offerings after controlling for extraordinary economic periods. Additionally, this effect holds after controlling for other variables which have been documented as determinants of bond issuance decisions. The coefficients of other control variables including size(sales), capital expenditures, cash and the number of firms issuing bonds in the previous year (BIN) are significant at the 5% level for all of our six specifications.

The regression below was undertaken using robust standard errors and I implemented the Ramsey RESET test for this regression to further verify that the underlying assumptions necessary to establish a causal effect are not violated. The results of the Ramsey RESET test, stated in figure 6B.3.1 in appendix II, demonstrates that the p-value of the F test is 0.4313. Given this evidence, we fail to reject the null hypothesis of no omitted variables at the 5% level of significance.

TABLE 6B.1.3
THE EFFECTS OF PEOs ON BOND ISSUANCE DECISIONS IN A MULTIPLE LINEAR REGRESSION MODEL WHEN CONTROLLING FOR EXTRAORDINARY ECONOMIC PERIODS.

	(1) BOND ISS	(2) BOND ISS	(3) BOND ISS	(4) BOND ISS	(5) BOND ISS	(6) BOND ISS
BOND ISSUANCES IN YEAR t + 1(BOND ISS)						
PEO	0.210**					
	(2.81)					
SIZE	-0.0205***	-0.0210***	-0.0206***	-0.0206***	-0.0206***	-0.0209***
	(-3.61)	(-3.67)	(-3.54)	(-3.45)	(-3.56)	(-3.49)
NONOPINCOME	0.0668	0.0803	0.0644	0.0644	0.0577	0.0564
	(0.53)	(0.64)	(0.50)	(0.52)	(0.46)	(0.47)
CAPEX	0.276***	0.268***	0.289***	0.289***	0.290***	0.292***
	(5.47)	(5.39)	(5.70)	(5.74)	(5.74)	(5.81)
CASH	0.0929***	0.0931***	0.0888***	0.0887***	0.0904***	0.0923***
	(3.94)	(3.98)	(3.69)	(3.70)	(3.73)	(3.77)
BIN	62.82***	60.74***	63.80***	63.15***	60.82***	61.72***
	(4.35)	(4.00)	(4.21)	(4.05)	(4.01)	(4.05)
LONGDEBT	0.00954	0.0103	0.0129	0.0130	0.0134	0.0140
	(0.55)	(0.60)	(0.71)	(0.73)	(0.74)	(0.80)
OUTSHARES	0.0298	0.0265	0.0396	0.0389	0.0389	0.0386
	(1.64)	(1.50)	(1.74)	(1.76)	(1.77)	(1.77)
CONCENTRATION	476.3	444.9	436.1	458.0	515.7	442.3
	(1.87)	(1.78)	(1.59)	(1.57)	(1.68)	(1.80)
DEBTEQUITY	2.787	1.950	3.569	3.359	3.390	3.421
	(0.21)	(0.15)	(0.26)	(0.26)	(0.24)	(0.25)
HIGH_PEO		978.5*				
		(2.29)				
PEON			-4.427			
			(-0.38)			
HIGH_PEON				-31.15		
				(-0.10)		
ADJPEON					162.5	
					(0.36)	
HIGH_ADJPEON						195.7
						(0.62)
_cons	-96.97	-32.19	43.40	16.74	-28.40	-14.36
	(-0.71)	(-0.24)	(0.29)	(0.12)	(-0.14)	(-0.10)
OBSERVATIONS	265	265	265	265	253	265

This table shows the results of a multiple linear regression in which the proceeds of bond issuance variable in the next year is the dependent variable and PEO in the current year is the main independent variable, alongside other control variables. In this estimation, I controlled for the effects of years of extraordinary economic experiences, the COVID-19 crises period of 2021, the financial crises years of 2007 to 2008 and the internet bubble years of 2001. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

6B.1.4 The Effect of PEOs on the Probability of Bond Issuances in a Probit Model When Controlling for Extraordinary Economic Periods

The results of the Probit model in Table 6B.1.4 below lends additional credence to the results established in Table 6B.1.4 above. The coefficients of the HIGH_PEON and HIGH_ADJPEON independent variables are -1.195 and 0.0.822 respectively, which are statistically significant at the 5% level. This finding is consistent with the postulation that firms can embark on strategic financial activities which can result in an adjustment of their leverage (Dittmar, 2000) in response to the threat of IPOs (Nguyen, Sutton, and Pham, 2014). While a plausible interpretation cannot be established for the coefficient in the first instance, however, in the second case we could adjudge that for a given industry with a high number of firms issuing bonds there is likely to be a 0.822 gap between in the probability of bond issuance if the number of firms issuing bonds where high as against if they were low. These results satisfy the applicable robustness checks as shown in figure 6B.3.2 in Appendix II. In figure 6B.3.2, we can see that hatsq has a coefficient of 0.52 but which is not statistically significant at the 5%, demonstrating that hatsq does not possess any predictive or explanatory capabilities. As a result, we can fail to reject the null hypothesis of no omitted variables. Furthermore, from figure 6.3B we can predict that the probability of bond issuance given the threats of public equity offerings is on the average about 0.187.

TABLE 6B.1.4
THE EFFECTS OF PEOs ON THE PROBABILITY OF BOND ISSUANCES IN A PROBIT MODEL WHEN CONTROLLING FOR EXTRAORDINARY ECONOMIC PERIODS

	(1) BI_DUMMY	(2) BI_DUMMY	(3) BI_DUMMY	(4) BI_DUMMY	(5) BI_DUMMY	(6) BI_DUMMY
BI_DUMMY						
PEO	0.0000619					
	(1.07)					
SIZE	-0.0000351***	-0.0000356***	-0.0000341***	-0.0000338***	-0.0000335***	-0.0000342***
	(-4.63)	(-4.70)	(-4.62)	(-4.21)	(-5.86)	(-5.39)
NONOPINCOME	0.0000450	0.0000551	0.0000848	0.000130*	0.000000185	0.00000788
	(0.79)	(0.83)	(1.44)	(1.99)	(0.00)	(0.11)
CAPEX	0.000414***	0.000420***	0.000414***	0.000422***	0.000397***	0.000403***
	(3.63)	(4.02)	(4.07)	(3.98)	(4.45)	(4.28)
CASH	0.000198**	0.000196***	0.000186***	0.000172**	0.000198***	0.000201***
	(3.00)	(3.86)	(3.76)	(2.92)	(4.33)	(4.15)
BIN	0.237***	0.235***	0.247***	0.249***	0.234***	0.229***
	(6.47)	(6.69)	(8.78)	(7.35)	(6.79)	(5.93)
LONGDEBT	-0.00000462	6.08e-08	-0.00000554	-0.00000709	0.00000142	0.00000107
	(-0.24)	(0.00)	(-0.35)	(-0.43)	(0.11)	(0.08)
OUTSHARES	0.0000298	0.0000280	0.0000292	0.0000300	0.0000314	0.0000323
	(1.17)	(1.20)	(1.57)	(1.57)	(1.34)	(1.43)
CONCENTRAT~N	-1.379	-1.314	-1.618*	-1.482*	-0.738	-1.529
	(-1.63)	(-1.59)	(-2.51)	(-1.98)	(-0.90)	(-1.74)
DEBTEQUITY	-0.00288	-0.00358	0.00150	0.00472	0.00160	-0.000514
	(-0.41)	(-0.50)	(0.19)	(0.60)	(0.24)	(-0.06)
HIGH_PEO		-0.158				
		(-0.75)				
PEON			-0.0451*			
			(-2.18)			
HIGH_PEON				-1.195**		
				(-2.63)		
ADJPEON					1.028	
					(0.94)	
HIGH_ADJPEON						0.822
						(1.59)
_cons	-2.548***	-2.504***	-2.262***	-2.571***	-2.901***	-2.615***
	(-5.57)	(-5.83)	(-5.52)	(-5.63)	(-4.89)	(-5.73)
OBSERVATIONS	273	273	273	273	260	273

This table shows the results of a multiple linear regression in which the proceeds of bond issuance variable in the next year is the dependent variable and PEO in the current year is the main independent variable, alongside other control variables. In this estimation, I controlled for the effects of years of extraordinary economic experiences, the COVID-19 crises period of 2021, the financial crises years of 2007 to 2008 and the internet bubble years of 2001. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

7.0 EXTENSIONS

7C.0 PART C: Data Analysis for The Competitive Effects of Intra-Industry Initial Public Offerings (IPOs) and Seasoned Equity Offerings (SEOs) on Stock Repurchase Decisions of Rival Firms.

In this section the goal is to deepen the current study by decomposing the effects of intra-industry PEOs on rival firms into those of IPOs and SEOs and examining the individual impacts of IPOs and SEOs on both stocks repurchase behavior and bond issuance decisions and/or tendencies of rival firms.

7C.1 Empirical Methodology

In this subsection, I will present and describe applicable econometric models that would form the analytical tool and basis for examining the unique predictive ability of the effects of intra-industry PEOs on stock repurchase decisions of rival firms in the Nordic region. In the initial moves, I would apply basic Tobit and Probit models, without interaction terms between the IPO and SEO variables on one hand and industry concentration and past equity returns on the other hand. This approach and subsequent ones, described in this section, are consistent with the methods applied in prior related studies such as Nguyen, Sutton, and Pham (2014).

Tobit:

$$SR\_Percentage_{t+1} = \beta_0 + \beta_1 IPO\_Threat + \beta_2 SEO\_Threat + \beta_3 Control\ Variables_t + Year\ Dummies$$

Probit:

$$SR\_Dummy_{t+1} = \beta_0 + \beta_1 IPO\_Threat + \beta_2 SEO\_Threat + \beta_3 Control\ Variables_t + Year\ Dummies$$

In interpreting the coefficients of the Tobit or Probit model, this study reports the marginal effect of a unit change in the standard deviation of an independent variable while keeping all other independent variables at their means. This can be achieved by standardizing all continuous control variables to possess a mean of zero in addition to a standard deviation of one. The marginal effects for the binary independent variables are evaluated as the effect of moving from a value of 0 to a value of 1.

In the above regressions, the parameter for the threat of IPOs and SEOs, β_1 and β_2 respectively will assess the marginal effect of the competitive threat of IPOs and SEOs on the stock

repurchase decisions of rival firms. I anticipate that β_1 and β_2 will be positive and significant after controlling for other relevant factors, suggesting that the competitive threat of IPOs and elevates the probability as well as the volume of repurchases of rival firms.

In the next move, I would interact the competitive threat variables of intra-industry IPOs and SEOs on one hand with the Concentration and the Past_return variables on the other hand. In the regressions stated below, the total of, β_1, β_2, β_3 , β_4, β_5 and β_6 represents the overall impact of the competitive threat of IPOs and SEOs on rival firm's equity repurchase decisions when both the Past_return and Concentration variables are one standard deviation away from their means, keeping other variables at their means. Marginal effects are computed in consistency with the propositions of Ai and Norton (2003) and Norton and Wang, and Ai (2004)

Tobit:

$$SR\_Percentage_{t+1} = \beta_0 + \beta_1 IPO\_Threat + \beta_2 SEO\_Threat + \beta_3 IPOThreat_t * Concentration_t + \beta_4 IPOThreat_t * PastReturns_t + \beta_5 SEOThreat_t * Concentration_t + \beta_6 SEOThreat_t * PastReturns_t + \beta_7 Concentration_t + \beta_8 PastReturns_t + \beta_9 Control\ Variables_t + Year\ Dummies$$

Probit:

$$SR\_Dummy_{t+1} = \beta_0 + \beta_1 IPO\_Threat + \beta_2 SEO\_Threat + \beta_3 IPOThreat_t * Concentration_t + \beta_4 IPOThreat_t * PastReturns_t + \beta_5 SEOThreat_t * Concentration_t + \beta_6 SEOThreat_t * PastReturns_t + \beta_7 Concentration_t + \beta_8 PastReturns_t + \beta_9 Control\ Variables_t + Year\ Dummies$$

In order to evaluate the predictive ability of intra-industry IPOs and SEOs on bond issuance decisions, I first estimate the following regression for which I included the necessary independent variables on the basis of established economic relationships as explained above in the relevant sections in this study.

$$Bond\ Issuances_{t+1} = \beta_0 + \beta_1 IPO\_Threat + \beta_2 SEO\_Threat + \beta_3 Control\ Variables_t + Year\ Dummies$$

7C.2 Main Results

7C.2.1 The Effects of Initial Public Offerings (IPOs) and Seasoned Equity Offerings (SEOs) on Stock Repurchase Decisions Using Tobit Models

The goal in this section is to attempt to understand the separate and individual effects of IPOs as distinct from those of SEOs in assessing their role in accounting for the stock repurchase behavior of rival firms.

7C.2.1.1 The Effects of IPOs & SEOs on Stock Repurchase Decisions Using Tobit Models without Interaction Terms

In this subsection, I apply Tobit models without interaction terms. From Table 7C.2.1.1 below, we can observe that IPOs do not have effects on stock repurchase decisions that are statistically significant. On the other hand, SEOs have statistically significant and positive effects on stock repurchase decisions of rival firms. This finding is consistent with the postulation that firms can embark on strategic financial activities which can result in an adjustment of their leverage (Dittmar, 2000) in response to the threat of equity offerings (Nguyen, Sutton, and Pham, 2014). A unit increase in the dollar amount of SEOs is likely to bring about 0.0000114 increase in the amount of stock repurchases programs of rival firms, all other factors held constant. Also, the amount of stock repurchases is likely to be 0.0521 units higher for each HIGH_SEO or when SEOs are in the top 20th percentile versus when SEOs are in the bottom 80th percentile. In evaluating the robustness of the results achieved, I applied the linktest, which is a model specification test for Tobit regressions, and the results of the test, which are demonstrated in figure 6A.0 in appendix II, shows that the coefficient of hatsq is not statistically significant at the 5% level. Therefore, hatsq does not possess any explanatory power, evidencing the case of a properly specified model.

7C.2.1.2 The Effects of IPOs & SEOs on Stock Repurchase Decisions Using Tobit Models with Interaction Terms

Here, I apply Tobit models with interaction terms. From Table 7C.2.1.2 below, we can observe that IPOs do not have effects on stock repurchase decisions that are statistically significant. On the other hand, SEOs have statistically significant and positive effects on stock repurchase decisions of rival firms. The results show that a unit increase in the dollar amount of SEOs is likely to bring about 0.0000102 increase in the amount of stock repurchase activities of rival firms, all other factors held constant. Also, the amount of stock repurchases is likely to be 0.193 units higher for each HIGH_SEO or when SEOs are in the top 20th percentile and in concentrated industries versus when SEOs are in the bottom 80th percentile in concentrated industries. In evaluating the robustness of the results achieved, I applied the linktest, which is a model specification test for Tobit regressions, and the results of the test, which are demonstrated in figure 6A.0.2 in appendix II, shows that the coefficient of hatsq is not statistically significant at the 5% level. Therefore, hatsq does not possess any explanatory power, evidencing the case of a properly specified model.

Table 7C.2.1.1
THE EFFECTS OF IPOs & SEOs ON STOCK REPURCHASE DECISIONS USING A TOBIT MODEL

	(1) STOCK REPURCHASE PERCENTAGE	(2) STOCK REPURCHASE PERCENTAGE
STOCK REPURHASE PERCENTAGE		
IPO	0.00000314	
	(0.79)	
NUMBER OF IPOs	-0.000426	
	(-0.38)	
SEO	0.0000114***	
	(4.29)	
NUMBER OF SEOs	-0.000289	
	(-0.86)	
PAST RETURNS	0.000115**	0.0000834**
	(3.08)	(2.80)
CONCENTRATION	-0.238*	-0.227**
	(-2.34)	(-2.89)
DIVIDEND RATIO	0.000163**	0.000146**
	(3.02)	(2.89)
PE	-0.000000763	-0.000000995
	(-1.03)	(-1.31)
OPERATING INCOME	0.00000127	0.00000181
	(0.47)	(0.73)
NON-OPERATING INCOME	0.00000120	0.00000176
	(0.44)	(0.75)
DEBT EQUITY	-0.000841	-0.000782
	(-1.36)	(-1.38)
CAPEX	0.00000611	0.00000622
	(1.65)	(1.52)
MARKET BOOK RATIO	-0.00000732	0.00000824
	(-0.55)	(0.66)
CASH	0.000000180	-2.22e-08
	(0.26)	(-0.03)
CASHFLOW	-0.00000786	-0.00000786
	(-1.08)	(-1.14)
HIGH_IPO		0.00842
		(0.66)
HIGH_IPON		-0.000424
		(-0.02)
HIGH_SEO		0.0521***
		(4.15)
HIGH_SEON		0.00000783
		(0.56)
_cons	-0.0868	-0.0178
	(-1.91)	(-0.56)
NUMBER OF OBSERVATIONS	328	328

This table shows the results of a Tobit regression in which the stock repurchase percentage variable in the next year is the dependent variable, IPO and SEO in the current year are the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

Table 7C.2.1.1

THE EFFECTS OF IPOs & SEOs ON STOCK REPURCHASE DECISIONS USING TOBIT MODELS WITH INTERACTION TERMS.

	(1) STOCK REPURCHASE PERCENTAGE	(2) STOCK REPURCHASE PERCENTAGE
STOCK REPURCHASE PERCENTAGE		
IPO	0.00000165	
	(0.38)	
NUMBER OF IPOs	-0.000734	
	(-0.54)	
SEO		0.0000102**
		(2.74)
NUMBER OF SEOs		-0.000219
		(-0.71)
c.IPO#c.CONCENTRATION	0.00000261	
	(0.38)	
c.IPO#c.PAST RETURNS	5.60e-08	
	(1.06)	
c.SEO#c.CONCENTRATION	0.00000423	
	(0.50)	
c.SEO#c.PAST RETURNS	-5.11e-08	
	(-1.87)	
PAST RETURNS	0.000282**	0.0000828*
	(3.03)	(1.97)
CONCENTRATION	-0.292	-0.299*
	(-1.60)	(-2.56)
DIVIDEND RATIO	0.000179**	0.000189***
	(3.19)	(3.55)
PE	-0.000000836	0.00000155
	(-0.97)	(1.23)
OPERATING INCOME	0.00000111	0.00000143
	(0.40)	(0.53)
NON-OPERATING INCOME	0.000000724	0.00000130
	(0.24)	(0.52)
DEBT EQUITY	-0.000775	-0.000662
	(-1.20)	(-1.26)
CAPITAL EXPENDITURE	0.00000632	0.00000640
	(1.67)	(1.64)
MARKET BOOK RATIO	-0.00000494	-0.0000166
	(-0.35)	(-1.04)
CASH	0.000000231	2.28e-08
	(0.31)	(0.03)
CASHFLOW	-0.00000667	-0.00000691
	(-0.79)	(-0.94)
HIGH_IPO		-0.0455
		(-1.64)
HIGH_IPON		-0.00631
		(-0.33)
HIGH_SEO		-0.0190
		(-0.59)

HIGH_SEO NUMBERS		0.00000641 (0.49)
c.HIGH_IPO#c.CONCENTRATION		0.124 (1.37)
c.HIGH_IPO#c.PAST RETURNS		0.000836 (1.43)
c.HIGH_SEO#c.CONCENTRATION		0.193* (2.00)
c.HIGH_SEO#c.PAST RETURNS		0.000291 (0.79)
_cons	-0.0633 (-0.96)	0.00866 (0.24)
/ var(e.SRE~1)	0.0205** (2.61)	0.0206** (2.67)
NUMBER OF OBSERVATIONS	328	328

This table shows the results of a Tobit regression in which the stock repurchase percentage variable in the next year is the dependent variable, IPO and SEO in the current year are the main independent variable, alongside other control variables. The regression incorporates interaction terms between IPO and SEO variables on one hand as well as past returns and industry concentration on the other hand. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

7C.2.1.3 The Effects of IPOs & SEOs on Stock Repurchase Decisions Using Tobit Models without Interaction Terms when Controlling for Extraordinary Economic Periods.

I apply Tobit models without interaction terms. From Table 7C.2.1.3 below, we can observe that IPOs do not have effects on stock repurchase decisions that are statistically significant. On the other hand, intra-industry SEOs have statistically significant and positive effects on stock repurchase decisions of rival firms. This finding is consistent with the postulation that firms can embark on strategic financial activities which can result in an adjustment of their leverage (Dittmar, 2000) in response to the threat of equity offerings (Nguyen, Sutton, and Pham, 2014). A unit increase in the dollar amount of SEO is likely to bring about 0.00000567 increase in the amount of stock repurchases all other factors held constant. Also, the amount of stock repurchases is likely to be 0.0202 units higher for each HIGH_SEO or when SEOs are in the top 20th percentile versus when SEOs are in the bottom 80th percentile. In evaluating the robustness of the results achieved, I applied the linktest, which is a model specification test for Tobit regressions, and interpreting the results of the test, which are demonstrated in figure 6A.0 in appendix II, shows that the coefficient of hatsq is statistically significant at the 5% level. Therefore, hatsq does possess some explanatory power, evidencing a violation of the zero conditional mean assumption or the presence of shortcomings in the model specification.

Table 7C.2.1.3
THE EFFECTS OF IPOs & SEOs ON STOCK REPURCHASE DECISIONS USING TOBIT MODELS WHEN CONTROLLING FOR EXTRAORDINARY ECONOMIC PERIODS

	(1) STOCK REPURCHASE PERCENTAGE	(2) STOCK REPURCHASE PERCENTAGE
STOCK REPURCHASE PERCENTAGE		
IPO	0.00000668	
	(1.41)	
NUMBER OF IPOs	-0.00201	
	(-1.62)	
SEO	0.00000567***	
	(3.84)	
NUMBER OF SEOs	-0.000192	
	(-0.72)	
PAST_RETURNS	0.000101***	0.0000947***
	(3.92)	(3.53)
CONCENTRATION	-0.265*	-0.271**
	(-2.37)	(-2.63)
DIVIDEND RATIO	0.000152*	0.000189*
	(2.05)	(2.56)
PE	-0.000000775	7.10e-08
	(-1.78)	(0.19)
OPERATING INCOME	0.000000864	0.00000115
	(0.22)	(0.30)
NON-OPERATING INCOME	0.00000109	0.00000117
	(0.67)	(0.75)
DEBT EQUITY	-0.000937	-0.000882
	(-1.38)	(-1.45)
CAPITAL EXPENDITURE	0.00000710	0.00000839
	(1.70)	(1.83)
MARKET BOOK	-0.00000427	-0.00000576
	(-0.58)	(-0.79)
CASH	0.000000124	-7.90e-08
	(0.25)	(-0.13)
CASHFLOW	-0.00000632	-0.00000488
	(-0.64)	(-0.47)
HIGH_IPO		0.00102
		(0.10)
HIGH_IPO NUMBERS		-0.0125
		(-0.90)
HIGH_SEO		0.0202*
		(2.24)
HIGH_SEO NUMBERS		-0.00000444
		(-0.72)
_cons	-0.00636	0.0156
	(-0.21)	(0.75)
NUMBER OF OBSERVATIONS	274	274

This table shows the results of a Tobit regression in which the stock repurchase percentage variable in the next year is the dependent variable, while IPO and SEO in the current year are the main independent variables, alongside other control variables. In addition, in this regression I controlled for extraordinary economic periods. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

7C.2.1.4 The Effects of IPOs & SEOs on Stock Repurchase Decisions Using Tobit Models with Interaction Terms when Controlling for Extraordinary Economic Periods

Here, I apply Tobit models with interaction terms. From Table 7C.2.1.4 below, we can observe that IPOs do not have effects on stock repurchase decisions that are statistically significant. Also, SEOs do not have statistically significant positive effects on stock repurchase decision. Worst still the results of the linktest, which are demonstrated in figure 6A.0.4 in appendix II, shows that the coefficient of hatsq is statistically significant at the 5% level. Therefore, hatsq does possess some explanatory power, evidencing shortcomings in the model specification.

7C.2.2 The Probability of Stock Repurchase Decisions

7C.2.2.1 The Probability of Stock Repurchase Decisions Arising from The Effects of IPOs & SEOs in a Probit Model without Interaction Terms

In this section, I would apply Probit models without interaction terms. From Table 7C.2.2.1 below, we can observe that IPOs do not have effects on stock repurchase decisions that are statistically significant. On the other hand, SEOs have statistically significant positive effects on stock repurchase decision. This finding is consistent with the postulation that firms can embark on strategic financial activities which can result in an adjustment of their leverage (Dittmar, 2000), and in response to the threat of equity offerings (Nguyen, Sutton, and Pham, 2014). A unit increase in the dollar amount of SEO is likely to bring about an increase in the amount of stock repurchase activities of rival firms by a probability of 0.0000789 all other factors held constant. Also, the probability of stock repurchases is likely to be 0.571 units higher for each HIGH_SEO or when SEOs are in the top 20th percentile versus when SEOs are in the bottom 80th percentile. However, the results may not be relied upon because the regression does not pass robustness checks. In evaluating the robustness of the results achieved, I applied the linktest, which is a model specification test for Probit regressions, and the results of the test, which are demonstrated in figure 6A.0.5 in appendix II. shows that the coefficient of hatsq is statistically significant at the 5% level. Therefore, hatsq possess some explanatory power, evidencing the case of inadequacies in the model specifications.

Table 7C.2.1.4

THE EFFECTS OF IPOs AND SEOs ON STOCK REPURCHASE DECISIONS USING TOBIT MODELS WITH INTERACTION TERMS WHEN CONTROLLING FOR EXTRAORDINARY ECONOMIC PERIODS

	(1) STOCK REPURCHASE PERCENTAGE	(2) STOCK REPURCHASE PERCENTAGE
STOCK REPURCHASE PERCENTAGE		
IPO	0.00000546	
	(1.13)	
IPO NUMBERS	-0.00195	
	(-1.59)	
SEO	0.00000355	
	(1.67)	
SEO NUMBERS	-0.000171	
	(-0.63)	
c.IPO#c.CONCENTRATION	0.00000194	
	(0.31)	
c.IPO#c.PAST RETURNS	7.51e-09	
	(0.18)	
c.SEO#c.CONCENTRATION	0.0000131	
	(1.05)	
c.SEO#c.PAST RETURNS	-3.75e-08	
	(-1.66)	
PAST_RETURNS	0.000255*	0.0000930**
	(2.20)	(3.10)
CONCENTRATION	-0.386	-0.290*
	(-1.82)	(-2.57)
DIVIDEND RATIO	0.000164*	0.000198**
	(2.29)	(2.75)
PE	-0.000000697	0.000000842
	(-1.35)	(1.11)
OPERATING INCOME	0.00000146	0.000000945
	(0.38)	(0.23)
NON-OPERATING INCOME	0.000000401	0.000000787
	(0.18)	(0.48)
DEBT EQUITY	-0.000877	-0.000894
	(-1.34)	(-1.57)
CAPITAL EXPENDITURE	0.00000675	0.00000850
	(1.64)	(1.89)
MARKET BOOK RATIO	-0.00000120	-0.0000137
	(-0.17)	(-1.33)
CASH	0.000000184	4.14e-08
	(0.33)	(0.07)
CASHFLOW	-0.00000581	-0.00000478
	(-0.55)	(-0.46)
HIGH_IPO		-0.00556
		(-0.25)
HIGH_IPON		-0.0128
		(-0.92)
HIGH_SEO		-0.0148

		(-0.49)
HIGH_SEO NUMBERS		-0.00000365
		(-0.60)
c.HIGH_IPO#c.CONCENTRATION		0.0140
		(0.25)
c.HIGH_IPO#c.PAST RETURNS		0.000170
		(0.34)
c.HIGH_SEO#c.CONCENTRATION		0.0945
		(1.30)
c.HIGH_SEO#c.PAST RETURNS		0.000329
		(1.06)
_cons	0.0180	0.0208
	(0.46)	(0.97)
/		
var(e.SRE~1)	0.0123	0.0123
	(1.44)	(1.43)
NUMBER OF OBSERVATIONS	274	274

This table shows the results of a Tobit regression in which the stock repurchase percentage variable in the next year is the dependent variable, IPO and SEO in the current year are the main independent variable, alongside other control variables. The regression incorporates interaction terms between IPO and SEO variables on one hand as well as past returns and industry concentration on the other hand. In addition, I controlled for periods of extraordinary economic situations. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

Table 7C.2.2.1
STOCK REPURCHASE DECISIONS: PROBIT MODELS USING AGGREGATE DATA FOR IPOs & SEOs

	(1) STOCK REPURCHASE DUMMY	(2) STOCK REPURCHASE DUMMY
STOCK REPURCHASE DUMMY		
IPO	-0.0000383	
	(-1.13)	
IPO NUMBER	0.00127	
	(0.23)	
SEO	0.0000789***	
	(5.49)	
SEO NUMBER	0.00178	
	(0.74)	
PAST RETURNS	-0.00228	-0.00108
	(-1.26)	(-0.75)
CONCENTRATION	-1.469	-1.464*
	(-1.78)	(-2.47)
DIVIDEND RATIO	-0.00170	-0.00332*
	(-1.41)	(-2.49)
PE	-0.0000686	-0.0000624*
	(-1.70)	(-1.97)
OPERATING INCOME	0.0000567	0.0000562
	(1.74)	(1.55)
NON-OPERATING INCOME	-0.0000239	-0.0000208
	(-0.47)	(-0.45)
DEBT EQUITY	0.00429	0.00455
	(0.49)	(0.55)
CAPITAL EXPENDITURE	0.0000254	0.0000336
	(0.46)	(0.64)
MARKET BOOK RATIO	0.000564	0.000527
	(0.91)	(1.08)
CASH	0.00000719	0.00000544
	(0.50)	(0.41)
CASHFLOW	-0.0000746	-0.0000585
	(-0.56)	(-0.46)
HIGH_IPO		-0.163
		(-0.94)
HIGH_IPO NUMBERS	0.00778	
	(0.05)	
HIGH_SEO	0.571**	
	(3.23)	
HIGH_SEO NUMBERS	0.0000334	
	(0.86)	
_cons	-0.957**	-0.336
	(-3.13)	(-1.18)
NUMBER OF OBSERVATIONS	339	339

This table shows the results of a Probit regression in which the stock repurchase dummy variable in the next year is the dependent variable, IPO and SEO in the current year are the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

7C.2.2.2 The Probability of Stock Repurchase Decisions Arising from The Effects of IPOs & SEOs in a Probit Model with Interaction Terms

In this section, I would apply Probit models with interaction terms. From Table 7C.2.2.2 below, we can observe that IPOs do not have effects on stock repurchase decisions that are statistically significant. On the other hand, SEOs have statistically significant positive effects on stock repurchase decision. This finding is consistent with the postulation that firms can embark on strategic financial activities which can result in an adjustment of their leverage (Dittmar, 2000) in response to the threat of IPOs (Nguyen, Sutton, and Pham, 2014). A unit increase in the dollar amount of SEO is likely to bring about an increase in the amount of stock repurchases by a probability of 0.0000727 all other factors held constant. However, the results may not be relied upon because the regression does not pass robustness checks. In evaluating the robustness of the results achieved, I applied the linktest, which is a model specification test for Probit regressions, and the results of the test, which are demonstrated in figure 6A.0.6 in appendix II, shows that the coefficient of hatsq is statistically significant at the 5% level. Therefore, hatsq possess some explanatory power, evidencing the case of inadequacies in the model specifications.

Table 7C.2.2.2

THE PROBABILITY OF STOCK REPURCHASE DECISIONS ARISING FROM THE EFFECTS OF IPOs & SEOs IN A PROBIT MODEL WITH INTERACTION TERMS

	(1) STOCK REPURCHASE DUMMY	(2) STOCK REPURCHASE DUMMY
STOCK REPURCHASE DUMMY		
IPO	-0.0000228	
	(-0.67)	
IPO NUMBERS	0.00113	
	(0.21)	
SEO	0.0000727**	
	(3.19)	
SEO NUMBERS	0.00200	
	(0.87)	
c.IPO#c.CONCENTRATION	-0.0000627	
	(-0.60)	
c.IPO#c.PAST RETURNS	0.000000160	
	(0.39)	
c.SEO#c.CONCENTRATION	0.0000359	
	(0.46)	
c.SEO#c.PAST RETURNS	-0.000000224	
	(-0.86)	

PAST RETURNS	-0.000623	-0.00386
	(-0.17)	(-1.61)
CONCENTRATION	-1.561	-2.087*
	(-1.32)	(-2.42)
DIVIDEND RATIO	-0.00205	-0.00353**
	(-1.74)	(-2.74)
PE	-0.0000701	-0.0000615
	(-1.68)	(-1.30)
OPERATING INCOME	0.0000547	0.0000537
	(1.62)	(1.47)
NON-OPERATING INCOME	-0.0000295	-0.0000265
	(-0.55)	(-0.57)
DEBT EQUITY	0.00498	0.00425
	(0.55)	(0.55)
CAPITAL EXPENDITURES	0.0000266	0.0000394
	(0.47)	(0.78)
MARKET BOOK	0.000572	0.000550
	(0.92)	(0.89)
CASH	0.00000894	0.00000660
	(0.60)	(0.45)
CASHFLOW	-0.0000736	-0.0000549
	(-0.56)	(-0.42)
HIGH_IPO		-0.443
		(-1.68)
HIGH_IPO NUMBERS		-0.0206
		(-0.12)
HIGH_SEO		-0.184
		(-1.02)
HIGH_SEON	0.0000313	
	(0.85)	
c.HIGH_IPO~N	0.432	
	(0.54)	
c.HIGH_IPO~S	0.00879	
	(1.81)	
c.HIGH_SEO~N	1.703*	
	(2.16)	
c.HIGH_SEO#c.PAST RETURNS	0.00963	
	(1.89)	
_cons	-0.962**	-0.119
	(-2.66)	(-0.42)
NUMBER OF OBSERVATIONS	339	339

This table shows the results of a Probit regression in which the stock repurchase dummy variable in the next year is the dependent variable, IPO and SEO in the current year are the main independent variable, alongside other control variables. The regression incorporates interaction terms between IPO and SEO variables on one hand as well as past returns and industry concentration on the other hand. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

7C.2.2.3 The Probability of Stock Repurchase Decisions Arising from The Effects of IPOs & SEOs in a Probit Model without Interaction Terms when Controlling for Extraordinary Economic Periods.

In this section, I apply Probit models with interaction terms. From Table 7C.2.2.3 below, we can observe that IPOs do not have effects on stock repurchase decisions that are statistically significant. On the other hand, SEOs have statistically significant positive effects on stock repurchase decision. This finding is consistent with the postulation that firms can embark on strategic financial activities which can result in an adjustment of their leverage (Dittmar, 2000) in response to the threat of equity offerings (Nguyen, Sutton, and Pham, 2014). A unit increase in the dollar amount of intra-industry SEOs is likely to bring about an increase in the amount of stock repurchases of rival firms by a probability of 0.0000825 all other factors held constant. However, the results may not be relied upon because the regression does not pass robustness checks. In evaluating the robustness of the results achieved, I applied the linktest, which is a model specification test for Probit regressions, and the results of the test, which are demonstrated in figure 6A.0.7 in appendix II, shows that the coefficient of hatsq is statistically significant at the 5% level. Therefore, hatsq possess some explanatory power, evidencing the case of inadequacies in the model specifications.

7C.2.2.4 The Probability of Stock Repurchase Decisions Arising from The Effects of IPOs & SEOs in a Probit Model with Interaction Terms when Controlling for Extraordinary Economic Periods

In this section, I apply Probit models with interaction terms. From Table 7C.2.2.4 below, we can observe that IPOs do not have effects on stock repurchase decisions that are statistically significant. On the other hand, SEOs have statistically significant positive effects on stock repurchase decision. This finding is consistent with the postulation that firms can embark on strategic financial activities which can result in an adjustment of their leverage (Dittmar, 2000) in response to the threat of equity offerings (Nguyen, Sutton, and Pham, 2014). The results of the study shows that a unit increase in the dollar amount of SEOs is likely to bring about an increase in the amount of stock repurchases by rival firms by a probability of 0.0000882, all other factors held constant. However, the results may not be relied upon because the regression does not pass robustness checks. In evaluating the robustness of the results achieved, I applied the linktest, the results of which are demonstrated in figure 6A.0.8 in Appendix II, shows that the coefficient of hatsq is statistically significant at the 5% level. Therefore, hatsq possess some explanatory power, evidencing the case of inadequacies in the model specifications.

Table 7C.2.2.3
THE PROBABILITY OF STOCK REPURCHASE DECISIONS IN THE PRESENCE OF THE EFFECTS OF IPOs & SEOs IN A PROBIT MODEL WHEN CONTROLLING FOR EXTRAORDINARY ECONOMIC PERIODS

	(1) STOCK REPURCHASE DUMMY	(2) STOCK REPURCHASE DUMMY
STOCK REPURCHASE DUMMY		
IPO	-0.0000171	
	(-0.44)	
IPO NUMBERS	-0.00389	
	(-0.67)	
SEO	0.0000825***	
	(4.58)	
SEO NUMBERS	0.000445	
	(0.14)	
PAST RETURNS	-0.00248	-0.000824
	(-1.07)	(-0.49)
CONCENTRATION	-1.470	-1.626*
	(-1.76)	(-2.45)
DIVIDEND RATIO	0.000453	0.000392
	(0.50)	(0.30)
PE	-0.0000740	-0.0000614
	(-1.77)	(-1.80)
OPERATING INCOME	0.0000888	0.0000981
	(1.67)	(1.65)
NON-OPERATING INCOME	-0.0000762	-0.0000793
	(-1.29)	(-1.60)
DEBT EQUITY RATIO	0.00307	0.00294
	(0.34)	(0.33)
CAPITAL EXPENDITURE	0.0000297	0.0000402
	(0.48)	(0.71)
MARKET BOOK RATIO	0.000632	0.000545
	(1.02)	(1.11)
CASH	0.0000215	0.0000216
	(1.46)	(1.63)
CASHFLOW	-0.000132	-0.000140
	(-0.67)	(-0.69)
HIGH_IPO		-0.168
		(-0.81)
HIGH_IPO NUMBER		-0.0909
		(-0.50)
HIGH_SEO		0.364
		(1.76)
HIGH_SEON		0.0000380
		(0.73)
_cons	-0.909**	-0.344
	(-2.77)	(-1.25)
NO OF OBSERVATIONS	279	279

This table shows the results of a Probit regression in which the stock repurchase dummy variable is the dependent variable, IPO and SEO are the main independent variable, alongside other control variables. The regression incorporates interaction. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

Table 7C.2.2.4

THE PROBABILITY OF STOCK REPURCHASE DECISIONS ARISING FROM THE EFFECTS OF IPOs & SEOs IN PROBIT MODELS WITH INTERACTION TERMS WHEN CONTROLLING FOR EXTRAORDINARY ECONOMIC PERIODS

	(1) STOCK REPURCHASE DUMMY	(2) STOCK REPURCHASE DUMMY
STOCK REPURCHASE DUMMY		
IPO	0.0000446	
	(0.67)	
IPON	-0.00435	
	(-0.77)	
SEO	0.0000882**	
	(3.19)	
SEO NUMBER	0.000399	
	(0.13)	
c.IPO#c.CONCENTRATION	-0.000229	
	(-1.47)	
c.IPO#c.PAST RETURNS	-0.000000218	
	(-0.22)	
c.SEO#c.CONCENTRATION	0.0000155	
	(0.18)	
c.SEO#c.PAST RETURNS	-0.000000400	
	(-1.53)	
PAST RETURNS	0.000846	-0.00187
	(0.67)	(-0.67)
CONCENTRATION	-1.011	-1.995*
	(-0.95)	(-2.43)
DIVRATIO	0.000606	0.000537
	(0.54)	(0.35)
PE	-0.0000779*	-0.0000618
	(-2.17)	(-1.36)
OPERATING INCOME	0.0000834	0.0000934
	(1.55)	(1.60)
NON-OPERATING INCOME	-0.0000707	-0.0000865
	(-1.09)	(-1.58)
DEBT EQUITY RATIO	0.00286	0.00245
	(0.28)	(0.27)
CAPITAL EXPENDITURES	0.0000300	0.0000443
	(0.46)	(0.78)
MARKET BOOK RATIO	0.000608	0.000555
	(1.14)	(0.96)
CASH	0.0000212	0.0000239
	(1.40)	(1.77)
CASHFLOW	-0.000135	-0.000136
	(-0.69)	(-0.66)
HIGH_IPO		-0.117
		(-0.26)
HIGH_IPON		-0.101
		(-0.54)
HIGH_SEO		-0.292
		(-0.86)

HIGH_SEON		0.0000548 (1.08)
c.HIGH_IPO~N		-0.338 (-0.25)
c.HIGH_IPO~S		0.00175 (0.21)
c.HIGH_SEO~N		1.886 (1.80)
c.HIGH_SEO~S		0.00492 (0.70)
_cons	-1.082* (-2.56)	-0.233 (-0.81)
NUMBER OF OBSERVATIONS	279	279

This table shows the results of a Probit regression in which the stock repurchase dummy variable in the next year is the dependent variable, IPO and SEO in the current year are the main independent variable, alongside other control variables. The regression incorporates interaction terms between IPO and SEO variables on one hand as well as past returns and industry concentration on the other hand. In addition, I controlled for years of extraordinary economic activities, including the COVID-19 crises of 2020 and 2021, the global financial crises of 2007 and 2008 and the internet bubble years of 2001. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

7D.0 PART D: Data Analysis for The Competitive Effects of Intra-Industry Initial Public Offerings (IPOs) and Seasoned Equity Offerings (SEOs) on Bond Issuance Decisions of Rival Firms.

7D.2.3 The Effects of IPOs & SEOs on Bond Issuance Decisions

7D.2.3.1 The Effects of IPOs & SEOs on Bond Issuance Decisions Using a Linear Multiple Regression Model

From the outcome of the regression analysis demonstrated in the Table 7D.2.3.1 below, we can observe the coefficients of IPO, HIGH_IPO and HIGH_SEON to be positive and statistically significant. This finding is consistent with the postulation that firms can embark on strategic financial activities which can result in an adjustment of their leverage (Dittmar, 2000) in response to the threat of equity offerings (Nguyen, Sutton, and Pham, 2014). The coefficients of IPO, HIGH_IPO and HIGH_SEON are respectively 0.0911, 592.3 and 0.138. Having a coefficient of 0.0911 can be interpreted to mean that a one unit increase in the proceeds of intra-industry PEOs is likely to result in a 0.0911 increase in the proceeds from bond issuances for an average rival firm, all other factors held constant. Additionally, having a coefficient of 592.3 can be interpreted to signify that the difference in the proceeds of bond issuances is likely to be 592.3 between when the proceeds of IPOs are high and when they are low all other factors held constant. However, we cannot rely on this result because the results of Ramsey RESET test, in figure 6B.1.1 in Appendix II in which a p-value of 0.0168 was

realized, shows that there are model specification problems. A p-value of 0.0168 is evidence against the null hypothesis at the 5% significance level and there is likely to exist the problem of omitted variable bias.

7D.2.3.2 The Effects of IPOs & SEOs on The Probability of Bond Issuance Decisions Using a Probit Model

The results of the Probit model in Table 7D.2.3.2 are unreliable because of model specification problems that are identified in the link test. In figure 6B.1.2 in appendix II, we can see that hatsq has a coefficient of 3.18 and which is statistically significant at the 5%, demonstrating that hatsq does possess some predictive or explanatory capabilities. As a result, we reject the null hypothesis of no omitted variables.

7D.2.3.3 The Effects of IPOs & SEOs on Bond Issuance Decisions in a Linear Multiple Regression Model when Controlling for Extraordinary Economic Periods

When we extend the study in section 6B.1.3 to control for extraordinary economic periods, results obtained do not satisfy robustness checks.

7D.2.3.4 The Probability of Bond Issuance Decisions Arising from The Effects of IPOs & SEOs in a Probit Model When Controlling for Extraordinary Economic Periods

The results of the Probit model in Table 7D.2.3.4 below shows that the coefficient of SEON which is 0.0145 is statistically significant at the 5% level. This finding is consistent with the postulation that firms can embark on strategic financial activities which can result in an adjustment of their leverage (Dittmar, 2000) in response to the threat of equity offerings (Nguyen, Sutton, and Pham, 2014). These values can be interpreted in the first instance to mean that a one unit increase in the number of SEOs can bring about a 0.0145 increase in the probability of bond issuance all other factors held constant. This result satisfies the applicable robustness checks as shown in figure 6B.1.4 in Appendix II. In figure 6B.1.4, we can see that hatsq has a coefficient of 0.49 but which is not statistically significant at the 5% level, demonstrating that hatsq does not possess any predictive or explanatory capabilities. As a result, we can fail to reject the null hypothesis of no omitted variables.

TABLE 7D.2.3.1

THE EFFECTS OF IPOs & SEOs ON BOND ISSUANCE DECISIONS IN A MULTIPLE LINEAR REGRESSION

	(1) BOND ISSUANCES	(2) BOND ISSUANCES
IPO	0.0911*	
	(2.19)	
IPO NUMBERS	-15.76	
	(-1.83)	
SEO	0.0286	
	(1.47)	
SEO NUMBERS	2.982	
	(0.98)	
SIZE	-0.0172***	-0.0183***
	(-3.64)	(-4.08)
NON-OPERATING INCOME	0.0446	0.0539
	(0.53)	(0.65)
CAPITAL EXPENDITURES	0.247***	0.232***
	(5.96)	(5.58)
CASH	0.0723***	0.0734***
	(3.48)	(3.59)
BOND ISSUANCES NUMBERS	77.53***	84.64***
	(5.57)	(6.78)
LONGTERM DEBT	0.0188	0.0217*
	(1.67)	(2.09)
OUTSTANDING SHARES	0.0240	0.0289
	(1.22)	(1.67)
CONCENTRATION	580.6*	477.1
	(2.07)	(1.80)
DEBT EQUITY RATIO	-4.318	-4.680
	(-0.42)	(-0.48)
HIGH_IPO		592.3*
		(2.06)
HIGH_IPO NUMBERS		-194.2
		(-1.21)
HIGH_SEO		556.4
		(1.91)
HIGH_SEO NUMBERS		0.138**
		(3.02)
_cons	-366.1*	-214.0
	(-2.04)	(-1.15)
NUMBER OF OBSERVATIONS	324	324

This table shows the results of a multiple linear regression in which the proceeds of bonds issued variable in the next year is the dependent variable, while IPO and SEO in the current year are the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

TABLE 7D.2.3.2

THE EFFECTS OF IPOs & SEOs ON THE PROBABILITY OF BOND ISSUANCE DECISIONS IN A PROBIT MODEL

	(1) BI_DUMMY	(2) BI_DUMMY
BI_DUMMY		
IPO	-0.0000446	
	(-0.95)	
IPON	0.00980	
	(0.72)	
SEO	0.0000315	
	(1.37)	
SEON	0.00309	
	(0.84)	
SIZE	-0.0000295***	-0.0000313***
	(-4.19)	(-4.41)
NONOPINCOME	0.0000135	0.0000187
	(0.22)	(0.29)
CAPEX	0.000259***	0.000239**
	(3.48)	(3.17)
CASH	0.0000661	0.0000836
	(1.02)	(1.25)
BIN	0.244***	0.255***
	(7.98)	(7.06)
LONGDEBT	0.0000627***	0.0000675***
	(3.36)	(3.45)
OUTSHARES	0.00000786	0.0000145
	(0.43)	(0.98)
CONCENTRAT~N	-0.874	-0.970
	(-1.33)	(-1.21)
DEBTEQUITY	-0.00725	-0.00868
	(-1.09)	(-1.24)
HIGH_IPO	-0.461	
	(-1.46)	
HIGH_IPON	0.578	
	(1.72)	
HIGH_SEO	0.406*	
	(2.41)	
HIGH_SEON	0.000119	
	(1.91)	
_cons	-3.039***	-2.718***
	(-7.48)	(-7.04)
N	332	332

This table shows the results of a multiple linear regression in which the proceeds of bonds issued variable in the next year is the dependent variable, while IPO and SEO in the current year are the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

TABLE 7D.2.3.4
THE PROBABILITY OF BOND ISSUANCE DECISIONS ARISING FROM THE EFFECTS OF IPOs & SEOs IN A PROBIT MODEL WHEN CONTROLLING FOR EXTRAORDINARY ECONOMIC PERIODS.

	(1) BONDS ISSUANCE DUMMY	(2) BONDS ISSUANCE DUMMY
BONDS ISSUANCE DUMMY		
IPO	-0.0000699	
	(-0.79)	
IPO NUMBERS	0.00599	
	(0.32)	
SEO	0.0000382	
	(1.16)	
SEO NUMBERS	0.0145**	
	(2.85)	
SIZE	-0.0000331***	-0.0000361***
	(-4.05)	(-4.13)
NON-OPERATING INCOME	0.0000845	0.0000487
	(1.31)	(0.78)
CAPITAL EXPENDITURES	0.000439***	0.000391***
	(4.06)	(3.45)
CASH	0.000158*	0.000197**
	(2.36)	(3.10)
BOND ISSUANCE NUMBERS	0.272***	0.253***
	(5.68)	(4.83)
LONG TERM DEBT	-0.00000760	0.00000572
	(-0.36)	(0.27)
OUTSTANDING SHARES	-0.00000187	0.0000266
	(-0.05)	(1.01)
CONCENTRATION	-1.150	-1.497
	(-1.77)	(-1.73)
DEBT EQUITY RATIO	-0.00434	-0.00488
	(-0.65)	(-0.66)
HIGH_IPO		-0.287
		(-0.79)
HIGH_IPON		0.542
		(1.17)
HIGH_SEO		0.289
		(0.96)
HIGH_SEON		0.0000529
		(0.88)
_cons	-4.068***	-2.672***
	(-4.30)	(-4.89)
NO. OF OBSERVATIONS	273	273

This table shows the results of a Probit regression in which the proceeds of bonds issuance dummy variable in the next year is the dependent variable, while IPO and SEO in the current year are the main independent variable, alongside other control variables. The t statistics are in parentheses, where *, **, and *** represents the 5%,1% and 0.1% levels of statistical significance respectively as well as p-values of less than 0.05, 0.01 and 0.001 correspondingly.

8.0 DISCUSSIONS

8.1 DISCUSSION OF MAIN RESULTS

In this section I will discuss the main results of the analysis in this study as reported both in sections four through six and the extended study in section seven. In sections four through six, I analyzed the effects of equity offerings by examining the combined effects of IPOs and SEOs using a PEOs variable and it can be observed that PEOs demonstrate a weak effect on stock repurchase behavior of firms. On the other hand, PEOs demonstrated a strong impact on the willingness of firms to issue bonds. In section nine, a recapitulation of our main results shows that IPOs do not have a causative effect on neither stock repurchase decisions nor bond issuance decisions in the Nordic region. However, I observed that SEOs have a causative effect on firms' stock repurchase behavior. I found that SEO had impacts with and without interaction terms as well as before and after controlling for extraordinary economic periods. Moreover, it is observable that SEON had a deterministic impact on the probability of firms' bond issuance decisions. This was also the case both in the situation in which I controlled for extraordinary economic periods and when I did not.

Given these results, it would make sense to initiate an enquiry into potential factors that could motivate firms to respond more strongly to PEOs by issuing bonds and less strongly by repurchasing stocks. It might also be rational to probe into why firms in the Nordic region are more sensitive to SEOs than they are to IPOs.

8.1.1 Determinants of Firms' Preferences for Bond Issuances over Stock Repurchases

Beginning my probe with the former question in the preceding paragraph, I would argue that leverage adjustments can be impacted by the cost of enforcing repayments of cashflows to investors or securities holders in the same way that capital structure choices are affected by cost of enforcing repayments in line with the predictions of Hvide and Leite (2008). Hvide and Leite (2008), considered capital structure and repayment conduct in a situation where information about the firm's cash flows is not publicly available and the cost of enforcing repayment varies across holders of securities. They deduced that if enforcement costs are higher for creditors than for shareholders, a mixed capital structure with debt and equity can prevail in equilibrium. They further posited that in the presence of a diversified capital structure comprising of debt and equity, debtholders intercede in low cash-flow states while equityholders intercede in high cash-flow states. Therefore, from this point of view, I would

expect firms with a mixed capital structure to adjust their leverage using a combination of bond issuance and stock repurchases.

Variations in firms' earnings could determine managerial choices between bond issuances and stock repurchases in implementing a leverage adjusting behavior in response to competitive effects of intra-industry PEOs. Skinner (2008) posited that stock repurchases are applied by managers to distribute increases in firms' earnings. He further demonstrated that although corporate earnings, in recent periods, had been a driving factor for absolute firm payouts, including stock repurchases and dividends, share repurchases dominates firms' redistribution of cash to shareholders. On the other hand, Hansen & Crutchley (1990) examined the long-term behavior of firm earnings around issuances of equity and bonds and found that earnings decreased for all issuing firms. Additionally, they specified that the deterioration in earnings was more extensive when firms secured greater amounts of capital. Therefore, the determination of equity repurchase programs and securities issuance actions on the basis of corporate earnings suggests that rival firms are more likely to respond to competitive effects of intra-industry PEOs using stock repurchases when their earnings are strong and bond issuances when their earnings are weak.

Additionally, there can be other considerations impacting on Nordic firm's preferences for bond issuance over stock repurchases as a method for leverage adjustment in response to the competitive effects of PEOs. A mature firm with excess cash and few profitable investment opportunities would seek to reduce its cash levels by repurchasing stocks in order to mitigate 'the agency costs of free cash flow', consistent with the predictions of Jensen (1986), who postulated a theory that strives to provide explanations for the benefits of leverage in reducing agency costs of free cash flows. Thus analogously, it would make sense for a growth firm with ample profitable investment opportunities to reduce the agency costs of free cash flow instead by issuing bonds. Issuing bonds would provide the capital to exploit all available investment opportunities whose return on equity exceeds the firms cost of capital, while simultaneously instilling some discipline in the management of cash by the introduction of bankruptcy threat of debt.

Moreover, a firm's perception of which approach, between stock repurchase and bond issuance, will more properly send signals to relevant stakeholders and/or members of the investing community about its financial circumstances and future potentials would affect its preferred method for altering leverage, consistent with the propositions of Myers and Majluf

(1984). Myers and Majluf (1984) developed the pecking order hypothesis in which they posited that the firm prefers to finance new projects with internal funds (slack) and secondarily with debt if internal funds are not available and only issue equity as a last resort. So just as a firm has a preference for which security type to finance its projects because it cares about how the financial markets would view its actions, the firm would also most probably strive to alter its leverage in such a way that most accurately convey its true financial situation or in a manner that places it in the most favorable light amongst its pertinent stakeholders. Thus, a firm with excess cash would most likely repurchase its stocks whereas a firm with limited or minimal cash would most likely issue bonds.

Firms could also prefer bond issuances to stock repurchases and/or vice versa based on the timing of the need for adjustment of its leverage in consistency with the timing hypothesis of stock repurchases and/or bond issuances. The optimality of firm value that can be created by stock repurchases and bond issuances is contingent upon business cycles. Dittmar and Dittmar (2007) demonstrated that differences in stock repurchase activities over time are determined by variations in business cycles. Santos (2003) posited that rating agencies impact the cost to raise capital from the bond market and economic recessions elevate the effects that rating agencies can bear on the cost of issuing bonds. It seems from their findings that there are times that are more favorable for repurchasing stocks and/or bond issuances than others. At any given point in time, the lack of coincidence between the periods amenable to bond issuances and stock repurchases may account for firms' preference for bond issuances over stock repurchases in adjusting its leverage in response to the competitive effects of intra-industry PEOs. Overall, the findings in this paragraph suggests that during time periods and/or phases of business cycles that are not amenable to or optimal for stock repurchases, firms may prefer to issue bonds in a bid to increase their leverage even though they may not have any profitable investment opportunity so as to counteract the negative valuation effects of rivals' strategic financing activities.

Finally, firms could demonstrate a preference for bond issuances over stock repurchases and/or vice versa based on its expectation of returns. Stock repurchases and bond issuances are dependent on expected returns (Fu and Huang, 2016; Wasserfallen and Wydler,1988), and this might differ between bonds and equity at any given time. Zeng and Zhao (2021) posited that the association between nominal bond returns/yields and equity returns/yields converted from positive to negative subsequent to the late 1990s, as a result of the effects of procyclical inflation in addition to a more extensive association between real GDP expectations and real

dividend growth in the years following year 2000. Firms' expectations about future stock prices can impact on their decisions to repurchase their stocks given that long-run abnormal returns following stock repurchases can be negative or positive as documented by several studies (Ikenberry et al.,1995; Peyer and Vermaelen,2009; as well as Fu and Huang, 2016). This might not coincide with periods that are more efficient for firms to issue bonds. Firms might prefer to issue bonds in certain periods that are more favorable to its total costs of issuance. This is because when interest rates or bond returns are expected to be low, bond securities are likely to be underpriced. Wasserfallen and Wydler (1988) examined the pricing of recently issued bonds on the Swiss capital market over the period ranging from 1980 to1982 and found a small underpricing of fresh bonds at the date of issue that is approximately equal to the disparity in the cost of transactions between the markets for original or initial bonds and follow-on bonds. They further demonstrated that the underpricing can be accounted for by the unanticipated interest rate changes over the issuance period. Therefore, I would argue that a firm's attempt to maximize the expected return on its equity securities and/or minimize the cost of issuance of its debt securities could be a fundamental factor in making choices surrounding stock repurchases or bond issuances in response to the competitive effects of PEOs.

8.1.2 Determinants of Firms' Sensitivity to SEOs versus IPOs

On the latter question, I would posit that the greater sensitivity of Nordic Firms to SEOs than to IPOs could emanate from a number of factors. Firstly, the existence of a valuation uncertainty in association with IPOs may incentivize firms to reduce their speed and tendency to sufficiently react to intra-industry IPOs within the Nordic region. Rock (1986) demonstrated that the valuation of the shares issued in an IPO is fundamentally subject to enormous uncertainty, which translates into an underpricing. The fact that a two-staged IPO offering strategy is cheaper than an IPO, given that trading diminishes the valuation uncertainty of firms adopting a two-staged strategy prior to embarking on an equity issuance, lends additional evidence of the reality of an IPO valuation uncertainty (Derrien and Kecskes, 2007). A two-staged strategy is adopted when a firm lists its equity on a stock market devoid of actually issuing equity and subsequently embark on equity issuance shortly thereafter (Derrien and Kecskes, 2007). The propensity for Nordic firms to react less to IPOs than to SEOs may be strengthened by the propositions raised in several studies on the underpricing and long-run operational performance of IPOs, including the works of Hansen and Jorgensen (2010), which demonstrates that an abnormal negative post-issue operational performance was found for

Scandinavian firms. Although equity stocks sold either by way of IPOs or SEOs are frequently discounted or underpriced (Cline, Fu, Tang and Wiley, 2012), SEOs stand a lower chance of valuation uncertainty and the associated underpricing given the fact that the firm has been previously trading publicly prior to undertaking an SEO and more extensive information regarding the risks and prospects of the company has already become public knowledge (Woolley,2022), culminating in a potentially reduced risk of SEO underpricing. Available evidence buttresses this point. Mola and Loughran (2004) undertook an assessment of 4,814 SEOs in the course of the period ranging from 1986 to 1999 and found that the mean offering of new SEOs suffered were issued at a discount of 3% as of the closing price on the day preceding the issue. On the contrary, the mean underpricing for IPOs observable in the United States stood at 14.8% for the timespan ranging from 1990 to1998, 51.4% for the period between 1999 and 2000 and 12.1% for the timespan ranging from 2001 to 2009 (Ritter, 2022). In the final analysis, the propensity for SEOs to suffer a lesser degree of underpricing in relation to IPOs may suggest that the potential competitive impact SEOs can impose on industry rivals can be better estimated, necessitating the greater need for an offsetting response.

There are potentially supplementary reasons why Nordic firms are more sensitive to SEOs than they are to IPOs. SEOs are recurrently a reflection of a firm's strong bid to remedy its weak operational performance and SEOs are routinely executed to finance or stimulate further investments and growth. Bayless and Jay (2011) investigated the operating performance of firms surrounding SEOs and found that weak operating performance of firms undertaking SEOs usually commences during a two-year timespan preceding an issue, suggesting that an SEO is more expectedly a response to periods of poor performance and an attempt to accelerate new projects and growth of the firm. On the contrary, Pagano, Panetta and Zingales (1998) documented that firms frequently embark on an IPO neither to finance forthcoming projects, investments nor growth, but to achieve a rebalancing of their accounts following episodes of soaring investments and growth. These activities of rebalancing include; overcoming constraints on borrowing; achieving more substantial negotiating power with banks; attaining liquidity and portfolio broadening for initial investors; installing a system of monitoring on behalf of firm's investors; implementing a change of managerial control; and exploiting an overvaluation window of opportunity in the financial market (Pagano, Panetta and Zingales,1998). Given this probable difference between the goals of an SEO and that of an IPO and the expectation that a successful completion of an SEO is more likely to strengthen

the capabilities of competitors within an industry and transform the degree of rivalry in product markets, Nordic firms have probably developed an inclination to accordingly become more responsive to an SEO.

From the available empirical data used in this study, Nordic IPOs seem to be smaller in proceeds generated than SEOs. As a result, I would believe that given the relatively small sizes of Nordic IPOs in juxtaposition with SEOs, firms would have less inclination to react to IPOs as against more strongly responding to SEOs, in consistency with the results of this study that has already been emphasized, in which Nordic firms were found not to be responsive to IPOs but responsive to SEOs. This is in contrast with previous research which demonstrates that firms repurchase their stocks in the face of competitive threats of IPOs. Our observation that firms in the Nordic region do not have a strong inclination to repurchase shares in the event of the competitive threat emanating from IPOs is not consistent with findings by other researchers that conducted their studies using data from other global economic regions. Therefore, one of the significances of this study is that firm behavior can have regional footprints.

Nevertheless, and as already mentioned, I found strong evidence demonstrating the tendency for Nordic firms to issue bonds in the face of competitive pressure emanating from public equity offerings. This finding is important for financial institutions, who need to be aware that although the one of the most important reason firms issue bonds may be to finance capital expenditures, corporations may also routinely embark on capital raising, regardless of the issuance purposes stated in relevant documents, using bond instruments in a bid to ward off the negative effects that they are prone to suffer when competing firms strengthen their capabilities by issuing equity.

Therefore, I can conclude that while numerous finance authors have shown that there are long standing risks associated with bond financing including but not limited to market risk (the risk that a bond's value will fluctuate with changing market conditions),interest rate risk (the risk that a bond's price will fall with rising interest rates),the risk of price fluctuation(rise in bond prices when interest rates fall), inflation risk(the risk that a bond's total return will not outpace inflation)and credit risk(the risk that the bond issuer may default on one or more payments before the bond reaches maturity), the mere issuance of bonds for purposes other than financing capital expenditures or working capital can dramatically exacerbate these risks because issuing bonds increases the cash available to a firm and in the absence of suitable growth opportunities, firms can easily fall prey to the agency costs of debt (Jensen,1986).

Firms need to maintain a competitive posture at all times and so it may not be inappropriate to issue bonds to fight off potential decline in stock market performance following the financing activities of competing firms. Nevertheless, the long-term costs and benefits of such actions must be weighed to ensure the viability of the firm. If competition-motivated bond issuances result in overly leverage levels, then it is ill motivated. However, if a firm remains within manageable levels of leverage despite issuance of new bonds in response to competitive pressure, then it should not be a source for much concern.

In underwriting bond issuances, it may be beneficial for society if investment banks can thoroughly vet the purpose of such financing behavior by corporations and provide the most valuable strategic financial advice to its clients and finally it is also important that CFOs thoroughly exhaust all approaches to dealing with competitive pressure before resorting to bond issuances as a means of managing competitive pressure that can emanate from intra-industry IPOs and SEOs.

8.2 LIMITATIONS OF THE STUDY

The accuracy of our findings is potentially limited by the quality of our data. The sources of data applied in this study are very credible and therefore while I do not envisage a reduction in the quality of the results emanating from low quality data, I would want to make sure I emphasize the fact that it was one factor that was not within the realms of my control. Other challenges could have been unforeseeable human error in the aggregation of data.

9.0 CONCLUSION

In this study, I utilized relevant securities and accounting data for publicly listed Nordic firms for the period ranging from 1990 to 2021. The data applied originated from highly reliable and reputable sources including Wharton data research services, Thompson Reuters DataStream and other credible websites. Methodologically, I applied the Tobit, Probit and multiple linear regression models where appropriate for the implementation of data analysis. The models were developed to include independent variables that have been established to be determinants of stock repurchases and bond issuances behaviors of firms as the case may be from other related preceding economic studies.

The results of the data analysis suggest that for firms in the Nordic region, intra-industry PEOs possess a weak effect on stock repurchase behavior of rival firms, but on the other hand intra-industry PEOs have a strong impact on the willingness of firms to issue bonds. The results of the extended study, in which I decomposed the combined effects of PEOs into those of IPOs and SEOs, demonstrated that IPOs executed within an industry do not have a causative effect on neither stock repurchase decisions nor bond issuance decisions for rival publicly-listed Nordic firms. However, I observed that intra-industry SEOs have a causative effect on rival firms' stock repurchase behavior. Moreover, it was observable that the number of intra-industry seasoned equity offerings (SEON) had a deterministic impact on the probability of rival firms' bond issuance decisions.

These findings are valid under alternative specifications, including incorporation of interaction terms, between the main dependent variables on one hand and industry concentration and historical returns on the other hand, as well as when controlling for extraordinary economic periods. Finally, I deliberated elaborately in the discussion section on the factors that could potentially account for firms' preference for stock repurchases over bond issuances and/or vice versa and their greater sensitivity to SEOs over IPOs in the Nordic region.

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APPENDIX I

Table 1

Amount of United States Dollars per Unit of relevant Nordic Currency

Date	Danish Krone	Euro	Finnish Markka	Norwegian Krone	Swedish Krona	Icelandic Krona
29-Dec-1990	0.18031		0.22943	0.15989	0.15019	0.01715
31-Dec-1991	0.18031		0.22943	0.15411	0.15019	0.01691
31-Dec-1992	0.18031		0.22943	0.16113	0.15019	0.01736
31-Dec-1993	0.18031		0.22943	0.14073	0.15019	0.01474
31-Dec-1994	0.18031		0.22943	0.14180	0.15019	0.01430
29-Dec-1995	0.18031		0.22943	0.15825	0.15019	0.01543
31-Dec-1996	0.16822		0.21534	0.15522	0.12753	0.01500
31-Dec-1997	0.14650		0.18448	0.13669	0.11621	0.01409
31-Dec-1998	0.15658		0.18448	0.13158	0.11054	0.01406
31-Dec-1999	0.13516		0.18448	0.12230	0.10771	0.01381
29-Dec-2000	0.12468	1.07469		0.11301	0.10488	0.01268
31-Dec-2001	0.11891	1.01413		0.11097	0.12519	0.01023
31-Dec-2002	0.14120	0.95356		0.14356	0.13535	0.01093
31-Dec-2003	0.14966	0.79177		0.14981	0.14043	0.01303
31-Dec-2004	0.15389	0.73416		0.16560	0.14297	0.01426
30-Dec-2005	0.15813	0.84767		0.14774	0.14424	0.01591
29-Dec-2006	0.17663	0.75930		0.15987	0.14551	0.01433
31-Dec-2007	0.19703	0.67930		0.18481	0.13649	0.01562
31-Dec-2008	0.18759	0.71855		0.14288	0.12747	0.01135
31-Dec-2009	0.18287	0.69416		0.17311	0.13865	0.00809
30-Dec-2010	0.17815	0.75301		0.16984	0.14700	0.00819
30-Dec-2011	0.17405	0.77286		0.16687	0.14444	0.00862
28-Dec-2012	0.17671	0.75855		0.17967	0.15348	0.00800
30-Dec-2013	0.18475	0.72553		0.16359	0.15365	0.00818
31-Dec-2014	0.16558	0.82366		0.13453	0.12801	0.00857
30-Dec-2015	0.14641	0.91525		0.11362	0.11973	0.00758
31-Dec-2015	0.15375	0.91853		0.11352	0.11973	0.00829
30-Dec-2016	0.14179	0.94868		0.11601	0.10993	0.00937
29-Dec-2017	0.16109	0.83382		0.12188	0.12147	0.00923
28-Dec-2018	0.15339	0.87306		0.11484	0.11147	0.00815
30-Dec-2019	0.14979	0.89373		0.11364	0.10730	0.00739
23-Dec-2020	0.16356	0.82196		0.11452	0.12041	0.00787
23-Dec-2021	0.15209	0.88417		0.11297	0.10969	0.00787

This table shows the prevailing exchange rate between the currencies of the various Nordic countries, including Denmark, Finland, Norway, Sweden and Iceland, and that of the United States for the timespan ranging from 1990 to 2021

APPENDIX II

FIGURE 6A.1.1

Figure 6A.1.1 Robustness Check for the effects of PEOs on Stock Repurchase Decisions

```
. linktest

Iteration 0:   log likelihood =  292.14571
Iteration 1:   log likelihood =  292.14571

Tobit regression                                Number of obs     =        328
                                                   Uncensored     =        328
Limits: lower = -inf                               Left-censored  =          0
        upper = +inf                               Right-censored =          0

                                                LR chi2(2)        =       5.36
                                                Prob > chi2       =     0.0686
Log likelihood =  292.14571                     Pseudo R2         =    -0.0093
```

SREP_PERCENTt1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_hat	.1847548	.1270692	1.45	0.147	-.0652243	.4347338
_hatsq	.1501183	.6754184	0.22	0.824	-1.17861	1.478847
_cons	.0336338	.0066798	5.04	0.000	.0204928	.0467747
var(e.SREP_PERCENTt1)	.0098602	.0007699			.0084561	.0114974

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

FIGURE 6A.1.2

Figure 6A.1.2 Robustness Check for the effects of PEOs on Stock Repurchase Decisions with Interaction Terms

```
. linktest

Iteration 0:   log likelihood =  306.18662
Iteration 1:   log likelihood =  306.18662

Tobit regression                                Number of obs     =        328
                                                   Uncensored     =        328
Limits: lower = -inf                               Left-censored  =          0
        upper = +inf                               Right-censored =          0

                                                LR chi2(2)        =      33.44
                                                Prob > chi2       =     0.0000
Log likelihood =  306.18662                     Pseudo R2         =    -0.0578
```

SREP_PERCENTt1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_hat	.565514	.095738	5.91	0.000	.3771717	.7538563
_hatsq	1.715499	.3692342	4.65	0.000	.9891165	2.441881
_cons	.0350334	.0061006	5.74	0.000	.0230319	.0470348
var(e.SREP_PERCENTt1)	.0090511	.0007068			.0077622	.010554

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6A.2.2

Figure 6A.2.2 Robustness Check for the effects of PEOs on the probability of Stock Repurchase Decisions with Interaction Terms in a Probit Model

```
. linktest

Iteration 0:   log likelihood = -216.46482
Iteration 1:   log likelihood = -180.91201
Iteration 2:   log likelihood = -180.03458
Iteration 3:   log likelihood = -179.99758
Iteration 4:   log likelihood = -179.99751
Iteration 5:   log likelihood = -179.99751

Probit regression                               Number of obs     =        339
                                                LR chi2(2)        =      72.93
                                                Prob > chi2       =     0.0000
Log likelihood = -179.99751                     Pseudo R2         =     0.1685

------------------------------------------------------------------------------
  SREP_DUMMY |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |    .933865    .141077     6.62   0.000     .6573591    1.210371
      _hatsq |  -.1791418   .1020962    -1.75   0.079    -.3792466     .020963
       _cons |   .0503533   .0979999     0.51   0.607     -.141723    .2424297
------------------------------------------------------------------------------
```

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6A.2.2b

The Prediction of the Probability of Stock Repurchase Decisions

```
. predict  y_1
(option pr assumed; Pr(SREP_DUMMY))
(33 missing values generated)

. summarize y_1

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
         y_1 |        339    .3338635    .2034382   .0110897   .9996338
```

This figure demonstrates the results of a predictive check and analysis described in the subject of the figure.

Figure 6A.2.3

Robustness Check for the effects of PEOs on the probability of Stock Repurchase Decisions with Interaction Terms in a Probit Model

```
. linktest

Iteration 0:   log likelihood = -173.13497
Iteration 1:   log likelihood = -138.03636
Iteration 2:   log likelihood = -136.08406
Iteration 3:   log likelihood = -135.99392
Iteration 4:   log likelihood = -135.99366
Iteration 5:   log likelihood = -135.99366

Probit regression                               Number of obs     =        279
                                                LR chi2(2)        =      74.28
                                                Prob > chi2       =     0.0000
Log likelihood = -135.99366                     Pseudo R2         =     0.2145

------------------------------------------------------------------------------
  SREP_DUMMY |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   .9208512   .1461221     6.30   0.000     .6344572    1.207245
      _hatsq |  -.3120346   .1370978    -2.28   0.023    -.5807414   -.0433277
       _cons |   .1294628   .1213749     1.07   0.286    -.1084277    .3673533
------------------------------------------------------------------------------
```

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6A.2.4

Robustness Checks for the effects of PEOs on the Probability of Stock Repurchase Decisions with Interaction Terms when Controlling for Extraordinary Economic Periods

```
. linktest

Iteration 0:   log likelihood = -173.13497
Iteration 1:   log likelihood = -138.19029
Iteration 2:   log likelihood = -136.23312
Iteration 3:   log likelihood =  -136.1093
Iteration 4:   log likelihood = -136.10914
Iteration 5:   log likelihood = -136.10914

Probit regression                               Number of obs     =        279
                                                LR chi2(2)        =      74.05
                                                Prob > chi2       =     0.0000
Log likelihood = -136.10914                     Pseudo R2         =     0.2139

------------------------------------------------------------------------------
  SREP_DUMMY |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |    .920072   .1482521     6.21   0.000     .6295031    1.210641
      _hatsq |  -.2778713   .1351707    -2.06   0.040     -.542801   -.0129416
       _cons |   .1082906    .119428     0.91   0.365     -.125784    .3423652
------------------------------------------------------------------------------
```

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6B.2.1

Robustness Checks for the effects of PEOs on Bond Issuance Decisions in a Multiple Linear Regression Model

```
. estat ovtest

Ramsey RESET test using powers of the fitted values of BIt1
       Ho:  model has no omitted variables
                 F(3, 310) =      2.12
                  Prob > F =      0.0982
```

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6B.2.2

Robustness Checks for the effects of PEOs on the Probability of Bond Issuance Decisions in a Probit Regression

```
Probit regression                               Number of obs     =        332
                                                LR chi2(2)        =     216.03
                                                Prob > chi2       =     0.0000
Log likelihood = -58.948898                     Pseudo R2         =     0.6469
```

BI_DUMMY	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_hat	1.041843	.1299363	8.02	0.000	.7871729	1.296514
_hatsq	.03151	.0203642	1.55	0.122	-.0084031	.0714231
_cons	-.0215021	.1556458	-0.14	0.890	-.3265623	.283558

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6B.2.2b

Predicting the Probability of Bond Issuance Decisions Using Combined PEO Data in a Probit Regression

```
. predict  z_1
(option pr assumed; Pr(BI_DUMMY))
(40 missing values generated)

. summarize z_1
```

Variable	Obs	Mean	Std. Dev.	Min	Max
z_1	332	.2025921	.3288847	0	1

Figure 6B.3.1

Robustness Checks for the effects of PEOs on Bond Issuance Decisions When Controlling for Extraordinary Economic Periods in a Multiple Linear Regression

```
. estat ovtest

Ramsey RESET test using powers of the fitted values of BIt1
       Ho:  model has no omitted variables
                 F(3, 251) =      0.92
                  Prob > F =      0.4313
```

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6B.3.2

Robustness Checks for the effects of PEOs on the Probability of Bond Issuance Decisions When Controlling for Extraordinary Economic Periods in a Probit Model.

```
Probit regression                               Number of obs     =        273
                                                LR chi2(2)        =     176.92
                                                Prob > chi2       =     0.0000
Log likelihood = -43.009473                     Pseudo R2         =     0.6729
```

BI_DUMMY	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_hat	1.089193	.2400018	4.54	0.000	.6187986	1.559588
_hatsq	.0565131	.1090853	0.52	0.604	-.1572901	.2703163
_cons	-.0263962	.1930167	-0.14	0.891	-.4047019	.3519095

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

FIGURE 6B.3.2b

```
. predict  z_1
(option pr assumed; Pr(BI_DUMMY))
(13 missing values generated)

. summarize z_1
```

Variable	Obs	Mean	Std. Dev.	Min	Max
z_1	273	.1874089	.3231785	2.14e-13	1

```
. linktest

Iteration 0:   log likelihood = -131.46831
Iteration 1:   log likelihood = -47.558245
Iteration 2:   log likelihood = -43.346558
Iteration 3:   log likelihood = -43.016282
Iteration 4:   log likelihood = -43.009476
Iteration 5:   log likelihood = -43.009473

Probit regression                               Number of obs     =        273
                                                LR chi2(2)        =     176.92
                                                Prob > chi2       =     0.0000
Log likelihood = -43.009473                     Pseudo R2         =     0.6729

------------------------------------------------------------------------------
    BI_DUMMY |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat |   1.089193   .2400018     4.54   0.000     .6187986    1.559588
      _hatsq |   .0565131   .1090853     0.52   0.604    -.1572901    .2703163
       _cons |  -.0263962   .1930167    -0.14   0.891    -.4047019    .3519095
------------------------------------------------------------------------------
```

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6A.0.1

Robustness Check for the effects of IPOs & SEOs on Stock Repurchase Decisions

```
. linktest

Iteration 0:   log likelihood =   291.9686
Iteration 1:   log likelihood =   291.9686

Tobit regression                                Number of obs     =        328
                                                      Uncensored  =        328
Limits: Lower = -inf                              Left-censored   =          0
        Upper = +inf                             Right-censored   =          0

                                                LR chi2(2)        =       5.00
                                                Prob > chi2       =     0.0819
Log likelihood = 291.9686                       Pseudo R2         =    -0.0086

------------------------------------------------------------------------------
SREP_PERCEN~1 | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
        _hat |   .1457943   .1223329     1.19   0.234    -.0948672    .3864558
      _hatsq |  -.0221014   .6303001    -0.04   0.972     -1.26207    1.217868
       _cons |   .0333899    .006666     5.01   0.000     .0202761    .0465036
-------------+----------------------------------------------------------------
var(e.SREP_~1) |   .0098708   .0007708                      .0084652    .0115098
------------------------------------------------------------------------------
```

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6A.0.2

Robustness Check for the effects of IPOs & SEOs Stock Repurchase Decisions with Interaction Terms

```
. linktest

Iteration 0:   log likelihood =   294.0923
Iteration 1:   log likelihood =   294.0923

Tobit regression                                  Number of obs     =        328
                                                        Uncensored  =        328
Limits: Lower = -inf                                Left-censored   =          0
        Upper = +inf                                Right-censored  =          0

                                                  LR chi2(2)        =       9.25
                                                  Prob > chi2       =     0.0098
Log likelihood = 294.0923                         Pseudo R2         =    -0.0160
```

SREP_PERCEN~1	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
_hat	.2490955	.0987693	2.52	0.012	.0547898	.4434012
_hatsq	.4948016	.3757304	1.32	0.189	-.2443607	1.233964
_cons	.0336566	.006433	5.23	0.000	.0210011	.046312
var(e.SREP_~1)	.0097438	.0007609			.0083563	.0113617

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6A.0.3. Robustness Check for the effects of IPOs & SEOs Stock Repurchase Decisions when Controlling for Extraordinary Economic Periods

```
. linktest

Iteration 0:   log likelihood =  304.74147
Iteration 1:   log likelihood =  304.74147

Tobit regression                                  Number of obs     =        274
                                                        Uncensored  =        274
Limits: Lower = -inf                              Left-censored     =          0
        Upper = +inf                              Right-censored    =          0

                                                  LR chi2(2)        =      10.84
                                                  Prob > chi2       =     0.0044
Log likelihood = 304.74147                        Pseudo R2         =    -0.0181
```

SREP_PERCEN~1	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
_hat	.2611929	.0947276	2.76	0.006	.0747005	.4476853
_hatsq	.576648	.4123352	1.40	0.163	-.2351262	1.388422
_cons	.0253096	.0057326	4.41	0.000	.0140236	.0365956
var(e.SREP_~1)	.0063312	.0005409			.005351	.0074909

```
. linktest

Iteration 0:   log likelihood =  306.66393
Iteration 1:   log likelihood =  306.66393

Tobit regression                                  Number of obs     =        274
                                                        Uncensored  =        274
Limits: Lower = -inf                              Left-censored     =          0
        Upper = +inf                              Right-censored    =          0

                                                  LR chi2(2)        =      14.69
                                                  Prob > chi2       =     0.0006
Log likelihood = 306.66393                        Pseudo R2         =    -0.0245
```

SREP_PERCEN~1	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
_hat	.3650562	.1044463	3.50	0.001	.1594302	.5706822
_hatsq	1.048824	.4956865	2.12	0.035	.0729545	2.024694
_cons	.0256658	.0056664	4.53	0.000	.0145103	.0368213
var(e.SREP_~1)	.006243	.0005334			.0052765	.0073865

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6A.0.4. Robustness Check for the effects of IPOs & SEOs on Stock Repurchase Decisions with Interaction Terms when Controlling for Extraordinary Economic Periods

```
. linktest

Iteration 0:   log likelihood =  305.93875
Iteration 1:   log likelihood =  305.93875

Tobit regression                                  Number of obs     =        274
                                                        Uncensored  =        274
Limits: Lower = -inf                              Left-censored     =          0
        Upper = +inf                              Right-censored    =          0

                                                  LR chi2(2)        =      13.24
                                                  Prob > chi2       =     0.0013
Log likelihood = 305.93875                        Pseudo R2         =    -0.0221
```

SREP_PERCEN~1	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
_hat	.309876	.0943708	3.28	0.001	.1240858	.4956661
_hatsq	.6990612	.3167578	2.21	0.028	.0754526	1.32267
_cons	.0258031	.0056134	4.60	0.000	.0147519	.0368543
var(e.SREP_~1)	.0062761	.0005362			.0053045	.0074257

```
. linktest

Iteration 0:   log likelihood =  306.96699
Iteration 1:   log likelihood =  306.96699

Tobit regression                                  Number of obs     =        274
                                                        Uncensored  =        274
Limits: Lower = -inf                              Left-censored     =          0
        Upper = +inf                              Right-censored    =          0

                                                  LR chi2(2)        =      15.30
                                                  Prob > chi2       =     0.0005
Log likelihood = 306.96699                        Pseudo R2         =    -0.0256
```

SREP_PERCEN~1	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
_hat	.3734715	.1034435	3.61	0.000	.1698199	.5771231
_hatsq	1.058907	.4636417	2.28	0.023	.1461245	1.97169
_cons	.0257975	.0056341	4.58	0.000	.0147055	.0368894
var(e.SREP_~1)	.0062292	.0005322			.0052648	.0073702

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6A.0.5. Robustness Check for the effects of IPOs & SEOs on the Probability of Stock Repurchase Decisions

```
Probit regression                                 Number of obs =    339
                                                  LR chi2(2)    =  81.92
                                                  Prob > chi2   = 0.0000
Log likelihood = -175.50527                       Pseudo R2     = 0.1892
```

SREP_DUMMY	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
_hat	.9307457	.1316354	7.07	0.000	.672745	1.188746
_hatsq	-.2934037	.106504	-2.75	0.006	-.5021478	-.0846596
_cons	.1099261	.1006788	1.09	0.275	-.0874007	.3072528

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6A.0.6 Robustness Check for the effects of IPOs & SEOs on the Probability of Stock Repurchase Decisions with Interaction Terms

```
. linktest

Iteration 0:   log likelihood = -216.46482
Iteration 1:   log likelihood = -165.09018
Iteration 2:   log likelihood = -162.60564
Iteration 3:   log likelihood = -162.47733
Iteration 4:   log likelihood = -162.47696
Iteration 5:   log likelihood = -162.47696

Probit regression                                 Number of obs =    339
                                                  LR chi2(2)    = 107.98
                                                  Prob > chi2   = 0.0000
Log likelihood = -162.47696                       Pseudo R2     = 0.2494
```

SREP_DUMMY	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
_hat	.9010378	.1260866	7.15	0.000	.6539126	1.148163
_hatsq	-.1866474	.1091445	-1.71	0.087	-.4005667	.0272718
_cons	.071439	.0977742	0.73	0.465	-.1201949	.2630729

```
. linktest

Iteration 0:   log likelihood = -216.46482
Iteration 1:   log likelihood = -175.91829
Iteration 2:   log likelihood = -172.15562
Iteration 3:   log likelihood = -171.71145
Iteration 4:   log likelihood = -171.70968
Iteration 5:   log likelihood = -171.70968

Probit regression                                     Number of obs =    339
                                                      LR chi2(2)    =  89.51
                                                      Prob > chi2   = 0.0000
Log likelihood = -171.70968                           Pseudo R2     = 0.2068

------------------------------------------------------------------------------
  SREP_DUMMY | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
        _hat |   .9269348   .1337539     6.93   0.000      .664782    1.189088
      _hatsq |  -.2351856   .1029194    -2.29   0.022    -.4369039   -.0334672
       _cons |   .0794739   .0974662     0.82   0.415    -.1115564    .2705042
------------------------------------------------------------------------------

Average marginal effects                              Number of obs = 328
Model VCE: Robust

Expression: E(SREP_PERCENTt1*|0<SREP_PERCENTt1<1), predict(ystar(0,1))
dy/dx wrt:  SEO

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         SEO |   3.65e-06   1.21e-06     3.03   0.002     1.29e-06    6.02e-06
------------------------------------------------------------------------------
```

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6A.0.7

Robustness Check for the effects of IPOs & SEOs on the Probability of Stock Repurchase Decisions when Controlling for Extraordinary Economic Periods

```
. linktest

Iteration 0:   log likelihood = -172.33501
Iteration 1:   log likelihood = -131.31257
Iteration 2:   log likelihood = -124.72535
Iteration 3:   log likelihood = -124.04395
Iteration 4:   log likelihood = -124.04111
Iteration 5:   log likelihood = -124.04111

Probit regression                                     Number of obs =    279
                                                      LR chi2(2)    =  96.59
                                                      Prob > chi2   = 0.0000
Log likelihood = -124.04111                           Pseudo R2     = 0.2802
```

SREP_DUMMY	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
_hat	.8273625	.1396824	5.92	0.000	.55359	1.101135
_hatsq	-.4056776	.1342927	-3.02	0.003	-.6688864	-.1424688
_cons	.177737	.1175563	1.51	0.131	-.0526692	.4081432

```
Note: 1 failure and 0 successes completely determined.

. linktest

Iteration 0:   log likelihood = -172.33501
Iteration 1:   log likelihood = -135.57032
Iteration 2:   log likelihood = -132.14581
Iteration 3:   log likelihood = -131.93472
Iteration 4:   log likelihood = -131.93429
Iteration 5:   log likelihood = -131.93429

Probit regression                                     Number of obs =    279
                                                      LR chi2(2)    =  80.80
                                                      Prob > chi2   = 0.0000
Log likelihood = -131.93429                           Pseudo R2     = 0.2344
```

SREP_DUMMY	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
_hat	.9117356	.14771	6.17	0.000	.6222294	1.201242
_hatsq	-.4475549	.1460026	-3.07	0.002	-.7337147	-.1613952
_cons	.1966727	.1244931	1.58	0.114	-.0473293	.4406747

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6A.0.8

Robustness Check for the effects of IPOs & SEOs on the Probability of Stock Repurchase Decisions with Interaction Terms when Controlling for Extraordinary Economic Periods

```
. linktest

Iteration 0:   log likelihood = -172.33501
Iteration 1:   log likelihood = -128.70412
Iteration 2:   log likelihood = -124.36162
Iteration 3:   log likelihood = -124.09924
Iteration 4:   log likelihood = -124.09841
Iteration 5:   log likelihood = -124.09841

Probit regression                                 Number of obs =    279
                                                  LR chi2(2)    =  96.47
                                                  Prob > chi2   = 0.0000
Log likelihood = -124.09841                       Pseudo R2     = 0.2799
```

SREP_DUMMY	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
_hat	.828942	.1381899	6.00	0.000	.5580949	1.099789
_hatsq	-.3313621	.1237758	-2.68	0.007	-.5739582	-.088766
_cons	.1437276	.1148819	1.25	0.211	-.0814368	.368892

```
. linktest

Iteration 0:   log likelihood = -172.33501
Iteration 1:   log likelihood = -136.46175
Iteration 2:   log likelihood =   -132.488
Iteration 3:   log likelihood = -131.90706
Iteration 4:   log likelihood = -131.90466
Iteration 5:   log likelihood = -131.90466

Probit regression                                 Number of obs =    279
                                                  LR chi2(2)    =  80.86
                                                  Prob > chi2   = 0.0000
Log likelihood = -131.90466                       Pseudo R2     = 0.2346
```

SREP_DUMMY	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
_hat	.9118635	.148776	6.13	0.000	.620268	1.203459
_hatsq	-.3493671	.1404803	-2.49	0.013	-.6247034	-.0740309
_cons	.1401936	.1203437	1.16	0.244	-.0956758	.3760629

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6B.1.3

Robustness Check for the effects of IPOs & SEOs on the Probability of Bond Issuance Decisions When Controlling for Extraordinary Economic Periods in a Probit Model

```
. linktest

Iteration 0:   log likelihood = -131.46831
Iteration 1:   log likelihood = -46.954166
Iteration 2:   log likelihood =  -42.35742
Iteration 3:   log likelihood = -42.040754
Iteration 4:   log likelihood = -42.035512
Iteration 5:   log likelihood =  -42.03551

Probit regression                                     Number of obs =    273
                                                      LR chi2(2)    = 178.87
                                                      Prob > chi2   = 0.0000
Log likelihood = -42.03551                            Pseudo R2     = 0.6803
```

BI_DUMMY	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
_hat	1.078918	.2346699	4.60	0.000	.618973	1.538862
_hatsq	.0513238	.1057117	0.49	0.627	-.1558674	.2585149
_cons	-.0247765	.1956231	-0.13	0.899	-.4081908	.3586378

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6B.1.1

Robustness Check for the effects of IPOs & SEOs on Bond Issuance Decisions Using in a Multiple Linear Regression Model.

```
Ramsey RESET test for omitted variables
Omitted: Powers of fitted values of BIt1

H0: Model has no omitted variables

F(3, 307) =   3.46
 Prob > F = 0.0168
```

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.

Figure 6B.1.2

Robustness Check for the effects of IPOs & SEOs on the Probability of Bond Issuance Decisions in a Probit Model.

```
. linktest

Iteration 0:   log likelihood =   -166.962
Iteration 1:   log likelihood = -58.816318
Iteration 2:   log likelihood = -57.166214
Iteration 3:   log likelihood = -56.775374
Iteration 4:   log likelihood = -56.746905
Iteration 5:   log likelihood = -56.743991
Iteration 6:   log likelihood = -56.743909
Iteration 7:   log likelihood = -56.743909

Probit regression                                     Number of obs =    332
                                                      LR chi2(2)    = 220.44
                                                      Prob > chi2   = 0.0000
Log likelihood = -56.743909                           Pseudo R2     = 0.6601
```

BI_DUMMY	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
_hat	1.045892	.1304075	8.02	0.000	.7902981	1.301486
_hatsq	.0335063	.0105425	3.18	0.001	.0128434	.0541692
_cons	-.0219076	.1584115	-0.14	0.890	-.3323884	.2885732

This figure demonstrates the results of the robustness check for the relevant econometric analysis described in the subject of the figure.