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Standing Selfish and Grand?

- A study of private equity impact on IPO valuation

Abstract

The conflicting effects of private equity certification and grandstanding in relation to IPO underpricing has been disputed since the 1990's. Using a sample of 334 IPOs on six Swedish trading platforms, applying a Tobin's Q value relative as an alternative to first-day returns, this thesis finds differences in valuations between private equity and non-private equity backed IPOs. The results suggest that companies controlled by a private equity owner go to market at a lower value relative. Similarly, for private equity backed IPOs across trading platforms with differing levels of regulation, it is found that valuations differ and the results indicate lower valuations for these financial sponsor backed companies listing on more well-regulated markets compared to their counterparts listing on less well-regulated markets. The results indicate consistency with grandstanding, the notion that general partners are inclined to take portfolio companies public earlier in order to raise follow-on funds, generating real wealth losses on the behalf of limited partners.

Keywords:

Initial Public Offering, Private Equity, Underpricing, Certification, Grandstanding

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1. Introduction

This paper focuses on the incremental effect of private equity involvement on the valuation at the time when a company goes public through an initial public offering in a Swedish context for the time period starting in 2015 and ending in the first quarter of 2021.[1] [2] Previous literature by Megginson & Weiss (1991) provides evidence of the ability of venture capital firms to validate the quality of portfolio companies taken public, thereby decreasing the underpricing. In 1996, Gompers suggested that grandstanding increases the underpricing of venture capital backed companies going public. Hence, challenging the notion that venture capital involvement will lead to less underpricing. Followingly, our first research question is concentrated on this friction and seeks to explore the impact of these effects on Swedish initial public offerings. Further, Duong et al. (2021) finds evidence that more well-regulated markets provide certification for companies going public. As Sweden has well-developed public markets including seven different trading platforms, of which four are regulated exchanges and three are multilateral trading facilities, this is an appropriate setting to test how private equity involvement impacts the relative valuation of companies going public on different exchanges. Regulated exchanges provide a more well-regulated environment compared to multilateral trading facilities as they have more stringent regulations, such as requirements around the minimum years of historical financials, the use of IFRS, mandating of a stock exchange auditor and legal due diligence. Multilateral trading facilities are less well-regulated and examples include only requiring local GAAP and no requirements of legal due diligence or a stock exchange auditor. As the theory and previous evidence show that certification should be more important on less well-regulated markets our second research question asks whether private equity involvement provides increased certification on less well-regulated exchanges.

The motivation for this research is three-fold. Firstly, it addresses an agency problem between general and limited partners. Whereas certification should increase the value transferred to limited partners, as less value is lost through underpricing, grandstanding

[1] Throughout the thesis the term private equity will encompass all types of financial backers with an active investment strategy as evidenced through their website. This includes firms focusing on leveraged buyouts, venture capital firms, family offices, and similar organizations. However, when referencing to previous research in section 2, care has been taken to use the same terminology used in the original paper.

[2] Our definition of an initial public offering is based on when a private company's shares are offered openly to the general public for the first time. However, upon examining our data set the definition has been widened to also include spin-offs as well rights issues prior to, but connected with, an initial public offering of a private company's share. The latter is an approach sometimes taken to secure a significant float and number of shareholders necessary to list a holding and more prevalent on Alternative markets. The sample includes only the first Swedish IPO of any company.

imposes a real wealth loss on investors. Hence it is important for limited partners to understand what drives the actions of general partners. Secondly, it provides guidance to private equity practitioners when making decisions regarding which market to take companies public on, as well as what effects those decisions may have on the valuation and the market reception of the offering. These issues have previously been addressed for different regions and time periods, however, to our best knowledge not in a Swedish context or over a similar time period. Additionally, previous studies have been focused on underpricing, whereas this paper applies a valuation perspective. Thirdly, our second research question builds on the research of Duong et al. (2021) by attempting to answer their call for how venture capital influences the relation between market manipulation and initial public offering outcomes. To the best of our knowledge this has not been examined before.

The final sample consists of 334 IPOs, divided over four major industry classifications whereof 132 (40%) had some private equity ownership, and for 63 (19%) of these the private equity owners were identified to have a controlling majority ownership interest. The outcome of the IPOs owned by the latter group is compared against the rest of the sample to draw statistical interference regarding the research questions. The data was sourced via Thomson Reuters Datastream ("Datastream") and S&P Capital IQ. However, in order to ensure accuracy and quality of the dataset, especially for initial public offerings outside the Main markets, data has also been sourced and audited manually from the applicable offering documentation, such as prospectuses and information memorandums.

Historically, certification and grandstanding has been examined through underpricing, proxied by the first day return. We argue that such a return measure could be tainted by current market sentiment and may not effectively reflect the decisions made ahead of the offering by the private equity organization. Also, we find that a single focus on share returns would disregard valuable information found in the relative valuation of the firm. Hence, in order to provide an alternative to this approach, this paper evaluates cross-sectional differences in valuation as measured by Tobin's Q. We argue that the use of a value relative such as Tobin's Q, set at the time of the initial public offering, better reflects the decision process of the private equity organizations as practitioners more often use this type of value relative. To the best of our knowledge this approach has not previously been applied to answer questions similar to our own. This approach echoes the reflections made by Cochrane (2011):

> "We have to answer the central question, what is the source of price variation?' When did our field stop being 'asset pricing' and become 'asset expected returning'? Why are betas exogenous? A lot of price variation comes from discount-factor news. What sense does it make to 'explain' expected returns by the covariation of expected return shocks with market return shocks? Market-to-book ratios should be our left-hand variable, the thing we are trying to explain, not a sorting characteristic for expected returns"

The statistical methodologies applied is a Welch's t-test for differences in means amongst subsamples, along with the application of a multivariate regression model of the ordinary least squares estimator. We recognize that this type of statistical method may have limitations as the underlying assumptions often are violated doing empirical research in the world of economics and finance. However, the choice to use these tools is based on previous research and we take this into account when commenting and analyzing our results.[3]

In line with the research by Gompers (1996) our results indicate that grandstanding could have an impact on private equity-controlled companies taken public, namely that these types of IPOs are valued less than their counterparts. These results are robust throughout the analysis. However, it should be noted that the results do not rule out a certification effect, suggested by Megginson & Weiss (1991), as this could have a mitigating but not visible effect. This allows us to carefully reject our first null hypothesis in order to provide an answer to our first research question, as we in fact find a significant difference in valuation at the time of the initial public offering dependent on if the owner is a private equity organization or not. Further, our second research question centers around the difference in certifying effect of private equity organizations depending on if the market can be considered well-regulated. Even though a significant difference in valuation exists, the underlying factors driving the results appear vague when analyzed. This leads us to reject our second null hypothesis but leaves the second research question without a definitive answer. In order to shed light on the underlying causes for the significant difference we suggest three approaches that can be tested in future research. We also find that on average all IPOs subgroups are valued above the prevailing same industry and quarter median multiple, but as this result lies outside the research question this will not be further analyzed in the thesis. Finally, our data indicates that informal means of influence between a private equity organization and their portfolio companies drives the impact on the IPO valuation.

[3] For a qualitative and quantitative discussion on the validity of the results please review section 7.3

The application of Tobin's Q seems to have explanatory value in situations when first day returns do not provide significant results with regards to grandstanding and certification in relation to private equity and non-private equity-controlled companies going public. This adds a tool to the academic toolbox in line with the request by Cochrane (2011). Further, our thesis effectively combines the existing research on grandstanding, certification as well as the effects of certification in markets that have different levels of regulation. Hence, it provides further understanding on the choices made by private equity organizations when they are faced with the opportunity to take a company public. The above results indicate that private equity companies act in their own interest rather than in the interest of the limited partners when taking companies public. Further, as our second research question remains without a clear answer, a similar line of action cannot be ruled out when portfolio companies are taken public on less well-regulated markets. However, as our tests cannot provide evidence of causal relations, any indication should be carefully interpreted.

This introduction is followed by seven sections starting with section two outlining the theoretical foundation. This part focuses on the background of private equity and the role it plays for corporate governance, how value is generated, as well as how investments are entered and exited. Further, this section provides an introduction to information asymmetries and agency problems created when a private equity chooses to exit an investment through an initial public offering. Section three provides information on the regulatory context by outlining the various markets on which initial public offerings can be conducted in Sweden. Section four introduces the data and methodology used, establishing the choice of time period, region, industries, as well as public market selected. This is followed by a description of the variables used as well as the methodology applied. The descriptive statistics for the data sample are presented in section five. In section six the results from the t-tests and regressions are generated and commented. This is followed by a discussion around the interpretation of the results as well as a comparison between the usage of different dependent variables and proxies for our key control variable. The section also includes comments on the statistical robustness and validity of the results. The final section closes the thesis by offering concluding remarks, recommendations, and ideas for future research.

2. Theoretical foundation

2.1 Background to the private equity industry

In the end of the 1980s, Jensen (1989) described the rise of a new type of ownership structure, superior to the public corporation that had been prevalent over the past decades. The new organizational structure was distinctly different from the traditional structure as it used private and public debt as a major financing source rather than public equity, the ownership base was more compact, and the firms were monitored by managers incentivized through equity, hence, intrinsically motivated to manage the cash generated more prudently as well as work harder to create a successful company. This model, driven through leveraged buyout ("LBO") transactions by active investors, focusing on highly leveraged structures, and substantial pay-for-performance compensation proved beneficial in a number of industries where the public ownership structure was suboptimal. However, as the junk bond market crashed in the beginning of the 1990s the LBO marked went from focusing on public-to-private transactions to acquiring private firms. The shift of focus between public and private environments seems recurring and in their research Kaplan and Strömberg (2009) describes the disappearance and reappearance of these types of LBOs in relation to industry wide boom and bust cycles.

As described by Kaplan and Strömberg (2009), the organizations undertaking LBOs of private and public companies are often structured as general partnerships managing funds, in turn structured as limited partnerships. The limited partners, such as corporate and public pension funds, endowments, and insurance companies, commit the bulk of the capital to the fund which is normally a closed-end vehicle with a fixed lifespan. For managing the funds, the general partners are compensated through management fees, carried interest, and in some instances, deal and monitoring fees. The management fee is usually structured as an annual fee based on the capital committed and the carried interest is a share of the profits earned. Metrick and Yasuda (2010) describes the above fee structures and finds that approximately two-thirds of general partnership revenues comes from the fixed components, namely management fees, and one-third from variable-revenue components. As suggested by Gompers and Lerner (1999), compensation is a delicate matter as it is the only way a limited partner can discipline the general partners. Direct involvement in the activities of the fund is not in line with the regulations of limited partnerships and removal of a general partner may therefore be both hard and costly. Their research further establish that younger general partnerships are motivated

through gaining reputation leading to less variable compensation while older firms receive a higher share of variable compensation, linked to performance.

2.2 Entry and value generation

It is the responsibility of the general partners to deploy the capital committed by the limited partners in order to generate returns. The capital is deployed through transactions such as the LBOs described above and Kaplan and Strömberg (2009) notes that the leverage used can equal an amount in excess of 60 percent of the total transaction value. At this point, the entry, the organizational form of companies taken private unveils values hidden in the public structure. Jensen (1989) notes that significant LBO premiums are offered. The new owner can redeem this value through financial and governance engineering undertaken throughout the holding period with the goal of generating structural improvements and a higher value. Kaplan and Strömberg (2009) note that while financial and governance engineering has been prevalent since at least the 1980s, operational engineering has become more prevalent when general partners reorganize the acquired company to unlock value. Hence, they include this third type of value engineering. Below follows a summary of the three types of engineering applied according to their research.

2.2.1 Financial engineering

Financial engineering is recognized as a skill among private equity professionals responsible for the deal making. The added leverage creates both potential for higher returns on investments as well as incentives for management to limit excessive spending. This leads to less resources wasted as managers are pushed to manage available free cash flow well. Further, interest may also be a tax-deductible expense leading to an increase in firm value, however, excessive leverage could also lead to lower values as free cash flow may be used to pay high interest expenses, limiting the management flexibility to spend on profitable projects and the risk of distress (Kaplan and Strömberg, 2009).

2.2.2 Governance engineering

Kaplan (1989a, b) and Jensen (1989) notes that private equity firms incentivize management of their portfolio companies by tying them through individual investments. These investments have potential of significant upside value. Further they note that management ownership as a percentage of the total ownership is significantly larger in companies after they are taken private by a financial sponsor, such as private equity firms. However, as the potential value development is tied to the performance of the firm it is normally only realized in connection

with the exit of the financial sponsor. The holding is therefore considered illiquid, encouraging loyalty and discouraging short-termism on behalf of management. Kaplan and Strömberg (2009) further deducted that the historical results were still robust and that management incentive schemes are still of essence when governing financial sponsor backed companies.

Governance of firms is also influenced through the board of the portfolio company. Acharya and Kehoe (2009) notes that the boards of private equity portfolio companies are smaller but meet more regularly, increasing efficiency. Their findings are furthered by the notion that financial sponsors also contribute through informal channels as well as their less sensitive approach to replacing management if necessary.

2.2.3 Operational engineering

In addition to the financial and governance engineering, being the value levers private equities have used historically (Jensen, 1989; Kaplan 1989a, b), Kaplan and Strömberg (2009) argue that another value lever has been added: operational engineering. As private equity firms have become more focused around industries in which they build expertise, further focus has gone into using this knowledge to create value by improving the operations of the portfolio company. This includes the practice of establishing and implementing value creation plans, which may include cost-cutting, productivity opportunities, strategic changes, or repositioning. This has led to private equity organizations tying industry experts to their structures as well as a shift in strategy when procuring human resources. In addition to professionals with strong skills in financial engineering, private equities nowadays recruit professionals with operating backgrounds to complement the existing organization.

2.3 Exit of a holding

The closed ended characteristic of the capital committed to the fund managed by the general partnership means an exit phase is a natural part of the holding period. Kaplan and Strömberg (2009) identify six types of exits: bankruptcy, an initial public offering, sale to a strategic buyer, a secondary buyout, a sale to an LBO-backed firm and sale to management. All of the above exit strategies include interesting characteristics but as the scope of this thesis is limited to initial public offerings the following sections will henceforth focus on characteristics in relation to this type of exit.

2.3.1 Information asymmetries in IPOs

When financing growth opportunities and further expansions, IPOs offer an important source of capital (Boulton et al., 2017). However, in processes such as IPOs, insiders and outsiders

have access to different quantity and quality of information. Akerlof (1970) describes this issue of information asymmetry. At the time of an offering, insiders and outsiders hold different sets of information concerning the value of what is on offer. This creates and increases the risk of an informationally induced standoff. At its extreme, this standoff may result in a market failure where trade will not take place. However, this information asymmetry may be partially mitigated in a number of ways, which in turn leave buyers more comfortable with the information acquired and less concerned about adverse information. This increases the price of the asset on offer. Below two such ways of mitigating information asymmetries will be addressed.

2.3.1.1 Signaling

In line with the research by Allen & Faulhaber (1989), it can be assumed that the best information regarding the firm is held by the firm itself. In some cases, such as an initial public offering, high quality firms would like to share this information with outsiders. For high quality firms this can be done through underpricing as the loss is believed to be recouped for these firms at subsequent offerings. Hence, high quality firms use underpricing as a tool to signal quality (Allen & Faulhaber, 1989). While high-quality firms would recoup the value lost by underpricing later, low value firms acting in a similar fashion risk being exposed. In this case, the underpricing incurred would be a cost of imitation (Grinblatt & Hwang, 1989; Welch, 1989). However, as can be seen in the example above, signaling is the practice in which insiders unilaterally disclose information through actions taken on its own part, making it possible for low-quality firms to imitate the actions of high-quality firms. Hence, the information may be subject to debate for a number of reasons. One such reason is that insiders may have a limited downside but a large upside at the time of the IPO. Stated in economic terms, if the perceived cost of misleading investors is lower than the perceived benefit of not misleading investors the risk of signaling failure may arise. Such practices include the situation when an insider is an infrequent issuer of securities, hence unlikely to be punished for misleading behavior in the long run. Another situation would be the situation where an issuer is able to sell the equities in the same company at multiple occasions with different timings (Gale & Stiglitz, 1989). The occurrence of such practices is unfortunate and distorts the effectiveness of the signaling mechanisms in an IPO process. In turn, this calls for third-party certification. By introducing third party certification, for which the third party holds reputational capital which is put at stake in relation to the offering of a security, it is possible to certify the quality of the offering. In the case the information presented regarding the security on offer proves false, the third-party

certifying agent, will be adversely affected (Megginson & Weiss, 1991). Third party certifying agents include participants such as underwriters, legal advisors or Big 4 audit firms.

2.3.1.2 Certification

Third-party specialists act as agents able to certify value and quality of securities being listed and traded on the capital markets. The formal certification hypothesis was developed by Booth and Smith (1986) and the issues are often characterized as follows: information is asymmetric with insiders such as owners and management holding a more comprehensive set of information, while outsiders such as public investors hold limited information. Further, the information held by outsiders is often both prepared and presented by the insiders. The area of third-party certification has been complemented by later research on the certifying capabilities of underwriters (Carter & Manaster, 1990), auditors (Menon & Williams, 1991), legal advisors (Moran & Pandes, 2019) and venture capitalists (Megginson & Weiss, 1991) as well as the regulatory environment in which the initial public offering is undertaken (Duong et al., 2021). In the following sections the power of certification of different agents will be described in more detail.

Underwriters, lawyers, and auditors as certifying agents

Rock (1986) presents a model for underpricing on initial public offerings in which he suggests that the issuer must discount shares on offer in order to guarantee purchases made by uninformed investors in the issue. The discount is due to the risk associated with the offering, which can be decreased through the usage of a prestigious underwriter with high reputational capital at stake (Carter and Manaster, 1990). In essence, the occurrence of a more prestigious underwriter in relation to the offering should lead to less underpricing and lower returns. Further, in order for prestigious investment banks to underwrite the offering the financials need to be audited. Prestigious investment banks along with the issuing party have a preference for more credible auditors. Issuers making a change in auditor ahead of the initial public offering predominantly do so from a local auditor to an auditor associated with more credibility and this has also been found to lower underwriter fees (Menon & Williams, 1991). Similarly, elite law firms provide certification leading to a lower first-day return as they limit the risk of litigations as well as convey a lack of conflicts of interest between the issuer and the elite law firm that has been engaged (Moran & Pandes, 2019).

Financial sponsors as certifying agents

In 1991, Megginson and Weiss related the presence of venture capitalists as owners of firms going public to the certification universe. In their research they examined the impact of venture capitalist presence on the certification of the offering price. In order to be believable, they note, third-party certification needs to pass three tests. Firstly, the certifying agent must have reputational capital at stake which it risks losing if the information provided proves to be wrong. Secondly, the value of the agent's reputational capital must be greater than the largest possible one-time wealth transfer or side-payment which could be obtained by certifying falsely. Finally, it must be costly for the issuing firm to purchase the services of the certifying agent, and the cost must be an increasing function of the scope and potential importance of the information asymmetry regarding intrinsic firm value. They further argue that VC firms pass all three tests and that the Venture Capital backing does not only contribute with certification but also have other positive effects in the IPO phase of the company's lifecycle. Firstly, they find that it maximizes the fraction of the proceeds of the IPO, net of underpricing and direct costs, which accrues to the issuing firm as it reduces the mean and median degree of underpricing and the underwriting spread charged by investment bankers. Secondly, Venture Capital backed firms are able to attract more prominent auditors and underwriters compared to non-Venture Capital backed issuers. Thirdly, institutional investors become more interested in the issue. Finally, it improves the ability of the issuing firm to go public at a younger age. In addition to the above findings, they find that the credibility of the information communicated is enhanced if the venture capital firm is a major shareholder ahead of the issue and retains a significant portion of their holding after the issue.

Market manipulation and listing rules as certifying agents

Certification can also be achieved by listing the company on a more well-regulated market as examined by Duong et al. (2021). Their sample includes IPOs on a global scale through which they investigate the impact of market manipulation trading rules. The risk of irregularities and manipulative conduct throughout the IPO is increased due to information asymmetries (Ritter, 2011) which in turn leads to underperformance in the long term (Hao, 2007). It also affects underpricing, and it is found that underpricing hurts issuing firms and owners across the globe as it leads to significant costs. However, in markets with more stringent rules on market manipulation it is found that IPO underpricing is mitigated. An example of this lower

underpricing is in the European Union where MiFiD has been implemented.[4] Further, they provide evidence that underpricing is mitigated in regions where shareholder protection is stronger and in situations where third-party certification (such as venture capital backing, underwriter, and auditor reputation) is prevalent (Duong et al., 2021).

2.3.2 Grandstanding

In 1989, Diamond indicated that equity and debt capital markets were better accessed by parties with a better reputation, hence, suggesting the importance of a good track-record. A market participant with limited reputational capital, such as firms with limited history, would have incentives to select projects with a higher risk. However, as time passes reputational capital increases, and the incentives are improved.

Later research has found similar patterns among funds perceived as high performing. Examples of this is that mutual funds tend to alter the riskiness of the portfolio at the time of an upcoming performance review (Chevalier & Ellison, 1997) and on evidence of consumers reactions to recent performance (Sirri & Tufano, 1998). According to their research, recent high performance can also have an exponential effect when combined with marketing and media attention as this lower the consumer's cost of searching. Sahlman (1990) establishes that a majority of returns from venture capital investments by limited partners come from companies that go public at some point. As limited partner insight is restricted (to some extent by the law), this is a highly accessible way for limited partners to gain insight in the performance of the management company. Hence, IPOs act as a good proxy for performance and earlier IPOs signal good performance. The following reasoning can be deducted: limited partners should be more willing to invest in venture capital funds that take their portfolio companies public as this should imply that the firms managing these funds are more successful, consistent with the grandstanding hypothesis, suggested by Gompers (1996). The hypothesis offers further explanations and motivations for why and how venture capital firms take portfolio companies public (Gompers, 1996).

Venture capital firms will have incentives to list portfolio companies with a higher underpricing and that are younger at the initial public offering. Even though older firms should have a longer track-record, reducing asymmetric information and underpricing (Rock, 1986), Gompers (1996) finds that venture capitalists do not fully comply with these facts when listing companies. According to his research this is due to the effect of the initial public offering on

[4] The Markets in Financial Instruments Directive (MiFID) is a European regulation that increases the transparency across the European Union's financial markets and standardizes the regulatory disclosures required for firms operating in the European Union.

the venture capital firm's ability to raise capital and follow-on funds. Due to the structure of the incentive schemes, usually a fixed fee and a variable fee based on the funds profits as described above, the venture capital is incentivized to raise larger follow-on funds. Hence, strong performance, signaled through initial public offerings, will lead to increased profits in turn increasing the incentives for grandstanding. These actions are further emphasized in organizations lacking reputational capital, such as newly established venture capital firms. Therefore, these firms hold portfolio companies for a shorter period of time, have smaller equity stakes at the time of the offering and plan the initial public offering so it is closer in time to future capital raisings. Further, the marginal utility of another initial public offering should be diminishing, meaning that the first initial public offering is very important and attract relatively more new capital to a young firm compared to later initial public offerings conducted by more mature venture capital firms. As grandstanding is associated with higher underpricing, it is a real loss for the investor as wealth is transferred from the existing owner to the new which is an agency issue with an adverse effect on limited partner returns (Gompers, 1996).

2.4 Summary of the theoretical foundation

The private equity fund structure usually comprises of general partners managing funds, committed by limited partners, through a management company. Through its model of operation, private equity ownership has acted as a catalyst for increasing company performance over the last decades with value being driven mainly through three levers: financial, governance and operational engineering. However, the structure and limited insight given to limited partners creates agency problems. The conflicts of interest can be mitigated through contractual tools, such as the fee structure, but also through the generation of reputational capital. Further, due to restricted insight limited partners interpret proxies that indicate good performance in order to evaluate the general partners. In general, initial public offerings function as a good indicator of performance which is regularly used as a tool by private equities when they exit portfolio companies. Unfortunately, initial public offerings are not free from frictions and underpricing has been found to signal high-quality companies but may be associated with a real loss of investor wealth. The level of underpricing may be controlled through third-party certification provided by elements such as underwriters, auditors, lawyers, regulatory environment or private equity ownership. Hence, private equity ownership should serve to minimize the underpricing at issue, but further complexity is added as the general partners want to provide evidence of good performance. Combined with the effects of limited oversight this may lead to grandstanding, the practice of adverse actions such as taking a

company public too early, before the value engineering is complete, or securing a successful initial public offering through activities increasing the underpricing. Consequently, two effects working in different directions, may have an impact on initial public offerings. Firstly, the improved governance, operating and financial structure of the company, provided through the value engineering initiated by the private equity owner should certify the company, decreasing the underpricing. Secondly, the general partners have a need to secure future funds to grow their practice leading to opportunistic behavior such as earlier listings, in turn increasing underpricing.

2.5 Research questions

As described in section two, third-party agents can verify the quality and accuracy shared by insiders at the time of an initial public offering. This functions to mitigate information asymmetries between investors and the issuing firm. With more reliable indicators of quality, the more likely investors are to be able to single out good initial public offerings from bad which leads to less risk associated with the investment and therefore a valuation suffering a lower discount. As owners taking a portfolio company public, private equity organizations have been shown to provide certification as they have reputational capital at stake (certification theory). However, on the other hand, research also indicates that private equity organizations act opportunistically by taking companies public too early in their life cycle in order to support their funding activities. This action increases underpricing, indicating a lower valuation at the initial public offering, and leads to real wealth losses for limited partners (grandstanding theory). To explore this tension our first research question is formulated:

Is there a difference in company valuation at the time of the initial public offering depending on if the owner is recognized as a private equity organization?

Research also shows that, similarly to private equity ownership, more stringent regulation provide certification to an issue. Therefore, the choice to take a company public on more well-regulated markets should decrease discounts due to less information asymmetries, leading to higher initial valuations, and in turn limiting underpricing. To our best knowledge, there is no research implying that grandstanding behavior, as discussed above, should be different depending on the regulatory context. It could therefore be hypothesized that the certification from private equity presence may be *more potent* when the market is less well-regulated. Followingly, our second research question is formulated:

If research question 1 is confirmed, is a certifying effect of private equity ownership more pronounced when companies are taken public on a less well-regulated exchange?

3. Regulatory setting

The following section outlines the regulatory setting in which the research questions will be addressed.

In Sweden there are two regulated markets ("Regulated markets") on which it is possible to list equities: Nasdaq Stockholm (here including Large Cap, Mid Cap and Small Cap but excluding First North) and NGM Equity, as well as three multilateral trading facilities ("MTFs"): First North, NGM SME and Spotlight. The markets differ widely, both on characteristics and listing requirements. Out of 942 listed companies (as of 31 March 2021), 72% (678) are floated on lists run by Nasdaq, 11% (100) are floated on lists run by NGM and 17% (164) are floated on Spotlight. The Main markets (Large Cap, Mid Cap and Small Cap) require financials going back at least three years, a market cap size of SEK 10 million, a free float of at least 25% and a sufficient number of shareholders. This can be compared with NGM Equity and NGM SME only requiring a minimum of two years of historical financials but a minimum market cap size of SEK 25 million as well as a Free float of at least 10% and a minimum of 300 shareholders. Spotlight matches the NGM lists on all points mentioned except minimum market cap where it, along with First North, does not have any requirements. First North does not have any requirements with regards to historical financials or minimum market cap, however, the multilateral trading facility requires a 10% free float, in line with the other Alternative markets, and a sufficient number of shareholders, in line with the Main markets.

The Regulated markets hold certification requirements in common. Reporting should be according to IFRS and ahead of an initial public offering a legal review, a stock exchange audit and an approval from the Swedish Financial Supervisory Authority is required. For listing on the MTFs, the financials need to be in accordance with local GAAP and no legal review, stock exchange audit or approval from the Swedish Financial Supervisory Authority is required[5]. However, on First North the listing company needs to hire a Certified Advisor and on NGM SME the listing company needs to hire a Mentor. The role of the Certified Advisor/Mentor is to ensure the company is reporting in line with the requirements of the list. For a summary of the exchange characteristics, please refer to Table A1 in the appendix.

[5] It should be noted that "Prospektskyldighet" is not required on multilateral trading facilities as long as a listing and offering does not occur simultaneously. The offering should also be below EUR 2.5 million and the number of unqualified investors should be below 150.

4. Data and methodology

4.1 Data collection

The IPO data sample includes a total of 334 observations conducted on the Swedish regulated exchanges and multilateral trading facilities. These trading platforms are Nasdaq Stockholm Large Cap ("Large Cap"), Nasdaq Stockholm Mid Cap ("Mid Cap"), Nasdaq Stockholm Small Cap ("Small Cap"), Nasdaq First North ("First North"), Nordic Growth Market Main Regulated Equity ("NGM Equity"), Nordic Growth Market Nordic SME ("NGM SME") and Spotlight (previously known as Aktietorget). Hereafter, when referred to collectively, Large Cap, Mid Cap and Small Cap will be referred to as "Main markets", while First North, NGM Equity, NGM SME and Spotlight will be referred to as the "Alternative markets", and all mentioned regulated exchanges and multilateral trading facilities will be referred to as the "Swedish lists". The IPOs have been conducted during the time period starting on January 1, 2015 until March 31, 2021.

Data on initial public offerings has been collected from Thomson Reuters Datastream ("Datastream") and S&P Capital IQ. However, in order to ensure accuracy and quality of the dataset, especially for initial public offerings outside the Main markets, data has been sourced and audited manually. The majority of the manually sourced data comes from the applicable offering documentation, such as prospectuses and information memorandums. Documentation on initial public offerings has been sourced from the company website or the Swedish Financial Supervisory Authority. The data gathering was completed in four steps of which the first was to find the total number of companies listed on the Swedish lists during the sample period. The second step was to eliminate companies with a date of initial public offering outside of the specified time period. Thirdly, company specific and financial data was added to the remaining companies both using the databases and manual sourcing. The final step was to manually audit the data and complement missing or faulty data. The total number of initial public offerings included in the data set for the sample period is 476. However, in line with previous research (e.g., Mitton & O'Connor, 2010; Duong et al., 2021) companies within the real estate and the financial sector (62) are excluded from the sample leading to a sample of 414 initial public offerings. Moreover, IPOs with missing initial public offering documentation have also been excluded, leading to a further reduction of 80 IPOs. The final data set comprises of 334 IPOs. Additional to the data on individual IPOs, financial data for all companies listed throughout the sample period have been collected through Datastream, as well as market data on gross

domestic product and the total market capitalization of all traded companies, collected through Statistics Sweden.

4.1.1 Choice of region, time period, and industries

The Swedish market was chosen due to the availability of market information through published initial public offering documentation. Further, the geography of choice was also limited by the language proficiency of the authors of this thesis. As documentation for initial public offerings at many times are limited to the local language, especially on lists considered alternative, and the sample require manually sourced and audited data this language barrier could have included a bias towards more well documented initial public offerings in the dataset. The time period of 6.25 years (2015 – 2021Q1) was chosen due to availability of data. As Swedish lists require companies to keep documentation public through their website for 5 years, prospectuses older than 5 years are thus not readily available. However, to further expand the sample size, initial public offerings from 2015 have also been included. IPO prospectuses are often made available through the Swedish Financial Supervisory Authority or the companies' websites. Further, all companies have been included in one of six industries: consumer ("CODIS"), financials ("FINAN"), healthcare ("HLTHC"), industrials ("INDUS"), real estate ("RLEST") and technology ("TECNO") as categorized in Datastream. As stated previously, real estate and financials have been excluded from the final sample in line with prior research. It should be noted that the primary industry classification sourced from Datastream included further industries: basic materials ("BMATR"), energy ("ENEGY"), telecom ("TELCM") and utilities ("UTILS") as well as a split between consumer discretionary and consumer staples. However, due to low number of observations in these industries, basic materials, energy, and utilities were included in industrials, telecom was included in technology and the consumer categories were merged to CODIS.

4.2 Variables

The following sections defines the dependent variable along with relevant regressors believed to further the understanding of the outcome in the dependent variable, in line with previous research. The section will also include an interpretation of each variable. In accordance with previous research all variables (not including dummies) have been winsorized at the top and bottom five percentile level, unless otherwise specified, in order to mitigate the effect of potential outliers. An analysis of multicollinearity has been undertaken. For further reference, please find table A2 in the appendix.

4.2.1 Dependent variable

Academia and practitioners are aligned in their view that enterprise value ("EV"), or related measures, are good measures for a company's total value as EV includes value claimed by both equity and debt holders. However, the prevalence and application of valuation multiples differ between the groups. A valuation multiple is normally expressed as the applicable value measure divided by an appropriate measure of earnings or assets (Ivashina & Boe, 2017). Although no perfect value measure exists, academics often use Tobin's Q which essentially is EV scaled by the book value of assets (e.g., Black et al., 2006; Mitton & O'Connor, 2010), whereas practitioners favor trading multiples such as EV scaled by EBITDA ("EV/EBITDA") (Ivashina & Boe, 2017). For academic comparability, and due to benefits of a larger sample size (less cumbersome data requirements than EV/EBITDA) this paper will focus on the Tobin's Q value relative as the main proxy for firm value.

Tobin's Q is defined below following Chung and Pruitt's (1994) approximation method, which has been shown to indicate at least 96.6% of the variability of the more data intensive method of Lindenberg and Ross' (1981). The advantage of using a more conservative method both in terms of data requirements and computational effort is twofold, firstly it will render a larger sample due to less missing values, and secondly, as Chung and Pruitt (1994) pointed out, the method developed by Lindenberg and Ross is theoretically cumbersome to such a degree that it sees virtually no application amongst industry practitioners. This approximation is also in line with previous literature investigating the effects of governance on firm value (Black et al., 2006; Mitton & O'Connor, 2010).

Tobin's Q is defined as:

$$\boldsymbol{Tobin's\ Q} = \ Q_{i,t} = \frac{MV(E)_i + PS_i + DEBT_i}{BV(A)_i}$$

Where:

$MV(E)_{i,} = \ Market\ value\ of\ equity\ for\ firm\ i$

$PS_i = Liquidating\ value\ of\ the\ preferred\ stock\ for\ firm\ i$

$DEBT_i = short\ term\ liab.net\ of\ short\ term\ assets, plus\ the\ book\ value\ of\ debt$

$BV(A)_i = \ book\ value\ of\ assets\ for\ firm\ i$

The applied MV(E) used to calculate Tobin's Q of each IPO has been based on the pre-money valuation as this should reflect the value of the operations of the company at the time of the initial public offering, which is the metric subject to issuer approval and investor access. As such, the number of outstanding shares ahead of the IPO, not including any newly issued shares used to raise cash, has been multiplied with the offering price. In the case of a price range the actual offering price has been used. If the data on the actual price was missing the midpoint of the initial price range was used, in line with Loughran and Ritter (2002).

Following the practice of previous literature employing regression techniques to infer differences in Tobin's Q between subgroups, the dependent variable will be a value relative constructed by scaling the valuation multiple of the firm by its relative benchmark (Mitton & O'Connor, 2010). As such, the valuation multiple of each IPO will be scaled by the median Tobin's Q multiple calculated on the basis of all companies traded within the same industry and quarter as the company being floated, creating a value relative.

The dependent variable based on Tobin's Q is defined as:

$$\boldsymbol{Tobin's\ Q\ value\ relative}: W\_Q\ = \frac{Q_{i,y,s}^{IPO}}{Q_{y,s,}^{MedIndustry}}$$

The same quarter-industry median multiple used for scaling the multiple of the IPO will hereafter be referred to as the "Industry multiple". A value relative greater than one indicates that the firm is valued above its same quarter-industry trading multiple.

For the Tobin's Q of the IPO, which is used in the numerator, we have pooled cross-sectional data across 334 observations. For each IPO the last reported accounting values ahead of the IPO as listed in the IPO prospectus has been used, and this also holds for any accounting value needed to compute the control variables listed in section 4.2.2.

For the industry multiples in the denominator, we have quarterly panel data during the sample period. For each quarter the end of the quarter market value of equity and last reported accounting book values were used to compile $Q_{y,s,}^{MedIndustry}$.

4.2.2 Control variables

The regressors introduced to explain the variance in the dependent variable follows prior literature (e.g., Megginson and Weiss, 1991; Black et al., 2006; Duong et al., 2021). For an overview of all variables, please refer to Table A3 in the appendix.

4.2.2.1 Private equity influence

Megginson and Weiss (1991) identify venture capitalists on the basis of the definition of the inside shareholder as stated in the prospectus. They also include shareholders for which the

name includes “venture”, “capital” or “investment company”. In contrast to this approach the scope of this thesis has been extended and aim to include all financial backers taking an active role in the governance of the holding[6]. In order to rule if the investor takes an active role each financial sponsor has manually been evaluated in the data collection process. The applicable criteria is that it should be clearly stated on the investor website if an active ownership model is applied on investments.

The data collection has generated five different tabulations of ownership characteristics, as depicted in Table 4.2.2.1a. However, as this thesis aspire to capture holdings in which the sponsor is not only active but also in a position to affect value driving levers, such as financial, governance and operating engineering, the variable “PE Controlled” has been generated as a dummy variable indicating if the financial sponsor holds a clear majority (the financial sponsor owns at least 50% of the shares) which will be the variable coefficient of interest in the result section.

Table 4.2.2.1a

Proxies for private equity influence

This table provides an overview of different variables measuring private equity influence.
No. Obs. <> 0 refers to the count of observations which are not zero

Variable	Type	No. Obs. <> 0	Description
PE Owned (D)	Dummy	132	Set=1 if any active PE-ownership
PE %-Shares Owned	Continous	132	Percentage of shares held by PE-sponsor before IPO
PE Controlled (D)	**Dummy**	**63**	**Set=1 PE-sponsor has at least 50% ownership**
PE Qualitative (D)	Dummy	49	Set=1 if PE Owned, and PE-company is part of SVCA
PE Boardmember Ratio	Continous	124	Ratio of board members not independent to PE-owner

4.2.2.2 Market variables

Market variables are included as the state of the economy changes over time, affecting the capital market development at the time of IPOs. In line with Duong et al. (2021) a control for the size of the market (“Market Size”) is included. This variable is measured as the ratio of the aggregated total market capitalization of stocks scaled by the same year GDP. Total market capitalization relative to the GDP address capital market development. The variable should increase when valuations increase faster than the gross domestic product. Hence, it is expected that the coefficient is positive.

[6] The terminology applied throughout this thesis for this type of investor is “private equity” or “PE”. We acknowledge this is a broad application as it may also include other types of investors that are not usually considered private equity investors.

4.2.2.3 Operational variables

Operational variables include controls for the growth in sales ("Sales Growth"), profitability ("Profitability"), turnover of assets ("Asset Turnover") as well as the size of the company at the time of the initial public offering ("IPO Size"). Sales growth has been defined as the full year revenues at the time of the initial public offering scaled by the full year revenues for the same period one year prior, minus one. For the treatment of missing and no sales growth data a dummy variable ("Missing Sales Growth") controlling for missing observations has been included in line with Black et al. (2006). This preserves the sample size. For profitability and asset turnover the treatment of Duong et al. (2021) is used. Profitability is defined as earnings before interest and taxes divided by the total assets, and asset turnover is defined as sales divided by the total assets of the IPO firm. Whereas Duong et al. (2021) use the natural logarithm on the book value of assets as a proxy for the size of the company, this paper uses the natural logarithm of the pre-money valuation as a proxy for size. This alteration was made because a pure asset-based size measure would be too similar to the Tobin's Q multiple construction which could lead to problems with simultaneity. An increase in profitability, asset turnover or sales growth should have a positive effect on valuation, hence, the coefficients are expected to be positive. Regarding IPO Size it can be hypothesized that small stocks have a historical tendency to outperform their larger counterparts, usually denoted as the size premium in the Fama & French (1992) three-factor model. This relationship was found in relation to stock price appreciation. Consequently, it can be deducted that the valuation should be depressed for smaller IPOs and then increase at a faster pace as the company grows, leading to higher returns. As such it is expected that the correlation between the size of the company and the IPO valuation is positive.

4.2.2.4 Governance variables

Megginson & Weiss (1991) documents that venture capital backed firms are able to go public at a younger age and Gompers (1996) suggests this practice is desirable as initial public offerings support fundraising activities. A variable controlling for the age of the company ("IPO Age") has therefore been included. Duong et al. (2021) found this variable to have a positive correlation with underpricing, it should therefore be negatively correlated with valuation. Further, governance is carried out through the board, why a variable on the number of board members of the firm ("No. Board Members") is included. A larger board could be expected to provide better oversight, but Acharya and Kehoe (2009) suggest the board composition of private equity owned entities is smaller but more engaged. As private equity

influence is controlled for separately the expectation is that the number of board members should be positively correlated with the valuation.

4.2.2.5 Financial variables

Leverage as defined by Duong et al. (2021), total debt over total assets, is used. However, as this variable uses total debt and total assets, data points also included in the Tobin's Q variable, the variable is applied as a dummy indicating no use of leverage ("No Leverage"), and a quartile split ("Leverage Quartile 1", "Leverage Quartile 2", "Leverage Quartile 3", Leverage Quartile 4"). In line with the findings of Black et al. (2006), the coefficients on the leverage dummies are expected to be increasingly positive with the amount of leverage.

4.2.2.6 Certification variables

In line with previous literature (e.g., Megginson & Weiss, 1991; Duong et al. 2021) dummies for certification, as measured by quality of advisors are included. Regressors include controls for qualitative underwriter[7] ("Qualitative Underwriter"), legal advisor ("Qualitative Legal Advisor")[8], or a "Big 4"[9] auditor ("Big 4 Auditor"). Further, a Main market dummy variable ("Main Market") has been included in line with the research by Duong et al. (2021). The variable is defined as one if the company is to be floated on a Main market and zero if it is to be floated on the Alternative markets. The reason Main market has been chosen over Regulated market is the low number of companies listed on NGM Equity, of which none have been listed during the sample period. Certification is expected to mitigate asymmetric information, aiding investors tasked with recognizing good and bad companies. This lowers the risk of the investment, decreases the underpricing, and increases the valuation. Hence, a positive correlation is expected for all certification variables in relation to firm value.

4.3 Methodology

Using the above variables, the methodology seeks to test the research questions at hand. This will be undertaken using t-tests, regression models, as well as the formulation of hypotheses, outlined in the following section.

[7] Qualitative underwriter is defined as an underwriter that is either recognized as an international bulge bracket investment bank by the Corporate Finance Institute, an associated member of Swedish Private Equity & Venture Capital Association ("SVCA") as of March 31, 2021 or recognized as a Swedish top performing bank by Kantar.
[8] Qualitative legal certification provider is defined as an associated member of the SVCA.
[9] Big 4 denotes the four largest auditing firms globally: EY, KPMG, PwC and Deloitte. The audit sector has undergone consolidation and other changes, why we use the "Big 4" definition whereas Megginson & Weiss (1991) used the "Big 8" definition for observations up until 1987 and "Big 6" thereafter.

4.3.1 Descriptive statistics and T-Test

The sample will be divided into a number of different subsamples, including market and ownership type. This division, along with a combination of the two, will be applied in order to identify potential differences in variable means between the groups. To analyze any potential significant difference and draw statistical inference related to the differences in variable means t-tests will be run. This will not only indicate statistical inference but also which regressors may be relevant to use in the regression model. The t-test applied is the Welch t-test for unequal variances[10]. As the t-test does not control for factors external to the variable at hand the results will be further explored with a multivariate regression model.

4.3.2 Regression

In the second part of the analysis a univariate and a multivariate regression model of the ordinary least squares ("OLS") estimator is implemented. This is a commonly applied method used in previous research related to valuation and initial public offerings (see Black et al, 2006; Mitton & O'Connor, 2010; Duong et al., 2021). The proposed regression design features a time and industry scaled value relative as the dependent variable, partly controlling for time and industry fixed-effects through the design. Vectors of controls will be added to control for cross-sectional variation across firms undergoing an initial public offering. The key coefficient of interest is a dummy variable indicating whether the IPO was PE-controlled or not.

We estimate the following main model:

$$\text{Tobin's Q Value Relative } = \frac{Q_{i,y,s}^{IPO}}{Q_{y,s,}^{MedIndustry}} \sim \alpha + \beta * PE\ Controlled + \gamma * X_i + \varepsilon$$

Here *i* indexes individual IPOs, *s* indexes industry and *y* indexes time by year and quarter. α, β and γ are regression coefficients, PE Controlled is a dummy variable indicating if a PE-sponsor held at least 50% of the shares ahead of the IPO. X_i is a vector of control variables based on five different categories Market Sentiment, Operational, Governance, Financial and Certification, and ε is the error term. Tobin's Q Value Relative is the dependent variable in line with the above description. The key coefficient of interest is β, which will help us draw inference about if there is a value premium or discount associated with the ownership structure at the time of the initial public offering. To explore the incremental effect of private equity ownership on firm valuation we begin by using a simple univariate OLS including only the variable approximating private equity control. Subsequently additional control variables are

[10] The Welch's t-test for unequal variances was decided upon based on the outcome of an F-test on equality of population variances applied on the dataset.

stepwise introduced. To help rule-out some non-causal explanations for the association between PE-ownership and the value relative sector-year dummies are introduced in the background to control for fixed-effects, which is in line with the method applied by Black et al. (2006).

4.4 Hypotheses

The certification theory implies that third-party specialists can act as agents in order to mitigate information asymmetries, normally present at the time of an initial public offering. This assurance limits the level of risk associated with the investment, limiting the underpricing. In turn, this indicate that the valuation at the initial public offering should be relatively higher due to the presence of a third-party certifier. In line with Megginson & Weiss (1991) an active owner, such as a venture capitalist, can provide this type of certification. Together this indicate that the valuation at the initial public offering should be relatively higher for PE-backed firms. However, on the other hand the grandstanding theory suggests that private equity owned companies should have a higher underpricing at the initial public offering leading to a lower valuation. There is no indication that the effect should be different depending on a Main or Alternative market setting. Hence, our first hypothesis is formulated as follows:

Private equity ownership has a significant effect on the valuation at the time of an initial public offering

(H0: PE Controlled is not significantly different from zero when comparing private equity backed and non-private equity backed initial public offerings)

The main research question of this thesis seeks to explore the difference in effect of private equity ownership on the valuation when comparing less well-regulated markets to more well-regulated markets. The findings of Duong et al. (2021) indicates that more well-regulated markets provide certification to the companies listing. Hence, the effect of private equity certification could be higher on less well-regulated markets where regulatory certification is lacking. Our second hypothesis is formulated:

There is a significant difference in effect of private equity ownership on the valuation when a company is taken public on a less well-regulated market compared to a more well-regulated market

(H0: PE Controlled is not significantly different from zero when comparing private equity backed initial public offerings on the Main and Alternative markets)

5. Summary statistics

This section gives an overview of the descriptive statistics for the sample data.

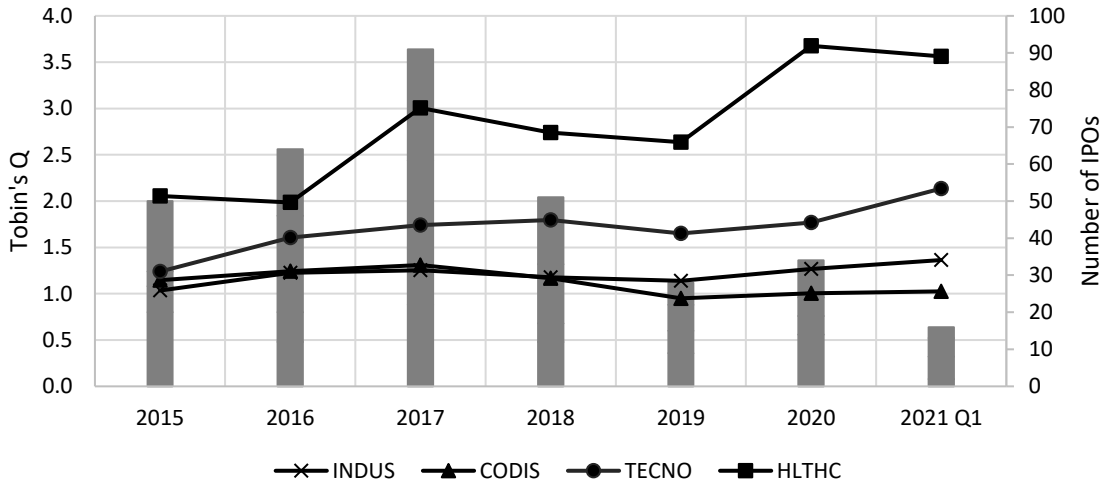
5.1 Data on the industry trading multiples

The development of the median Tobin's Q industry multiple is presented in figure 5.1a.

Figure 5.1a

Tobin's Q Trading Industry Multiples

The left-hand side denotes the evolution of the industry multiple whereas the right-hand side denotes the annual number of initial public offerings included in the sample. Lines refer to trading multiples per industry, whereas bars refer to number of IPOs



It is evident that the four different sectors trade at different multiples. The healthcare and technology sectors trade at multiples above those of the industrials and consumer discretionary sectors. This is expected as firms within the technology and healthcare universe are comparatively asset light with a relatively larger share of value coming from off-balance sheet assets rather than assets reflected on the balance sheet, which is the denominator of Tobin's Q. It is also apparent that the healthcare and technology sectors have experienced increasing relative valuations during the sample period. Healthcare, being the sector with the highest valuation, has since 2015 developed from a relative valuation of 2.1x to 3.6x the book value of assets and Technology has increased from 1.2x to 2.1x the book value of assets. The multiple of Consumer, exhibiting the lowest relative valuation as of March 31, 2021, has dropped slightly during the period while Industrials, which started out the period as the lowest multiple, has grown from just above 1.0x to slightly below 1.5x. The evolution of sector multiples

throughout the period demonstrates the benefit of constructing the dependent variable by scaling the company's Tobin's Q with the applicable industry and quarter trading multiple. This help neutralize differences in sentiment and industry cross-variation.

Similarly to the industry multiples, the number of IPOs increased from 2015 until 2017 with a sample period maximum of 91 initial public offerings in 2017. During 2018 and 2019 the number of initial public offerings declined, and a sample period minimum was reached at 28 initial public offerings in 2019. In 2020, despite the effect of COVID-19, the number of initial public offerings increased to 34. The development for 2018 and 2019 was in line with the development for industry multiples with the slight difference that the technology industry multiple continued to see positive development into 2018. Two things are worth noting. Firstly, 2021 only accounts for initial public offerings conducted up until March 31, 2021. Secondly, due to the pre-defined initial public offerings and sector criteria laid out in this paper and data availability the number of initial public offerings does not represent the entire Swedish universe of initial public offerings during the period.

5.2 Initial public offering data

Descriptive statistics is presented for all initial public offerings in table 5.2a and 5.2b. As we explore the effect of private equity backing in relation to all initial public offerings and its effect in different regulatory contexts, descriptive statistics for private equity backed companies and non-private equity backed companies as well as private equity backed initial public offerings on the Main and Alternative market are included in the appendix (see Table A4 to A11).

Table 5.2a

Descriptive statistics - All IPOs

This table includes aggregated data for all observations and defined continuous variables.

Variable	Number of IPOs	Mean	Median	Minimum	Maximum	Std. Dev.
Tobin's Q Value Relative	334	2.611	1.777	0.297	13.604	2.308
Market Size	334	1.482	1.452	1.265	1.878	0.161
Sales Growth	334	0.910	0.274	-0.518	7.270	1.896
Profitability	334	-0.233	-0.111	-1.369	0.239	0.415
Asset Turnover	334	0.759	0.492	0.000	2.513	0.749
IPO Size	334	5.101	4.624	2.370	11.556	1.661
IPO Age	334	2.350	2.303	0.000	5.030	0.912
No. Board Members	334	5.249	5.000	3.000	10.000	1.325

Tobin's Q Value Relative

The Tobin's Q Value Relative mean is 2.611 for the full sample. This indicates that on average a company listing is valued at 2.611 times the trading industry multiple. Private equity-controlled companies exhibit a lower sample mean while non-private equity-controlled

companies exhibit a higher sample mean. The lower mean of private equity-controlled companies is driven by an even lower sample mean for private equity backed companies listing on the Main market. Interestingly, the highest sample mean found is for private equity backed companies listing on the Alternative markets. For all subsamples, the sample median is lower than the mean indicating a positive skewness. A pattern of relatively higher means for PE-backed IPOs on the alternative market can be identified and will be explored below in relation to the other variables.

Market Size

The market size is 1.482 at the time of the average initial public offerings in our dataset. The subsample market size means indicate the same pattern as the mean for Tobin's Q. This is also indicated for the subsample medians.

Sales Growth

The growth in sales for the average company in the year leading up to the initial public offering is 0.851 (85.1%). The variable provides the same suggested pattern as Tobin's Q and market size for the subsamples, and this is also suggested with regards to the subsample medians.

Profitability

Profitability is negative on average for all subsamples, however, the suggested pattern seen in the previous three variables still holds, only inverse. The full sample mean is -0.233 (-23.3%) with private equity-controlled companies having a less negative mean and non-private equity-controlled companies having a more negative mean. Private equity-controlled companies listing on the Main market are on average the subsample with the least negative profitability, while the same subsample on Alternative markets holds the most negative profitability. Compared to the other variables, the inverted pattern is also suggested for subsamples medians in relation to the subsample means indicating a negative skewness.

Asset Turnover

Asset turnover subsample means suggests a reversed pattern compared to Tobin's Q, market size and sales growth. The full sample mean is 0.759, with the private equity-controlled sample holding a higher mean and non-private equity-controlled holding a lower mean. Private equity-controlled companies listing on the Main market have the highest asset turnover on average while the ones on the Alternative market have the lowest means for our sample. The potential skewness indicated in the subsamples differs as the median for the full sample, the non-private

equity-controlled, and private equity controlled on the Alternative market are below the mean. For the other subsamples, the relationship is reversed.

IPO Size and Age

The variables for IPO size and IPO age are logarithmic, hence, the numbers presented in the tables should not be interpreted as the actual size and age for the observation at the time of the initial public offering. However, the maximum and minimum pre-money initial public offering values are SEK 104.4 billion and SEK 10.7 million. The maximum and minimum number of years a company has operated at the initial public offering in the sample are 152 and 0. IPO size mean is higher for the private equity controlled and private equity-controlled listed on the Main market subsamples than for the full sample. For the other subsamples, the average is below the full sample average. It is only the non-private equity-controlled subsample that indicates a lower average age than the full subsample. IPO size median are lower than the means for all subsamples except the private equity-controlled subsample. For IPO age all subsample medians are lower than the mean except for the non-private equity-controlled subsample.

Number of Board Members

In our sample no board exceed ten board members or go below three. The number of board members must be a positive integer, hence the exact minimum, maximum and median are not surprising. Further, no board should go below a certain threshold as there are regulations on the number of members a board must have. The full sample mean is 5.249 members. The means suggested for non-private equity-controlled companies and private equity-controlled companies listed on an Alternative exchange are lower than the full sample mean. The other groups have higher means relative to the total sample. Only private equity-controlled companies are suggested to have a median higher than the mean.

Dummy variables (D)

In table 5.2b the descriptive statistics for dummy variables are presented. From this table it is possible to deduct that 63 companies (18.9% of the sample) were private equity controlled, 48 (14.4%) companies had zero sales growth at the initial public offering, and 30 (9.0%) of the listed firms used zero leverage, while 304 (91.2%) were leveraged to some extent[11]. A qualified underwriter was used by 68 (20.4%) of the issuers, a qualified legal advisor was used by 136

[11]As expected, table 5.2b showcases an even distribution of levered firms due to the quartile split.

(40.7%) of the issuers and a Big 4 auditor was used by 195 (58.4%) of the issuers. Out of the 334 companies, only 64 (19.2%) were floated on the Main market.

Table 5.2b

Descriptive statistics - All IPOs

This table includes aggregated data for all observations and defined dummy variables.

Variable	Number of IPOs	Observations equal to 1	*Observations as % of total*	Std. Dev.
PE Controlled (D)	334	63	*18.9%*	0.392
Missing Sales Growth (D)	334	48	*14.4%*	0.351
No Leverage (D)	334	30	*9.0%*	0.286
Leverage Quartile 1 (D)	334	76	*22.8%*	0.420
Leverage Quartile 2 (D)	334	76	*22.8%*	0.420
Leverage Quartile 3 (D)	334	76	*22.8%*	0.420
Leverage Quartile 4 (D)	334	76	*22.8%*	0.420
Qualitative Underwriter (D)	334	68	*20.4%*	0.403
Qualitative Legal Advisor (D)	334	136	*40.7%*	0.492
Big 4 Auditor (D)	334	195	*58.4%*	0.494
Main Market (D)	334	64	*19.2%*	0.394

6. Results

In this section we start by testing the difference in subsample means in order to establish if the differences in means found in the summary statistics are in fact significant. As our research questions and hypotheses revolves around the impact of private equity control on the valuation at the initial public offering and the impact of regulatory environment in relation to the private equity control, we use a t-test on the differences between private equity controlled and non-private equity-controlled variable means as well as on the variable mean differences of private equity-controlled companies listed on the Main and Alternative market. We will also use a multivariate regression, in line with the methodology described in section four, to test if any potential significance is robust when introducing control variables.

6.1 T-test for differences in means between subsamples

6.1.1 Effect of controlling owner

In section five it was found that subsample means differed depending on if the company was private equity controlled at the time of the initial public offering. In table 6.1a these differences are scrutinized, and the results indicate that the difference in Tobin's Q differs depending on the ownership structure at the 5% significance level. Further, for the variables IPO size, IPO age and the number of board members the results suggest that private equity-controlled companies have a larger size, higher age, and an increased number of board members at the 1% significance level. No significant differences are indicated for the variables market size, sales growth, profitability, and asset turnover. However, as a potential difference in valuation is detected in line with our first hypothesis we will test if the significance is robust when control variables are introduced through a multivariate regression model.

Table 6.1a

T-test - PE controlled vs. Non-PE controlled

This table uses a t-test to compare the variable means of companies, owned by a financial sponsor holding at least 50% of the shares and those not held by such an owner, at the time of the IPO.

Variable	PE Controlled mean	Non-PE Controlled mean	Difference	Standard Error	T-stat	Observations
Tobin's Q Value Relative	2.118	2.726	0.608**	0.275	2.213	334
Market Size	1.477	1.483	0.006	0.024	0.255	334
Sales Growth	0.851	0.923	0.073	0.257	0.283	334
Profitability	-0.176	-0.247	-0.070	0.063	-1.110	334
Asset Turnover	0.840	0.740	-0.100	0.092	-1.089	334
IPO Size	6.933	4.676	-2.258***	0.204	-11.070	334
IPO Age	3.014	2.195	-0.819***	0.123	-6.642	334
No. Board Members	6.238	5.018	-1.220***	0.211	-5.774	334

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

6.1.2 Effect of regulatory environment on private equity-controlled companies

Out of the subsamples presented in section five, private equity-controlled companies floated on the Main market and the Alternative market indicated the maximum and minimum means for Tobin's Q, market size, sales growth, profitability, and asset turnover. Hence for these variables the largest differences were suggested. From table 6.1b it is suggested that Tobin's Q, profitability, and asset turnover are significantly different at the 5% significance level. Whereas the results indicate a higher Tobin's Q in relation to the industry multiple for private equity-controlled companies listed on the Alternative market, it is suggested that these companies have a lower profitability and a lower asset turnover. The results also point towards companies on the Main market being larger, older, and having more board members as these variables are significant at the 1% significance level. No significance is found for market size and sales growth. Similar to the results in table 6.1a, Tobin's Q indicate a difference in valuation in line with our second hypotheses. Hence, to further explore this relationship we will later use a multivariate regression model to test if the difference in Tobin's Q is robust when control variables are introduced.

Table 6.1b

T-test - PE controlled on Main market vs. Alternative market

This table uses a t-test to compare the variable means of companies, owned by a financial sponsor holding at least 50% of the shares, at the time of the IPO on the Main markets vs. the Alternative Market.

Variable	PE Cont. & Main market mean	PE Cont. & Alt. market mean	Difference	Standard Error	T-stat	Observations
Tobin's Q Value Relative	1.655	2.870	1.215**	0.516	2.356	63
Market Size	1.449	1.522	0.073	0.049	1.503	63
Sales Growth	0.607	1.247	0.640	0.523	1.224	63
Profitability	-0.073	-0.345	-0.272**	0.121	-2.244	63
Asset Turnover	0.997	0.586	-0.412**	0.163	-2.518	63
IPO Size	7.722	5.652	-2.069***	0.316	-6.545	63
IPO Age	3.281	2.581	-0.700***	0.219	-3.198	63
No. Board Members	6.872	5.208	-1.663***	0.327	-5.094	63

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

It should be noted that the effects suggested in table 6.1b could be due to underlying differences between *any* initial public offering on the Main and Alternative markets. In line with this notion a t-test was conducted, testing the differences in the variables between all firms in our sample listed on the Main and Alternative market. The results were similar to the results suggested in table 6.1b. However, for Tobin's Q, profitability, and asset turnover the differences were significant at the 1% significance level. In line with these results, the effects of introducing the Main market dummy in the regression will be of great interest to explore if the difference between the type of owner is robust controlling for the listing market. For an overview of the t-test on all IPOs split on the two lists, please refer to table A12 in the appendix.

6.2 Regression Results

6.2.1 Effect of controlling owner

Table 6.2a presents the first regression. In this regression the key coefficient of interest, private equity control is negative and significant through all specifications suggesting that PE-ownership indeed has an incremental effect on the valuation of IPO-firms. Starting with the univariate regression, we find that the significance level at 10% differs from the significance level of the t-test which was at 5%. This is due to the differing assumptions introduced when applying a Welch's t-test for unequal variances and the OLS regression. Using a Student's t-test a significance level in line with the 10% significance level in the OLS is suggested. We recognize this effect of differing assumptions but choose to adhere to our methodology as outlined in section four. For a more thorough review of the statistical validity please review section 7.4. Adding control vectors of sector-year dummies (2), market sentiment (3), operational engineering (4), governance factors (5) and financial engineering (6) the coefficient magnitude expands to becomes more negative, and significant on the 5%-level. Together with the control vectors in specification (6) four different proxies for certification are introduced and tested individually. These proxies have been chosen on the background of previous academia. However, it should be noted that paired with our research on various listing requirements (see table A1 in the appendix) we find that the choice of underwriter, auditor, legal advisor, and exchange may overlap. If a company is listed on the Main market, they are required to mandate a legal advisor and an auditor and likely to use an underwriter. An analysis of the sample suggests that companies listing on the Main market are more prone to use a reputable legal advisor and underwriter as well as a Big4 auditor. The relationship is evident from the cross-correlation matrix (Table A2), where the Main Market dummy has a correlation factor of approximately 0.83 with the Qualitative Underwriter and 0.50 with the Qualitative Legal Advisor. As these variables all are proxies for certification, and due to the possible presence of multicollinearity between these variables (i.e., the regressors may explain some of the same variation in the dependent variable) only one will be included in subsequent regressions. Of the four variables controlling for certification, the main market dummy is the only with a suggested significant result (at the 5% significance level). Further, compared with the other regressors controlling for certification it has a positive effect on the adjusted R^2. In line with our note in section 6.1.2, it also influences the suggested significance level of the key coefficient, going from 5% significance level to 10%. Hence, specification (10) will be used as the main regression. As previously reported, regression (10) suggests that private equity control

has a significant negative relation to Tobin's Q (at the 10% significance level). In other words, it is indicated that companies controlled by private equity firms generate a lower Tobin's Q relative the market at the initial public offering compared to companies that are not. Market size, asset turnover, and size of the company at the initial public offering is positively correlated with the dependent variable. This is significant at the 5% significance level for market size and at the 1% significance level for IPO size and profitability. Hence, the regression points toward a higher relative valuation for i) when the market has a higher valuation relative to GDP ii) relatively larger companies iii) high asset turnover. Sales growth missing is also positively correlated with the dependent variable at the 10% significance level. Profitability and the age of the company at the initial public offering are negatively correlated with the dependent variable at the 1% significance level. This indicates that less profitable and younger companies get a higher valuation relative the market. All leverage dummies, relative the No Leverage dummy, are negatively correlated with the dependent variable at the 1% significance level. This suggest that companies not using leverage receive a higher relative valuation. As the magnitude is decreasing the data suggest that for companies using leverage, a higher leverage is associated with a higher relative valuation. The negative main market coefficient (at 5% significance level) indicates that companies listing on the main market receive a lower relative valuation. The model estimates no effect of sales growth and the number of board members as the results are insignificant. The adjusted R^2 of 0.391 indicates that 39.1% of the variability is explained by the regression model.

Table 6.2a

OLS Regression Output - Main Model with Tobin's Q Value Relative on the Total Sample

The table describes OLS regression results for the main model defined in [4.3.2]. The dependent variable is a value relative of the respective Tobin's Q of the IPO scaled by the same industry-quarter trading median multiple on all exchanges. Each column adds from left to right vectors of controls - FE: Sector-year dummies, SE: Market Sentiment, OP: Operational, GO: Governance, FI: Financial, and certification - specification (7) - (10) test four different mutually exclusive estimators from the certification category. Dummy for zero leverage omitted = reference category. The last specification (10) is deemed as the best fitted model, and interpretations will thus revolve round these coefficients.

VARIABLE	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
	Q	**Q + FE**	**SE**	**SE+OP**	**SE+OP+GO**	**SE+OP+GO+FI**	**(6)+UW**	**(6)+Legal**	**(6)+Big 4**	**(6)+Main Market**
PE Controlled (D)	-0.608*	-0.602*	-0.610*	-1.087***	-0.873**	-0.782**	-0.672**	-0.776**	-0.782**	-0.588*
	[0.322]	[0.334]	[0.334]	[0.348]	[0.343]	[0.327]	[0.340]	[0.329]	[0.327]	[0.335]
Market Size			2.154	3.052**	2.856*	2.757**	2.826**	2.754**	2.762**	2.864**
			[1.696]	[1.496]	[1.458]	[1.390]	[1.390]	[1.392]	[1.393]	[1.381]
Sales Growth				0.110*	0.071	0.069	0.069	0.069	0.07	0.07
				[0.061]	[0.060]	[0.058]	[0.058]	[0.058]	[0.058]	[0.058]
Missing Sales Growth (D)				1.396***	1.036***	0.581	0.617*	0.579	0.581	0.698*
				[0.356]	[0.357]	[0.356]	[0.357]	[0.357]	[0.357]	[0.357]
Profitability				-2.639***	-2.511***	-2.245***	-2.222***	-2.249***	-2.242***	-2.217***
				[0.307]	[0.303]	[0.291]	[0.292]	[0.293]	[0.293]	[0.289]
Asset Turnover				0.682***	0.658***	0.622***	0.637***	0.620***	0.623***	0.672***
				[0.177]	[0.173]	[0.164]	[0.165]	[0.165]	[0.165]	[0.164]
IPO Size				0.301***	0.458***	0.443***	0.510***	0.453***	0.440***	0.548***
				[0.086]	[0.096]	[0.091]	[0.108]	[0.110]	[0.095]	[0.101]
IPO Age					-0.550***	-0.558***	-0.553***	-0.556***	-0.559***	-0.561***
					[0.149]	[0.143]	[0.143]	[0.144]	[0.143]	[0.142]
No. Board Members					-0.159	-0.199**	-0.174*	-0.199**	-0.198**	-0.141
					[0.104]	[0.099]	[0.101]	[0.099]	[0.099]	[0.101]
Leverage Quartile 1 (D)						-2.425***	-2.395***	-2.421***	-2.424***	-2.294***
						[0.416]	[0.417]	[0.418]	[0.417]	[0.417]
Leverage Quartile 2 (D)						-2.312***	-2.280***	-2.315***	-2.310***	-2.256***
						[0.426]	[0.427]	[0.427]	[0.427]	[0.424]
Leverage Quartile 3 (D)						-1.992***	-1.973***	-1.991***	-1.994***	-1.898***
						[0.441]	[0.442]	[0.442]	[0.443]	[0.440]
Leverage Quartile 4 (D)						-1.736***	-1.694***	-1.740***	-1.735***	-1.649***
						[0.446]	[0.447]	[0.447]	[0.447]	[0.444]
Qualitative Underwriter (D)							-0.522			
							[0.448]			
Qualitative Legal Advisor (D)								-0.051		
								[0.299]		
Big 4 Auditor (D)									0.023	
									[0.231]	
Main Market (D)										-0.937**
										[0.408]
Constant	2.726***	1.685	-2.301	-2.643	-1.03	1.244	0.859	1.206	1.234	0.564
	[0.140]	[1.297]	[3.395]	[2.387]	[2.382]	[2.288]	[2.310]	[2.302]	[2.294]	[2.290]
Observations	334	334	334	334	334	334	334	334	334	334
Adjusted R2	0.008	0.053	0.055	0.272	0.310	0.382	0.383	0.380	0.380	0.391
Sector#Year Dummies	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*** p<0.1, ** p<0.05, *** p<0.01, SE in brackets**

6.2.2 Effect of regulatory environment on private equity-controlled companies

Table 6.2b introduces an interaction between the PE Controlled variable and the Main Market dummy. This is conducted to test our second hypothesis in an effort to shed light on the second research question. For reference, column 1 shows our main specification (10) as found in table 6.2a. Column 2 and 3 provides results for the interaction between the main market dummy and private equity control. In column 2 the interaction results are relative to non-private equity-controlled companies listed on Alternative markets (PE0MM0). The only significant interaction term is private equity-controlled companies listed on the Main markets (PE1MM1) for which the coefficient is negative and significant at the 1% level, indicating that these companies receive a lower valuation relative to the valuation received by non-private equity-controlled companies listed on the Alternative markets (PE0MM0). Similar results are found but at the 5% significance level for the private equity-controlled companies listed on the Main market (PE1MM1) when related to the private equity-controlled companies listed on the Alternative market (PE1MM0). This comparison is found in column 3 and indicate that a statistically significant difference in valuation exist for private equity-controlled companies depending on the regulatory environment. PE-backed IPOs appear to receive a relatively lower value relative when introduced on the Main market (PE1MM1), compared to their counterparts on the alternative market (PE1MM0).

Table 6.2b

OLS Regression Output – Main Model & interaction between PE Controlled and Main Market

The table describes and compares OLS regression results. The dependent variable is a value relative of the respective Tobin's Q of the IPO scaled by the same industry-quarter median trading multiple on all exchanges. In the first column, the main regression specification (10) is showed for reference. The remaining two columns feature the same specification, but with an interaction term between the Main Market and the PE Controlled dummies. The middle and last two columns differ only in reference group. As the research question is focused on comparing PE Controlled on the main market vs PE Controlled on alternative market, the p-statistics of interest is in the last column [in bold]

VARIABLE	**Main Specification (10)**	**(10) + Interaction PE#MM Reference group: PE0MM0**	**(10) + Interaction PE#MM Reference group: PE1MM0**
PE Controlled (D)	-0.588*		
	[0.335]		
Main Market (D)	-0.937**		
	[0.408]		
Market Size	2.864**	2.807**	2.807**
	[1.381]	[1.383]	[1.383]
Sales Growth	0.070	0.066	0.066
	[0.058]	[0.058]	[0.058]
Missing Sales Growth (D)	0.698*	0.672*	0.672*
	[0.357]	[0.358]	[0.358]
Profitability	-2.217***	-2.210***	-2.210***
	[0.289]	[0.290]	[0.290]
Asset Turnover	0.672***	0.664***	0.664***
	[0.164]	[0.165]	[0.165]
IPO Size	0.548***	0.541***	0.541***
	[0.101]	[0.102]	[0.102]
IPO Age	-0.561***	-0.559***	-0.559***
	[0.142]	[0.142]	[0.142]
No. Board Members	-0.141	-0.143	-0.143
	[0.101]	[0.101]	[0.101]
PE0MM0 (D)			0.357
			[0.428]
PE0MM1 (D)		-0.682	-0.325
		[0.503]	[0.590]
PE1MM0 (D)		-0.357	
		[0.428]	
PE1MM1 (D)		-1.609***	**-1.252****
		[0.468]	**[0.546]**
Constant	0.564	0.643	0.286
	[2.290]	[2.293]	[2.368]
Observations	334	334	334
Adjusted R2	0.391	0.390	0.390
Leverage Dummies	Yes	Yes	Yes
Sector#Year Dummies	Yes	Yes	Yes

* p<0.1, ** p<0.05, *** p<0.01, SE in brackets

7. Discussion

Section 7 will interpret and discuss the empirical findings from section 6, in comparison to the theoretical foundation and previous empirical findings. The focus of the discussion will be on the dependent variable and its relation to our key variable, private equity control, as well as our interaction for private equity control and Main market variable. Further, the analysis is based on the t-tests presented in table 6.1a and 6.1b as well as regression (10) in table 6.2a and regression (3) in table 6.2b. The proxy used for private equity influence and alternatives to the applied dependent variable will also be analyzed further. Finally, the section will end by examining the statistical robustness and the validity of the results.

7.1 Interpretation of empirical findings

7.1.1 Effect of controlling owner

The empirical findings support our first hypothesis, private equity control is suggested to have a significant effect on the valuation at the time of an initial public offering, as there is a significant difference between the mean of private equity-controlled and the non-private equity-controlled Tobin's Q value relative when examined using a t-test. The results are also robust for the application of a multivariate OLS regression in which a number of control variables are introduced. The difference in means between the subsamples as well as the direction of the regression coefficient for private equity control suggest that the impact of private equity on the Tobin's Q relative is negative. This is in line with grandstanding, as suggested by Gompers (1996). This interpretation of the results would indicate that the actions taken by general partners in relation with the initial public offering of a portfolio company would be costly to limited partners, affecting their returns. Hence, our suggestive results could bring light on an agency problem. However, our results do not provide evidence of the direction of causality or if mixed endogeneity stories are possible. Hence, other explanations for the lower Tobin's Q value relative are possible. One such explanation is a lack of certification for private equity-controlled companies going public. Firstly, this interpretation would question the lasting value impact of private equity ownership. Previous research on private equity (e.g., Jensen, 1989; Kaplan & Strömberg, 2009), argues that this value indeed is lasting, hence it contradicts existing research. Secondly, it could also reflect a pessimistic Swedish view on private equity value creation which in this case would have a negative impact on portfolio company valuation. Provided that we assume that private equity provides lasting value, as put forward by Jensen (1989) and Kaplan & Strömberg (2009), our result could be positive for IPO

investors as they would be able to reap excess returns as the private equity owner exits and the valuation no longer is burdened by PE-influence. As we have no indication of the Swedish view on private equity as an organizational form, we can neither rule in favor nor against this interpretation. Further, in line with the possibility of mixed endogeneity stories, the above suggested interpretations could affect the results simultaneously.

Other alternative explanations, not connected to certification nor grandstanding, could also co-exist driving the significant and negative key coefficient. Below follows explanation based on the construction of Tobin's Q, scaling the EV of the company with the asset base. The first is inferior growth and profitability prospects for private equity-controlled companies leading to lower valuations. This would be contrary to existing theory, as described by Jensen (1989) and Kaplan and Strömberg (2009), as private equity is suggested to provide value through operational improvements. From our t-test we are unable to say whether this is the case as we do not find significant differences in operational variables. As valuation is normally conducted based on future expectations for which historical figures may not always be good proxies, this could have an impact on our findings. As accurate information on the future does not exist, we deem the use of historical figures the most accurate. A second reason for the lower relative valuation at the time of the initial public offering of private equity-controlled companies is that they have a larger asset base. This would indicate that private equity-controlled companies are more prevalent in industries using less off-balance sheet items, such as industrial and consumer. This has been suggested by Jensen (1989). As we do not find significant differences in asset turnover for the two subsamples this does not guide us, and also we control for industry characteristics through both the design of the value relative and by including sector-year dummies. A third alternative interpretation presented is that the market either is willing to accept or does not price in possible excess risk of the cash flows of non-private equity-controlled companies leading to an increased valuation. Contrary to this, Fama & French (1992) states that larger companies should receive a premium valuation, due to size being a risk factor, and we find our private equity-controlled subsample to be significantly larger than the non-private equity controlled. None, of the above provides convincing evidence for an alternative explanation but will be kept in mind when progressing the analysis.

To summarize, our results in table 6.1a and 6.2a provide evidence consistent with grandstanding but could also be explained by a possible lack of certification as well as other endogenous effects. Hence, the empirical findings have been interpreted with caution. With that said, our result indicates that the value relative in fact is significantly different between the two ownership types at the time of the initial public offering, which is why we reject our first

null hypothesis. Even though we recognize a significant difference in line with our first research question, there is unobservable endogeneity which is why we are careful about the causal interpretation of the result. A potential way to explore a causal relationship could be to test if the private equity-controlled companies also see higher first day returns, as this would indicate that a higher underpricing is in fact generated by the relatively lower valuation. For further comments on this, please refer to section 7.3.2.

7.1.2 Effect of regulatory environment on private equity-controlled IPOs

The t-test in table 6.1b implies that the average private equity-controlled company listed on the Alternative markets receive a significantly higher value relative compared to its Main market equivalent. This is further supported by the results in the multivariate regression model, including control variables. The regression in column 3 in table 6.2b, with an interaction between PE Controlled and Main Market, points toward an effect of the choice of regulatory environment on the relative valuation of a private equity-controlled company at the time of the initial public offering. The negative and significant relative relation between the private equity-controlled and Main market interaction and the dependent variable indicates that the presence of private equity has a different effect on Alternative markets, on which regulation is less stringent. Multiple reasons for the difference can be identified. Either private equity-controlled companies listing on the Main market generate lower value relatives or those listing on the Alternative market generate higher valuations, or any combination of the two effects.

We start by analyzing the reasons for a potential lower value relative on the Main market. Firstly, it could be due to grandstanding in which private equity organizations use the Main market when listing high quality companies for which they are certain they will reach their return targets. Our sample shows a much lower intensity in the number of IPOs on the Main market during the period. As one of relatively fewer initial public offerings on the Main market it is likely that the issue will enjoy a higher media coverage and investor attention, providing incentives for grandstanding on this particular list. Secondly, the lower value relative could be due to a lack of certification in line with the argumentation in section 7.1.1. On the other hand, for the potential of higher valuation on Alternative markets two explanation are identified. The first explanation is an increased effect of certification for private equity-controlled companies on the Alternative market in line with the research of Duong et al. (2021). However, we do not find a significant difference dependent on the type of ownership when analyzing the full Alternative market subsample. Hence, this finding suggest it would rather be a lack of certification of private equity-controlled companies on the Main market. As stated above and

in section 7.1.1, we find this argument counterintuitive and do not find support for it in previous research. The second explanation is a lack of grandstanding when private equity-controlled companies are listed on Alternative markets. A possible reason behind this lack of grandstanding could be that Alternative markets are better used by the fund to off-load less good investments for which the private equity organization only wish to secure the returns rather than using the IPO as a tool to signal performance towards limited partners. This interpretation is consistent with why private equity organizations accept a lower value relative on the Main market. Further, in line with the possibility of mixed endogeneity stories, the above suggested interpretations could affect the results simultaneously.

A number of alternative explanations, not connected to certification nor grandstanding, can also be suggested. Similarly to section 7.1.1 the alternative explanations presented follows the construction of Tobin's Q. Firstly, operational differences may answer for the difference in valuation. Similar to the reasoning in section 7.1.1, Kaplan and Strömberg (2009) suggest that operational improvements should increase the value of private equity-controlled companies. Our t-test suggest that profitability is significantly less negative (higher), and that asset turnover is significantly higher for companies listing on the Main market, which according to the theory should have a positive impact on valuation. Worth noting is that these types of operational variables have been controlled for in the regression. The significantly higher asset turnover of companies listing on the Main market also suggest that their asset base is relatively lower than sales, all else equal. Comparably to the discussion around the investor view on risk in section 7.1.1, the private equity-controlled companies are larger and in line with Fama & French (1992) this should warrant a size premium.

To summarize, on first look the results on the effect of regulatory environment on private equity-controlled companies indicates a certification effect. Hence, we reject our second null hypothesis. However, examining the results open up for multiple interpretations. Thereby, we are not able to say that our results are due to the effects of certification and our second research question remains unanswered.

7.2 Alternative measures - value, underpricing and influence

7.2.1 EV/EBITDA as an alternative proxy of firm value

Tobin's Q is often used in academia (see Black et al., 2006; Mitton & O'Connor, 2010), whereas practitioners often use other value relatives, such as enterprise value-to-earnings before interest, tax, depreciation, amortization ("EV/EBITDA") (Ivashina & Boe, 2017).

Hence, EV/EBITDA has been tested as an alternative proxy for value[12]. Cons of using a value relative based on earnings is the existence of negative values. These need to be excluded. Further EBITDA is not as readily available as assets. This leads to restrictions to the data sample which decreases from 334 companies when using Tobin's Q to 139 companies for the use of EV/EBITDA, a reduction of 58%. This greatly limits the statistical relevance making it an inferior measure of value when applied on this particular sample. The regression model based on our main specification (10) only provides significance for sales growth (at the 1% significance level) and profitability (at the 5% significance level). For the third regression with an interaction variable between PE Controlled and Main Market, the same result appears. In this regression non-private equity-controlled companies listed on the Alternative markets (PE0MM0) provides a higher EV/EBITDA relative private equity-controlled companies listed in the Alternative market (PE1MM0) significant on the 5% level. This result does not impact our hypotheses and will therefore not be further analyzed. Further, the adjusted R^2 also decreases compared to the model using Tobin's Q. As we cannot be sure if the results are due to the low number of observations, we disregard EV/EBITDA as an alternative measure. For reference, please find table A13 in the appendix.

7.2.2 First day return as a measure of underpricing

When examining certification and grandstanding effects in previous academia the dependent variable is almost exclusively first day return (see Megginson & Weiss, 1991; Gompers, 1996; Duong et al., 2021).[13] Hence, for comparability we have tested this measure as an alternative dependent variable for our sample. Using the first day return as the dependent variable, we have re-run our regressions, focusing on specification (10) in table 6.2a and specification (3) in table 6.2b. The regressions yield no significant results, except for the univariate constant using PE Controlled as the only regressor. The positive constant of 0.069 at the 1% significance level indicates an underpricing in our subsample of non-private equity-controlled companies, but no additional incremental underpricing associated with being PE controlled. The regression also generates a very low R^2. Hence, no further analysis will be undertaken, and the table can be found in the appendix (table A14). However, in line with our final comment in section 7.1.1, had these results been significant they could have been interesting as they could have affected the interpretation of the results generated using Tobin's Q. To visualize, using the results in table A14, showing a positive coefficient on PE Controlled for specification (1), while

[12] Defined using the same approach as for Tobin's Q (EV/EBITDA of IPO firm / same quarter-industry trading EV/EBITDA) and winsorized at 5%.
[13] Defined as (Closing price first day of trading) / (mid-most listing price in prospectus) -1 and winsorized at 5%

disregarding the lack of significance, the first regression would point towards an underpricing for this ownership type. If paired with the result using Tobin's Q, this would suggest that grandstanding is an influencing factor affecting the valuation at the time of the offering and that the market acknowledges this action, indicated by an increased first day return. However, as we do not find significant results and the private equity control coefficient is negative (and still insignificant) using the main specification (10), no such relations can be identified.

7.2.3 Other proxies for PE-influence

As discussed in section 4.2.2.1 there is ambiguity around how to define private equity influence. With the data collected for our sample we were able to iterate five different possible measures of PE influence, defined in Table 4.2.2.1a. In order to select an appropriate measure all five proxies were tested in the main specification (10). We find that PE Controlled, defined as PE Ownership of at least 50%, is the only variable that is significant, and for this proxy we also find the highest adjusted R^2, which is why this variable was selected to be used in the main model. More than 50% ownership constitutes the hurdle for achieving a controlling interest in a firm, which naturally enables a much higher formal influence than what a minority interest would generate. Please refer to table A15 in the appendix for an overview of the regression.

Interestingly this regression also shed light on how private equity organizations influence their portfolio companies. It seems as if just being owned by an organization, identifying as an active investor as depicted by the PE Owned dummy, does not affect the company significantly. Similarly, results are found for companies held by renowned private equities, as measured by PE Qualitative. However, this could of course be affected by the identification of these private equity organizations. As previously explained, membership in SVCA has been used to identify renowned private equity organizations. This membership may not reflect what we try to capture. Finally, the ratio of board members coming from the private equity does not show significance. This is especially interesting as it provides insight into how private equity companies interact with their portfolio companies when generating value. A potential explanation to why companies with a high ratio of PE board members do not show significant effects on Tobin's Q, vis a vis PE Controlled, could be the use of informal channels of influence. Private equity organizations may not go through the board to nudge their portfolio companies in the right direction but rather through more informal channels such as contact networks.

7.3 Statistical robustness and validity of the results

7.3.1 Statistical robustness

As a multivariate OLS regression is used as one of the main statistical tools, a Variance Inflation Factor-test ("VIF") for multicollinearity and a Ramsey RESET-test for specification error have been implemented. Also, the residuals have been tested for normality and heteroskedasticity using a Breusch Pagan and Shapiro-Wilk W test. The result from these tests in regressions (1), (6) and (10) is shown in Table A16.

Our data show no signs of severe multicollinearity. The VIF test show low scores in the range of 2-4, and no regressor has been assigned a value of 5 (or above), commonly used as the threshold of exclusion. The other tests show signs of specification error, and heteroskedasticity and non-normality in the residuals. However, as Cochrane (2018) points out, this tension of robustness versus efficiency is expected when doing empirical research in the world of economics and finance. Even though some assumptions behind the OLS often are violated to some extent, this still represents one of the best and most viable statistical methods in the toolbox. Due to the aforementioned reasons, the model and method has not been modified.

7.3.2 Validity of results

This paper seeks to explore and explain economic relationships using real-world data. Even though best efforts have been used to find estimators that have desirable statistical properties in relation to consistency, efficiency and unbiasedness, the applied econometric method is subject to certain limitations.

Logically there exists firm specific cross-variation when it comes to the real-world choices of firms which can cause random disturbances in the model. The choice of exchange, and which type of firms get private equity-backing are two such examples. As the estimators are not necessarily statistically independent from all various random disturbances in the model in all periods, the econometric results in this paper should be viewed as suggestive, rather than definitive. To help rule-out noise and non-causal relationships an ideal setting to test the research question would have been if the sample of firms were randomly assigned to either the Main market or Alternative market, and if we could find firms that have been randomly assigned private equity-backing. Such a scenario represents a statistical utopia, rarely achievable, when conducting empiric research on economics and finance. Because of this

endogeneity there is potential omitted variable bias in the results, and therefore we cannot comment on causality.

Another limitation is not having panel data, which would have provided more efficiency and less estimation biases than pure cross-sectional data. If we would have had a balanced panel dataset for the same firms at several points in time, we would have been able to hold constant unobservable characteristics across the observations to comment on causal relationships more efficiently. As a way to partly mitigate this caveat we have included three features in the main specification i) the value relative used as a dependent variable is a scaled multiple of the same sector-quarter trading multiple, ii) the regressor Market Size is used in the main specification which captures the time varying annual valuation of the stock exchange relative to the same year GDP iii) sector-year dummies in line with Black et al.'s (2006) methodology. Together these features ought to capture some unobservable one-way time and sector fixed effects.

It shall also be noted that even though the total sample size of 334 IPOs is comparable with previous academia, the subsequent splits per owner and exchange greatly reduces the number of observations per reference group. In the t-test comparisons the largest subsample is alternative market IPOs which includes 270 observations, and the smallest is PE Controlled firms on alternative markets of 24 observations. Again, our results should from this aspect thus be cautiously interpreted.

The data collection method, and the sources used to gather the data are also subject to a margin of error. The main sources are Thomson Reuters Datastream, S&P Capital IQ and the individual prospectuses of each IPO. The two former sources have quality assuring routines and processes set in place to ensure timeliness, accuracy, and completeness of data in the economics databases. From these databases data has been extracted automatically using Microsoft Excel as the software intermediary. Where data has been missing, or for data items not available in the databases, information has been manually gathered from IPO prospectuses. In this process data has not only been gathered, but many of the datapoints extracted through the databases have also been audited against the prospectuses. As a further check for data quality, we have produced box plots of many of the data items to identify potential outliers and faulty data. When an error or discrepancy was found the data from the IPO prospectus was given superiority, as this type of document often goes through many steps of auditing before being published. However, as this has been done manually there could exist a potential risk of human data errors. With that said, using a large set of observations a small frequency of such

errors should not have material impact on the results. In addition, all accounting-based variables have been winsorized at the 5%-level to correct for faulty data.

Lastly, there is an ambiguity around what is an appropriate measure of value. In line with previous academia this paper has applied Tobin's Q as the main proxy for firm value, which measures the market value of the assets relative to the book value of those assets. One could question whether this measure efficiently captures the inherent firm value equally across the different firms and subgroups. As we have seen smaller firms have a relatively lower book value of assets to the market value compared to large firms, leading to a higher Tobin's Q and value relative. As such there could be value amongst certain firms and subgroups that is not captured by the balance sheet book value of assets, such as human capital, inflating Tobin's Q. To partly control for this effect the OLS-model includes regressors of firm specific characteristics such as size, asset turnover and sales growth. Additionally, we have tested the same regression specifications on the more practically used EV/EBITDA as an alternative measure of value. Unfortunately, for our sample this test implied a loss of approximately 60% (139 vs 334) of the observations due to more cumbersome data requirements. With that said, even though these results were statistically insignificant the PE Controlled coefficient of interest had the same direction as in the main regression, providing some validation of our results.

8. Conclusion

Using a sample of 334 initial public offerings conducted on the Swedish market, split over six regulated exchanges and multilateral trading platforms, during the time period 2015 until the end of the first quarter 2021, we find results indicating that a difference in company value relatives at the time of an initial public offering is dependent on private equity control. This allows us to reject the first null hypothesis and answer our first research question. Further, the direction of the difference is in line with the grandstanding hypothesis presented by Gompers (1996), implying that private equity organizations take companies public before the full impact of value generating activities, such as financial, governance, and operational engineering, is achieved. Previous research suggests these actions are due to misaligned incentives inherent in the relationship between general and limited partners and leads to a real wealth loss for limited partners. Hence, our data suggests this agency problem also have an effect in a Swedish context. However, alternative explanations exist of which one is a lack of certification for private equity organization due to the societal view on private equity. In order to improve the understanding of the effects of grandstanding and certification it would be interesting to understand the market view on private equity in a Swedish setting. We leave this for future research.

By applying an interaction variable using the proxies for ownership control and listing market, we find that private equity-controlled companies listing on the Main market generate a lower value relative compared to the value relative generated by the private equity-controlled companies listing on the Alternative market. However, when analyzing the results, we find that the underlying reasons for this are vague. Analyzing private equity-controlled companies in isolation, our results suggest a relation in line with the findings of Megginson & Weiss (1991) and Duong et al. (2021). However, when introducing non-private equity-controlled companies to the analysis we find no significant difference in value relative between private equity-controlled and non-private equity-controlled companies listing on the Alternative market. Therefore, the effects of certification are questionable and opens for alternative explanations, including grandstanding. Consequently, while we find a significant effect on the value relative, leading us to reject the second null hypothesis, however, the ambiguity in the results does not provide an answer to our second research question. We do not find convincing evidence that the certifying effect of private equity ownership is enhanced when companies are floated on less well-regulated exchanges. However, in line with our argumentation on the potential effects of grandstanding we would find it interesting to test the difference in media coverage between Swedish exchanges in relation to where private equity organizations choose to take their

companies public. A study on the fund raising of follow-on funds in relation to what Swedish exchange a private equity company choose to list a portfolio company on could also shine light on this area. Furthermore, it would be interesting for future research to approach this research question from a qualitative perspective interviewing private equity professionals about where and why they choose to list their holdings. Not only could such a study help explain the causal relationships behind the main findings of this paper, but it could also shed light on how to better approach our research questions from a quantitative perspective in the future.

With the above conclusions in mind the following suggestion is made. First, limited partners should take measures to limit the loss of wealth. As the relationship between limited partners and general partners is normally regulated through a contract, the timing of initial public offerings should be addressed in this contract. One such measure could be to address the valuation of the company gone public in line with the methodology in this thesis and compare the post initial public offering development of the value relative to the development of the market and require general partners to reimburse any differences that are due to real wealth losses over certain thresholds, or at least that such information is incorporated in the decision of whether or not to invest in the next follow-on fund of the private equity fund manager.

In addition to the above contribution, this thesis suggests that Tobin's Q can be applied to analyze the effects of certification and governance in periods when first day return does not provide significant results. This expands the toolbox used to understand this academic universe. In the future we suggest the use of a valuation metric in combination with the first day return metric as we hypothesize that Tobin's Q captures the choices made by the issuer while first day returns capture the market perception of these choices. However, we leave this notion to be further quantified in future studies.

Lastly, as a negative value difference was found in the Swedish context during our sample period it would also be interesting to evaluate whether the results could be generalized across other regions as well, especially during longer time periods.

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Appendix

Table A1

Summary of the regulatory setting

This table summarizes the characteristics of the Swedish regulated markets and multilateral trading facilities.

	Nasdaq Nordic				NGM		Spotlight
	Large cap	**Mid cap**	**Small cap**	**First North**	**Equity**	**SME**	**Spotlight**
Type	Regulated exchange	Regulated exchange	Regulated exchange	MTF	Regulated exchange	MTF	MTF
Founded	1863	1863	1863	2007	1984	1984	1997
Number of companies (2021-03-31)	101	138	93	346	8	92	164
Company requirements							
Historical financials	≥3 years	≥3 years	≥3 years	n.a.	≥2 years	≥2 years	≥2 years
Minimum market cap	SEK ≥10m	SEK ≥10m	SEK ≥10m	n.a.	SEK ≥25m	SEK ≥25m	n.a.
Free float	≥25%	≥25%	≥25%	≥10%	≥10%	≥10%	≥10%
Number of shareholders	Sufficient	Sufficient	Sufficient	Sufficient	≥300	≥300	≥300
Certification requirements							
Reporting rules	IFRS	IFRS	IFRS	Local GAAP	IFRS	Local GAAP	Local GAAP
Legal review	YES	YES	YES	NO	YES	NO	NO
Stock exchange auditor	YES	YES	YES	NO	YES	NO	NO
Approval from Finansinspektionen	YES	YES	YES	NO	YES	NO	NO
Other (Certified advisor / Mentor)	NO	NO	NO	YES	NO	YES	NO
Other requirements							
Website	YES	YES	YES	YES	YES	YES	YES
Information time period	5 years	5 years	5 years	5 years	5 years	5 years	5 years
Market							
Main markets	**YES**	**YES**	**YES**				
Alternative markets				**YES**	**YES**	**YES**	**YES**
Regulated markets	**YES**	**YES**	**YES**		**YES**		
MTFs				**YES**		**YES**	**YES**
Nasdaq owned	**YES**	**YES**	**YES**	**YES**			
NGM owned					**YES**	**YES**	
Spotlight owned							**YES**

Table A2

Cross-Correlation Matrix

The table shows a cross correlation matrix between all variables used in the main regression of this paper.

#	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	**Tobin's Q Value Relative**	1.00																		
2	**Market Size**	0.08	1.00																	
3	**Sales Growth**	0.10	0.03	1.00																
4	**Profitability**	-0.34	0.01	-0.16	1.00															
5	**Asset Turnover**	0.10	0.01	-0.01	0.39	1.00														
6	**IPO Size**	0.00	0.10	-0.03	0.31	0.23	1.00													
7	**IPO Age**	-0.26	0.06	-0.10	0.28	0.19	0.49	1.00												
8	**No. Board Members**	-0.12	-0.01	-0.02	0.11	0.07	0.56	0.39	1.00											
9	**PE Controlled (D)**	-0.10	-0.01	-0.02	0.07	0.05	0.53	0.35	0.36	1.00										
10	**Missing Sales Growth (D)**	0.11	-0.06	-0.20	-0.15	-0.35	-0.23	-0.30	-0.18	-0.09	1.00									
11	**No Leverage (D)**	0.35	0.03	0.04	-0.20	-0.14	-0.12	-0.15	-0.03	-0.10	0.29	1.00								
12	**Leverage Quartile 1 (D)**	-0.12	-0.03	0.13	-0.05	-0.10	-0.11	-0.10	-0.11	-0.10	0.12	-0.17	1.00							
13	**Leverage Quartile 2 (D)**	-0.11	0.06	-0.05	0.03	-0.04	-0.03	-0.06	0.00	-0.04	-0.06	-0.17	-0.29	1.00						
14	**Leverage Quartile 3 (D)**	-0.01	-0.06	0.03	0.12	0.14	0.01	0.00	-0.02	0.01	-0.12	-0.17	-0.29	-0.29	1.00					
15	**Leverage Quartile 4 (D)**	0.01	0.01	-0.13	0.03	0.09	0.21	0.26	0.14	0.19	-0.14	-0.17	-0.29	-0.29	-0.29	1.00				
16	**Qualitative Underwriter (D)**	-0.08	0.07	-0.02	0.26	0.23	0.77	0.43	0.55	0.57	-0.16	-0.13	-0.10	-0.03	0.01	0.20	1.00			
17	**Qualitative Legal Advisor (D)**	-0.04	0.05	-0.05	0.13	0.09	0.68	0.37	0.39	0.43	-0.15	-0.07	0.00	-0.07	0.02	0.10	0.55	1.00		
18	**Big 4 Auditor (D)**	-0.01	-0.08	-0.06	0.02	-0.03	0.35	0.19	0.20	0.24	-0.04	-0.01	-0.06	-0.08	0.11	0.04	0.32	0.32	1.00	
19	**Main Market (D)**	-0.13	-0.02	-0.01	0.23	0.21	0.70	0.38	0.55	0.52	-0.11	-0.13	-0.03	-0.06	0.03	0.15	0.83	0.49	0.32	1.00

Table A3

Definition of variables

*This table describes each variable noted in section 4.2. Variables noted with * have not been winsorized at 5% due to the construction of the variable.*

Variable	
Dependent variable	
Tobin's Q Value Relative	Value relative measured as a ratio between the Tobin's Q of the IPO-firm and the same quarter and industry trading multiple
PE-Involvement (Coefficient of interest)	
PE Controlled (D)	Dummy variable, set=1 if PE-sponsor holds at least 50% of shares
Market sentiment	
Market Size*	Ratio of the annual total market capitalization of stocks traded to the annual GDP (Duong et al., 2021)
Operational	
Sales Growth	Full year revenues at the time of the IPO scaled by the full year revenues for the same period one year prior minus one
Missing Sales Growth (D)	Dummy variable, set=1 if sales growth data is missing (Black et al., 2006)
Profitability	Earnings before interest and taxes divided by the total assets (Duong et al., 2021)
Asset Turnover	Sales divided by the total assets of the IPO firm (Duong et al., 2021)
IPO Size*	The natural logarithm of the pre-money equity valuation of the firm
Governance	
IPO Age*	The natural logaritm of the age of the company minus the IPO year, plus one (Duong et al., 2021)
No. Board Members*	Number of board members
Financial	
Leverage Quartile (D)	All firms have been assigned to a quartile based on their total debt over asset leverage ratio. This vector of variables, set=1 if the company places in the quartile.
No Leverage (D)	Dummy variable, set=1 if no leverage (Black et al., 2006)
Certification	
Qualitative Underwriter (D)	Dummy variable, set=1 if underwriter is a member of the Swedish Association for Venture Capital and Private Equity ["SVCA"] (Megginson and Weiss, 1991)
Big 4 Auditor (D)	Dummy variable, set=1 if IPO-firm has engaged a "big 4" auditor
Qualitative Legal Advisor (D)	Dummy variable, set=1 if legal advisor is part of the SVCA
Main Market (D)	Dummy variable, set=1 if IPO is listed on OMX Nasdaq Stockholm Small, Medium or Large cap
Cross sectional fixed effects	
Sector#Year dummies	Dummy variables, set=1 for an observation in a particular industry sector and year. Sectors are Consumer Discretionary, Industrials, Healthcare and Technology (Black et al., 2006)

Table A4

Descriptive statistics - PE Controlled

This table includes aggregated data for continuous variables included in section 3 for observations owned by a financial sponsor holding at least 50% of the shares.

Variable	Number of IPOs	Mean	Median	Minimum	Maximum	Std. Dev.
Tobin's Q Value Rela	63	2.118	1.448	0.297	11.117	1.854
Market Size	63	1.477	1.428	1.265	1.878	0.174
Sales Growth	63	0.851	0.285	-0.518	7.270	1.816
Profitability	63	-0.176	0.051	-1.369	0.239	0.465
Asset Turnover	63	0.840	0.878	0.000	2.513	0.628
IPO Size	63	6.933	7.174	2.929	9.306	1.473
IPO Age	63	3.014	2.890	0.693	5.030	0.890
No. Board Members	63	6.238	6.000	3.000	10.000	1.583

Table A5

Descriptive statistics - PE Controlled

This table includes aggregated data for dummy variables included in section 3 for observations owned by a financial sponsor holding at least 50% of the shares.

Variable	Number of IPOs	Observations equal to 1	*Observations as % of total*	Std. Dev.
PE Controlled (D)	63	63	*100.0%*	0.000
Missing Sales Growth (D)	63	5	*7.9%*	0.272
No Leverage (D)	63	2	*3.2%*	0.177
Leverage Quartile 1 (D)	63	9	*14.3%*	0.353
Leverage Quartile 2 (D)	63	12	*19.0%*	0.396
Leverage Quartile 3 (D)	63	15	*23.8%*	0.429
Leverage Quartile 4 (D)	63	25	*39.7%*	0.493
Qualitative Underwriter (D)	63	43	*68.3%*	0.469
Qualitative Legal Advisor (D)	63	53	*84.1%*	0.368
Big 4 Auditor (D)	63	52	*82.5%*	0.383
Main Market (D)	63	39	*61.9%*	0.490

Table A6

Descriptive statistics - Non-PE Controlled

This table includes aggregated data for continuous variables included in section 3 for observations not owned by a financial sponsor holding at least 50% of the shares.

Variable	Number of IPOs	Mean	Median	Minimum	Maximum	Std. Dev.
Tobin's Q Value Relative	271	2.726	1.898	0.308	13.604	2.389
Market Size	271	1.483	1.460	1.265	1.878	0.158
Sales Growth	271	0.923	0.268	-0.518	7.270	1.917
Profitability	271	-0.247	-0.156	-1.369	0.239	0.402
Asset Turnover	271	0.740	0.396	0.000	2.513	0.774
IPO Size	271	4.676	4.368	2.370	11.556	1.393
IPO Age	271	2.195	2.197	0.000	5.030	0.846
No. Board Members	271	5.018	5.000	3.000	10.000	1.143

Table A7

Descriptive statistics - Non-PE Controlled

This table includes aggregated data for dummy variables included in section 3 for observations not owned by a financial sponsor holding at least 50% of the shares.

Variable	Number of IPOs	Observations equal to 1	*Observations as % of total*	Std. Dev.
PE Controlled (D)	271	0	*0.0%*	0.000
Missing Sales Growth (D)	271	43	*15.9%*	0.366
No Leverage (D)	271	28	*10.3%*	0.305
Leverage Quartile 1 (D)	271	67	*24.7%*	0.432
Leverage Quartile 2 (D)	271	64	*23.6%*	0.426
Leverage Quartile 3 (D)	271	61	*22.5%*	0.418
Leverage Quartile 4 (D)	271	51	*18.8%*	0.392
Qualitative Underwriter (D)	271	25	*9.2%*	0.290
Qualitative Legal Advisor (D)	271	83	*30.6%*	0.462
Big 4 Auditor (D)	271	143	*52.8%*	0.500
Main Market (D)	271	25	*9.2%*	0.290

Table A8

Descriptive statistics - PE Controlled on Alternative markets

This table includes aggregated data for continuous variables included in section 3 for observations listed on Alternative markets and owned by a financial sponsor holding at least 50% of the shares.

Variable	Number of IPOs	Mean	Median	Minimum	Maximum	Std. Dev.
Tobin's Q Value Relative	24	2.870	1.976	0.817	11.117	2.288
Market Size	24	1.522	1.431	1.265	1.878	0.212
Sales Growth	24	1.247	0.291	-0.518	7.270	2.312
Profitability	24	-0.345	-0.227	-1.369	0.210	0.497
Asset Turnover	24	0.586	0.374	0.000	2.513	0.675
IPO Size	24	5.652	5.556	2.929	9.306	1.412
IPO Age	24	2.581	2.485	0.693	4.762	0.869
No. Board Members	24	5.208	5.000	3.000	8.000	1.062

Table A9

Descriptive statistics - PE Controlled on Alternative markets

This table includes aggregated data for dummy variables included in section 3 for observations listed on Alternative markets and owned by a financial sponsor holding at least 50% of the shares.

Variable	Number of IPOs	Observations equal to 1	*Observations as % of total*	Std. Dev.
PE Controlled (D)	24	24	*100.0%*	0.000
Missing Sales Growth (D)	24	4	*16.7%*	0.381
No Leverage (D)	24	1	*4.2%*	0.204
Leverage Quartile 1 (D)	24	7	*29.2%*	0.464
Leverage Quartile 2 (D)	24	6	*25.0%*	0.442
Leverage Quartile 3 (D)	24	5	*20.8%*	0.415
Leverage Quartile 4 (D)	24	5	*20.8%*	0.415
Qualitative Underwriter (D)	24	5	*20.8%*	0.415
Qualitative Legal Advisor (D)	24	15	*62.5%*	0.495
Big 4 Auditor (D)	24	16	*66.7%*	0.482
Main Market (D)	24	0	*0.0%*	0.000

Table A10

Descriptive statistics - PE Controlled on Main markets

This table includes aggregated data for continuous variables included in section 3 for observations listed on Main markets and owned by a financial sponsor holding at least 50% of the shares.

Variable	Number of IPOs	Mean	Median	Minimum	Maximum	Std. Dev.
Tobin's Q Value Relative	39	1.655	1.139	0.297	5.519	1.365
Market Size	39	1.449	1.428	1.265	1.878	0.142
Sales Growth	39	0.607	0.278	-0.518	7.270	1.409
Profitability	39	-0.073	0.059	-1.369	0.239	0.417
Asset Turnover	39	0.997	1.008	0.000	2.405	0.550
IPO Size	39	7.722	7.641	6.279	9.210	0.812
IPO Age	39	3.281	3.178	1.609	5.030	0.801
No. Board Members	39	6.872	7.000	4.000	10.000	1.525

Table A11

Descriptive statistics - PE Controlled on Main markets

This table includes aggregated data for dummy variables included in section 3 for observations listed on Main markets and owned by a financial sponsor holding at least 50% of the shares.

Variable	Number of IPOs	Observations equal to 1	*Observations as % of total*	Std. Dev.
PE Controlled (D)	39	39	*100.0%*	0.000
Missing Sales Growth (D)	39	1	*2.6%*	0.160
No Leverage (D)	39	1	*2.6%*	0.160
Leverage Quartile 1 (D)	39	2	*5.1%*	0.223
Leverage Quartile 2 (D)	39	6	*15.4%*	0.366
Leverage Quartile 3 (D)	39	10	*25.6%*	0.442
Leverage Quartile 4 (D)	39	20	*51.3%*	0.506
Qualitative Underwriter (D)	39	38	*97.4%*	0.160
Qualitative Legal Advisor (D)	39	38	*97.4%*	0.160
Big 4 Auditor (D)	39	36	*92.3%*	0.270
Main Market (D)	39	39	*100.0%*	0.000

Table A12

T-test - Main markets vs. Alternative markets

This table uses a t-test to compare the variable means of companies, floated on the Main markets compared to those of the companies floated on the alternative markets, at the time of the IPO.

Variable	Main market mean	Alternative market mean	Difference	Standard Error	T-stat	Observations
Tobin's Q Value Relative	1.977	2.762	0.785***	0.283	2.776	334
Market Size	1.475	1.484	0.009	0.022	0.393	334
Sales Growth	0.866	0.920	0.054	0.250	0.217	334
Profitability	-0.041	-0.279	-0.238***	0.052	-4.593	334
Asset Turnover	1.081	0.683	-0.398***	0.092	-4.331	334
IPO Size	7.492	4.535	-2.957***	0.152	-19.469	334
IPO Age	3.063	2.181	-0.882***	0.140	-6.279	334
No. Board Members	6.750	4.893	-1.857***	0.195	-9.539	334

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

Table A13

OLS Regression Output – EV/EBITDA Value Relative in Specification (1) and (10)

The table describes and compares the OLS regression results with EV/EBITDA substituted as an alternative valuation multiple. The dependent variable is a value relative of the respective EV/EBITDA of the IPO scaled by the same industry-quarter trading multiple on all exchanges. The first column show a simple linear regression with the PE Controlled dummy. The middle column feature the main specification (10). The last column show (10), but with an interaction term between the main market and the PE controlled dummies with PE1MM0 as the reference group. The reference group in the last column has been chosen to compare PE Controlled on the main market (PE1MM1) vs PE Controlled on alternative market (PE1MM0).

VARIABLE	**EV/EBITDA Specification (1)**	**EV/EBITDA Specification (10)**	**EV/EBITDA Specification (10) + Interaction PE#MM Reference group: PE1MM0**
PE Controlled (D)	-3.212*	-3.610	
	[1.656]	[2.407]	
Main Market (D)		0.615	
		[2.735]	
Market Size		4.780	4.071
		[13.511]	[13.439]
Sales Growth		3.255***	3.438***
		[0.695]	[0.702]
Missing Sales Growth (D)		1.237	1.333
		[8.903]	[8.850]
Profitability		-11.524**	-12.329**
		[5.251]	[5.249]
Asset Turnover		-0.626	-0.582
		[1.313]	[1.306]
IPO Size		0.100	0.153
		[0.757]	[0.754]
IPO Age		-0.617	-0.502
		[0.975]	[0.972]
No. Board Members		-0.512	-0.535
		[0.672]	[0.668]
PE0MM0 (D)			7.564**
			[3.590]
PE0MM1 (D)			5.894
			[4.386]
PE1MM0 (D)			
PE1MM1 (D)			**4.900**
			[3.976]
Constant	6.633***	0.444	-6.563
	[0.921]	[23.133]	[23.248]
Observations	139	139	139
Adjusted R2	0.020	0.178	0.188
Leverage Dummies	No	Yes	Yes
Sector#Year Dummies	No	Yes	Yes

* p<0.1, ** p<0.05, *** p<0.01, SE in brackets

Table A14

OLS Regression Output – First Day Return in Specification (1) and (10)

The table describes and compares the OLS regression results with the First Day Return as the dependent variable. A positive first day return implies underpricing, and vice versa. The first column show a simple linear regression with the PE Controlled dummy. The middle column feature the main specification (10). The last column show (10), but with an interaction term between the main market and the PE controlled dummies, with PE1MM0 as the reference group. The reference group in the last column has been chosen to compare PE Controlled on the main market (PE1MM1) vs PE Controlled on alternative market (PE1MM0).

VARIABLE	**First Day Return Specification (1)**	**First Day Return Specification (10)**	**First Day Return Specification (10) + Interaction PE#MM Reference group: PE1MM0**
PE Controlled (D)	0.039	-0.023	
	[0.039]	[0.051]	
Main Market (D)		0.021	
		[0.063]	
Market Size		-0.125	-0.129
		[0.212]	[0.212]
Sales Growth		-0.001	-0.001
		[0.009]	[0.009]
Missing Sales Growth (D)		0.040	0.038
		[0.055]	[0.055]
Profitability		0.070	0.070
		[0.044]	[0.044]
Asset Turnover		0.011	0.010
		[0.025]	[0.025]
IPO Size		0.024	0.023
		[0.016]	[0.016]
IPO Age		-0.020	-0.020
		[0.022]	[0.022]
No. Board Members		-0.010	-0.010
		[0.015]	[0.016]
PE0MM0 (D)			0.008
			[0.066]
PE0MM1 (D)			0.045
			[0.091]
PE1MM0 (D)			
PE1MM1 (D)			**0.001**
			[0.084]
Constant	0.069***	0.194	0.191
	[0.017]	[0.351]	[0.364]
Observations	334	334	334
Adjusted R2	0.000	0.020	0.017
Leverage Dummies	No	Yes	Yes
Sector#Year Dummies	No	Yes	Yes

* p<0.1, ** p<0.05, *** p<0.01, SE in brackets

Table A15

OLS Regression Output – Five Different Proxies for PE-Influence in Specification (10)

The table describes and compares the OLS regression results for regression specification (10) with different proxies for PE-influence. The dependent variable is a value relative of the respective Tobin's Q of the IPO scaled by the same industry-quarter median trading multiple on all exchanges. In each column a different proxy for PE-influence is used. Please review table 4.2.2.1a for the definitions. The middle column with PE Controlled as a dummy set to 1 if PE-sponsor has at least 50% ownership was chosen for the main regression.

VARIABLE	Specification (10) with PE-Owned dummy	Specification (10) with PE-% ownership	Specification (10) with PE Controlled dummy [Main Regression]	Specification (10) with Renowned PE dummy	Specification (10) with PE-Board Member Ratio
Main Market (D)	-1.111***	-1.047**	**-0.937****	-1.024**	-1.151***
	[0.400]	[0.406]	**[0.408]**	[0.412]	[0.398]
Market Size	2.888**	2.865**	**2.864****	2.814**	2.924**
	[1.389]	[1.386]	**[1.381]**	[1.389]	[1.386]
Sales Growth	0.070	0.071	**0.070**	0.068	0.062
	[0.058]	[0.058]	**[0.058]**	[0.058]	[0.058]
Missing Sales Growth (D)	0.680*	0.677*	**0.698***	0.692*	0.695*
	[0.359]	[0.358]	**[0.357]**	[0.359]	[0.359]
Profitability	-2.152***	-2.172***	**-2.217*****	-2.146***	-2.121***
	[0.290]	[0.290]	**[0.289]**	[0.288]	[0.289]
Asset Turnover	0.694***	0.686***	**0.672*****	0.686***	0.706***
	[0.165]	[0.165]	**[0.164]**	[0.165]	[0.165]
IPO Size	0.510***	0.525***	**0.548*****	0.526***	0.489***
	[0.101]	[0.101]	**[0.101]**	[0.101]	[0.101]
IPO Age	-0.588***	-0.577***	**-0.561*****	-0.578***	-0.595***
	[0.142]	[0.142]	**[0.142]**	[0.142]	[0.141]
No. Board Members	-0.140	-0.134	**-0.141**	-0.135	-0.144
	[0.102]	[0.102]	**[0.101]**	[0.102]	[0.101]
PE Owned (D)	-0.030				
	[0.244]				
PE %-Shares Owned		-0.342			
		[0.436]			
PE Controlled (D)			**-0.588***		
			[0.335]		
PE Qualitative (D)				-0.327	
				[0.399]	
PE Board Member Ratio					0.631
					[0.663]
Constant	0.852	0.736	**0.564**	0.739	0.932
	[2.304]	[2.300]	**[2.290]**	[2.299]	[2.293]
Observations	334	334	334	334	334
Adjusted R2	0.384	0.386	0.391	0.386	0.386
Leverage Dummies	Yes	Yes	Yes	Yes	Yes
Sector#Year Dummies	Yes	Yes	Yes	Yes	Yes

Table A16

OLS - Full Model Statistical Robustness Test

The table show the following statistical robustness tests: VIF: Multicollinearity, Ramsey RESET - H0: No specification error, Brush Pagan - H0: Normality in residuals, Shapiro-Wilk W - H0: No heteroskedasticity. Tests have been performed on specification (1), (6) and (10) with the Tobin's Q Value Relative as the dependent variable

Specification	**(1)** **Q**	**(6)** **SE+OP+GO+FI**	**(10)** **[Main Regression]**
Variance Inflation Factor			
PE Controlled (D)	N/A	1.49	1.57
Market Size		1.04	1.04
Sales Growth		1.15	1.16
Missing Sales Growth (D)		1.45	1.47
Profitability		1.38	1.38
Asset Turnover		1.34	1.36
IPO Size		2.17	2.69
Leverage Quartile 1 (D)		2.90	2.94
Leverage Quartile 2 (D)		3.06	3.07
Leverage Quartile 3 (D)		3.15	3.17
Leverage Quartile 4 (D)		3.24	3.25
IPO Age		1.55	1.55
No. Board Members		1.55	1.68
Mean VIF	**N/A**	**1.96**	**2.05**
Ramsey RESET test for specification error			
F(.)	N/A	8.81	11.20
Prob > F	N/A	0.000	0.000
Breusch Pagan Test for heteroskedasticity			
F(.)	4.92	73.84	65.75
Prob>F	0.027	0.000	0.000
Shapiro-Wilk W test for normality in residuals			
W	0.805	0.913	0.909
V	45.675	20.443	21.258
z	9.017	7.12	7.212
Pr>z	0.000	0.000	0.000

Specifications (1), (6) and (10) without sector#year FE