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The Impact of Seasoned Equity Offerings on Competition

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## **Abstract**

The purpose of this study is to analyse the intra-industry effects of 112 large seasoned equity offerings (SEOs) between 2000 and 2015 on incumbent firm's operating performance. Consistent with previous findings, there is evidence of a decline in post-issue operating performance of SEO firms, whereas there is little evidence of changes in post-issue operating performance of incumbent firms, when the ex-ante use of proceeds is disregarded. The stated intended use of proceeds is disclosed and publicly available prior or at the offer, while the actual use of proceeds is unknown a priori, conveying valuable information to market participants. So, this study provides new evidence for the role that the primary intended use of proceeds plays in explaining changes in incumbent firms' operating performance, which significantly improves after debt related large SEO events. The competitive effects prevail for this issue category, as evidence on the literature indicates that issuers' performance deteriorates when the proceeds are planned to be used to repay debt obligations since it sends signals to market participants of an opportunistic behaviour, trying to take advantages of market timing, issuing in overvaluation moments. However, there is little evidence regarding the negative impact of SEOs whose ex-ante intended use of proceeds are claimed to be used to conduct investments or are not specific. The existence of SEOs intra-industry effects can play an important role in firms' investment and capital structure decisions and their understanding may be useful for several agents, including investors, managers, competitors, and market authorities, to react accordingly and decide wisely in response to these corporate events.

**Key words:** Seasoned Equity Offerings; Long-Term Operating Performance; Use of Proceeds; Competitive Effects.

**JEL Codes:** G31; G32.

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## 1. Introduction

Seasoned Equity Offerings (SEOs) consist in transactions in which a listed company decides to sell additional stocks and can be categorised into primary, which are a source of additional capital, or secondary ones, that do not change firm's capital structure. As SEOs correspond to issues of equity following the Initial Public Offerings (IPOs), both transactions have several similarities, namely the transmission of some of the ownership rights in the firm from existing to new shareholders (Spiess and Affleck-Graves, 1995) and thus can be studied using similar research strategies.

The literature on equity issuances is extensive. However, most studies refer to the stock price and operating performances of issuing companies around their equity offerings. From the point view of the stock performance, there is strong evidence documenting significant poor post-issue abnormal returns for issuing firms in comparison with matched non-issuers (e.g. Spiess and Affleck-Graves, 1995; Loughran and Ritter, 1995), whereas, from the operating performance perspective, there is an improvement right before the offering but a decrease afterwards, related to earnings management and to the exploitation of windows of opportunity (e.g. Loughran and Ritter, 1997; McLaughlin, Safieddine, and Vasudevan, 1996).

Regarding the intra-industry effects of SEOs, however, there is not substantial research, a gap this study aims to fill. There is only evidence of rivals' stock price reactions to SEOs (Slovin, Sushka, and Polonchek, 1992; Bradley and Yuan, 2013), while effects on the operating performance of industry competitors remain unknown. Moreover, it would also be interesting to address not only the impact of SEOs in competition. Thus, our main research question is "What is the impact of large SEOs on incumbent firms' operating performance?" and an additional research question is "How do rival firms strategically react to intra-industry SEOs?".

The answer to these questions is of the extreme importance not only for firms, but to investors, managers, and market authorities. For investors, to find if they should or not participate in a SEO or buy shares from the competitors instead. For managers of a future issuer firm, to assess if it is a strategy that will bring competitive advantages, or managers of a rival firm, to plan how to strategically react. Finally, for market authorities, to be aware of regulatory and competition concerns possibly raised by these events.

Hsu, Reed, and Rocholl (2010) is one of the few articles that devotes attention to the

relationship between equity issues, namely IPOs, and competition, being particularly interesting for this dissertation. They argued that performance differences are related to sources of competitive advantages and found that non-issuing competitors exhibit poorer stock price and operating performances. However, the evidence is mixed, with authors such as Chod and Lyandres (2011) and Spiegel and Tookes (2020) achieving similar results, whereas Akhigbe, Borde, and Whyte (2003), focusing merely on stock returns, found that IPOs announcements convey only firm-specific information.

After Hsu, Reed, and Rocholl (2010), Bradley and Yuan (2013) concluded that SEOs have an impact on the company's rivals, as they found a positive reaction in the case of primary SEOs, dominated by competitive effects, and a negative reaction in the case of secondary SEOs, with contagion effects prevailing. However, these authors focused merely on stock returns.

Despite not being studied with the frequency of other aspects, intra-industry effects are analysed in several market operations further from equity issuances, which reinforces their importance. For example, in share repurchases (Hertzel, 1991; Erwin and Miller, 1998; Massa, Rehman, and Vermaelen, 2007), bankruptcies (Lang and Stulz, 1992), M&A<sup>1</sup> (Eckbo, 1983; Mitchell and Mulherin, 1996; Akhigbe and Madura, 1999), earnings announcements (Foster, 1981), management forecasts of earnings (Baginski, 1987) and dividend changes (Firth, 1996).

All in all, research examining intra-industry effects of diverse corporate events suggests that information releases of one firm are often used to make inferences about competing firms in the same industry, so a firm's decision to issue equity also has the potential to impact market participants.

The results of this study, that takes in consideration 112 large SEOs between 2000 and 2015, involving 97 European issuers and 610 incumbent firms, suggest little evidence of an overall deterioration in incumbent firms' performance, namely when the ex-ante intended use of proceeds are related to investments, while issuers show an overall poorer performance after conducting equity issues, according to the literature. However, there is strong evidence of a significant improvement on peers' performance after intra-industry SEOs, when issuers claim to intend to use the proceeds to debt related purposes, balancing their capital structure. Thus, towards debt issues, incumbent firms' have a competitive

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<sup>1</sup> M&A – Mergers and Acquisitions.

advantage over issuers, who show a particularly poorer performance in this category, according to the literature.

Besides this section, this report is structured as follows. Section 2 provides literature review on the topic, with Section 2.1. approaching the main capital structure theories and the security issuance decision, Section 2.2 focusing on the issuers' pre-SEO and post-SEO performance, Section 2.3. concentrating on the intra-industry effects of several corporate events and Section 2.4. approaching the hypotheses development. Section 3 contains information regarding the sample selection (Section 3.1.) and sample description (Section 3.2.). Section 4. mentions the methodology followed, which is segmented into a univariate analysis in Section 4.1. and a multivariate analysis in Section 4.2. and this last one is subdivided into Section 4.2.1., which explains the methodology followed on the first models based on panel data regressions and Section 4.2.2. explains the methodology adopted based on quantile and OLS regressions. Both Sections 4.2.1. and 4.2.2. aim to study the impact of large SEOs on incumbents' operating performance, considering different control variables. Section 5. provides evidence on operating performance, analysing the results based on the methodology adopted. Thus, Sections 5.1. and 5.2. report the empirical results of both univariate and multivariate statistics. In Section 5.2.1. the results of the multivariate model explained in Section 4.2.1. whose control variables are based on firms' characteristics are presented, while Section 5.2.2. presents the results of the multivariate model explained in Section 4.2.2. whose control variables are based on deal characteristics. Finally, Section 6. presents the main conclusions of the study.



## **2. Literature Review**

This section covers the main topics of interest of the existing literature on SEOs, as the capital structure theories and the decision of issuing new shares, the pre-SEO and post-SEO both stock and operating performances and the impact of specific corporate events on competition, allusive to the effect of equity issuances on rivals, which will be the focus of this academic study. It presents the developed hypotheses under analysis.

### ***2.1. Capital Structure Theories and Security Issuance Decision***

Undoubtedly, the way a firm is financed is not indifferent to it, affecting its value. Therefore, firms' capital structure decisions have been a highlighted topic of research throughout time.

According to the well-known trade-off theory, the optimal capital structure emerges from the balance between costs (bankruptcy and agency costs) and benefits (debt tax shields and reduction of free cash-flows problems) associated with equity and debt financing, attributing an important role to taxes on firms' financing decisions (Kraus and Litzenberger, 1973). Thus, according to this theory, when deciding the amount of debt, a firm considers that higher debt grants higher tax benefits, but it may also lead to bankruptcy and increase agency costs, so "the firm will borrow up to the point where the marginal value of tax shields on additional debt is just offset by the increase in the present value of possible costs of financial distress" (Myers, 2001, p.88 and 89). Consequently, since the weighting of benefits and costs will establish limits to leverage, firms will have moderate levels of debt.

Indeed, McLaughlin, Safieddine, and Vasudevan (1996) found that high-leverage firms are prone to pursuing SEOs, which is consistent with the trade-off theory, as when leverage becomes too high, firms have incentives to choose equity financing due to excessive costs of debt.

Moreover, according to Hovakimian, Opler, and Titman (2001) firms face obstacles that prevent them to make adjustments towards a target debt ratio, which can change over time with variations in firm's profitability and stock price.

Nevertheless, there is evidence against the trade-off theory. One of the criticisms consist in the negative market reaction to the announcement of equity issuances and other leverage-reduction transactions, as if these are movements towards an optimal level of

debt either in a positive or negative direction, the theory predicts that they should lead to a positive market reaction (Masulis, 1980). Moreover, evidence showing a negative relation between past profitability and debt is also inconsistent with this theory (Rajan and Zingales, 1995), as according to it, more profitable firms should take advantages of valuable interest tax shields (Myers, 2001). However, these high profit firms may have low debt ratios since they generate the necessary cash-flows to sustain their activity and may have more retained earnings that allow to embrace investment opportunities without raising leverage.

The pecking order theory (Myers and Majluf, 1984) postulate that firms follow a financing hierarchy when they choose their sources of funding due to information asymmetries and, consequently, adverse selection costs, prioritizing the use of internal funds over external financing, recurring to retained earnings. When external funds are required, firms prefer debt against equity, given the lower inherent costs and higher safety degree. This way, asymmetric information and signalling problem associated with external financing will induce managers to prefer internal funding, and debt to equity. This preference is related to the fact that debt sends the positive signal to investors that managers are confident about firm's future performance and growth opportunities and will be able to meet its debt obligations, whereas equity issuances signal an overpricing of outstanding shares, leading to a negative stock price reaction afterwards, being then a last resort for managers (Myers, 2001).

However, the strong inherent assumptions that managers act in the interest of the shareholders may not be reasonable (Jensen and Meckling, 1976) and there is wide empirical evidence rejecting the pecking order's predictions about under what circumstances and how often firms issue equity (Fama and French, 2005; Huang and Ritter, 2005).

Stock prices have been claimed throughout time as a key driver on firms' equity issuance decision, suggesting that firms issue equity to take advantage of moments of overvaluation, whereas undervaluation leads firms avoid equity issuance.

According to Baker and Wurgler (2002), the "equity market timing" is the term used to refer to the firms' practice of issuing equity when it is overvalued and repurchase shares at relatively low prices, when undervalued, aiming to take advantage of temporary market fluctuations. These academics concluded that market timing affects the capital structure in a persistent way, claiming that this theory can explain the evidence found that leverage

and market value are strongly negatively correlated, as low-leverage firms are more likely to raise funds when their stocks are overvalued and, conversely, high-leverage firms tend to raise funds when their stocks are undervalued. Despite the existing evidence consistent with the market timing theory, reporting that firms conduct SEOs when managers believe their firms are overvalued (Bayless and Chaplinsky, 1996; Greenwood and Hanson, 2012; Huang and Ritter, 2005; Loughran and Ritter, 1995; Spiess and Affleck-Graves, 1995), Alti (2006) found that the impact of market timing on capital structure is important in the short run, but not pervasive in the long run and Hovakimian (2006) found no evidence of market timing influence over firms' capital structure.

Dittmar and Thakor (2007) created a "managerial investment autonomy" theory consistent with the overvaluation idea, suggesting that firms issue equity when their stock prices are high because it is more likely to exist an agreement between investors and managers' expectations regarding the project payoffs, otherwise managers use debt.

However, while some authors point to stocks' overvaluation as the main reason behind security issuances, DeAngelo, DeAngelo, and Stulz (2010) considered the need for cash as the primary motivation to conduct SEOs, but still attributed importance to market timing and corporate lifecycle stage to the issuance decision, and McLean (2011) found that equity issuances are motivated by precautionary cash savings.

## ***2.2. Pre-SEO and Post-SEO Issuers' Performance***

The post-IPO underperformance has been widely analysed and confirmed throughout time in several studies (Jain and Kini, 1994; Loughran and Ritter, 1995; Ritter, 1991; Ritter and Welch, 2002), but the same relevance was not given to SEOs, although these capital markets' operations have similarities and there are many academics suggesting that this phenomenon is not exclusive to IPOs (Loughran and Ritter, 1995; Spiess and Affleck-Graves, 1995). Indeed, this underperformance puzzle has motivated several academics to explore the market reaction to equity issuances and changes in operating performance and to provide plausible explanations to justify it. It is crucial to first understand the effects of equity issuances on issuers to have a solid foundation for comparison and a better understanding of the potential effects on intra-industry rivals.

### ***2.2.1. Stock Performance***

Several studies report a long-run underperformance for firms' stocks following SEOs. These results are similar to those obtained for IPOs (e.g., Ritter, 1991), which indicates that the underperformance puzzle is not exclusive to initial offerings, but a common feature to all stock offerings instead (Loughran and Ritter, 1995; Spiess and Affleck-Graves, 1995).

There is evidence across the literature for several years showing a negative market reaction to equity issuances' announcements, leading issuers' stock prices to decrease significantly afterwards (Asquith and Mullins Jr, 1986; Barclay and Litzenberger, 1988; Masulis and Korwar, 1986). Denis (1994) claimed that this negative market reaction to equity issuances announcements is not associated with the investment opportunities, as the effect persists regardless of the profitability expectations associated.

Loughran and Ritter (1995) performed an analysis in which they found evidence that underperformance holds not only for firms going public as documented previously through numerous studies, but also for firms conducting SEOs, with the degree of underperformance varying over time. They reported that the average raw returns for SEO issuers is 7 percent per year during the five years after the offering, while for non-issuing firms this value is around 15 percent per year considering firms with the same market capitalization. Nevertheless, these low post-issue returns follow extremely high returns in the year prior to the offer of 72 percent, on average.

In line with the previous authors are Spiess and Affleck-Graves (1995), who analysed the long-run financial performance subsequent to primary SEOs during the period of 1975-1989. They also reported that firms issuing SEOs clearly underperformed a set of matched non-issuing firms from the same industry and of equal size, with underperformance persisting even after controlling for trading system, offer size, age, and book-to-market ratio.

Moreover, these academics also documented that underperformance associated with equity issuance is "more severe for the smallest, youngest and NASDAQ-traded firms, and those with the lowest book-to-market ratios" (p.266). Segmenting the investigation by industry, they concluded that the underperformance of SEOs in the long-run is very related with industry effects, since SEOs were most numerous in the same (or similar) industries as those associated with IPOs. They also show that long-run underperformance

for issuing firms is prevalent across industries and is not the product of extreme underperformance in a few specific industries.

According to Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995), the poor performance after the issue is not attributable to differences in risk or risk mismeasurement, but to the exploitation of windows of opportunity, as firms take advantage of periods of significant overvaluation to issue equity.

Furthermore, the persistent long-run underperformance leads these authors to suggest that the market does not fully and accurately react to the information disclosed by an equity announcement, claiming that SEOs occur during periods in which investors make mistakes about the future profitability of the firm.

On the other hand, Eckbo, Masulis, and Norli (2000) point out that the lower systematic risk exposure for issuing firms relative to the matched non-issuer explains the equity issuers' stocks underperformance. A consistent explanation is that, despite issuers being more exposed to market risk, as they decrease leverage this effect is offset by issuers' lower exposure to risk factors, such as unanticipated inflation, default spread, and changes in the slope of the term structure, leading to a reduction of their stocks' expected returns in comparison to matched firms. Also, equity issues increase stock turnover, often considered a measure of liquidity, whereas the stock turnover for matched firms remains unchanged, meaning that issuing firm stocks are, on average, less risky during the period right after the offering.

Eckbo et al. (2000) criticized the methodology used by Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995), who stated that the market does not fully adjust to information disclosed in equity issue announcements, otherwise the underperformance would not be so significant and persistent. According to their view, underperformance is only a result of the poor risk controls embedded in the matched-firm technique employed by Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) and not a true market underreaction to the offerings announcements.

Finally, Autore, Bray, and Peterson (2009) and Walker and Yost (2008) contributed with a new perspective that relates ex-ante stated intended use of proceeds and both long-run stock and operating performance of U.S.<sup>2</sup> firms conducting SEOs, which settled roots for Amor and Kooli (2017) taking this approach regarding IPOs.

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<sup>2</sup> U.S. – United States.

Autore, Bray, and Peterson (2009) and Walker and Yost (2008) categorized the intended use of proceeds into investment, when firms plan to use the proceeds to conduct new investments, debt, when firms issue equity to raise capital to repay debt obligations, and general corporate purposes, when firms do not specify or do not have a specific purpose to use the proceeds. Amor and Kooli (2017) considered an additional category, namely marketing and sales promotion.

Walker and Yost (2008) found that when firms are specific about their investment plans when conducting SEOs, they benefit from value increases at the issue announcement, which is related to the size of the investment program. The opposite effect is verifiable for firms who are not transparent regarding their plans.

Autore, Bray, and Peterson (2009)'s results indicate that issuers whose proceeds are used for recapitalization motives or general corporate purposes experience abnormally poor performance in the subsequent three years, indicating this kind of issues may have an opportunistic market timing motivation behind. Contrarily, investment issuers do not show signs of subsequent underperformance, indicating that they send credible signals to use the proceeds on profitable investment opportunities.

### ***2.2.2. Operating Performance***

The main findings regarding operating performance show that SEOs tend to be preceded by large increases in operating profitability and followed by decreases (Loughran and Ritter, 1997; McLaughlin et al., 1996). As in the case of financial performance, operating performance also deteriorates after the offering.

Loughran and Ritter (1997) concluded that the operating performance of issuing firms reaches a maximum around the moment of the offering, showing that, for example, the median profit margin for the issuer falls from 5.4 percent in the fiscal year of the offering to 2.5 percent four years later and the ROA decreases from 6.3 percent to 3.2 percent, whereas the median operating income to assets ratio falls from 15.8 percent to 12.1 percent. These deteriorations, observable for both large and small issuing firms, are much larger than the corresponding deteriorations for non-issuers matched by asset size, industry, and operating performance. Loughran and Ritter (1997) claim that some firms manipulate earnings bearing in mind the idea of an equity offering, whereas others exploit moments of overvaluation to issue equity without any manipulation of earnings.

McLaughlin et al. (1996) measured operating performance through operating cash flows deflated by the book value of assets and found that the issuers reveal significant gains in performance right before the SEO, while following the SEO and during a three-year period they observe a strong decrease. This decrease in performance is larger for firms with higher free-cash flows, suggesting that there are agency issues in the sense that managers keep excess cash-flow to pursue value reducing activities, which is consistent with Jensen (1986) suggesting that managers prefer to retain excess cash-flow in the firm and might use the cash surplus for value reducing activities, so the announcement of SEOs must have a negative effect on stock prices because SEOs increase the resources available for poor investment by managers. Nevertheless, their results also show that the fall in performance is smaller for larger firms and those that invest in fixed assets, but there is no evidence that it is greater for low-growth firms. They also found that “larger improvements in performance prior to the issue have bigger declines subsequent to the issue” (p.52).

Teoh, Welch, and Wong (1998), Rangan (1998) and Lim, Thong, and Ding (2008) documented that issuing firms with high levels of discretionary accruals that report a higher net income before the offering have worst subsequent stock returns and poorer post-issue earnings, suggesting that some firms manipulate the performance prior to the issue to make it more attractive to investors. This post-SEO underperformance is consistent with the hypothesis that investors are too optimistic and extrapolate pre-issue earnings without fully adjusting for the potential manipulation of reported earnings, being afterwards disillusioned by expected declines in earnings caused by earnings management.

In terms of operating performance accordingly to the intended use of proceeds, Autore, Bray, and Peterson (2009) found that firms using the proceeds to general corporate purposes or recapitalization motives have significantly declines in performance following equity offerings, and better performance when the plan is to use the proceeds to conduct investments. Most importantly, these authors indicate that the stated use of proceeds indeed have a relevant impact on issuers' performance, whereas most literature does not take it as a key factor, considering all issues as equal in terms of information disclosures. Their findings indicate that, as the intended use of proceeds is known a priori but the actual use is not, investment issues convey reliable information of a non-timing motivation to issue equity, while an unspecified statement and recapitalization purposes convey

to some degree a timing motive to market participants.

Walker and Yost (2008), on the other hand, found that regardless of the stated intended use of proceeds, issuers increase their long-term debt following SEOs, which would not be expectable for recapitalization issuers who claim the proceeds will be used to repay debt obligations and conduct more investments, revealing an increase in both capital expenditures and R&D<sup>3</sup> after equity offerings.

### ***2.3. Competitive Effects of Corporate Events and Information Spillovers***

The literature regarding the post-offer issuer's performance is vast but the competitive effects remain to some extent uncovered. Adding competition to the analysis complements the existing literature on performance as the aim is assessing the impact of equity offerings on the performance of competitors, which impacts numerous agents (Hsu, Reed, and Rocholl, 2010).

In the literature of information spillovers (i.e., assessing how competitors react to peers moves) several authors distinguish between contagion effects and competitive effects. According to Bradley and Yuan (2013), contagion effects suggest that information spillovers will equally impact all firms in the same industry because they share common features like growth perspectives and capital structure. Competitive effects suggest that information about one firm can a signal about advantages or disadvantages that this firm has relative to rivals, predicting the opposite effect on rivals.

Akhigbe et al. (2003) analysed the impact of IPOs on rivals and did not find significant valuation effects, due to the existence of contrarian effects that offset each other.

Whereas Akhigbe et al. (2003) focused merely on the stock returns, Hsu, Reed, and Rocholl (2010) studied both the returns, operating performance and likelihood of survival of listed intra-industry rivals at the time of the largest IPOs in their industry. Contrasting to Akhigbe et al. (2003), they documented that industry rivals exhibit negative stock price changes and a decrease in their operating performance after the IPO, whereas an IPO withdrawal has the opposite effect. This evidence suggests that newly listed firms are able to compete in the market and that such events have implications for investors "particularly in the assessment of the expected risk and return of companies in industries in which there is a high probability of new IPO entrants" (Hsu, Reed, and Rocholl, 2010, p.525). Thus,

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<sup>3</sup> R&D – Research and Development.



competitive advantages of IPO firms are related to the IPO and include “lower leverage, recent certification by financial intermediaries, and operational differences such as higher levels of knowledge capital” (p.496) and affect rivals’ performance and survival. Hsu, Reed, and Rocholl (2010) concluded that firms in the industry reveal a relatively better operating performance after large IPOs if they have less leverage, if the underwriter of the IPO was a well ranked investment bank, and if their R&D expenses are larger.

Nevertheless, despite the identical purpose of the abovementioned studies, the approaches differ in terms of data and methodology. For example, Akhigbe et al. (2003) focus on the average effect of all IPOs, since they consider a sample of all IPOs that have at least one listed incumbent, not filtered by the IPO size, capturing then the effect of both small and large IPOs, while Hsu, Reed, and Rocholl (2010) reveal a deeper concern regarding the sample contamination, only including IPOs that are not proceeded or followed by a larger IPO in the same industry in a 6-year window. Also, in order to capture post-trading competitive effects, Hsu, Reed, and Rocholl (2010) starts in the IPO withdrawal date or 10 days before the IPO, as markets can react to predicted events, whereas Akhigbe et al. (2003) starts only on the IPO date.

Consistent with the findings of Hsu, Reed, and Rocholl (2010), Spiegel and Tookes (2020) found a decline in the performance of issuer’s rivals after an IPO in the industry. Along the same line, Chod and Lyandres (2011) realized that IPOs have a negative impact on market shares and valuations of product market rivals, resulting from the issuer’s increased product market aggressiveness. Besides, the strategic benefit of being public associated with greater competitiveness leads to a positive relationship between the proportion of listed firms in an industry and the competitiveness degree among firms in the market.

Approaching the impact of IPOs on rivals’ stock prices associated with supply effects in emerging markets, in which individual financial assets’ supply and demand are less elastic, Braun and Larrain (2009) found that the supply of new assets from IPOs affects the cross-section of prices of other assets in the industry.

Regarding SEOs, Slovin, Sushka, and Polonchek (1992) were pioneers analysing the effects of equity issuances announcements on industry rivals, focusing on competitors’ stock price reactions and distinguishing the effects for banks and industrial firms. They concluded that the market interprets commercial banks’ equity announcements as

negative for other banks. For industrial firms, however, there are no effects on rivals. The documented negative effect on commercial banks is attributable to the regulatory pressure that they suffer to issue equity in order to meet capital requirements.

Bradley and Yuan (2013) used a sample of 1,777 companies announcing SEOs between 1997 and 2006 and analysed competitors' stock price reactions, finding an increase of 0.26 percent in the case of primary SEOs and a decrease of 0.35 percent, in the case of secondary SEOs. Therefore, there is evidence of a competitive effect when a primary SEO announcement occurs and a contagion effect when a secondary SEO is announced. This means that primary offers signal positive industry growth prospects while secondary offers, in which no further capital is raised since insiders sell their shares, suggest overvaluation, being compatible with the windows of opportunity hypothesis. Moreover, the authors found that if the market reacts favourably to a certain SEO announcement leading to an increase of the issuer stock price it works as an incentive for peers to conduct primary SEOs, as well as when growth options and leverage are high. Regarding the long-run performance of rivals after SEOs announcements in the industry, they tend to outperform only issuers of secondary SEOs, once again emphasizing the windows of opportunity hypothesis.

Besides the competitive effects of equity issuances, there are some other studies regarding the competitive effects of share repurchases, bankruptcies, and M&A as well.

Erwin and Miller (1998) observed the existence of competitive and contagions effects when competitors announce share repurchase programs, but competitive effects dominate. They found that, on average, share repurchases send positive signals about the own firm and negative about rivals, but the observable intra-industry effects are dependent on the specific characteristics of the industry in which the repurchasing firm is inserted, since in more concentrated industries and those with different cash-flow characteristics from the repurchasing firms, rivals observed a negative stock reaction to share repurchases, whereas in industries with the opposite features, firms experienced a small, but positive contagion effect. Massa, Rehman, and Vermaelen (2007) reached similar results, finding that, in industries with low degree of competition, peers' stock price decreases in response to repurchase announcements and, to mitigate such negative effects, competitors tend to mimic their peers repurchase program. However, the evidence on intra-industry effects associated with share repurchases is inconsistent, with Hertzell (1991) finding

insignificant abnormal returns, indicating that the repurchase announcement conveys merely firm-specific information.

Lang and Stulz (1992) considered the impact of bankruptcy announcements on industry peers and used the Herfindahl index<sup>4</sup> to measure the degree of industry concentration. They found evidence of both contagion effects, as peers with similar characteristics as the bankrupt firms suffered wealth losses, and competitive effects especially in concentrated industries, as incumbents enjoyed wealth gains from the bankruptcy announcement. Overall, they estimated that bankruptcy announcements decrease the value of competitors stocks by 1 percent, effect which is greater for highly levered industries and industries where the stock returns of the nonbankrupt and bankrupt companies are highly correlated. Nevertheless, for industries with low leverage and low degree of competition, where the competitive effects dominate, stock returns increased by 2.2. percent, while for industries with high leverage and high competition, where contagion effects dominate, stock returns decreased by 3.2 percent.

In addition, several studies report a positive relationship between competitors' stock price changes and certain announcements, including earnings announcements (Foster, 1981), management forecasts of earnings (Baginski, 1987) and dividend changes (Firth, 1996).

The evidence of a positive association between rivals' stock price changes and intra-industry firms' announcements seems to be valid also for M&A. Eckbo (1983) studied the announcement effect of horizontal and vertical mergers in the U.S. mining and manufacturing industries on the stock performance of rival companies and found that, over a 7-day event window, significant positive cumulative abnormal returns were found for the portfolio of rival companies. The explanation relies on the signalling provided by mergers announcements that the other companies in the industry can be more efficiently ran. Mitchell and Mulherin (1996) interpreted the positive response on rival companies as an anticipation of some sort of restructuring that will take place on the industry after a first M&A announcement. Akhigbe and Madura (1999) also showed additional evidence of intra-industry effects in response to acquisition announcements and attributed such reaction to an increased probability of further takeovers in the industry.

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<sup>4</sup> The Herfindahl index is a measure of market concentration that uses as input the market shares of the companies in the industry. It ranges between 0 (perfect competition) and 10,000 (monopoly).

Slovin, Sushka, and Bendeck (1991) analysed delistings driven by merger and acquisitions (M&A) and documented that the going private bids generate positive valuation effects for industry competitors of target firms, which exhibit a 2-day average excess return of 1.32 percent.

#### ***2.4. Hypotheses Development***

All in all, there are numerous reasons for a firm to issue equity, including to embrace valuable investment opportunities that otherwise would be lost due to the lack of funding to finance it, to repay debt obligations and balance capital structure, or even to take opportunistic advantages of market timing. However, there is wide evidence across literature claiming that issuers' stock and operating performance deteriorates after equity offerings (e.g., Loughran and Ritter, 1995; Spiess and Affleck-Graves, 1995; McLaughlin et al., 1996; Loughran and Ritter, 1997). Moreover, the effect of issues on firms' performance is not transversal to all equity offerings, since it depends on the ex-ante intended use of proceeds. This information is publicly available at or before the offering, as opposed to the actual use, and sends signals to market participants regarding the motivations behind the issue and how the firm will use the proceeds (Walker and Yost, 2008; Autore, Bray, and Peterson, 2009; Amor and Kooli, 2017).

Additionally, research examining intra-industry effects and information spillovers of several corporate events suggests that information releases of one firm are often used to make inferences about peers in the same industry and impacts their performance. Nevertheless, not only the evidence regarding SEOs is scarce in this scope, as these potential effects tend to focus on stock returns, rather than operating performance changes (e.g., Bradley and Yuan, 2013).

Thus, given the relevance of certain intra-industry corporate events on incumbent firms' decision-making process and performance, it is rational to analyse whether SEOs can also have an impact over peers. Given the lack of literature addressing these potential intra-industry effects of SEOs, especially in terms of operating performance, this study aims to fill this gap and provide relevant knowledge to all market participants.

Thus, the key question in this dissertation is whether SEOs have an impact on the performance of competing companies in the same industry, which can be assessed in different ways. Accordingly, several hypotheses were developed in order to form the basis

for the empirical tests in the subsequent sections.

The first main hypothesis relates to how the operating performance of competing companies reacts to a large SEO in their industry. It is expected that a large SEO has an impact on intra-industry incumbent firms. Overall, the completion of a SEO is expected to give the issuer company a competitive advantage over its competitors and thus to negatively affect incumbent firms' operating performance.

*Hypothesis 1:* The operating performance of intra-industry incumbents will deteriorate after a large SEO in their industry.

However, as seen on the literature review, the intended use of proceeds convey relevant information regarding a issue and affects issuer's operating performance on different ways. In particular, it shows that firms whose proceeds are intended to be used either to repay debt obligations, changing firm's capital structure, or to general corporate purposes experience significantly subsequent declines on their operating performance, as opposed to firms whose proceeds are claimed to be used to invest (Amor and Kooli, 2017; Autore, Bray, and Peterson, 2009).

Therefore, as SEOs whose proceeds are intended to be used to invest reveal signalings of issuer's embracing profitable investment opportunities, non-related with market-timing motivations, it is expected to give the issuing firm a competitive advantage over its competitors and thus to negatively affect their operating performance.

On the other hand, intended use of proceeds which have the potential of changing issuers' capital structure through debt convey signals of oportunitic behaviors related to timing motivations. Thus, the completion of a SEO whose proceeds are used to reduce debt may signal that the issuing firm is in financial distress or taking oportunistice behaviors, consequently positively affecting intra-industry competitors' operating performance.

*Hypothesis 2:* The operating performance of intra-industry incumbents will deteriorate (improve) after a SEO in the industry, when the intended use of proceeds is stated to investment purposes (to balance the capital structure through debt recapitalization, refinancing or restructuring).

### 3. Data Sources and Sample Description

This section clarifies about the data collection and sample construction, presenting the main descriptive statistics.

#### 3.1. Sample Selection

Firstly, the SEO data used in this study comes from the Refinitiv Eikon database. The data was screened using the following criteria:

- 1) **Issue type:** “Follow-On”;
- 2) **Transaction status**<sup>5</sup>: “Live”;
- 3) **Share type offered:** “Primary (new) only”
- 4) **Security type:** “Common stock” or “Ordinary shares” or “Ordinary or common shares”;
- 5) **Issue date:** [01/01/2000-31/12/2015];
- 6) **Issuer Domicile Region:** “Europe”<sup>6</sup>;
- 7) **NAICS**<sup>7</sup> **2017 Sector Code:** “11”, “21”, “22”, “23”, “31-33”, “42”, “44-45”, “48-49”, “51”, “54”, “55”, “56”, “61”, “62”, “71”, “72”, “81”, “92”.

The sample period from 2000 and 2015 was selected since it is difficult to obtain accounting data before that and, in order to access the pre-SEO and post-SEO performances it is necessary to have historical data. Moreover, the older the issue, the harder it is to gather accounting and financial information regarding the issuer, the peers and about the event itself.

SEOs can be categorised into primary or secondary ones. Primary issues consist in the issuance of new shares by the company, being a source of additional capital, whereas shares sold by existing shareholders are designated as secondary shares, so they do not change firm’s capital structure, being non-dilutive. Given these specific characteristics, each type of issue can have different impacts on the performance (Bradley and Yuan, 2013; Masulis and Korwar, 1986), therefore only primary SEOs were considered since they change firms’ capital structure.

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<sup>5</sup>According to Refinitiv Eikon screener filters, the transaction status indicates the status of an offering, and in the case of equity offerings it can be considered live, in progress, mandated, announced, rumoured, unknown, postponed and cancelled. The “live” classification stands for already priced deals or those whose terms are fixed, therefore having a final number of securities and the offer price or amount announced.

<sup>6</sup> Refinitiv Eikon considers as European countries the following ones: Albania, Andorra, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France, Germany, Gibraltar, Greece, Guernsey, Hungary, Iceland, Isle of Man, Italy, Jersey, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Moldova, Monaco, Netherlands, Norway, Poland, Portugal, Republic of Ireland, Republic of Montenegro, Republic of Serbia, Romania, Russia, San Marino, Slovak Republic, Slovenia, Spain, Svalbard and Jan Mayen, Sweden, Switzerland, Ukraine, United Kingdom, and Vatican City.

<sup>7</sup> NAICS – North American Industry Classification System.

There is a wide variety of industry taxonomies available, considering different criterias and used by different organizations. The Standard Industrial Classification (SIC) is a commonly used commercial classification system, namely by several academics (e.g. Barber and Lyon, 1996; Hsu, Reed, and Rocholl, 2010; Jain and Kini, 1994), but it was further superseded by the North American Industry Classification System (NAICS)<sup>8</sup>, which appeared in 1997. Thus, given this replacement, other academics consider the SIC industries until the NAICS' implementation date and thereafter they consider the NAICS (Giroud and Mueller, 2011; Menzly and Ozbas, 2010). According to Kolasinski (2009), NAICS has the advantage over SIC of being more precise and a better reflection of the economic reality. Adding to NAICS feasibility, considering the lack of information regarding firms' SIC codes on Refinitiv Eikon database and a sample period post-NAICS implementation from 2000 to 2015, for the study in analysis the industry classification adopted is NAICS, considering the three-digit NAICS for industry classification and comparison purposes, similarly to Kolasinski (2009).

Moreover, similarly to Hsu, Reed, and Rocholl (2010)'s study, only nonfinancial firms were considered, excluding the deals whose issuer's NAICS 2017 sector code were 52 – “Finance and Insurance” and 53 – “Real Estate and Rental and Leasing”, since financial firms differ in their accounting information and nature of operations (Pagano, Panetta, and Zingales, 1998).

Considering these conditions, the initial sample comprises all nonfinancial public firms that issued seasoned equity offerings between 2000 and 2015. However, further restrictions had to be applied in order to have the deals with the necessary available information regarding each issuer and deal. Thus, the issues without information regarding the date the company was found, the stock exchange, the three-digit NAICS. the use of proceeds and the proceeds amount were excluded, leading to a sample composed by SEOs.

Moreover, there is a possibility of existing more than one SEO in the same period in the industry, since SEOs are not isolated in time and with this it comes the challenge of selecting SEOs for which the results are not contaminated by the impact of other SEOs in the same industry in the same period of time. Therefore, similarly to Hsu, Reed, and Rocholl (2010)'s methodology, in order to avoid cross contamination and feasibly analyse the impact of an equity issuance over the issuer's publicly traded competitors, the effects are isolated by identifying the SEOs events in each industry with the lowest potential of other SEOs contaminating the results. Thus, the SEOs selected were the ones which are not preceded or followed by a larger SEO in

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<sup>8</sup> In Appendix A it is possible to find a summary of NAICS structure, segmented into sectors and subsectors.

the same industry in a 6-year period surrounding the SEO event, being the SEO proceeds used as the measure of size. Each industry is identified according to three-digit NAICS 2017 subsector and the SEO proceeds will be used to measure the SEO size for comparison purposes. For this, although the events in analysis are from the period between 2000 and 2015, issues from January 1st, 1997 to December 31st, 1999 and from January 1st, 2016 to December 31st, 2018 were retrieved in order to guarantee the selection of the largest issues not preceded 3 years before nor followed 3 years after by larger ones. Thus, by considering the largest SEOs on the period in analysis, it is possible to extinguish or at least diminish the possible contamination of results, mitigating the chance of a larger SEO dominate the effect and interfere in the results (Hsu, Reed, and Rocholl, 2010).

The following step on the sample selection relies on the definition of each issuer peer group, which comes with several difficulties and limitations as it is a subjective decision. An accurate intra-industry peers identification plays a key role in the sample selection process for this study, as it aims to ascertain potential effects on nonissuers deriving from equity offerings, thus there should be a link between the issuers and the respective nonissuers under analysis.

Several academics (e.g. Hsu, Reed, and Rocholl, 2010) consider the entire industry as peers, defined according to a certain commercial classification system, usually the Standard Industrial Classification (SIC). Although commercial classification systems do provide a good starting point for the construction of a relevant peer group considering the firms operating within the same industry, the business activity similarity criteria is not sufficient to defined accurately a peer group. Barber and Lyon (1996) reinforced the importance of a well-defined peer group to provide valuable insights regarding the company's performance, matching the benchmark to control firms based on the firm's industry, identical size or pre-event performance.

The Refinitiv Eikon database provides a detailed peer analysis for each company with available information, through an algorithm that combines competitors lists provided in filings, analyst cross coverage, business classification, revenue proximity and geography. We found this analysis to be very reasonable, providing accurate competitors for each control firm, based on several relevant informational factors besides the business activity. Therefore, the peers considered for each issuer are the ones within the same NAICS 2017 subsector<sup>9</sup> and from European countries identified by Refinitiv Eikon.

Furthermore, the peers are defined not only as those companies that operate in the same

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<sup>9</sup> The NAICS 2017 subsector considers three-digit codes.



three-digit NAICS 2017 industry as the SEO firm but also that were publicly listed at least three years before the SEO date, similarly to Hsu, Reed, and Rocholl (2010)'s methodology. This last requirement allows to have sufficient historical accounting information to clearly observe potential differences in performance before and after the SEO and also to make more accurate comparisons instead of comparing public with private entities, which carry differences.

Equity offerings from issuers without available peers on Refinitiv Eikon database meeting the established criteria, namely i) that are inserted in the same respective issuer's NAICS 2017 subsector; ii) that are from similar economies and markets, i.e., are headquartered in European countries; iii) that were publicly listed at least three years before the year of the affecting SEO.

The sample was then split accordingly to the primary intended use of proceeds, as reported in the filings, information available in Refinitiv Eikon database. Walker and Yost (2008), Autore, Bray, and Peterson (2009), and Amor and Kooli (2017) studied the relation between the ex-ante announced intended use of proceeds on equity offerings and the issuers' performance. They categorized companies into those that recur to equity markets to supposedly raise capital in order to realize investments such as acquisitions or other projects, or to repay debt obligations, changing its capital structure. Others do not specify the intended use of proceeds, referring as general corporate purpose, as they may not have a specific purpose to use the proceeds or may prefer not to disclaim the motivations. Moreover, these authors found that ex-ante information regarding the intended use of proceeds convey valuable information regarding issuers' motivations and further operating performance.

Thus, similarly to the segmentation adopted by these academics, the intended use of proceeds is segmented into the main categories identified, namely i) general corporate purpose for the unspecified cases; ii) investment, which includes acquisition finance, future acquisitions, and investment/loan; and iii) debt, which comprises restructuring – including restructuring, and reduce indebtedness, refinancing – including refinancing, and refinance/retiring bank debt, and recapitalization purposes that change the firm's capital structure.

Thus, from the sample obtained of the largest SEO issues that respect all previous requirements, as the intended use of proceeds will be approached accordingly to these three categories, only issues who fit one of these will be considered. Therefore, since three of the selected issues claimed to intend to use the proceeds to conduct a "Share Repurchases" programme, to "Distribute Proceeds to Shareholders", and "Others", they were excluded from the sample, as they are not representative.

### 3.2. Sample Description

Figure 1 shows the number of considered SEOs per year, being possible to observe a concentration of offerings in 2009 and 2010, in which occurred 27 of the 112 SEOs identified. Additionally, it is verifiable that the number of identified larger issues increased over time.

**Figure 1: Number of Issues per Year**

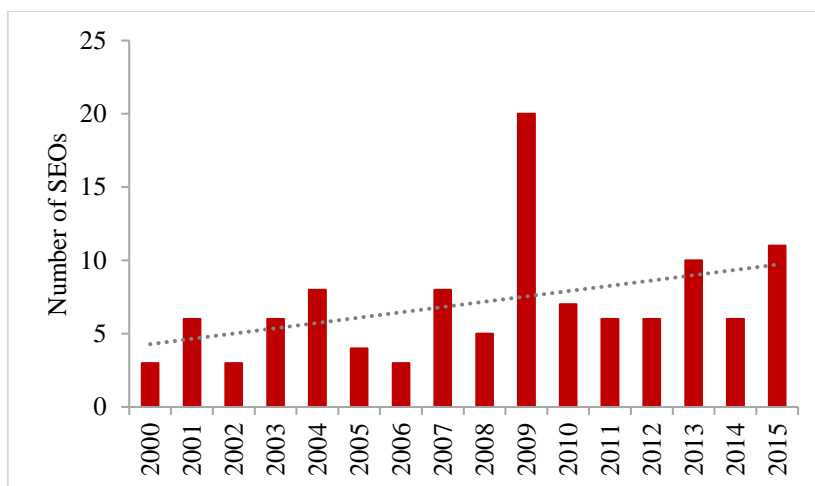


Table I, Panel A, provides descriptive statistics for our sample of 112 issues partitioned by the primary intended use of proceeds, adapted from Walker and Yost (2008), Autore, Bray, and Peterson (2009) and Amor and Kooli (2017). The mean of gross proceeds raised by the issuing firms is equal to €1,158 million while the median is equal to €453 millions.

According to Table 1, Panel A, the largest part of the selected issues claim general corporate purpose as primary intended use of proceeds, therefore not specifying the plans regarding how and where to apply the capital raised. The mean offering proceeds vary across the diverse classifications, being the means (medians) €753 (€273), €1,173 (€1,179) and €3,486 (€1.277) all expressed in millions for general corporate purpose, investment and debt categories, respectively. Although the mean proceeds value is larger for debt issues than for other classifications, the median values of both investment and debt issues are very close, which is in accordance to Autore, Bray, and Peterson (2009) analysis, being €1,179 and €1.277 millions, respectively. On the other hand, the proceeds raised by firms claiming general corporate purpose as the intended use of proceeds are significantly lower for this sample.

The mean market value<sup>10</sup> is higher for issuers whose intended use of proceeds are classified

<sup>10</sup> For deals traded in different tranches that take place on different days, the stock price on the day prior to the

as debt, being €41,551 millions, compared to a mean market value of €9,372 millions for issuers whose intention was to invest and €5,517 millions for general corporate purpose issues. However, in terms of medians, the issuer size is larger for investment related issues, and smaller to the general corporate purposes classification. Means are larger than medians due to the existence of extreme values, especially in terms of market value and for the debt category.

Contrarily to Autore, Bray, and Peterson (2009), who show that firms that are ambiguous about their planned use of proceeds, stating general corporate purpose, are larger and raise more proceeds, in this sample this category is the one whose issuers are smaller and raise less proceeds. Issuers whose proceeds are intended to be invested conduct relatively smaller offers.

**Table 1: SEOs Sample Summary Statistics**

Panel A presents some characteristics of the SEO sample by primary intended use of proceeds categories. The intended use of proceeds is categorized similarly to Walker and Yost (2008), Autore, Bray, and Peterson (2009) and Amor and Kooli (2017), with the categories of General Corporate Purpose; Investment; and Debt. Proceeds represent the proceeds amount including overallotment sold in all markets raised at the SEO. As in Amor and Kooli (2017) and Autore, Bray, and Peterson (2009), the Market Value is the stock price times the number of shares outstanding on the day prior to the offer and the Relative Offer Size is the number of shares offered divided by the number of shares outstanding on the day prior to the offer. From Refinitiv Eikon, there is information regarding the Market Value for 95 issues and for the Relative Offer Size for 107 issues. N represents the number of SEOs.

**Panel A: SEO Characteristics by Primary Intended Use of Proceeds**

|                              | All Issues |          | General Corporate Purpose |        | Investment |          | Debt      |          |
|------------------------------|------------|----------|---------------------------|--------|------------|----------|-----------|----------|
|                              | Mean       | Median   | Mean                      | Median | Mean       | Median   | Mean      | Median   |
| Proceeds<br>(€ millions)     | 1,158.06   | 452.76   | 752.67                    | 273.34 | 1,173.18   | 1,179.15 | 3,486.37  | 1,277.13 |
| Market Value<br>(€ millions) | 8,983.75   | 1,292.11 | 5,517.11                  | 765.33 | 9,371.75   | 5,536.03 | 41,551.03 | 1,118.44 |
| Relative Offer<br>Size (%)   | 224.83     | 38.27    | 199.54                    | 40.00  | 47.73      | 18.48    | 854.43    | 87.37    |
| N                            | 112        |          | 82                        |        | 21         |          | 9         |          |

Table 2, Panel A reports the number of selected issues, respective issuers firms and identified incumbent firms by two-digit NAICS 2017 sector code. It shows a large dispersion of SEOs per industry, however it is relevant to have in mind that the issues and incumbent firms selection was based on the three-digit NAICS 2017 subsector code, which justifies having more issues concentrated in the Manufacturing sector, which aggregates the two-digit codes from 31 to 33, as well as for Retail Trade (44-45) and Transportation and Warehousing (48-49). Additionally,

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offer was computed as a weighted average accordingly to the percentage of shares issued at each tranche over the total shares offered on the deal.

some industries did not have equity offerings on the selected sample. Moreover, as previously mentioned<sup>11</sup> issues by financial firms (52 and 53 NAICS 2017 sector codes) were disconsidered.

**Table 2: Issuers and Incumbent Firms Sample Summary Statistics**

Panel A represents the number of issues, issuer firms and identified incumbent firms by NAICS 2017 sector composing the sample. Panel B reports the descriptive statistics for the sample SEO firms and associated incumbent firms. Assets, Sales, and Market Capitalization are reported at the end of the SEO event year. Firm age since trading corresponds to both issuers and incumbent firms listing age at the SEO event year and from Refinitiv Eikon database this information was retrieved for 81 SEO events and 610 incumbent firms. The significance tests are based on the Wilcoxon sum-rank test. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

| <b>Panel A: Number of Selected SEOs, Issuer Firms and Identified Incumbents per NAICS 2017</b> |                            |                                  |                           |
|--|----------------------------|----------------------------------|---------------------------|
| Sector   | Number of Issues           | Number of Issuer Firms           | Number of Incumbent Firms |
| 11: Agriculture, Forestry, Fishing and Hunting   | 3                          | 3                                | 12                        |
| 21: Mining, Quarrying, and Oil and Gas Extraction  | 4                          | 4                                | 32                        |
| 22: Utilities  | 2                          | 2                                | 32                        |
| 23: Construction   | 8                          | 7                                | 33                        |
| 31-33: Manufacturing   | 35                         | 30                               | 221                       |
| 42: Wholesale Trade  | 2                          | 2                                | 7                         |
| 44-45: Retail Trade  | 19                         | 19                               | 60                        |
| 48-49: Transportation and Warehousing  | 12                         | 8                                | 30                        |
| 51: Information  | 7                          | 7                                | 72                        |
| 54: Professional, Scientific, and Technical Services   | 3                          | 2                                | 17                        |
| 56: Administrative and Support and Waste Management and Remediation Services                   | 2                          | 2                                | 16                        |
| 62: Health Care and Social Assistance  | 5                          | 4                                | 13                        |
| 71: Arts, Entertainment, and Recreation  | 4                          | 3                                | 30                        |
| 72: Accommodation and Food Services  | 6                          | 4                                | 35                        |
| <b>Total</b>   | 112                        | 97                               | 610                       |
| <b>Panel B: Characteristics of Issuers and Incumbent Firms Sample</b>                          |                            |                                  |                           |
|  | SEO firms<br>Mean (Median) | Incumbent firms<br>Mean (Median) | Wilcoxon<br>Significance  |
| Assets (€ millions)  | 16,631.48<br>(4,255.82)    | 6,943.86<br>(681.73)             | ***                       |
| Sales (€ millions)   | 10,787.20<br>(2,567.05)    | 4,544.49<br>(508.72)             | ***                       |
| Market Capitalization (€ millions)   | 7,230.48<br>(2,082.84)     | 3,881.34<br>(445.60)             | *                         |
| Firm age since trading (years)   | 20.59<br>(14.00)           | 17.98<br>(14.00)                 | ***                       |

<sup>11</sup> See Section 3.1. Sample Selection for more information.

Moreover, as observable in Table 2, Panel A, from the 112 issues identified there are only 97 issuer firms, which indicates that the sample comprises firms from various sectors that conduct more than one of the largest intra-industry issues from 2000 to 2015. In addition, there were 610 incumbent firms identified that respect the established criterias, some in common among different issuers that are from the same industry.

Table 2, Panel B reports descriptive statistics for both SEO and incumbent firms. Similarly to the results obtained by Hsu, Reed, and Rocholl (2010) for IPOs, the SEO sample suggests that issuers are significantly larger in terms of assets and market capitalization than peers, and also have significantly larger revenues than incumbent firms. These differences are statistically significant and are a consequence of the sample selection, which focuses on large SEOs relative to others within the same industry.

Moreover, SEO firms are publicly traded for, on average, 20.59 years when they decide to issue the SEO, whereas incumbent firms are about 2.61 years younger in the market at the time of the SEO. Thus, issuer firms are well established in capital markets when they decide to raise new capital, and compete with the respective incumbent firms for a long time.

## 4. Methodology

This section presents the methodology adopted in order to test the hypotheses, consisting on both univariate and multivariate analyses.

### 4.1. Univariate Analysis

There is wide evidence on the operating performance of issuers following equity issues, either for IPOs (e.g. Jain and Kini, 1994; Amor and Kooli, 2017) or SEOs (e.g. Loughran and Ritter, 1997; McLaughlin et al., 1996; Autore et al., 2009). Although the focus of this study is the operating performance of incumbent firms surrounding SEOs events, Hsu, Reed, and Rocholl (2010)'s methodology was also adopted for issuer firms for complementarity purposes.

To measure operating performance, we used several cash-flow variables, including some used by Hsu, Reed, and Rocholl (2010) and others that are well-known in the literature regarding operating performance (Jain and Kini, 1994; Loughran and Ritter, 1997; McLaughlin et al., 1996) to complement the analysis: (1) Capital Expenditures/Total Revenues; (2) Assets Growth  $[(\text{Total Assets}_t - \text{Total Assets}_{t-1})/\text{Total Assets}_{t-1}]$ , corresponding to the annual percentage change of assets; (3) Revenues Growth  $[(\text{Total Revenues}_t - \text{Total Revenues}_{t-1})/\text{Total Revenues}_{t-1}]$ , corresponding to the annual percentage change of revenues; (4) Operating Income/Total Assets; (5) Operating Income/Total Revenues; (6) Asset Turnover (Total Revenues/Total Assets). In this case,  $t$  represents any year around the SEO.

On the univariate statistics, following Hsu, Reed, and Rocholl (2010), the median change in operating performance was measured as the four-year average before the SEO event and the four-year average after. This way, for each ratio it is computed the four-year average before the SEO for a company  $i$ , i.e., from years -1 to -4, where -1 represents the last fiscal year before the SEO, -2 represents two fiscal years before the SEO, and so on until year -4. On the other level, it is also computed the four-year average after the SEO for a company  $i$ , meaning the average from years 0 to +3, being 0 the post-SEO fiscal year end, +1 the fiscal year following the fiscal of the SEO and so on. This was repeated either for the entire sample, as for the sub-samples that are based on the intended use of proceeds according to the categories general corporate purpose, investment, and debt.

Then, the reported significance tests for the differences between the paired sub-samples, i.e., the different series which are the four-year average before and after the SEO event for each

ratio<sup>12</sup>, are based on the Wilcoxon rank-sum test (Mann-Whitney U-test), whereas the significance tests are based on the Wilcoxon signed-rank test for the medians, and T-test for the averages.

Accounting data is available from Refinitiv Eikon database and it is measured at the end of fiscal year.

## 4.2. Multivariate Analysis

In order to analyse the combined effect of the potential determinants of the post-SEO operating performance of incumbent firms, a multivariate analysis was taken in consideration. For this, two methodologies were taken into account, namely a first one, following Hsu, Reed, and Rocholl (2010)'s approach that conducts a panel data regression based on firm-specific characteristics and a complementary one adapted from Autore, Bray, and Peterson (2009) and based on both median quantile and OLS regressions considering deals' features.

### 4.2.1. Operating Performance and Incumbent Firm's Characteristics

To do so, using unbalanced panel data to look at performance over time and determine the impact of large SEOs on performance, accordingly to the intended use of proceeds, equations (1) and (2) were estimated, modelling performance as a function of firm-specific information, namely age since trading<sup>13</sup>, firm size and past performance.

$$Performance_{i,t} = \alpha + \beta_1 SEO\_Dummy_{i,t} + \gamma controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$Performance_{i,t} = \alpha + \beta_1 SEO\_Invest_{i,t} + \beta_2 SEO\_Debt_{i,t} + \gamma controls_{i,t} + \varepsilon_{i,t} \quad (2)$$

Performance is measured as *Capital Expenditure Growth*, *Revenues Growth*, and both *Operating Income on Assets Growth* and *Operating Income on Revenues Growth* in each year t for every incumbent firm i.

Similarly to Hsu, Reed, and Rocholl (2010), the growth is given by the difference between the logarithmic dependent variable at the observation year and the logarithmic dependent

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<sup>12</sup> Firstly, each ratio was computed for each period from year -4 to year +3 relative to the event date. Then, the average ratios before and after the SEO were calculated, by computing the average from year -4 to year -1 (before SEO) and from year 0 to year +3 (after SEO), relative to the event date. Therefore, Wilcoxon-sum rank tests were applied to each ratio and to each intended use of proceeds category, comparing the four-years average before the SEO and the four-years average after the SEO. To test the individual significance for the median ratios it was applied a Wilcoxon signed rank test.

<sup>13</sup> The independent variable related to age since trading enter as the logarithmic difference between the observation year and the listing year. For some firms this difference was negative, which means they disclosed accounting information before the IPO year for unknown reasons. These observations were excluded from the sample.

variable in the correspondent previous year. Prior to logarithmization, as some firms in some years report a negative operating income, consequently leading to negative ratios over assets and over revenues, the respective ratios were shifted to generate positive values. To do so, both operating income on assets and operating income on revenues were transformed by adding one to actual values, which certifies that the ratio is positively defined<sup>14</sup>.

The control variables include the natural log of age since trading expressed as  $Log(Age)$ , proxied for firm's age<sup>15</sup> given by the log of the number of years between the incumbent firm's listing year and the observation year, and firm's size  $Log(Assets)$ , measured by the natural log of firm's total assets on the previous year. Additionally, it also includes past performance as a determinant of firm's performance (*Lag dependent variable*), which is measured as the lag of the dependent variable by one year per peer, i.e., the lagged capital expenditures growth, lagged revenues growth, lagged operating income on assets and lagged operating income on revenues, accordingly to the respective measure of performance used in the model.

Similarly to Hsu, Reed, and Rocholl (2010), the sample comprises data from both SEO and non-SEO years for each incumbent firm and model (1) considers an indicator dummy variable  $SEO\_Dummy$  that is equal to one if year t is within the three years of a large SEO in firm i's industry, and zero otherwise. This means that this dummy indicator will equal one in the year of a large SEO, and in the first, second and third years following the SEO.

Model (2) is an adaptation of Hsu, Reed, and Rocholl (2010) model considering the intended use of proceeds. As it is expected that incumbents' performance varies accordingly to the intended use of proceeds announced, which has been proven for issuers in several studies for diverse equity offering types, given that we have three dummy categories, two indicator variables were introduced, namely i)  $SEO\_Invest$ , which is equal to one if year t is within the three years of a large SEO in firm i's industry whose proceeds use are destined to pursue investments, and zero otherwise; and ii)  $SEO\_Debt$ , which is equal to one if year t is within the three years of a large SEO in firm i's industry whose proceeds use are destined to change issuer's capital structure through recapitalization, refinancing or restructuring, and zero

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<sup>14</sup> The dependent variables which are the growth of ratios are measured as  $Performance_{i,t} = \log(1 + Operating\ Income\ ratio_{i,t}) - \log(1 + Operating\ Income\ ratio_{i,t-1})$ , where i is the firm, t is the observation year value and t-1 is the correspondent previous year value.

<sup>15</sup> Age since trading is used as a proxy for firm's age, since Hsu, Reed, and Rocholl (2010) found similar results when age is defined by the natural log of the number of years since founding and when both the log of age since founding and age since listing are used simultaneously. Refinitiv Eikon does not display information for most observations regarding the date the company was founded, reinforcing the choice of using age since trading as explanatory variable.



otherwise.

The sample comprises the period from 1995 to 2019<sup>16</sup> for each firm and thus we have a panel regression in which each firm has data from both SEO years and non-SEO years.

Furthermore, for both regressions, to decide whether to estimate the model using fixed effects as Hsu, Reed, and Rocholl (2010) or random effects, a Hausman specification test was conducted, whose results<sup>17</sup> indicate that the preferred model is based on fixed effects<sup>18</sup>, thus there is a separate constant term for each SEO event's industry (Hsu, Reed, and Rocholl, 2010).

Moreover, in order to test for heteroscedasticity, both Breush-Pagan and White tests were conducted in the respective order and the results refute the homoscedasticity hypothesis, thus the standard errors are heteroscedasticity-adjusted<sup>19</sup>. Individual significance of variables was tested using a T-test and joint significance using a F-test.

#### ***4.2.2. Operating Performance and Deal Characteristics***

Autore, Bray, and Peterson (2009) studied the relationship between the intended use of proceeds and the long-run performance of firms conducting SEOs. This methodology was adopted, considering instead the incumbent firm's performance, therefore estimating both median quantile and OLS regressions as following.

$$Performance_i = \alpha + \beta_2 SEO\_Invest_i + \beta_3 SEO\_Debt_i + \gamma controls_i + \varepsilon_i \quad (3)$$

The performance is measured as the absolute change in Operating Income on Assets and Operating Income on Revenues from year -1 to year +3 around the issue date. These changes are given by [operating income ratio<sub>i,t+3</sub> – operating income ratio<sub>i,t-1</sub>], where i represents a company, t represents a post-SEO fiscal year end and so t-1 represents the fiscal year prior to the SEO and t+3 represents three fiscal years following the SEO.

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<sup>16</sup> Refinitiv Eikon's time series function retrieves the information for each firm i disclosed at each fiscal-year end with the respective date. For some firms on the sample the fiscal year end consists of 52 or 53 weeks and ends on the Sunday nearest to December 31st, which leads to the existence of doubled financial information for a single year. This induces a panel data error of repeated time values in some cases, as it requires a single value per year for each observation. These cases of firms whose fiscal-year end data was dated on the following year due to this adopted approach were analyzed one by one and, to avoid inconsistencies and errors, that financial information was dated to the previous year.

<sup>17</sup> The results obtained from the Hausman test for each regression (1) and (2), accordingly to the different dependent variables Capital Expenditures Growth, Revenues Growth, Operating Income on Assets Growth and Operating Income on Revenues Growth are reported in the Appendix B table.

<sup>18</sup> The same models were estimated based on year-fixed effects adding dummy indicators for each time period t. This consideration does not significantly affect the estimated obtained using fixed effects, and the results can be consulted in the Appendix C table.

<sup>19</sup> The results are very similar comparing to the estimated models with the standard errors adjusted for clustering by SEO issue date, as in Hsu, Reed, and Rocholl (2010)'s methodology and are reported in the Appendix D table.

Thus, both median quantile regressions and OLS regressions were estimated with the dependent variables being the *Change in Operating Income on Assets* and the *Change in Operating Income on Revenues*, from years -1 to -3 relative to the issue.

For the median quantile regressions, the bootstrapped standard errors were based on 1000 replications. In OLS estimations, both Breush-Pagan and White tests were conducted and, given the refutation of the null hypothesis, the standard errors were adjusted for heteroscedasticity. Moreover, in the OLS regressions, the dependent variables were winsorized at the 5<sup>th</sup> and 95<sup>th</sup> percentiles to mitigate the influence in statistics of existing outliers in the sample. To test for individual and joint significance of the variables we use a T-test and F-test, respectively.

These academics' models have in consideration deal specific information, namely the relative offer size, the proceeds amount, and the ex-ante intended use of proceeds as well as issuer's specific information, as the size prior to the offer measured by the market capitalization. Therefore the explanatory variables include dummy indicators for the investment category, namely *SEO\_Invest* that equals one if the issuer intends to use the proceeds to conduct investments and zero otherwise, and *SEO\_Debt*, which is equal to one if the issuer intends to use the proceeds to balance capital structure, either by recapitalization, restructuring or refinancing debt.

These authors consider deals specific characteristics as the control variables. Thus, the independent variables in this case are the natural log of the issuer's market value *Log(Market Value)*, consisting in the market capitalization on the day prior to the offer, calculated as the stock price times the number of shares outstanding on the day prior to the offer, and others referent to the deal conditions, namely the natural log of the proceeds amount *Log(Proceeds)*, and the relative offer size (*Relative Offer Size*), computed as the ratio between the number of shares issued to all markets over the number of shares outstanding prior to the offer.

## **5. Evidence on Operating Performance**

### **5.1. Univariate Results**

Table 3, Panel A reports the issuers' median capital expenditures four-year average before and after SEO, showing that companies that claim to use the proceeds to general corporate purposes or to invest reveal an increase in the investment measure after SEO, increasing from 5.21 percent to 5.29 percent and from 5.18 percent to 5.52 percent, respectively. Thus, median Investment firms do significantly increase their investment following the SEO year, which is in accordance to the findings for IPOs reported by Amor and Kooli (2017). While investment issuers and general corporate purpose issuers invest more after SEO, the debt related issuers reveal to invest less after the SEO. This partially contradicts Walker and Yost (2008)'s findings, who found that regardless of the intended use of proceeds, SEOs issuers engage in investments afterwards, increasing both capital expenditures and R&D.

Median assets growth, reported in Table 3, Panel C, reveals to decrease drastically after SEOs comparing to the median four-year average before, namely for general corporate purpose and debt categories, with debt issuers revealing a median four-year average negative growth on assets. Investment ones increase their assets growth rate on the period following SEO events.

Table 3, Panel C shows a drastic significant decrease in issuers' revenues growth, with a median four-year average value of 10.22 percent prior to the SEO, but 3.53 percent afterwards. Investment issuers are the only exception, increasing about 2.07 percentage points after the event, whereas debt issuers are the ones performing worse in terms of revenues growth.

Panel D and E document the median four-year average operating income scaled by assets and revenues before and after SEO. The results meet the literature review on the pre and post-operating performance of issuers conducting SEOs, verifying that there is a deterioration on the operating performance afterwards (e.g. Loughran and Ritter, 1997; McLaughlin et al., 1996). However, although median operating income on assets significantly decreases for both general corporate purposes and investment categories, the operating income on revenues reveals a significant improvement after the SEO for investment issuers. The deterioration in performance for general corporate purpose issuers corroborates the results achieved by Autore, Bray, and Peterson (2009), and these authors found little evidence of long-run underperformance of issuers who claim to intend to use the proceeds to invest.

Issuers' asset turnover, expressed in Table 3, Panel F significantly decreases after large SEOs, except for debt issues, which is inconsistent with the literature (Autore, Bray, and

Peterson, 2009).

According to the T-tests conducted besides the Wilcoxon signed-rank tests to verify individual significance, the averages are statistically different from zero for capital expenditures on revenues before the SEO for debt issues and after the SEO for all issue categories except debt; assets growth for all issue categories; revenues growth before the SEO for general corporate purpose and debt issues and after the offer for all issue categories; operating income on assets for all firms and investment issues before the SEO and after for investment issues; operating income on revenues for investment issues after the SEO; and asset turnover for all issue categories.

**Table 3: Operating Performance of Issuer Firms**

This table reports univariate statistics for several performance ratios for the SEO issuers, categorizing the issues accordingly to the intended use of proceeds, being those i) General Corporate Purposes; ii) Investment; and iii) Debt. The values represent the median ratios for 112 observations for 97 issuers before and after the SEO events occurred between 2000 and 2015. Before the SEO consists in the four-year average prior to the event, i.e., from the last fiscal year end before the issue to the fourth fiscal year end relative to the issue. After the SEO consists in the four-year average after the event, i.e., from the first fiscal year end following the issue to the fourth fiscal year end relative to the issue. *N* consists of the number of observations. The significance tests are based on the Wilcoxon signed-rank test<sup>20</sup>, which assumes that the observations are independent. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

| Measure of Operating Performance          | Primary Intended Use of Proceeds |                           |            |          |
|---|----------------------------------|---------------------------|------------|----------|
|   | All Firms                        | General Corporate Purpose | Investment | Debt     |
| Panel A: Capital Expenditures on Revenues |                                  |                           |            |          |
| Before the SEO                            | 5.21***                          | 5.21***                   | 5.18***    | 9.74***  |
| After the SEO                             | 5.40***                          | 5.29***                   | 5.52***    | 4.38***  |
| N   | 108                              | 78                        | 21         | 9        |
| Panel B: Assets Growth                    |                                  |                           |            |          |
| Before the SEO                            | 10.07***                         | 14.80***                  | 8.86***    | 3.85**   |
| After the SEO                             | 5.32***                          | 3.45***                   | 14.68***   | -4.95*** |
| N   | 110                              | 80                        | 21         | 9        |
| Panel C: Revenues Growth                  |                                  |                           |            |          |
| Before the SEO                            | 10.22***                         | 10.22***                  | 9.83***    | 13.30*** |
| After the SEO                             | 3.53***                          | 3.27***                   | 11.90***   | -4.93**  |
| N   | 110                              | 80                        | 21         | 9        |
| Panel D: Operating Income on Assets       |                                  |                           |            |          |
| Before the SEO                            | 4.76***                          | 4.02***                   | 9.09***    | 0.90     |
| After the SEO                             | 3.96***                          | 3.55**                    | 6.58***    | 2.05     |
| N   | 110                              | 80                        | 21         | 9        |
| Panel E: Operating Income on Revenues     |                                  |                           |            |          |
| Before the SEO                            | 4.86***                          | 4.14***                   | 9.00***    | 1.18     |
| After the SEO                             | 4.36***                          | 3.80**                    | 10.11***   | 1.53     |
| N   | 110                              | 80                        | 21         | 9        |
| Panel F: Asset Turnover                   |                                  |                           |            |          |
| Before the SEO                            | 81.12***                         | 86.82***                  | 78.36***   | 60.69*** |
| After the SEO                             | 77.66***                         | 83.68***                  | 65.66***   | 69.54*** |
| N   | 110                              | 80                        | 21         | 9        |

<sup>20</sup> According to the T-tests conducted besides the Wilcoxon signed-rank tests to verify individual significance, the averages are statistically different from zero for capital expenditures on revenues before the SEO for debt issues and after the SEO for all issue categories except debt; assets growth for all issue categories; revenues growth before the SEO for general corporate purpose and debt issues and after the offer for all issue categories; operating income on assets for all firms and investment issues before the SEO and after for investment issues; operating income on revenues for investment issues after the SEO; and asset turnover for all issue categories.

Table 4, Panel A documents the median four-year average Capital Expenditures on Revenues ratio before and after the SEO event, whereas Panel B shows Assets Growth. Firms invest significantly less after a large SEO event with the median four-year average declining significantly from 5.95 percent to 5.40 percent and assets growth declining about 3.21 percentage points, similarly to Hsu, Reed, and Rocholl (2010)'s findings regarding IPOs. Considering the ex-ante intended use of proceeds, when issuers claim to plan to use the proceeds to invest, incumbent firms show as well an increase in capital expenditures on revenues after the event from 5.91 percent to 5.95 percent, which does not happen for the remaining categories.

On Table 4, Panel C it is possible to observe a significantly deterioration in the median four-year average revenues growth after SEO, regardless of the stated intended use of proceeds.

Table 4, Panel D and Panel E exhibit the median four-year average in operating income on assets and operating income on revenues before and after the event, respectively. These ratios takes opposite directions, as the operating income on assets significantly decreases from 5.96 percent to 5.91 percent taking into account the median average ratio for all incumbents, with incumbent firms' revealing a poorer performance following SEOs whose proceeds are allegedly destined to investments or to general corporate purposes. The operating income on revenues shows a slight increase after SEOs, as a consequence of the drastic increase for incumbent firms' that are affected by a SEO whose proceeds are used to change the issuer's capital structure. Therefore, when issuers claim to use their proceeds either for general corporate purposes or to pursue investments, incumbent firms have poorer median operating income on assets and on revenues following the SEO. On the other hand, when the use of proceeds are destined to recapitalization, refinancing or restructuring purposes, incumbent firms improve their performance measure by these ratios after the SEO.

Productivity, however, measured by asset turnover shows a decline after the event, as seen in Table 4, Panel F, for all categories of issues.

So, similarly to the results reported by Hsu, Reed, and Rocholl (2010), there is a decline in post-SEO peers' operating performance in terms of the common ratios used, namely assets and revenues growth, and operating income on assets. However, the impact on the incumbent firms' operating performance varies accordingly to the planned use of proceeds stated by issuers.

When the intended use of proceeds has the claim to change the balance sheet structure through changes in debt, the peers perform better after the issue. Autore, Bray, and Peterson (2009) found that issuers who state recapitalization as the intended use of proceeds have a

poorer performance after SEOs, consistent with market timing theory, indicating that firms conduct debt related equity offerings to take advantage of moments of overvaluation. Therefore, the competitive effects prevail in debt issues, as there is a reverse effect comparing to issuers performance on the literature.

According to the T-tests conducted besides the Wilcoxon signed-rank tests to verify individual significance, the averages are statistically different from zero for capital expenditures before SEO for debt issues and for all issue categories after the SEO; assets growth before the SEO for investment issues and after the SEO for all issue categories; revenues growth for investment and debt issues before and after the SEO; operating income on assets before the SEO for general corporate purpose and investment issues and after the SEO for all issue categories; operating income on revenues after the SEO for investment and debt issues; asset turnover for all issue categories.

**Table 4: Operating Performance of Incumbent Firms**

This table reports univariate statistics for several performance ratios for different group of companies, categorizing the issues according to the intended use of proceeds, namely i) General Corporate Purposes; ii) Investment; and iii) Debt. The values represent the median ratios for 817 observations for 610 incumbent firms before and after the SEO events occurred between 2000 and 2015. Before the SEO consists in the four-year average prior to the event, i.e., from the last fiscal year end before the issue to the fourth fiscal year end relative to the issue. After the SEO consists in the four-year average after the event, i.e., from the first fiscal year end following the issue to the fourth fiscal year end relative to the issue. *N* consists of the number of observations. The significance tests are based on the Wilcoxon signed-rank test, which assumes that the observations are independent. \*\*\* and \*\* indicate significance at the 1% and 5% levels, respectively.

| Measure of Operating Performance          | Primary Intended Use of Proceeds |                           |            |          |
|---|----------------------------------|---------------------------|------------|----------|
|   | All Firms                        | General Corporate Purpose | Investment | Debt     |
| Panel A: Capital Expenditures on Revenues |                                  |                           |            |          |
| Before the SEO                            | 5.95***                          | 5.82***                   | 5.91***    | 8.45***  |
| After the SEO                             | 5.40***                          | 5.05***                   | 5.95***    | 6.32***  |
| N   | 769                              | 523                       | 167        | 79       |
| Panel B: Assets Growth                    |                                  |                           |            |          |
| Before the SEO                            | 7.43***                          | 7.98***                   | 5.48***    | 8.36***  |
| After the SEO                             | 4.22***                          | 4.30***                   | 3.29***    | 4.45***  |
| N   | 807                              | 552                       | 171        | 84       |
| Panel C: Revenues Growth                  |                                  |                           |            |          |
| Before the SEO                            | 6.95***                          | 7.07***                   | 5.48***    | 9.68***  |
| After the SEO                             | 4.33***                          | 4.16***                   | 3.68***    | 7.34***  |
| N   | 801                              | 549                       | 169        | 83       |
| Panel D: Operating Income on Assets       |                                  |                           |            |          |
| Before the SEO                            | 5.96***                          | 5.95***                   | 8.15***    | 3.52***  |
| After the SEO                             | 5.91***                          | 5.66***                   | 7.06***    | 5.52***  |
| N   | 813                              | 557                       | 171        | 85       |
| Panel E: Operating Income on Revenues     |                                  |                           |            |          |
| Before the SEO                            | 6.72***                          | 6.06***                   | 10.47***   | 3.66***  |
| After the SEO                             | 6.87***                          | 5.69***                   | 9.79***    | 7.54***  |
| N   | 806                              | 553                       | 169        | 84       |
| Panel F: Asset Turnover                   |                                  |                           |            |          |
| Before the SEO                            | 85.05***                         | 91.47***                  | 75.00***   | 68.13*** |
| After the SEO                             | 81.91***                         | 87.90***                  | 68.03***   | 65.49*** |
| N   | 813                              | 557                       | 171        | 85       |



## 5.2. Multivariate Results

### 5.2.1. Operating Performance and Incumbent Firm's Characteristics

The univariate results suggest that SEOs affect the performance of industry incumbents, and these effects are not transversal to all categories, but it is questionable whether there are other factors that explain the results. Thus, in order to analyse the intra-industry equity issues on the incumbent firms' post operating performance Hsu, Reed, and Rocholl (2010)'s methodology was adapted for SEO's, available in Table 5, considering the intended use of proceeds.

Table 5 shows that firms' age since trading and size measured by previous year total assets significantly affect capital expenditures growth, revenues growth, and both growth in operating income on assets and on revenues.

The model estimates from Table 5 indicate that SEO years do not significantly affect performance, which contradicts the results by Hsu, Reed, and Rocholl (2010) regarding IPOs effect over incumbent firms. Also contradicting these academics' results, older firms perform better than younger firms, *ceteris paribus*, when it is measured by capital expenditures growth and operating income ratios growth. Nevertheless, when it comes to revenues growth, older firms perform worse than younger ones, *ceteris paribus*, as shown by the negative coefficient of the variable *Log(Age)*. Moreover, firms performance declines with firm's size measured by total assets, *ceteris paribus*.

These models failed to predict the overall impact of a SEO intra-industry event on incumbent firms, as the representative dummy variable *SEO\_Dummy* is not statistically significant. However, as previously mentioned, the literature reports different impacts on issuers' performance accordingly to the stated intended use of proceeds. Therefore, in Table 5, the models (2), (4), (6), and (8) address the potential impact of SEO events on incumbent firms accordingly to the planned use of proceeds for each performance measure.

The low R square obtained for each model is a consequence of the small sample size and also of the existence of several potential factors affecting firm's performance besides the ones considered in the estimated models in Table 5.

**Table 5: The Effect of SEO Events and Firm Characteristics on Incumbent Firms**

Table 5 reports estimates from a panel regression of incumbent firms' capital expenditures growth, revenues growth, and growth in operating income scaled by assets and revenues on SEO indicators and control variables from 1995 to 2019. *Capital Expenditure Growth* is the difference between the log of capital expenditures at the observation year and the log of capital expenditure in the previous year. *Revenues Growth* is the difference between the log of revenues at the observation year and the log of revenues in the previous year. *Operating Income Growth* is the difference between the log of operating income at the observation year and the log of operating income in the previous year. *SEO\_Dummy* is a dummy variable equal to one in SEO event year and the three following years. *SEO\_Invest* is a dummy indicator variable equal to one in the Investment SEO event year and the three following years. *SEO\_Debt* is a dummy variable equal to one in the Debt SEO event year and the three following years. Other variables were previously defined. *N* corresponds to the number of observations. All models were estimated using panel data fixed effects. Standard errors are heteroscedasticity-adjusted based on Breusch Pagan and White's procedures. T-statistics are reported in parentheses. \*\*\*, \*\*, and indicate significance at the 1%, 5%, and 10% levels, respectively.

| Dependent variable     | Capital Expenditures Growth |                       | Revenues Growth      |                      | Operating Income on Assets Growth |                      | Operating Income on Revenues Growth |                       |
|------------------------|-----------------------------|-----------------------|----------------------|----------------------|-----------------------------------|----------------------|-------------------------------------|-----------------------|
|                        | (1)                         | (2)                   | (3)                  | (4)                  | (5)                               | (6)                  | (7)                                 | (8)                   |
| SEO_Dummy              | -0.020<br>(-1.29)           |                       | -0.009<br>(-1.16)    |                      | 0.001<br>(0.50)                   |                      | -0.004<br>(-0.80)                   |                       |
| SEO_Invest             |                             | -0.010<br>(-0.37)     |                      | 0.022**<br>(2.37)    |                                   | -0.002<br>(-0.77)    |                                     | -0.002<br>(-0.40)     |
| SEO_Debt               |                             | 0.036<br>(1.18)       |                      | 0.001<br>(0.09)      |                                   | 0.025***<br>(4.78)   |                                     | 0.033***<br>(4.26)    |
| Lag dependent variable | -0.255***<br>(-14.05)       | -0.255***<br>(-14.04) | -0.040<br>(-1.22)    | -0.040<br>(-1.23)    | -0.364***<br>(-6.58)              | -0.364***<br>(-6.60) | -0.396***<br>(-15.59)               | -0.397***<br>(-15.60) |
| Log(Age)               | 0.062***<br>(3.09)          | 0.061***<br>(3.10)    | -0.023**<br>(-2.32)  | -0.025**<br>(-2.53)  | 0.015***<br>(4.59)                | 0.016***<br>(4.71)   | 0.023***<br>(4.41)                  | 0.023***<br>(4.42)    |
| Log(Assets)            | -0.171***<br>(-7.64)        | -0.171***<br>(-7.62)  | -0.077***<br>(-5.71) | -0.078***<br>(-5.69) | -0.023***<br>(-6.25)              | -0.024***<br>(-6.30) | -0.027***<br>(-3.42)                | -0.027***<br>(-3.48)  |
| Intercept              | 3.427***<br>(8.06)          | 3.427***<br>(8.02)    | 1.709***<br>(6.52)   | 1.718***<br>(6.52)   | 0.439***<br>(6.20)                | 0.441***<br>(6.24)   | 0.491***<br>(3.28)                  | 0.497<br>(3.33)       |
| N                      | 9,866                       | 9,866                 | 10,630               | 10,630               | 10,702                            | 10,702               | 10,405                              | 10,405                |
| R <sup>2</sup>         | 0.017                       | 0.017                 | 0.001                | 0.001                | 0.074                             | 0.075                | 0.111                               | 0.111                 |

Table 5, model (4) estimates show that when issuers' intend to use the proceeds to make investments, the impact is significantly positive impact of these SEOs, *ceteris paribus*, which contradicts the findings obtained on the univariate analysis.

There is not enough statistical evidence to prove that SEO events impact peers' capital expenditures growth, according to the estimates from model (2) of Table 5.

However, when performance is assessed in terms of operating income ratios as in models (6) and (8) from Table 5, if SEOs are used to change issuer's capital structure by recapitalization, restructuring or refinancing, there is a statistically significant increase in both operating income on assets and operating income on revenues growth in SEO years. These findings are similar to the results observed in the univariate analysis. Therefore, incumbent firms face a 2.5 percent increase in operating income on assets, *ceteris paribus*, in the years in which a large SEO occurs in the same industry whose proceeds are planned to use to balance issuer's capital structure. Similarly, for this category of issues, incumbent firms' operating income on revenues increase by a statistically significant 3.3 percent in SEO years, *ceteris paribus*<sup>21</sup>.

The literature on SEO issuers' operating performance relation with intended use of proceeds indicate that issuers perform worse when the *ex-ante* plan is to use the proceeds to repay debt obligations as it sends signals of market timing motivations (Autore, Bray, and Peterson, 2009), thus the results obtained on Table 5 when the intended use of proceeds categories are considered indicate that competitive effects prevail between issuers and peers if the claims to issue equity are related to debt.

Nonetheless, when the impact of all issues are taken into account regardless of the intended use of proceeds categories, there is not statistical evidence showing an effect of large intra-industry SEOs over incumbent firms' operating performance.

### ***5.2.2. Operating Performance and Deal Characteristics***

In order to complement the analysis, based on Autore, Bray, and Peterson (2009)'s methodology, who studied the relationship between the intended use of proceeds and the long-run performance of firms conducting SEOs, both median quantile and OLS regressions were estimated, in which the performance is measured as the change in both the Operating Income over Assets and the Operating Income over Sales from year -1 to year +3 relative to the SEO event date.

As it is possible to see on Table 6, for all models the deal characteristics do not significantly

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<sup>21</sup> Considering year-fixed effects as reported in Appendix E table does not substantially affect the reported results for the main explanatory dummy variables.

impact changes in incumbent firms' performance, which corroborates Autore, Bray, and Peterson (2009)'s results.

In all models the *SEO\_Debt* coefficient enters significantly positive, being 0.022 and 0.044 on the median quantile regressions for the operating income on assets and on revenues, respectively, and 0.041 and 0.069 on the OLS regressions for the operating income on assets and on revenues, respectively. Thus, when issuers claim to use the proceeds to make changes in the capital structure there is a subsequent improvement in incumbent firms' operating performance, *ceteris paribus*. These results corroborate both previous univariate and multivariate analyses' findings, therefore there is statistical evidence demonstrating that incumbent firms perform better following SEOs, whereas the literature indicates that issuers themselves perform particularly worse when their claims are to use the proceeds to debt related purposes (Autore, Bray, and Peterson, 2009).

Although the *SEO\_Invest* coefficients are negative, except for the last model (12), they are not statistically significant. Thus, there is no evidence that issues whose proceeds are claimed to be used to pursue investments affect the intra-industry rivals' performance. Autore, Bray, and Peterson (2009) found little evidence regarding issuers' long-run underperformance following SEOs conducted to supposedly make investments.

**Table 6: The Effect of SEO Events and Deal Characteristics on Incumbent Firms**

This table presents median quantile and OLS regressions in which the dependent variable is the change in operating income scaled by total assets or sales from year -1 to year +3. The explanatory variables include the dummy variables *SEO\_Debt*, which equals one where Restructuring, Refinancing or Recapitalization related purposes are the intended use of proceeds and zero otherwise; *SEO\_Invest* which equals one where Investment related purposes is the intended use of proceeds and zero otherwise. In the median quantile regressions (models 9 and 10) bootstrapped standard errors based on 1000 replications are reported in parentheses. In the OLS estimations (models 11 and 12) heteroscedasticity-adjusted standard errors based on both Breusch Pagan and White's procedures are in parentheses. In the OLS estimations, the dependent variables are winsorized at the 5<sup>th</sup> and 95<sup>th</sup> percentiles. Coefficients are presented with standard errors in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

|                         | Operating<br>Income on<br>Assets | Operating<br>Income on<br>Revenues | Operating<br>Income on<br>Assets | Operating<br>Income on<br>Sales |
|-------------------------|----------------------------------|------------------------------------|----------------------------------|---------------------------------|
|                         | (9) Median<br>Quantile           | (10) Median<br>Quantile            | (11) OLS                         | (12) OLS                        |
| Intercept               | -0.017<br>(0.012)                | -0.021*<br>(0.011)                 | -0.025*<br>(0.015)               | -0.057***<br>(0.019)            |
| SEO_Invest              | -0.002<br>(0.005)                | -0.001<br>(0.005)                  | -0.005<br>(0.007)                | 0.005<br>(0.010)                |
| SEO_Debt                | 0.022**<br>(0.010)               | 0.044***<br>(0.015)                | 0.041***<br>(0.012)              | 0.069***<br>(0.015)             |
| Log(Market<br>Value)    | 0.001<br>(0.002)                 | 0.001<br>(0.002)                   | 0.002<br>(0.003)                 | 0.003<br>(0.004)                |
| Log(Proceeds)           | 0.001<br>(0.003)                 | 0.003<br>(0.002)                   | 0.002<br>(0.003)                 | 0.003<br>(0.005)                |
| Relative Offer<br>Size  | 0.001<br>(0.001)                 | 0.001<br>(0.002)                   | 0.001<br>(0.001)                 | 0.001<br>(0.001)                |
| Adjusted R <sup>2</sup> | -                                | -                                  | 0.034                            | 0.041                           |
| N                       | 684                              | 673                                | 684                              | 673                             |

## 6. Conclusion

Undoubtedly, across literature it has been proven that corporate events, namely equity offerings, not only affect issuer's both stock and operating performance, as it can impact incumbent firms as well. However, the literature on the potential effects on intra-industry competitors is scarce and even scarcer when it comes to post-events operating performance. Regarding the intra-industry effects of SEOs on incumbents' operating performance, to our best knowledge this topic has not been addressed yet. Therefore, this dissertation aims to fill that gap, presenting evidence on the post-SEO incumbent firm's operating performance, in particular regarding European firms.

The operating performance was assessed through different ways, but the primarily reference was Hsu, Reed, and Rocholl (2010)'s methodology, who provided relevant and innovative evidence on the impact of IPOs on intra-industry incumbents. Thus, univariate statistics were produced to measure differences in the median operating performance on the four-years average before and after the SEO events, considering different performance measures, including capital expenditures on revenues, assets and revenues growth and both operating income scaled by assets and operating income scaled by revenues.

Moreover, as there are several determinants that can affect company's performance, unbalanced panel data regressions were estimated taking into account firm-specific characteristics, as age, size and past performance, which are well-known key determinants on firm's performance. To complement the analysis, both median quantile and OLS regressions were estimated based on Autore, Bray, and Peterson (2009)'s results, to assess the impact of SEOs and its characteristics that serve as control variables on the change in incumbents' operating income on assets and on revenues in the years surrounding the event.

The sample comprises 610 identified incumbent firms which were public for at least three years prior to the SEO event, potentially affected by the 112 largest intra-industry issues, accordingly to three-digit NAICS 2017 subsector, within a 6 year period, between 2000 to 2015.

Control variables related to firm's specific characteristics, such as age, size and past performance significantly affect incumbent firms' performance, whereas deal characteristics do not significantly contribute to changes in incumbents' operating income on assets and operating income on revenues.

The results provide little evidence of an overall impact of SEOs on incumbent firms' performance when ex-ante intended use of proceeds categories are not taken in consideration. There is also little evidence of deterioration in operating performance related to issues whose proceeds are intended to be used either to invest or to general corporate purposes.

However, when issuers claim to intend to use the proceeds for recapitalization, refinancing or restructuring, operating performance of incumbent firms significantly improves. Accordingly to the literature (e.g., Autore, Bray, and Peterson, 2009; Amor and Kooli, 2017), debt related motivations behind equity issues lead to greater declines in issuers' operating performance due to signals of opportunistic behavior trying to take advantages of market timing by appropriating from overvaluation moments. Thus, competitive effects prevail within industry for issues of this category, having the opposite effect on intra-industry incumbent firms.

Thus, there is evidence of competitive disadvantages for issuers comparing to incumbent firms' associated with issues that are used to refinance debt, but little evidence of competitive advantages associated with issues which main purpose is to finance investment activities.

The presence of competitive advantages in primary SEOs for incumbent firms was previously confirmed by Bradley and Yuan (2013) regarding stock operating performance, but these academics did not take into account the intended use of proceeds categories.

Nevertheless, a firm's performance depends on numerous factors, combining firm-specific ones along with industry ones, both micro and macro economics determinants and other events. Therefore, to measure the impact of any corporate event on a firm's operating performance is an extremely hard task. The inherent difficulties are even higher when the goal is to assess the impact of an event over non-issuers' performance, since the combination of these different factors is noisy and can disrupt and distort the potential observation of an actual impact, if it is the case. So, despite the efforts made in the sample selection to mitigate cross-contamination, there is the possibility of other events and factors to interfere with the results.

Moreover, there were other boundaries arising through the process, namely the limited available accounting and financial information regarding the deals and companies, whether issuers or incumbents, which limited the sample size. Adding up, although the lack of literature regarding the effect of SEOs on incumbents' operating performance gives room to try to fill this gap, there is scarce evidence on the literature to support the results achieved.

All in all, the results provide evidence regarding SEOs' intra-industry competitive effects, and the ex-ante intended use of proceeds convey valuable information to market participants and to intra-industry peers, potentially affecting peers' performance in different ways. This evidence is relevant and has implications for investors and incumbent firms, to understand their competitive positions and how to respond to such events. It also provides knowledge to potential issuers considering whether to raise capital through an equity offering.

This topic leaves room for future research in several aspects, namely to address the potential competitive effects that can be found for other capital market transactions and even to pursue

an approach for both stock and operating performances that considers the potential effect of ex-ante intended use of proceeds when applicable.



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## Appendix

### Appendix A: Two-digit NAICS 2017 Sector and Three-digit NAICS 2017 Subsector List

| Level     | NAICS 2017 Sector and Subsector                                   |
|-----------|---|
| Sector    | 11: Agriculture, Forestry, Fishing and Hunting                    |
| Subsector | 111: Crop Production  |
| Subsector | 112: Animal Production and Aquaculture                            |
| Subsector | 113: Forestry and Logging   |
| Subsector | 114: Fishing, Hunting and Trapping                                |
| Subsector | 115: Support Activities for Agriculture and Forestry              |
| Sector    | 21: Mining, Quarrying, and Oil and Gas Extraction                 |
| Subsector | 211: Oil and Gas Extraction                                       |
| Subsector | 212: Mining (except Oil and Gas)                                  |
| Subsector | 213: Support Activities for Mining                                |
| Sector    | 22: Utilities   |
| Subsector | 221: Utilities  |
| Sector    | 23: Construction  |
| Subsector | 236: Construction of Buildings                                    |
| Subsector | 237: Heavy and Civil Engineering Construction                     |
| Subsector | 238: Specialty Trade Contractors                                  |
| Sector    | 31-33: Manufacturing  |
| Subsector | 311: Food Manufacturing   |
| Subsector | 312: Beverage and Tobacco Product Manufacturing                   |
| Subsector | 313: Textile Mills  |
| Subsector | 314: Textile Product Mills  |
| Subsector | 315: Apparel Manufacturing  |
| Subsector | 316: Leather and Allied Product Manufacturing                     |
| Subsector | 321: Wood Product Manufacturing                                   |
| Subsector | 322: Paper Manufacturing  |
| Subsector | 323: Printing and Related Support Activities                      |
| Subsector | 324: Petroleum and Coal Products Manufacturing                    |
| Subsector | 325: Chemical Manufacturing                                       |
| Subsector | 326: Plastics and Rubber Products Manufacturing                   |
| Subsector | 327: Nonmetallic Mineral Product Manufacturing                    |
| Subsector | 331: Primary Metal Manufacturing                                  |
| Subsector | 332: Fabricated Metal Product Manufacturing                       |
| Subsector | 333: Machinery Manufacturing                                      |
| Subsector | 334: Computer and Electronic Product Manufacturing                |
| Subsector | 335: Electrical Equipment, Appliance, and Component Manufacturing |
| Subsector | 336: Transportation Equipment Manufacturing                       |
| Subsector | 337: Furniture and Related Product Manufacturing                  |
| Subsector | 339: Miscellaneous Manufacturing                                  |
| Sector    | 42: Wholesale Trade   |
| Subsector | 423: Merchant Wholesalers, Durable Goods                          |
| Subsector | 424: Merchant Wholesalers, Nondurable Goods                       |
| Subsector | 425: Wholesale Electronic Markets and Agents and Brokers          |

|           |  |
|-----------|--|
| Sector    | 44-45: Retail Trade  |
| Subsector | 441: Motor Vehicle and Parts Dealers   |
| Subsector | 442: Furniture and Home Furnishings Stores   |
| Subsector | 443: Electronics and Appliance Stores  |
| Subsector | 444: Building Material and Garden Equipment and Supplies Dealers                             |
| Subsector | 445: Food and Beverage Stores  |
| Subsector | 446: Health and Personal Care Stores   |
| Subsector | 447: Gasoline Stations   |
| Subsector | 448: Clothing and Clothing Accessories Stores  |
| Subsector | 451: Sporting Goods, Hobby, Musical Instrument, and Book Stores                              |
| Subsector | 452: General Merchandise Stores  |
| Subsector | 453: Miscellaneous Store Retailers   |
| Subsector | 454: Nonstore Retailers  |
| Sector    | 48-49: Transportation and Warehousing  |
| Subsector | 481: Air Transportation  |
| Subsector | 482: Rail Transportation   |
| Subsector | 483: Water Transportation  |
| Subsector | 484: Truck Transportation  |
| Subsector | 485: Transit and Ground Passenger Transportation   |
| Subsector | 486: Pipeline Transportation   |
| Subsector | 487: Scenic and Sightseeing Transportation   |
| Subsector | 488: Support Activities for Transportation   |
| Subsector | 491: Postal Service  |
| Subsector | 492: Couriers and Messengers   |
| Subsector | 493: Warehousing and Storage   |
| Sector    | 51: Information  |
| Subsector | 511: Publishing Industries (except Internet)   |
| Subsector | 512: Motion Picture and Sound Recording Industries   |
| Subsector | 515: Broadcasting (except Internet)  |
| Subsector | 517: Telecommunications  |
| Subsector | 518: Data Processing, Hosting, and Related Services  |
| Subsector | 519: Other Information Services  |
| Sector    | 52: Finance and Insurance  |
| Subsector | 521: Monetary Authorities-Central Bank   |
| Subsector | 522: Credit Intermediation and Related Activities  |
| Subsector | 523: Securities, Commodity Contracts, and Other Financial Investments and Related Activities |
| Subsector | 524: Insurance Carriers and Related Activities   |
| Subsector | 525: Funds, Trusts, and Other Financial Vehicles   |
| Sector    | 53: Real Estate and Rental and Leasing   |
| Subsector | 531: Real Estate   |
| Subsector | 532: Rental and Leasing Services   |
| Subsector | 533: Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)                    |
| Sector    | 54: Professional, Scientific, and Technical Services   |
| Subsector | 541: Professional, Scientific, and Technical Services  |

|           |  |
|-----------|--|
| Sector    | 55: Management of Companies and Enterprises  |
| Subsector | 551: Management of Companies and Enterprises                                       |
| Sector    | 56: Administrative and Support and Waste Management and Remediation Services       |
| Subsector | 561: Administrative and Support Services   |
| Subsector | 562: Waste Management and Remediation Services                                     |
| Sector    | 61: Educational Services   |
| Subsector | 611: Educational Services  |
| Sector    | 62: Health Care and Social Assistance  |
| Subsector | 621: Ambulatory Health Care Services   |
| Subsector | 622: Hospitals   |
| Subsector | 623: Nursing and Residential Care Facilities                                       |
| Subsector | 624: Social Assistance   |
| Sector    | 71: Arts, Entertainment, and Recreation  |
| Subsector | 711: Performing Arts, Spectator Sports, and Related Industries                     |
| Subsector | 712: Museums, Historical Sites, and Similar Institutions                           |
| Subsector | 713: Amusement, Gambling, and Recreation Industries                                |
| Sector    | 72: Accommodation and Food Services  |
| Subsector | 721: Accommodation   |
| Subsector | 722: Food Services and Drinking Places   |
| Sector    | 81: Other Services (except Public Administration)                                  |
| Subsector | 811: Repair and Maintenance  |
| Subsector | 812: Personal and Laundry Services   |
| Subsector | 813: Religious, Grantmaking, Civic, Professional, and Similar Organizations        |
| Subsector | 814: Private Households  |
| Sector    | 92: Public Administration  |
| Subsector | 921: Executive, Legislative, and Other General Government Support                  |
| Subsector | 922: Justice, Public Order, and Safety Activities                                  |
| Subsector | 923: Administration of Human Resource Programs                                     |
| Subsector | 924: Administration of Environmental Quality Programs                              |
| Subsector | 925: Administration of Housing Programs, Urban Planning, and Community Development |
| Subsector | 926: Administration of Economic Programs   |
| Subsector | 927: Space Research and Technology   |
| Subsector | 928: National Security and International Affairs                                   |

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**Appendix B: Hausman Test Results**

| Dependent Variable                  | Regression (1)       |         | Regression (2)       |         |
|-------------------------------------|----------------------|---------|----------------------|---------|
|                                     | Chi-square Statistic | P-value | Chi-square Statistic | P-value |
| Capital Expenditures Growth         | 266.81               | 0.00    | 269.76               | 0.00    |
| Revenues Growth                     | 380.31               | 0.00    | 389.48               | 0.00    |
| Operating Income on Assets Growth   | 117.67               | 0.00    | 118.46               | 0.00    |
| Operating Income on Revenues Growth | 72.61                | 0.00    | 72.98                | 0.00    |

### Appendix C: The Effect of SEO Events and Firm Characteristics on Incumbent Firms, based on Year-Fixed Effects

Appendix E table reports estimates from a panel regression of incumbent firms' capital expenditures growth, revenues growth, and growth in operating income scaled by assets and revenues on SEO indicators and control variables from 1995 to 2019. *Capital Expenditure Growth* is the difference between the log of capital expenditures at the observation year and the log of capital expenditure in the previous year. *Revenues Growth* is the difference between the log of revenues at the observation year and the log of revenues in the previous year. *Operating Income Growth* is the difference between the log of operating income at the observation year and the log of operating income in the previous year. *SEO\_Dummy* is a dummy variable equal to one in SEO event year and the three following years. *SEO\_Invest* is a dummy variable equal to one in the Investment SEO event year and the three following years. *SEO\_Debt* is a dummy variable equal to one in the Debt SEO event year and the three following years. Other variables were previously defined. *N* corresponds to the number of observations. All models were estimated using panel data year-fixed effects. Standard errors are heteroscedasticity-adjusted based on Breusch Pagan and White's procedures. T-statistics are reported in parentheses. \*\*\*, \*\*, and indicate significance at the 1%, 5%, and 10% levels, respectively.

| Dependent variable     | Capital Expenditures Growth |                       | Revenues Growth      |                      | Operating Income on Assets Growth |                      | Operating Income on Revenues Growth |                       |
|------------------------|-----------------------------|-----------------------|----------------------|----------------------|-----------------------------------|----------------------|-------------------------------------|-----------------------|
|                        | (1)                         | (2)                   | (3)                  | (4)                  | (5)                               | (6)                  | (7)                                 | (8)                   |
| SEO_Dummy              | -0.003<br>(-0.18)           |                       | -0.002<br>(-0.21)    |                      | -0.000<br>(-0.04)                 |                      | -0.003<br>(-0.72)                   |                       |
| SEO_Invest             |                             | 0.006<br>(0.22)       |                      | 0.028***<br>(.77)    |                                   | -0.004<br>(-1.45)    |                                     | -0.000<br>(-0.05)     |
| SEO_Debt               |                             | 0.028<br>(0.87)       |                      | 0.011<br>(0.77)      |                                   | 0.015***<br>(2.97)   |                                     | 0.023***<br>(2.99)    |
| Lag dependent variable | -0.265***<br>(-14.60)       | -0.265***<br>(-14.61) | -0.044<br>(-1.35)    | -0.045<br>(-1.36)    | -0.366***<br>(-6.66)              | -0.366***<br>(-6.66) | -0.398***<br>(-15.66)               | -0.399***<br>(-15.65) |
| Log(Age)               | -0.007<br>(-0.31)           | -0.007<br>(-0.30)     | -0.025**<br>(-2.26)  | -0.026**<br>(-2.36)  | 0.005<br>(1.14)                   | 0.006<br>(1.21)      | 0.008<br>(1.52)                     | 0.008<br>(1.52)       |
| Log(Assets)            | -0.175***<br>(-6.80)        | -0.176***<br>(-6.80)  | -0.070***<br>(-4.71) | -0.070***<br>(-4.71) | -0.025***<br>(-5.98)              | -0.025***<br>(-6.01) | -0.029***<br>(-3.23)                | -0.029***<br>(-3.25)  |
| Intercept              | 3.617***<br>(7.33)          | 3.618***<br>(7.32)    | 1.606***<br>(5.73)   | 1.610***<br>(5.73)   | 0.474***<br>(5.87)                | 0.477***<br>(5.90)   | 0.554***<br>(3.22)                  | 0.558***<br>(3.25)    |
| N                      | 9,866                       | 9,866                 | 10,630               | 10,630               | 10,702                            | 10,702               | 10,405                              | 10,405                |
| R <sup>2</sup>         | 0.024                       | 0.024                 | 0.005                | 0.005                | 0.073                             | 0.073                | 0.109                               | 0.109                 |

### Appendix D: The Effect of SEO Events and Firm Characteristics on Incumbent Firms with Clustering-Adjusted Standard Errors

Appendix D table reports estimates from a panel regression of incumbent firms' capital expenditures growth, revenues growth, and growth in operating income scaled by assets and revenues on SEO indicators and control variables from 1995 to 2019. *Capital Expenditure Growth* is the difference between the log of capital expenditures at the observation year and the log of capital expenditure in the previous year. *Revenues Growth* is the difference between the log of revenues at the observation year and the log of revenues in the previous year. *Operating Income Growth* is the difference between the log of operating income at the observation year and the log of operating income in the previous year. *SEO\_Dummy* is a dummy variable equal to one in SEO event year and the three following years. *SEO\_Invest* is a dummy variable equal to one in the Investment SEO event year and the three following years. *SEO\_Debt* is a dummy variable equal to one in the Debt SEO event year and the three following years. Other variables were previously defined. *N* corresponds to the number of observations. All models were estimated using panel data fixed effects. Standard errors are adjusted for clustering by SEO event date. T-statistics are reported in parentheses. \*\*\*, \*\*, and indicate significance at the 1%, 5%, and 10% levels, respectively.

| Dependent variable     | Capital Expenditures Growth |                       | Revenues Growth      |                      | Operating Income on Assets Growth |                      | Operating Income on Revenues Growth |                       |
|------------------------|-----------------------------|-----------------------|----------------------|----------------------|-----------------------------------|----------------------|-------------------------------------|-----------------------|
|                        | (1)                         | (2)                   | (3)                  | (4)                  | (5)                               | (6)                  | (7)                                 | (8)                   |
| SEO_Dummy              | -0.020<br>(-1.26)           |                       | -0.009<br>(-0.96)    |                      | 0.001<br>(0.42)                   |                      | -0.004                              |                       |
| SEO_Invest             |                             | -0.010<br>(-0.29)     |                      | 0.022**<br>(2.57)    |                                   | -0.002<br>(-0.77)    |                                     | -0.002<br>(-0.36)     |
| SEO_Debt               |                             | 0.036<br>(1.56)       |                      | 0.001<br>(0.12)      |                                   | 0.025**<br>(2.29)    |                                     | 0.033**<br>(2.26)     |
| Lag dependent variable | -0.255***<br>(-11.97)       | -0.255***<br>(-11.97) | -0.040<br>(-1.38)    | -0.040<br>(-1.38)    | -0.364***<br>(-6.40)              | -0.364***<br>(-6.38) | -0.396***<br>(-15.49)               | -0.397***<br>(-15.53) |
| Log(Age)               | 0.062**<br>(2.60)           | 0.061**<br>(2.58)     | -0.023**<br>(-2.11)  | -0.025**<br>(-2.30)  | 0.015***<br>(4.45)                | 0.016***<br>(4.67)   | 0.023***<br>(4.04)                  | 0.023***<br>(4.08)    |
| Log(Assets)            | -0.171***<br>(-7.14)        | -0.171***<br>(-7.11)  | -0.077***<br>(-6.23) | -0.078***<br>(-6.19) | -0.023***<br>(-5.63)              | -0.024***<br>(-5.70) | -0.027***<br>(-3.46)                | -0.027***<br>(-3.53)  |
| Intercept              | 3.427***<br>(7.43)          | 3.427***<br>(7.38)    | 1.709***<br>(7.18)   | 1.718***<br>(7.15)   | 0.439***<br>(5.51)                | 0.441***<br>(5.58)   | 0.491***<br>(3.34)                  | 0.497***<br>(3.41)    |
| N                      | 9,866                       | 9,866                 | 10,630               | 10,630               | 10,702                            | 10,702               | 10,405                              | 10,405                |
| R <sup>2</sup>         | 0.017                       | 0.017                 | 0.001                | 0.001                | 0.074                             | 0.075                | 0.111                               | 0.112                 |