Essays on Private Investments in Public Equity

PhD Thesis

Styliani Panetsidou

Department of Accounting and Finance

University of Strathclyde, Glasgow

July 2018

Declaration of authenticity and author's rights

This thesis is the result of the author's original research. It has been composed by the author and has not been previously submitted for examination which has led to the award of a degree.

Signed: 

Date: 19 July 2018

Abstract

This PhD thesis, comprised of 3 essays, assesses the activity of Private Investments in Public Equity (PIPEs) and provides new insights on PIPEs behaviour. In the second chapter, I document PIPEs performance around the world and assess whether cross-country regulatory and institutional differences can explain the variation in PIPEs valuation. I document a significant decline in the market valuation around the announcement of PIPEs, especially from 2004 to 2015 and find that firms participating in the PIPE market during these years have worse fundamentals in terms of size, profitability and operating performance. I further find that PIPE issuers are followed by a significant long-term underperformance globally. Finally, consistent with the Law and Finance theory, I show that country governance quality matters, as issuing firms operating in countries with better regulatory quality and higher law enforcement outperform others. In the third chapter, I examine the stock returns and volume prior to PIPE announcements, to document whether there is a price run ahead of the public announcement of the issues. Focusing in the UK and the US, that both have high levels of PIPE activity but differ in the PIPE regulatory environment and insider trading treatment, I assess whether the price run patterns are affected by regulatory differences. In addition, assessing the contemporaneous relationship between abnormal returns and volume, I examine whether the price runs can be explained by leaked information. I find abnormal returns and abnormal volume prior to the announcement of PIPEs in both markets. I further find support of the information leakage hypothesis for US issuers. In the fourth chapter, I assess registered insider trades around PIPEs in the UK. I examine whether insiders adjust their trading strategies before the PIPE issue. I find that insiders significantly increase their net sales in the pre-announcement PIPE period, with the results being robust after controlling for time effects and comparing with a matched sample of control firms.

Acknowledgements

I am truly grateful to my supervisor Dimitris Andriosopoulos for his constant guidance, motivation and support all these years. I really appreciate all his friendly advices and his positive spirit. I am also grateful to the faculty members of the University of Strathclyde, with a special mention to Patrick McColgan for the discussions and Krishna Paudyal and Andrew Marshal for giving me the opportunity to develop my academic skills as a tutor. I would also like to thank my external examiner Dimitris Gounopoulos for his valuable feedback and my master's supervisor Apostolos Dasilas for the advices on my initial steps as a PhD candidate.

I also thank the discussants and participants at the 2016, 2017 and 2018 annual Financial Engineering and Banking Society (FEBS) meeting, the 2017 annual meeting and Northern Area Group meeting of the British Accounting and Finance Association (BAFA) conference, and the 2017 The International Journal of Accounting (TIJA) meeting for their helpful comments and suggestions. I am also grateful to the Scottish Graduate School of Social Science (SGSS) and the Economic and Social Research Council (ESRC) for the financial support on my PhD studies.

A special gratitude to my partner Angelos Synapis for being the greatest inspiration, motivation and support. You have made this journey much more enjoyable. Finally, I am grateful to my friends from back home and from the University of Strathclyde, and my parents Christos and Alexandra and my brother Zisis, for the emotional support all these years. This PhD wouldn't have been such a great experience without you. Thank you for all the encouragement!

Table of Contents

List of Tables

List of Figures

List of abbreviations

ADR	American Depositary Receipt
AR	Abnormal Returns
AV	Abnormal Volume
BHAR	Buy and Hold Abnormal Returns
CAR	Cumulative Abnormal Returns
CAV	Cumulative Abnormal Volume
CMPO	Confidentially Marketed Public Offerings
CRSP	Centre for Research in Security Prices
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortization
EPS	Earnings Per Share
EU	European Union
FCA	Financial Conduct Authority
FSMA	Financial Services and Markets Act
GBP	Great Britain Pound
ICRG	International Country Risk Guide
M&A	Merger and Acquisition
MAR	Market Abuse Regulation
NYSE	New York Stock Exchange
OTC	Over The Counter
PIPE	Private Investment in Public Equity
R&D	Research and Development
ROA	Return On Assets
SEC	Securities Exchange Commission
SEO	Seasoned Equity Offering
TRD	Thomson Reuters Datastream
UK	United Kingdom
US	United States
VC	Venture Capital

1. Introduction

1.1 An overview of Private Investment in Public Equity

Private Investment in Public Equity (PIPE) is an equity funding choice, for publicly listed firms, to raise equity from a group of accredited private investors. PIPE issues differ from traditional public placements in terms of cost and time efficiency. Specifically, PIPE issuers can close the deal and receive the cash quickly[1] as they do not have to go through time-consuming procedures such as a Securities Exchange Commission (SEC) review or a prospectus compilation. In addition, PIPE issuers, if they choose to, they can directly negotiate with the investors, without the use of an intermediary, thereby limiting all the direct issuance costs, which makes a PIPE a cost effective capital raising method. PIPE issues also differ from traditional private placements as they impose much shorter resale restrictions. Traditional private placements have resale restrictions that can last up to two years, while in a PIPE the purchased securities can typically be resold within 3 to 4 months. However, even for this short illiquid period, investors are typically compensated in the form of discounts that can be 5 to 6 times higher than the discounts offered in Seasoned Equity Offerings (SEOs) (Chen, Dai and Schatzberg, 2010).

Because of their benefits, PIPEs have grown to be an important choice for capital raising, establishing their position in the market. Specifically, PIPEs have exceeded the number of deals and proceeds of SEOs during the decade 1996 – 2006 (Chen et al., 2010). In a more recent study Lim, Schwert and Weisbach (2018) also report that PIPEs have raised circa $243 billion via PIPEs, which is similar in magnitude to the proceeds of SEOs (circa $240 billion) during the same period, showcasing the increased PIPEs popularity. More interestingly, PIPEs have spread their activity not only in the US but globally, with the most popular markets for PIPEs outside the US being

[1] PIPEs negotiations between issuers and potential investors is typically a 1 to 2 weeks' process, while following the receipt of a definite purchase commitment from the investors, the issuer can close the transaction and receive the funds (Dresner and Kim, 2010).

Canada, the United Kingdom, Australia and Hong Kong. More than 17,000 issues are reported outside the US between 1995 and 2015[2].

This rapid growth in PIPEs activity has attracted not only market interest but also academic attention. Despite PIPEs activity spreading around the world, the findings on PIPEs behaviour is so far concentrated on US issuers. Studies on US PIPEs, report that these issues are followed by positive returns around their announcement and negative long term performance (Berkman, Mckenzie and Verwijmeren, 2016; Brophy, Ouimet and Sialm, 2009; Chen et al., 2010; Dai, 2011; Floros and Sapp, 2012), which is similar to the behaviour observed in private placements (Hertzel, Lemmon, Linck and Rees, 2002). However, studies that differentiate between issue types and participating investors show that PIPEs behaviour is not always the same. For instance, it is reported that structured PIPEs in the US perform worse than traditional PIPEs (Brophy et al., 2009) while specific categories of participating investors, such as hedge funds, are also associated with worse performance, due to the hedge funds tendency to finance firms with generally poor financials (Brophy et al., 2009), whereas higher participation of venture capitalists is associated with better performance (Dai, 2007).

1.2 PIPE motives and firm characteristics

PIPE firms are reported to be young, small, risky (Brophy et al., 2009; Dai, 2007, 2009) and R&D intensive firms that are likely to face financing constraints (Brown and Floros, 2012). Additionally, they tend to be financially distressed and have high cash burn rates, which effectively means that they have little time before running out of cash (Chaplinsky and Haushalter, 2010; Floros and Sapp, 2012). Due to these characteristics, PIPEs have been reported to be a last resort financing for poor performing firms with large information asymmetries (Brophy et al., 2009; Chen et al., 2010). In addition, studies assessing the choice between PIPEs and SEOs, report that due to their poor financial conditions, PIPE issuers are left with fewer options for capital raising (Chaplinsky and Haushalter, 2010), while characteristics

[2] Based on data from Sagient Research Placement Tracker database.

such as low analyst coverage, high information asymmetry and poor operating performance are traditionally seen as unattractive for the SEO market (Chen et al., 2010). Further to that, Floros and Sapp (2012) find that firms that repeatedly issue PIPEs do not satisfy the performance criteria required for public offerings.

Overall, the existing studies find that firms choose to issue a PIPE either due to their poor financial condition or because they cannot bear the costs of large public issues (Chaplinsky and Haushalter, 2010; Chen et al., 2010; Floros and Sapp, 2012). US evidence on PIPEs further shows that these deals are followed by poor long-term performance (Brophy et al., 2009; Lim et al., 2018). However, there is still scope for investors to participate in PIPEs, as PIPE securities are offered to investors on substantial discounts to the market price (Chen et al., 2010) that allow them to generate profit. In my global dataset, in untabulated results, I find that PIPEs are offered on an average of 5.5% discount relative to their announcement date, consistent with Lim et al. (2018) who find an average discount of 6.3% on US PIPEs, suggesting that these discounts are offered to investors as a compensation for being willing to invest on financially constrained firms.

Existing studies have assessed the impact of discounts on private placements and provide several explanations. One explanation is based on the owner structure theory according to which, firms issue private placements to either acquire funding for their investments or to improve managers' performance (Demsetz and Lehn, 1985; Shleifer and Vishny, 1986; Wruck, 1989). Consistent to that theory, discounts are offered to investors for the anticipated monitoring they will provide. Other studies suggest that discounts are offered to private investors as a compensation for providing expert advice and the costs to evaluate firms' value. Specifically, private investors can dissolve information asymmetries through discussions or negotiations with the management thus assessing the firm value, as such the harder it is to assess a firm, the larger the discount offered (Hertzel and Smith, 1993; Myers and Majluf, 1984). An alternative explanation from Barclay, Holderness and Sheehan (2007) is that discounts are offered to private investors for keeping

a passive position following their purchase of shares, attributing that behaviour to managerial entrenchment. Meanwhile (Anson, 2001) argues that discounts can act as compensation for the liquidity risk the participating investors bear until either the registration or the conversion of the securities purchased.

1.3 PIPE categories and contract types

Since there are several PIPE issue types, in this section I provide details on PIPE categories and provisions in order to clarify the available issue contracts and what pertains them. PIPE issues can be classified in two main categories, traditional and structured PIPEs. Traditional PIPEs comprise mainly of common stock issues, also referred as plain vanilla and fixed price convertibles. Structured PIPEs include more complicated contract terms and are usually based on floating price convertibles, which effectively means that the price of the securities can change if the market conditions or the issuing firm's fundamentals change. In this thesis, I follow the Placement Tracker database classification and categorize PIPEs as follows. Traditional PIPEs refer to common stock issues, common stock-rights offerings, fixed convertibles and non-convertible debt/preferred stocks. In common stock issues, a certain number of shares is issued and offered, usually on a preset discount to the market price. The common stock PIPE may also include warrants that allow investors to purchase additional shares over a certain period following the closing of the deal. Common stock rights issues further give investors the right to participate in future issues in order to keep their ownership percentage. On the other hand, fixed convertibles include securities with a fixed conversion price that can be exercised during a specific time window.

The second main PIPE category as described earlier is structured PIPEs. Structured PIPEs are comprised of floating convertibles, convertible reset issues, convertible-company instalment issues and structured equity lines. Specifically, common stock reset issues are common stock securities with repricing rights that give investors the right to receive extra shares if the market price falls below the price at the closing of the deal. Floating

convertibles are securities with a conversion price that re-adjusts constantly. One point to note in these securities is that they may include floor or ceiling terms that prohibit investors from converting their shares when the price falls/exceeds a pre-set limit. Convertible reset issues are securities with a fixed conversion price, however, this fixed price may reset a few times during the term of the securities. Moreover, company installments, are also securities with a fixed conversion price, but these will be repaid by the company over a number of installments. Finally, structured equity line is a contract that obliges the investor to purchase a certain number of the firm's common stock over a certain period of time.

PIPE contracts are further accompanied by clear terms and provisions. The most popular contract terms include the following: i) Anti-dilution protection which is a contract term that aims to protect investors from future capital raisings on valuations lower than the current issue. This provision allows PIPE investors to convert their securities at a lower price, equal to the new financing, or acquire more cash or stock. Anti-dilution protection is more popular amongst convertible issues and less frequently included in plain-vanilla common stock issues (Dai, 2009). ii) Investor registration rights which is the most popular provision that is included in the majority of PIPE contracts. It aims to mitigate investors' illiquidity risk due to the latter not being able to sell the securities purchased. The registration rights provision demands that the issuing firm files a resale registration quickly (no later than a set time window) after the closing of the PIPE deal, so the participating investors can trade their newly acquired securities. iii) Investor rights of first refusal which is another popular provision; it allows PIPE investors to purchase additional securities within a period of time after the closing of the deal with lower transactions costs. iv) Investor board representation which is a rare provision that gives the right to participating PIPE investors to nominate directors to the firm's board. This term is most commonly found on common stock issues. v) Trading/hedging restrictions. Some contracts include provisions that prohibit investors from short-selling or hedging the securities purchased through the PIPE issue for a period of time after the

closing of the deal in order to avoid circumstances where the selling pressure will result in significant decreases in the firm's stock price. These provisions are most commonly found on convertible issues and rarely on common stock issues.

Although traditional PIPEs have always been favoured by issuers the already limited number of structured issues has decreased significantly through the years. Possible explanations for this decrease could be the toxic reputation these issues received due to the potential of price manipulation through short sales (Hillion and Vermaelen, 2004) or due to a turn towards issuer friendly contracts with more investor protection terms and fewer repricing rights, which as suggested by Bengtsson, Dai and Henson (2014), was led by a series of SEC investigations to limit price manipulation around PIPEs in 2002.

1.4 PIPE Investors

As stated earlier, PIPE offerings are negotiated with a small group of sophisticated / accredited investors. In the European Union as set by Article 2(1e) of Directive 2003/71/EC, the term qualified investor refers to: legal entities such as credit institutions, investment firms, regulated financial institutions, insurance companies, collective investment schemes and their management companies, pension funds and their management companies, commodity dealers or national and regional governments, central banks, international and supranational institutions or certain natural persons or Small Medium Enterprises (SMEs), subject to mutual recognition. A member state may choose to authorise natural persons or SMEs who are residents or have their registered office in that member state and who expressly ask to be considered as qualified investors.

In the US, under Rule 501 of Regulation D, the term accredited investor refers to financial institutes such as banks, pension funds, savings and loan associations, registered brokers or dealers, registered insurance, business development or investment companies, Small Business Investment Companies, directors, executive officers or general partners of the issuer or

any natural person whose individual net worth or joint net worth with that person's spouse, exceeds $1,000,000.

Dai (2009) finds that the most popular investors in the US PIPE market include hedge funds, pension funds, mutual funds, private equity firms, venture capitalists, brokers, banks and insurance companies while Carpentier, L'her and Suret (2011) suggest that the most active PIPE investors in Canada are individual investors. Structured PIPEs are mostly popular to hedge fund investors, as these issues fit the scope of their strategy to fund young firms with high information asymmetries (Brophy et al., 2009). Brophy et al. (2009), in a study in US PIPEs, find that 72% of their structured PIPEs sample is indeed financed by hedge fund investors. Other than hedge funds Dai (2007) suggests venture capitalists as important investors in the PIPE market. The author argues that VCs are interested in PIPEs due to the reasonable returns, lower risk and higher liquidity of these issues compared to placements on private firms.

1.5 PIPE issue process and illustration

A PIPE issue is publicly announced only after the deal has closed. However, before issuing a PIPE, the firm will contact potential investors to assess their interest thereby providing them with information about the upcoming deal. These investors are then not permitted to trade on that information, since it is considered material non-public information. They are also prohibited to advise others to trade on that information (Dai, 2009; Dresner and Kim, 2010) as they are considered "wall crossers" or in other words they have crossed the wall and are temporary firm insiders (Berkman et al., 2016). This pre-issuing process can raise concerns over illegal insider trading. Through the years PIPEs have indeed appeared in the news to be involved in illegal insider trading cases[3] while cases were also recorded that investors tried to "hedge" their positions by short-selling securities before the public announcement of the PIPE (Dai, 2009).

[3] A detailed description of PIPEs involved legal cases is provided in Dai (2009) and Bengtsson et al. (2014).

PIPE transactions typically have a short timetable with the negotiations process amongst the issuer, the placement agent and potential investors spanning a few days (Dresner and Kim, 2010). Once a PIPE issuer receives a definite purchase commitment, they are able to close the transaction and receive the funds typically within 7-10 days. Following the closing of the transaction the issuer will have to publicly announce the deal, else the participating investors will be holding material information that restricts them from trading. Therefore, the issuer announces the deal typically within 1-2 business days.

In order to better understand the structure of these issues, I provide details of a PIPE deal included in my sample. The example corresponds to a US firm, listed on NASDAQ (at the time of the issue), that has raised capital through a structured PIPE, offering unregistered common stock securities via a structured equity line. According to the public announcement at the SEC on 27 January 2014, "Aastrom Biosciences Inc." which is a company that operates in the healthcare products industry, successfully issued a PIPE. The only investor participating to the issue was "Linkoln Park Capital Fund LLC" which under the PIPE contract was obliged to purchase up to 15,000,000 in shares of common stock from the issuing company on several intervals during a 30-month period. There was no underwriter involved in the issue and the securities were offered on a 10% discount that led to a dilution of 36%. In the announcement day the stock price decreased by 8.24%. The PIPE contract further included a floor price provision in which the purchaser could not purchase the shares on a day that the price fell below $2.50 per item. The deal closed on the 21st of January while the public announcement was made on the 27th of January. The issue announcement is illustrated in the Appendix 1-A.

1.6 Thesis aims and main findings

This thesis aims to document PIPEs activity and to bring new insights on PIPEs behaviour both before and after the issue, as well as document investors and price patterns around these deals. The focus of this study is on 3 main topics. My first aim is to document PIPEs performance around the world, so as to gain a complete picture of the behaviour and market reaction

around these issues. While PIPEs have established their position as an equity funding choice, we do not have direct evidence on their performance outside the US. In addition, PIPEs do not have the same activity levels around the world, with the US leading in the number of issues and the rest of the world catching up. Specifically, over 1995 to 2015, United States is the most active market on PIPEs (19,566 deals) followed by America excluding the US (8,980 deals), Asia (5,922 deals) while Europe appears to be less active (2,929 deals)[4]. Further to that, the literature as described earlier, provides mixed evidence when assessing different type of PIPEs and participating investors. So overall, there is a growth in PIPE issues with the levels of activity varying across markets and mixed evidence for different issue types, which taken collectively, raise concerns on whether we can extrapolate US results globally. These concerns motivate my second chapter.

International Business and Law and Finance literature widely assess how cross-country differences can explain firms' financing choices and firms' valuations. Specifically, Law and Finance literature supports that the structure of the law and the quality of its enforcement can affect the financial development of the markets as well as the rights that security holders have. These differences in investors' rights may in turn explain why firms choose different financing methods in different countries (La Porta, Lopez De Silanes, Shleifer and Vishny, 2002; La Porta, Lopez De Silanes, Shleifer and Vishny, 1997, 1998). Similarly, International Business literature supports that macro level institutional elements such as macro-economic and legal factors along with business environments are associated with firms' financing choices and performance (Himmelberg, Hubbard and Love, 2004; Klapper and Love, 2004; Lombardo and Pagano, 1999). Therefore, in my second chapter, further to documenting PIPEs performance around the world, I focus on cross-country institutional and legal origin differences in order to explain the observed variation in PIPE valuations on different markets.

[4] These numbers correspond to all the deals defined as PIPEs in Sagient Research, Placement Tracker database over 1995 to 2015 and are therefore different from my final dataset that excludes firms that do not satisfy certain criteria as described in detail on Chapter 2.3.1

I find that the market reaction on PIPEs has declined from 2004 and until the end of my examination period, with the US announcement returns to be significantly lower compared to earlier evidence, while non-US regions follow this decline as well. I assess various factors in order to explain this negative shift in the announcement performance, including assessing different issue types, comparing firms' fundamentals and considering the impact of the recent financial crisis. I find that firms issuing PIPEs after the observed shift in 2004, are significantly smaller, burn more cash and significantly more firms fall into the distressed zone. Overall, the issuers appear to be in a significantly worse financial position, which offers an explanation for the marked decline in the market reaction. In addition, contrary to the US evidence, I find that outside the US, PIPEs announcement is associated with negative market reaction. Moreover, I find that PIPE issues are followed by significantly negative announcement returns which are robust globally, while traditional PIPEs perform better than structured PIPEs almost across all regions and windows assessed. Finally, I argue that the variation in PIPEs valuation is explained by institutional differences across countries as I find firms operating in countries with better regulatory quality and stronger law enforcement, where there is more transparency, more efficient government and business environment, better investor rights and superior legal protection, to outperform the others. These findings are consistent with the Law and Finance literature that shows that more effective and less corrupt governments lead to better economic outcomes and enhance equity returns (Chiou, Lee and Lee, 2010; La Porta et al., 1998; Lombardo and Pagano, 1999)

Since in my second chapter I find evidence of abnormal returns around the announcement of PIPE deals, there is an opportunity for profit generation for those that are knowledgeable over the upcoming issue as they can potentially use their privileged information to trade profitably over the upcoming event prior to its public announcement. As such, my third chapter focuses on documenting price run patterns ahead of PIPEs. This study is motivated by concerns for illegal trading ahead of PIPEs. The literature has

widely reported price runs ahead of corporate event announcements, such as Mergers and Acquisitions (M&As) (Gupta and Misra, 1989; Jabbour, Jalilvand and Switzer, 2000; Keown and Pinkerton, 1981; King, 2009; Siganos and Papa, 2015) tender offers (Jarrell and Poulsen, 1989), as well as real estate appraisal announcements (Damodaran and Liu, 1993). The "wall crossing" practice ahead of a PIPE, during which potential investors know about the forthcoming firm's financing before its public announcement, makes these issues susceptible to potential illegal trading and are therefore well suited for this examination.

In order to document price run patterns ahead of PIPEs, I examine the Abnormal Returns (ARs) and the Abnormal Volume (AV) during the pre-announcement period. In addition, I gauge the contemporaneous relationship between prices and trading volume (King, 2009; Siganos and Papa, 2015) in order to assess whether the price runs can be explained by leaked information. I focus on the UK and the US market, which are two markets with high PIPE activity that differ in PIPEs treatment and insider trading regulations. The UK market can be argued that it has generally more lenient insider trading penalties, it is reported to be less effective in insider trading prosecutions (Bhattacharya and Daouk, 2002; Bris, 2005) and generally appears more susceptible to illegal transactions (Siganos and Papa, 2015). These differences between the UK and the US market allow me to further assess whether the price-volume behaviour ahead of PIPE announcements is affected by different regulatory and enforcement regimes, aiming to gain insights on which regulatory environment is associated with illegal insider activities and information leakage.

I find price runs as evidenced by abnormal returns and abnormal volume ahead of PIPEs announcement both in the UK and in the US. The abnormal returns in both markets are observed around 2 days prior to the PIPE announcement with the abnormal trading volume starting to be observed around 4 days prior to the PIPE announcement and be more pronounced from two days prior to the PIPE announcement. I further find evidence of information leakage on US PIPEs as evidenced by the strong

contemporaneous relationship between abnormal returns and abnormal volume, which is higher during the pre-announcement period compared to a control period. Finally, contrary to my initial expectations I do not find support of the information leakage hypothesis for UK PIPEs. However, the announcement of a PIPEs is followed by a negative market reaction in the UK. Hence price-volume dynamics may not correctly capture information leakage behaviour, which suggests that a future research examining short-selling activity prior to PIPEs may shed more light on price runs ahead of UK PIPEs.

The fact that issuers assess the interest of potential investors before the PIPE deal, also shows that firm insiders are likely to be aware of the upcoming issue in advance of its public announcement. This idea inspires my fourth chapter in which I focus on assessing registered insider trades prior to the announcement of PIPEs, in order to examine whether insiders use their privileged information of the upcoming PIPE to generate profit. Insider trading literature reports that insiders profitably trade on their personal accounts ahead of corporate event announcements (Agrawal and Nasser, 2012; Harlow and Howe, 1993; Jaffe, 1974; Karpoff and Lee, 1991; Lakonishok and Lee, 2001; Seyhun and Bradley, 1997). Insiders signal information to the market when they announce equity changes, that is reported to affect stock prices (Myers and Majluf, 1984). Hence before the public announcement they can trade profitably on that privileged information. The motivation for this examination arises from the nature of PIPEs issue process that allows insiders to have knowledge of the upcoming event, in order to discuss with potential investors, ahead of its public announcement. The latter when considered together with the substantial impact that corporate event announcements have been reported to have on firms' stock prices, can create a tempting environment for insiders to trade on their personal accounts based on their superior information.

I examine whether insiders adjust their trading behaviour based on the information of the forthcoming PIPE issue, by separately assessing purchases, sales and net sales of insiders registered trades. I focus my examination in the

UK market because PIPE issues trigger a negative reaction in that market, which allows me to assess whether insiders adapt their trading strategy ahead of a negative corporate event. While the price runs generated ahead of UK PIPEs are small in magnitude, PIPEs susceptible nature for market manipulation, arising from the issue procedure, and the UK insider trading legal environment lead me to dig deeper and further assess the insider trading activity ahead of these issues for potential informed trading. Since the Market Abuse Regulation (MAR)[5], which provides the regulatory framework to prevent market abuse, imposes the same laws across Europe, and PIPEs market reaction is also similar across Europe, the findings of this study can be used by other European countries so as to be pro-active as PIPEs expand their activity around Europe. There are two ways in which insiders, who wish to trade on their information, can act ahead of an unfavourable event. They can either sell their shares, thereby engaging in active insider trading or they can refrain from buying additional shares, deviating from their normal buying behaviour, effectively increasing their net sales (sales – purchases) which is known as passive insider trading (Agrawal and Nasser, 2012; Harlow and Howe, 1993).

For my examination I employ a difference in differences approach, following the methodology used in Agrawal and Nasser (2012), and assess insider trades relative to a time-series benchmark and a cross-sectional benchmark and find that contrary to the active insider trading hypothesis insiders do not increase their sales prior to the PIPE announcement. However, I find that insiders increase their net sales during the pre-announcement period, mainly due to the reduction in purchases, which is in line with the passive insider trading hypothesis.

1.7 Thesis Contribution

The main contribution of this thesis can be summarized as follows. First, I provide comparative evidence of the short-term, medium-term and long-term performance of PIPEs across 37 countries around the word. To my knowledge

[5] Market Abuse Regulation, No 596/2014 of the European Parliament.

this is the first global study of the market valuation of PIPEs. Second, I provide evidence that regulatory frameworks and country institutional characteristics are economically and statistically significant on their impact on PIPE valuations, thereby contributing to the Law and Finance and International Business literature. Specifically, I show that better regulatory quality positively affects PIPEs performance as for 1% increase in the regulatory quality and the control for corruption there is an increase of circa 8% and 6% in PIPEs market reaction respectively. Third, I show that the long-term returns following PIPEs are robust across the world and persist to date. Fourth, I document that traditional PIPEs outperform structured PIPEs almost across all regions and time windows. Fifth, I complement the insider trading literature by providing evidence on the price runs as well as price-volume dynamics ahead of PIPEs. Specifically, I find both abnormal returns and abnormal volume ahead of PIPE issues. These findings aim to assist regulators to gain better insights of the behaviour of a corporate event that is susceptible to illegal trading. Sixth, by assessing non-US markets, I address the criticism that findings in the US may be a function of data mining. Finally, I provide evidence on registered insider transactions ahead of PIPEs and show that insiders may engage in passive insider trading as on average they increase their net sales mainly due to the reduction in purchases prior to PIPE announcements in the UK where PIPEs trigger a negative market reaction; showcasing that insiders may need closer monitoring on their transactions.

Overall, this study is of interest to companies, as it provides evidence on issuers' performance around the world, both in the short and in the long term. In addition, this thesis matters to investors, either existing shareholders or private investors contemplating to participate in a PIPE offer as it provides an understanding of the stock returns following PIPEs. The study further contributes to regulators as it sheds light on the price patterns ahead of these deals. Since insider trading regulations are unified across Europe while PIPEs market reaction is qualitatively similar amongst European countries, the evidence from this study using UK data could be extrapolated to other European countries, so regulators can be pro-active as PIPEs spread their

activity. Further to that this research aims to aid regulators and policy makers as it contributes to the discussion of passive insider trading legislation. Finally, PIPEs offer capital to firms that are in need of financing and hence PIPEs aid these firms to continue with their normal operations and fund their investments. In that sense, it could be argued that PIPEs contribute to the growth of the economy and thereby to the people in the economy, so implicitly this study could be of interest to anyone in our society.

1.8 Structure of the thesis

The remaining of this thesis continues as follows. Chapter 2 documents the global performance of PIPE issues and assesses whether institutional differences can explain the variation in PIPE valuations. Chapter 3 assesses whether there are price runs ahead of PIPEs and if these patterns can be explained by leaked information. Chapter 4 focuses on registered insider trades ahead of PIPEs. Chapter 5 offers a discussion of the overall findings, the limitations of this study, provides future suggestions and concludes.

2. A global analysis of Private Investments in Public Equity

2.1 Introduction

The time efficient manner and low issuance costs[6] of Private Investment in Public Equity (PIPE) has led to the emergence of PIPEs as an alternative way of raising capital. Chen et al. (2010) find that the US PIPE market has surpassed the US Seasoned Equity Offering (SEO) market both in dollar volume and number of transactions during 1996-2006. In addition, US PIPE proceeds were almost the same as those of SEOs in 2007-2008 (Floros and Sapp, 2012). In a more recent study Lim et al. (2018) report that during 2001 to 2015, firms in the US raised approximately $243 billion via PIPEs, analogous to approximately $240 billion raised by similar sized firms in US SEOs. PIPEs have not only grown to be a popular funding choice in the US, but their activity has spread globally. Figure 2-1 shows that PIPEs have grown significantly during the last decade, both in numbers and in deal value. For instance, the average deal value per annum is $46bn in the US, $29bn in Asia and $35bn in Europe, showcasing the increased attention from corporations and establishing their position as a means of raising equity capital. This chapter evaluates the market performance of PIPE issuing firms around the world and assesses how varying institutional characteristics affect market valuation.

"Figure 2-1 goes about here"

[6]The transaction can be executed quickly as the issuer can close the deal and receive the funds without going through a time consuming SEC review in the case of US issues, or without the need to publish a prospectus, upon satisfying certain criteria relative to the country of issue in non-US markets. In addition, PIPE issuing firms have the option to negotiate directly with the purchaser without the help of an intermediary, which reduces all the direct offering costs (Chen et al., 2010; Dresner and Kim, 2010).

It is well established in the literature, focusing on US evidence, that firms issuing private equity are followed by a positive short-term market valuation and a long-term underperformance (Hertzel et al., 2002), similar to the behaviour found in public equity placements (Loughran and Ritter, 1995; Ritter, 1991). Likewise, US studies on PIPEs have shown that these issues experience on average a positive market reaction followed by a negative long-term performance (Brophy et al., 2009; Chaplinsky and Haushalter, 2010; Chen et al., 2010; Dai, 2007, 2011). However, not all PIPE issues are reported to follow the same patterns, especially when assessing different types of PIPE deals. For instance, the negative long-term stock performance following private placements is significant only on high growth firms, which can be attributed to investor over-optimism (Chou, Gombola and Liu, 2009). In addition, only structured PIPEs and PIPEs with warrants have negative long-term returns, showcasing that contract types have an impact on PIPEs performance (Ellis and Twite, 2008). PIPEs performance also varies according to the type of the participating investors, with issues funded by hedge funds to perform significantly worse than those funded by other investor types (Brophy et al., 2009). Billett, Elkamhi and Floros (2015) also report investor identity and contract terms to influence PIPEs valuations. Overall, there is a mixed picture regarding the behaviour of these deals, especially when assessing different PIPE types.

Despite the growing popularity of PIPEs in the US, PIPE issues are not used with the same frequency across the world. For instance, in terms of number of issues the US is the most active market on PIPEs (19,566 deals) followed by the Americas excluding the US (8,980 deals) and Asia (5,922) with Europe lagging with a lower number of deals (2,929)[7]. These numbers highlight that the activity and shareholders' wealth creation differ substantially amongst regions. I argue that this variation is driven, at least

[7] These numbers represent the total PIPE issues reported in Sagient Research Placement Tracker database and therefore are higher than the final sample which excludes firms that do not satisfy the criteria of legal structure, security type and data availability. For a detailed description of the dataset collection process, see Table 2-1.

partially, by cross-country differences and hypothesize that by digging deeper into country institutional characteristics, I can potentially explain these differences.

It is well documented in the Law and Finance and the International Business literature, that cross-country differences affect the financial markets' development and firms' financing choices. La Porta et al. (1997,1998) argue that the structure of the law and the quality of its enforcement are potential determinants of the rights that security holders have and how well these rights are being protected. These differences in investors' legal protection across countries, can in turn aid in explaining why firms are being financed so differently in different countries. Cross country differences are also associated with economic growth and firms' ability to raise external capital (Demirgüç Kunt and Maksimovic, 1998; El Ghoul, Guedhami and Kim, 2017). Moreover, other than firm level factors, macro level institutional elements such as macro-economic and legal factors along with business environments, are associated with firms' financing choices and performance (Himmelberg et al., 2004; Klapper and Love, 2004; La Porta et al., 2002; Lombardo and Pagano, 1999). What these studies effectively suggest is that better legal protection can limit investors' profits expropriation fears and thereby raise the prices that securities can achieve in the market, which may offer an explanation for the different price reactions around PIPEs in different markets.

Studies also stretch the importance of legal rights on private equity markets, showing that they affect the rights of the parties and the financial outcomes (Cumming, Fleming and Schwienbacher, 2006). In addition, strong legal environments are associated with fair valuation in private equity contracts (Cumming and Johan, 2013), contractual agreements (Jandik and Kali, 2009) and the contracting evaluation process, as arguably private investors in high law enforcement environments can rely on the information presented on financial reports to conduct their due diligence, while in poor law enforcement countries, investors are more likely to depend on personal

contacts to acquire information. (Cumming et al., 2006; Cumming and Walz, 2009). The evidence of these studies points out that legal environments are highly likely to impact PIPE agreements and therefore potentially explain the variation in returns across countries.

Khanna and Palepu (2010) argue that institutions vary amongst both emerging and developed economies, in line with Djankov, Mcliesh and Shleifer (2007) who argue that there are systematic differences in the effectiveness of institutions across countries in different levels of economic development. They suggest that a large country coverage can mitigate these concerns and lead statistical results to be more reliable. A concern when measuring stock performance is that long-term abnormal returns are sensitive to the methods used to evaluate them and can often disappear when changing model specifications, a way to mitigate these concerns is to use a different dataset (Fama, 1998). Empirical evidence further suggests that anomalies recorded in the literature are not robust across different sample periods (Fu and Huang, 2016), while research findings might cause the market to become more efficient leading well-known anomalies to disappear (Schwert, 2003).

Albeit PIPEs activity is increasingly growing over the world, there is scant evidence of PIPEs' behaviour in non-US markets. The PIPEs growth around the world, the dispersed activity in different markets and the cross-country differences in the regulatory treatment, raise questions on whether we can extrapolate US results worldwide. In order to gain a better understanding of PIPE issues on corporate performance, I assess the announcement, short-term, medium-term and long-term market valuation of more than 10,000 PIPE issues around the world, between 1995 and 2015 covering the universe of PIPE issues during that period. Moreover, in order to answer the question of whether macro level institutions affect PIPEs behaviour, I explore the effects of various public governance factors such as country level governance, law enforcement, corruption and legal structures, on PIPEs performance. In addition, since my study captures the period from the beginning of PIPEs, I

am able to document whether the short-term and long-term valuations of PIPEs persist over time.

Overall, this chapter extends our understanding of PIPEs' behaviour by providing comparative evidence of PIPEs valuation around the world, employing a unified methodology and time horizon across 37 countries. In addition, I contribute to the Law and Finance and International Business literature, by addressing the impact of macro level governance and legal structures on PIPE firms' valuation. Finally, I contribute to the persistence of stock price anomalies literature by assessing whether the long-term price anomalies following PIPE issues persist.

Consistent with the evidence on equity issues (Hertzel et al., 2002; Ritter, 1991) and US PIPEs (e.g. Lim et al. (2018)) I find a positive market reaction to PIPE announcements in the US, but contrary to the US results, I document a negative market valuation in non-US regions. In addition, I find that the short-term market valuation of PIPEs in the US has a downward shift, with the average announcement returns for all PIPEs falling by almost 135% during the last decade of the sample. Following PIPE announcements, firms exhibit a poor long-run market performance across countries, suggesting that this long-term price anomaly is evident globally and is thus not the result of the model specification, the data sample, the sample period, or the sample size bias. More importantly, I find that superior country governance quality and higher law enforcement are positively related to PIPE issuers' performance. Specifically, I find that for 1% increase in Regulatory Quality and Control for Corruption, the average announcement returns increase by approximately 8% and 6% respectively, after controlling for other firm and issue specific factors. This confirms my expectation that higher levels of shareholder protection and more robust legal environments can limit wealth expropriation fears and positively affect the market valuation of PIPEs. In addition, my findings are consistent with the literature indicating a positive relationship between the quality of the legal environment and economic outcomes in terms of corporate valuations, economic growth, market

development (La Porta et al., 2002; La Porta et al., 1997, 1998), firm profitability and equity returns (Hooper, Sim and Uppal, 2009; Lombardo and Pagano, 1999).

I assess various potential factors for the performance shift and the variation of the returns in different countries, including the impact of the recent financial crisis, the firms' fundamentals and the institutional country characteristics. I find that all firms raising capital through PIPEs around the world, from 2004 onwards, have significantly worse fundamentals in terms of size, profitability and operating performance, consistent with the US-based findings of Lim et al. (2018).

The contribution of this chapter is fourfold. First, I provide the first to my knowledge global study of the market valuation of PIPEs. Khanna and Palepu (2010) argue that institutions vary amongst both emerging and developed economies, in line with Djankov et al. (2007), who argue that there are systematic differences in the effectiveness of institutions across countries in different levels of economic development and suggest that a large country coverage can mitigate these concerns and lead statistical results to be more reliable. Second, I provide evidence that regulatory frameworks which affect investors' monitoring and certification are economically and statistically significant in their impact on the market valuation of PIPEs. Third, by extending my analysis to a global setting, I confirm previous US-based evidence and the persistence of stock price anomalies by assessing whether the long-term price anomalies following PIPE issues persist. Therefore, I alleviate any concerns that previous evidence in the literature can be sensitive to the time periods (Fu and Huang, 2016) and to the methods used, since a way to mitigate these concerns is to use a different dataset (Fama, 1998). In addition, I address the concerns of the potential disappearance of market anomalies (Schwert, 2003). Fourth, I find structured PIPEs in their vast majority to systematically perform significantly worse than traditional PIPEs.

The remainder of the chapter is organized as follows. The second section discusses the legal and regulatory framework of PIPEs and develops my

hypotheses. The third section describes the collection of the data and the methods used. The fourth section discusses the empirical results and the fifth section concludes.

2.2 Hypotheses development

2.2.1 Regulatory framework of Private Investments in Public Equity

PIPEs typically fall in two broad categories, traditional and structured. In traditional PIPEs, investors acquire common stock or fixed price convertibles, while structured PIPEs have more complex contract terms and are usually based on floating price convertibles. The rules that apply on PIPEs vary across the world. In the US, although security offerings are required to be registered with the Securities Exchange Commission (SEC), PIPEs are not required to undergo the same regulatory review process and can be exempt of a registration statement subject to satisfying certain criteria[8]. Since there is no SEC review required, the transaction is executed quickly, even within seven days, thus making PIPEs a time efficient method of raising capital. Investors are still restricted from reselling or short-selling their shares until the registration statement receives approval. Due to this restriction[9], investors are compensated with large discounts, that are on average 5 to 6 times higher than those received on SEOs (Chen et al., 2010).

In the European market unlike the US, there are no specific rules for PIPEs. The companies and investors interested in PIPEs will have to conform to the main rules that apply to all listed companies in Europe. The specific rules of the corresponding market may also affect the PIPE issue. For instance, companies traded on regulated markets such as the Euronext or the London's Stock Exchange should follow the Prospectus (2003/71/EC) and

[8] Based on Regulation D, Rule 506 section 4 of the Securities Act of 1933, a company has an exemption of registration statement when satisfying the following criteria: i) the company does not engage in any general solicitation to market the securities; ii) the offering is made to a specific number of accredited investors and iii) relevant information for the investments is made available to investors by the company.

9 The average restriction period, during which purchasers are not allowed to resell their PIPE securities to the public market, is approximately 120 days a time period which is considerably lower than restriction periods that apply to traditional private placements which can last up to two years (Chen et al., 2010).

Transparency (2013/50/EU) directives. However, similar to the US case, as set by Article 3(2) of Directive 2003/71/EC an offer may be exempt from the obligation to publish a prospectus if the offer of securities addresses exclusively to qualified[10] investors. The same rules apply for all EU countries, subject to each EU member jurisdiction.

The takeover code together with the pre-emption rights are considered caveats for PIPEs. A major consideration for large PIPE deals is the mandatory offer requirement that triggers at 30% for the majority of European and Asian[11] countries, while no such regulation is in place for the US. Considerations for smaller deals might include the pre-emption rights which protect shareholders against share price dilution.

2.2.2 PIPE firms' behaviour, legal environment and cross-sectional variation in market valuation

PIPE issues typically exhibit positive announcement returns followed by negative long-term performance (Brophy et al., 2009; Chen et al., 2010; Dai, 2007). The evidence however varies across investor and contract types. PIPEs funded by Venture Capital (VC) perform better due to the certification effect of VCs' commitment to PIPE-issuing firms (Dai, 2007). Structured PIPEs funded by hedge fund investors perform significantly worse, due to hedge funds acting as investors of last resort and the delayed market realization of

10 As set by Article 2(1e) of Directive 2003/71/EC, the term qualified investor refers to: legal entities such as credit institutions, investment firms, regulated financial institutions, insurance companies, collective investment schemes and their management companies, pension funds and their management companies, commodity dealers or national and regional governments, central banks, international and supranational institutions or certain natural persons or SMEs, subject to mutual recognition. A member state may choose to authorise natural persons or SMEs who are residents or have their registered office in that member state and who expressly ask to be considered as qualified investors.
In the US, under Rule 501 of Regulation D, the term accredited investor refers to financial institutes such as banks, pension funds, savings and loan associations, registered brokers or dealers, registered insurance, business development or investment companies, Small Business Investment Companies, directors, executive officers or general partners of the issuer or any natural person whose individual net worth, or joint net worth with that person's spouse, exceeds $1,000,000.

11 In some cases lower limits are imposed such as the case in India where a mandatory offer triggers at 15% (Stewart and Shroff, 2007).

the issuing firms' troubled financial state (Brophy et al., 2009). Staged financed PIPEs perform better in the long-term since staging acts as a monitoring mechanism (Dai, 2011). Floros and Sapp (2012) find positive market valuation following initial PIPE offerings but negative and insignificant returns across successive offerings and argue that investors find continuous issues as no longer informative for the firm's value.

Prior studies have widely assessed legal institutions and law enforcement, striving to explain international differences on the development and functioning of the capital markets, cost of capital and firm valuations. The literature suggests that government and governance quality have a major role in corporate decisions, economic growth and firm value on a global setting (Brockman, Tresl and Unlu, 2014; Dittmar, Mahrt Smith and Servaes, 2003; Haider, Liu, Wang and Zhang, 2017; Liu and Magnan, 2011). Moreover, strong legal protection and efficient legal systems can lead to better outcomes in financial development (La Porta, Lopez De Silanes and Shleifer, 1999; La Porta et al., 1997). Well-functioning legal systems offer better protection to outside investors, enabling firms to raise external financing (La Porta et al., 2002) and leading to lower investment risk (Chiou et al., 2010). Meanwhile, investors who enjoy only security benefits, are more reluctant to invest in weak legal protection countries due to the information asymmetry between inside and outside investors that limit their profit potential (Giannetti and Simonov, 2006). Higher legal quality systems are also reported to provide lower ex-ante investment uncertainty (Hail and Leuz, 2006) higher demand for equity and higher risk adjusted returns on equity, either through the reduction of agency costs between managers and shareholders or simply due to the improvement in firms profitability which makes companies pay higher returns to their shareholders (Lombardo and Pagano, 1999). Similarly, Fan, Rui and Zhao (2008) report that firms in countries with weak governance tend to finance their projects through debt rather than equity, due to the increased agency and transaction costs, leading to a reduced demand for equity and therefore lower equity returns. Gompers, Ishii and Metrick (2003), also argue that weak governance induces higher agency costs and leads to lower equity

returns. Effectively what these studies suggest is that more robust legal environments lead to better outside investor protection thereby facilitating firms' access to external capital and growth opportunities, ultimately leading to higher equity valuations.

However, this is not the only view of how legal institutions impact firms' valuations. Well-functioning legal institutions may reduce the risk-premium demanded by investors, thereby reducing the cost of capital. This view effectively reports that weak legal environments may be considered risky to investors and induce them to require higher risk premiums, suggesting a negative relationship between regulatory quality and equity returns. In fact, Low, Kew and Tee (2011) find stock markets in weak governance countries to have higher average equity returns, arguing that investors associate low governance quality with higher risk and hence demand higher risk premiums as compensation. In line with this view, Hail and Leuz (2006) report that more effective and better enforced legal systems have significantly lower cost of capital. Albuquerue and Wang (2008) also provide evidence that weak legal environments are associated with higher equity risk premiums. Their model supports that investment in countries with weak investment protection increases volatility and ultimately equity returns. In line with the latter studies Harvey (1995) studying emerging markets, that typically have weaker governance, also finds increased volatility and higher risk premiums. In this international setting I aim to assess how the differences in ex-ante institutional quality and law enforcement can explain the cross-sectional variation in the market valuation of PIPEs.

The development of laws in each country is based on a few legal families and traditions (Watson, 1974). In line with this argument, La Porta et al. (1998) show that laws vary across countries due to these legal origin differences and argue that while there are no countries with laws exactly alike, there are certain similarities that allow for the classification of legal families. Specifically, common law countries give investors the highest legal rights while German and Scandinavian civil law countries have the strongest law

enforcement. In contrast, French civil law countries have the weakest legal protection and law enforcement (La Porta et al., 1998; Shleifer and Vishny, 1997).

In order to assess whether legal structures influence the market valuation of PIPEs I follow La Porta et al. (1998) and classify firms into four categories: a) English common law and b) French, c) German and d) Scandinavian Civil law legal origin. If PIPE performance is influenced by strong legal rights, I expect to find a positive and significant relationship between PIPEs market reaction and English common law. If law enforcement influences PIPEs performance, I expect the market reaction to be significantly better on German and Scandinavian civil law issuers. This formulates my first hypothesis:

Hypothesis 2-1: Country legal origin affects the market valuation of PIPEs.

Legal origin classification is a time invariant characteristic. Recent studies show that firms of the same legal origin can still vary subject to the advances of judicial system over time (Chiou et al., 2010). In addition, Berkowitz, Pistor and Richard (2003) report that an important determinant of the effectiveness of legal institutions is the way the respective countries received their law, rather than the legal family they belong, which effectively leads to differences in the legal system between countries of the same legal origin. Therefore, I include in my analysis three alternative time variant variables, proxying for legal rights and law enforcement. As legal rights and law enforcement proxies I include the variables "Control for Corruption", "Regulatory Quality" and "Rule of Law". Higher scores point to more robust business and legal environments.

If a strong governance framework leads to better economic outcomes, higher demand for equity and higher equity valuations (Chiou et al., 2010; Hooper et al., 2009; La Porta et al., 1998; Lombardo and Pagano, 1999) and effectively greater transparency, investor protection and monitoring, I expect to find superior valuations on PIPE issuers operating in countries with better

institutional quality. However, if poor governance quality leads to increased risk valuation thereby driving investors to demand higher returns as compensation for the increased risk (Low et al., 2011), I expect a negative relationship between PIPE returns and governance quality. My second hypothesis is:

Hypothesis 2-2: Institutional quality is positively related with PIPE valuations.

2.3 Data and summary statistics

2.3.1 Data selection

I formulate a dataset of all PIPE transactions that occurred worldwide. The period under examination is between 1995 and 2015, covering almost the entire period of PIPE issuances. Data for PIPE issue dates and deal characteristics are collected from Sagient Research, Placement Tracker database. Daily stock prices for US firms are collected from the Centre for Research in Security Prices (CRSP) database and for non-US firms from Thomson Reuters[12] in local currency to avoid the potential effect of currency changes. To ensure the quality of the data employed from Thomson Reuters I follow a two-steps cleaning process as suggested by Manconi et al. (2017). First I remove all non-trading days. Second, I remove stale prices due to a firm's delisting, by replacing all zero returns with missing values, starting from the most recent observation up to the first non-zero observation[13].

Financial data are collected from Worldscope database in US dollars for comparability purposes and are complemented by Placement Tracker database. I start with 39,249 issues which is the universe of PIPE issues during the examined period. The final dataset includes data from 37 countries. Following relevant studies (Brown and Floros, 2012; Dai, 2007) I exclude financial firms. I further exclude all firms that trade in Over The Counter

[12] Thomson Reuters database is reported in several studies to have poorer quality stock data compared to the CRSP database (Ince and Porter, 2006; Manconi, Peyer and Vermaelen, 2017). Therefore, I collect US stock data from the CRSP database.
[13] The returns are winsorised at the 1% and 99% by country.

(OTC) and pink sheets[14], American Depositary Receipts (ADRs), Rule 144-A, Regulation S.[15], secondary issues and all "Confidentially Marketed Public Offerings" (CMPO) / overnight offerings and shelf sale issues[16]. These restrictions lead to a final dataset of 93,576 firm year observations comprising 10,408 PIPE issuances from 4,456 unique firms in 37 countries. A breakdown of the sample selection process is presented on Table 2-1.

"Table 2-1 goes about here"

PIPE deals are categorised into traditional and structured as follows. Traditional PIPEs include: common stock issues, common stock-bought deals, common stock-rights offerings, fixed convertibles and non-convertible debt/preferred stocks. Structured PIPEs include: common stock reset issues, floating convertibles, convertible reset issues, convertible-company instalment issues and structured equity lines[17].

2.3.2 Summary statistics

Table 2-2 presents a nation breakdown of the PIPE issues in my final dataset between 1995 and 2015. Throughout the examined period the US has the most PIPE issues (2,747 deals) followed by Australia (2,495 deals) and Canada (2,411 deals). European firms exhibit a lower activity with a total number of 1,808 deals out of which 1,650 are issued by UK firms. Moreover, PIPE funding is not a one-time occurrence. On average each firm issues 3 PIPEs in the US and 2 PIPEs outside the US during the entire examination period, with

[14] There is a large amount of firms trading in OTC markets (29%). This amount is in line with Brown and Floros (2012) and Floros and Sapp (2012) who also find 21% of their PIPE sample to trade in OTC and due to data availability issues they exclude those firms from their empirical testing. These firms are excluded from my sample as there are no data available in Datastream and CRSP.

[15] I exclude all issues categorised as Rule 144-A, as in Brophy et al. (2009), since these securities are issued by larger and more mature firms and are not considered PIPEs due to different regulations. Further, I exclude all the Registration S. securities, as in Chen et al. (2010), since a registration statement is required before the issuance, which makes them inherently different from PIPEs.

[16] CMPOs are publicly announced on the last day of the confidential pre-marketing of the securities, allowing retail investors to participate, while shelf-sale issues require an effective registration statement before the sale of the stock, effectively making these two security types public offerings.

[17] Brophy et al. (2009) offers a detailed description of PIPE security types.

the average proceeds per firm being $90m. The average number of PIPE issues per firm and proceeds however, exhibit a considerable variation as the average proceeds per firm in Europe are $145m, while the average proceeds in the American continent excluding the US and in Asia-Pacific are $36m and $69m, respectively.

"Table 2-2 goes about here"

Table 2-3 presents a breakdown of the dataset according to the region, industry, contract type and issuers' legal origin respectively. The majority of the firms have their headquarters in the US and in Asia-Pacific, as Australia and Hong Kong attract a large number of PIPEs. This is also apparent in Panel D where the sample is dominated by English common law legal origin, due to the large proportion of PIPE issuing firms being from the United States, Canada, Australia and the United Kingdom. Almost half of the firms are in the mining and constructions industry, followed by firms in business equipment and oil, gas and coal extraction industries. In addition, the vast majority of PIPE offerings classify as traditional PIPEs, with common stock issues being the most popular as they hold 63.5% of the total traditional PIPE contracts. Structured PIPEs amount to just 6.6% of the total issues.

"Table 2.3 goes about here"

Table 2-4 Panel A reports the mean (medians are reported in the parentheses) values of the descriptive statistics of PIPE issuing firms from 1995 to 2015 for each nation, clustered on the issuing firms' region. American firms excluding the US, appear to have the lowest market value. Considering that most of the issuers in this region are from Canada, these results are consistent with Carpentier et al. (2011) who show that due to the light listing requirements in Canada there are many small firms listed in the Canadian stock exchanges that are in need of relatively low financing, making PIPEs a good option for their capital needs. US PIPE issuers have an average market-to-book ratio of 3, which is higher compared to PIPE issuers from the rest of the world. Consistent with the literature, I see that PIPE issuers have leverage levels ranging from 19% to 25%. In addition, I note that US firms have the

highest enterprise values (adjusted for total assets), while cash over assets is similar across all regions averaging at 29%, although US firms are more R&D intensive. Cash burn rates are high (negative values) especially in the Americas and US regions, suggesting that these firms do not have much time before running out of cash and pointing to their financial constraints. Operating performance as measured by the return on assets (ROA) is significantly negative across all regions, with approximately 70% of the issuing firms to have negative ROA prior to the PIPE issue. The results on the operating performance are in line with US evidence (Dai, 2007), confirming the poor financial position of these firms. However, they come in contrast with Dahiya, Klapper, Parthasarathy and Singer (2017) who find Asian PIPE issuers to have high operating performance. This difference could be either due to the latter authors earlier sample period (2000-2009) or because they focus to high proceeds PIPEs only[18]. Finally, regarding the pre-announcement performance of PIPE issuers, measured by the Cumulative Abnormal Returns (CARs) on a 21 trading days' window prior to the issue, all returns are positive with the exception of European firms that exhibit a low negative mean performance.

Overall, PIPE issuing firms are small, levered firms with negative operating performance and high financing needs. Prior studies find PIPE firms to be of a distressed nature (Chaplinsky and Haushalter, 2010; Floros and Sapp, 2012), therefore in Table 2-4 Panel B I measure the default probability of PIPE issuers using two methods, the original Altman z-score (Altman, 1968) and the firms' operating income. The first column shows the percentage of firms that have a z-score lower than 1.8, which falls in the unsafe zone, one year prior to the PIPE issue. The second column shows the percentage of firms that have negative operating income during the two years prior to the PIPE issue. Both measures show that PIPE issuers have very high

[18] The authors keep only PIPE issues with proceeds higher than $1m. This criterion is relevant to their study since they are comparing PIPEs to SEOs, however it does not fit the purpose of our paper, in which we aim to document the behaviour of all PIPE issues.

distress risk, a finding which is in line with the literature suggesting that PIPEs are a last resort method of raising capital (Brophy et al., 2009; Floros and Sapp, 2012).

"Table 2-4 goes about here"

2.4 Empirical analyses

2.4.1 PIPE issuers' stock performance

To assess whether the evidence from the US literature on PIPE issuers' performance is robust in a global environment, I use a standard event study methodology. The Abnormal Returns (ARs) are estimated following Brown and Warner (1985) as:

$$AR_{i,j,t} = R_{i,j,t} - \hat{\alpha}_{i,j,t} - (\hat{\beta}_{i,j,t} * R_{m,j,t}) \qquad (2.1)$$

where $AR_{i,j,t}$ is the abnormal return of a security *i*, in country *j*, on day *t*. $R_{i,j,t}$ is the logarithmic return of security *i*, in country *j*, on day *t*, $\hat{\alpha}$ and $\hat{\beta}$ coefficients are estimated based on 250 trading days before day -25 relative to the announcement date and $R_{m,j,t}$ is the return of the market *m*, in country *j*, on day *t*. I use as a benchmark the CRSP value weighted market indices for US firms and the Datastream country indices for non-US firms, following global stock performance studies (Bris, 2005; Manconi et al., 2017). I measure the announcement returns using the window (-4, +5) trading days around the PIPE announcement. To measure the short, medium and long-term stock performance, I use the following time windows respectively (+6, +100), (+6, +250) and (+6, +500) trading days around the PIPE announcement. I follow the time windows used for US issues by Brophy et al. (2009), Chen et al. (2010) and Dai (2011) for comparability reasons.

"Table 2-5 goes about here"

Table 2-5 Panel A shows the cumulative abnormal returns on four different trading days' windows around the announcement of the PIPE issue [(-4, +5), (+6, +100), (+6, +250) and (+6, +500)], clustered by the issuers' region. PIPE issues are further categorised into traditional and structured

according to the contract type. The differences are presented in the last column of each category. Although the cumulative abnormal returns method is considered a standard practice to assess firms' performance, it has been suggested that this method introduces biases especially when assessing long-term returns, as it ignores compounding (Barber and Lyon, 1997). Therefore, on Table 2-5 Panel B I re-estimate the abnormal returns over the same time windows employing the Buy and Hold Abnormal Returns (BHAR) method. This method estimates the returns that original shareholders would get, had they held the stocks for certain periods post the issuance. I estimate BHARs using the formula:

$$BHAR_{i,j,t} = \prod_{t=1}^{N}\left(1 + R_{i,j,t}\right) - \prod_{t=1}^{N}(1 + R_{m,j,t}) \qquad (2.2)$$

where $BHAR_{i,j,t}$ denotes the daily Buy and Hold Abnormal Returns of security *i*, in country *j*, on day *t*, $R_{i,j,t}$ is the logarithmic return of security *i*, in country *j*, on day *t* and $R_{m,j,t}$ is the daily return of market *m*, in country *j*, on day *t*. I use the same benchmarks as in the CARs specification.

Contrary to earlier US based studies that show a positive announcement market reaction around PIPEs, I document negative average announcement returns outside the US and specifically in the European and Asian regions, as shown in both announcement windows and both specifications. In addition, US PIPEs exhibit lower announcement returns compared to earlier studies that find approximately 2% excess returns (Berkman et al., 2016; Floros and Sapp, 2012) and 3.5% to 6% excess returns (Brophy et al., 2009; Chen et al., 2010; Dai, 2011) using examination periods spanning the years 1995 to 2011. I therefore assess in the next section several factors, including the timing of the issues and/or the inclusion of all PIPE types,[19] in order to explain the lower or negative PIPE announcement returns.

Regarding the longer post-announcement windows, I find a significant long-term underperformance following PIPE issues across all regions, with

[19] Lim et al. (2018) in a more recent study, also find higher announcement returns (approximately 4%) when focusing on common equity issues only.

the least underperformance for traditional PIPEs to be evident in US and European firms. Structured PIPEs perform worse than traditional PIPEs almost across all regions and all time windows. However, the differences between the structured and traditional categories are only significant for US and European firms on most windows assessed. US structured PIPEs also appear to have the worst long-term performance (+6, +500) loosing approximately 70%. This significantly negative performance following structured PIPEs could be due to a permanent dilution caused by convertible investors that may push the stock below the fair value to benefit upon conversion (Hillion and Vermaelen, 2004). The negative long-term returns following PIPEs are consistent with literature on IPOs (Aggarwal and Rivoli, 1990; Loughran and Ritter, 1995; Ritter, 1991) and SEOs (Eckbo and Masulis, 1995; Eckbo, Masulis and Norli, 2000; Spiess and Affleck Graves, 1995), while significantly large negative abnormal returns on US structured PIPEs are also reported in Hillion and Vermaelen (2004) and Brophy et al. (2009).

For robustness I repeat the analysis dividing the sample into "initial issues" which include only the first issue of each company, and "follow-up issues" which include all issues from a company except the first one. I do so to alleviate possible concerns that my results are driven by outliers, as Floros and Sapp (2012) report that PIPEs performance deteriorates across successive issues. Alternatively, I assess the returns for a sample that excludes all issues that occurred in less than 255 trading days from the previous issue, effectively keeping only 1 issue per trading year[20]. The latter is a conservative event study approach employed in order to avoid confounding effects that may occur from multiple events in close periods (Bris, 2005; Campbell, Lo and Mackinlay, 1997). The results, presented in Appendix 2-C, are qualitatively similar, however, when I include only the initial issues the returns are slightly better / less-negative, across almost all windows and regions, suggesting that the negative long-term performance is not resulting from outliers. I argue that

[20] I follow this conservative tactic as the announcement or pre-announcement returns of an issue may be contaminated from the previous issue (Bris, 2005).

follow-up issues show larger negative returns due to investors having already observed the firms' negative long-run performance following the initial PIPE issue.

Next, I examine why the announcement returns are lower / negative compared to earlier evidence. As most of the prior studies focus specifically on common stock and fixed price convertible PIPEs (Berkman et al., 2016; Chen et al., 2010; Dai, 2011) for comparability reasons and in order to first assess whether the inclusion of all PIPE contracts can explain the lower / negative PIPE announcement returns; in Table 2-6 I assess the announcement returns (-4,+5) by the security type issued. In line with my expectations and the results on Table 2-5, traditional PIPEs and especially common stock issues perform considerably better than the other security types, exhibiting positive market reaction across all regions with the exception of European firms that show low negative returns. However, even for those security types that perform better, the announcement returns have been decreasing through the years as illustrated in Figure 2-2, while these results extend globally. More specifically, the average announcement returns during the last ten years of the sample period dropped by almost 100% compared to the first 11 years of the sample.

"Table 2-6 goes about here"

Therefore, the timing of the issues may offer an explanation for the lower returns as I notice that PIPEs announcement valuation starts deteriorating from 2004 onwards (Figure 2-2), while this decrease is evident on all security types. Bengtsson et al. (2014) assessing US PIPEs also document an underperformance during 2003-2006 and find PIPE firms to be more distressed compared to earlier years. They associate the underperformance to a series of SEC's actions in 2003 to limit the potential of stock price manipulation around PIPEs.

The SEC investigations that started in late 2002 and resulted in several subpoenas and legal cases filings in 2003, were aiming to limit the potential for price manipulation around PIPEs, stemming mainly from aggressive

investor rights agreed in structured PIPEs. The allegations were mainly regarding insider trading and the sale or short-selling of unregistered securities. This is because if you short sell shares that you acquired through a PIPE transaction before the issuer files a resale registration it effectively corresponds to illegal selling of unregistered securities (Bengtsson et al., 2014). However, Bengtsson et al. (2014) do not find empirical support that the SEC investigations impacted the market reaction to PIPEs. In addition, as seen in Figure 2.2 the negative shift in the market reaction around PIPEs extends to non-US markets. This may extend the possible explanations to non-regulation specific outcomes, as SEC's enforcement or regulation amendments cannot apply globally or simultaneously. Nevertheless, there could be concerns that the SEC action may create a turbulence in the wider PIPE market. For all the above reasons, I take the 2004 as the break point in order to assess alternative reasons for the decline in market reaction around PIPEs.

"Figure 2.2 goes about here"

In Table 2-7 Panel A, I examine the issuers' fundamentals before and after the negative shift in the announcement returns around PIPEs. I find that recent year issuers have significantly worse fundamentals. Specifically, firms issuing PIPEs between 2004 and 2015 are significantly smaller, hold less cash and have significantly worse cash burn rates. In addition, a significantly larger proportion of firms fall into the distressed category as measured by the Altman (1968) z-score, one year prior to the PIPE issue[21], spend less in R&D and have worse profitability and operating performance. These findings suggest that this negative shift in PIPEs market reaction could be attributed to the issuing firms' weak fundamentals. As a robustness check and to alleviate potential endogeneity concerns arising from the association of financially weak firms and poor performance, I assess the announcement

[21] The results are qualitatively similar when I use as a distress proxy, the negative operating income indicator variable, which takes the value 1 if the firm has negative operating income before depreciation during the two years prior to the PIPE issue and 0 otherwise.

returns using a sub-sample of "weak" and "not weak" firms. Specifically, on the one hand, one could argue that firms underperform due to PIPE issues giving a negative signal to the market. On the other hand, the underperformance could be due to weak firms choosing to issue a PIPE and not the PIPE per se. The weak firms sub-sample comprises firms that have cash burn rates lower than the sample median[22]. If both the weak and not-weak firms have poor announcement reaction, it may mean that a PIPE issue is perceived as bad news by the market. If however, only weak firms perform poorly then this could be attributed to the weak firms participating in the PIPE market. The results presented on Table 2-7 Panel B show that the sub-sample of firms with the weaker fundamentals perform significantly worse than the not weak sub-sample, confirming the results on Panel A that PIPEs performance can be explained by the weak fundamentals of the issuing firms.

"Table 2-7 goes about here"

Finally, since my examination period includes the years of the recent financial crisis, in Table 2-7 Panel C I further assess the impact of the recession on PIPEs' performance, as a potential determinant for the low / negative returns. The financial crisis of 2007-08 has seriously challenged the stability of the markets. However, other than asset prices, the financial crisis has adversely affected people's trust towards the firms and the capital markets as a whole (Lins, Servaes and Tamayo, 2017). Lins et al. (2017) highlight the importance of trust for stock performance while trust is further associated with greater economic development (La Porta, Lopez-De-Silanes, Shleifer and Vishny, 1996; Putnam, 2001). Overall, a time of crisis is widely associated with negative market effects (Furceri and Mourougane, 2012; Furceri and Zdzienicka, 2012). Therefore, I assess whether the decline in PIPEs performance can be explained by the financial crisis.

[22] I repeat this test twice. First categorizing weak firms as those with a z-score below the 1.8 threshold. Second categorizing weak firms as those with size, market to book ratio and cash burn rate lower than the sample median, z-score below the distress threshold and leverage higher than the sample median. In both specifications the results are qualitatively similar.

To assess the impact of the financial crisis I split the sample into 3 periods: before, during, and after the financial crisis. During the recession years there is a pronounced drop in the returns. However, there is no sign of improvement during the years following the financial crisis, as the returns keep decreasing. If the negative shift was attributed to the financial crisis I would expect the announcement returns to recover to the levels prior to the recession. Therefore, although the financial crisis could have an impact on firms' and general market's performance, the negative shift in the market reaction around PIPEs cannot be attributed to that, at least in full. Overall, the results suggest that the negative shift in the market reaction can be explained by the weaker condition of firms participating in the PIPE market recently.

2.4.2 PIPE announcement reaction and country level institutional characteristics

In this section I explore PIPEs valuation on different countries, aiming to explain the variation observed in the announcement returns on different regions. To do so, I assess whether cross-country differences, including legal structures and country level institutional characteristics, influence PIPEs' market reaction. I first employ a univariate analysis of differences in the announcement returns across firms with different legal origins. The announcement returns are calculated on a 10-day window (-4, +5) around the announcement of the PIPE. Table 2-8 Panel A shows that German civil law firms exhibit positive and significant announcement abnormal returns. The differences in the abnormal returns between English common law and German civil law firms are also significant. To the extent that the German and Scandinavian civil law countries impose the highest law enforcement, the results suggest that PIPEs are benefited from a strong law enforcement environment.

"Table 2-8 goes about here"

Next, I run the regressions of the announcement returns from firms of different legal origins using firm specific and issue specific characteristics, in

order to check whether the results hold after the inclusion of a set of control variables. Table 2-8 Panel B reports the estimates of the model[23]:

$$CAR_{i,t} = \alpha + \beta_1 * nation\ characteristics_j + +\beta_2 * size_{i,t} + \beta_3 * leverage_{i,t} + \beta_4 * multi\ issuer_i + \beta_5 * proceeds_{i,t} + \beta_6 * pre\ announcement\ returns_{i,t} + \beta_7 * distressed_{i,t} + \beta_8 * R\&D_{i,t} + \gamma * Year + \vartheta * Industry + \varphi * security\ type \quad (2.3)$$

The dependent variable is the average CAR over a 10 days' window (-4, +5) around the announcement of the PIPE. The independent variable of interest here is the nation characteristics which represent the legal origin of the issuing firm. The first set of independent variables, controls for firm specific characteristics that are typically reported to affect firms' performance[24]. Specifically, I control for firms' size using the natural logarithm of market capitalization and leverage as measured by the ratio of total debt over total assets. Small size firms are reported to outperform the market (Fama and French, 1993), I therefore expect a negative relationship between size and the announcement returns. In addition, small firms, given their size, typically have low analyst coverage and therefore high information asymmetry, thus size further serves as a control for information asymmetry (Chen et al., 2010). Leverage and capital structure is also known to affect firms' value since firms may benefit by the tax advantage induced by debt payments (Modigliani and Miller, 1958). Nevertheless, a decrease in leverage levels through equity issues may decrease distress costs and thereby expected returns (Eckbo and Masulis, 1995). I further control for R&D measured as the expenses on research and development over total assets. Since PIPEs are reported to be R&D intensive firms (Brown and Floros, 2012) I expect this variable to be positive and significant. In addition, PIPEs are reported to be of a distressed nature (Chaplinsky and Haushalter, 2010; Floros and Sapp, 2012) therefore, I include a distressed indicator variable, as in Floros and

[23] I repeat the estimations with the explanatory variables being lagged by one year, i.e. at the year-end prior to the PIPE issuance, and the results are qualitatively similar.
[24] All financial data are from the fiscal year end prior to the PIPE issue.

Sapp (2012), that takes the value of 1 if a firm has a z-score lower than 1.8 one year prior to the PIPE announcement and 0 otherwise. I further include a multi-issuer indicator variable that takes the value of 1 if a firm has issued at least two PIPEs during the examination period and 0 otherwise, as multi issuers are identified to be associated with worse performance (Floros and Sapp, 2012). I therefore expect the multi-issuer variable to be negatively associated with my dependent variable. I further include industry and year fixed effects to control for clustering on specific industries and for time varying factors common to all firms. Finally, I include security type indicator variables to control for the effects of specific contract types due to the observed variation in announcement returns amongst security types as shown in Tables 2-5 and 2-6.

The second set of independent variables controls for deal specific characteristics. In particular, the variable PIPE proceeds, measured as proceeds over market capitalization, allows for the consideration of the issue size and its magnitude relative the firm's value. In addition, it serves as a proxy of the amount of information conveyed to the market (Kalay and Shimrat, 1987). Moreover, I control for the pre-announcement returns measured by the CARs from day -25 up to day -5 prior to the PIPE issue. The results confirm my first hypothesis *(H2-1)* that legal origins affect the market valuation of PIPEs as they show that German civil law coefficient is positive and significant in all specifications, even after controlling for firm and issue specific characteristics, suggesting that issuers in countries with strong law enforcement exhibit higher announcement returns.

Legal origin classification is static through the years which can lead to a potential bias of the results. Therefore, I assess PIPE returns over several time windows, as a function of a set of time variant country governance characteristics. Specifically, as nation characteristics in equation (2.3) I now use the variables "Control for Corruption", "Regulatory Quality" and "Rule of Law". Control for corruption measures the corruption in the political system, a low score shows low efficiency in the government and business and

people assuming positions through patronage rather than skills. Regulatory quality is a measure of the investment profile, it assesses the factors affecting the risk to investment including contract viability, profits repatriation and payment delays. Rule of law is a proxy for law enforcement. It measures the impartiality of the legal system and the compliance to the law. A low score shows that a country suffers from high criminality and ignorance to the law while a high score points to a good judicial system. The three country governance measures are significantly positively correlated. Specifically, there is a strong positive relation between the pair Control for Corruption and Regulatory Quality (22%) and the pair Control for Corruption and Rule of Law (41%) explained by the fact that countries with low corruption rates typically have a good judicial system[25]. Hence, I include the variable Control for Corruption on different specifications from the ones that include the Regulatory Quality and the Rule of Law.

"Table 2-9 goes about here"

The results of the panel regressions are reported on Table 2-9. Columns (1) - (4) report the estimates of the regressions on PIPE announcement returns, (5) & (6) report the estimates of the regressions on PIPEs short-term returns, (7) & (8) report the estimates of the regressions on PIPEs medium-term returns and (9) & (10) report the estimates of the regressions on PIPEs long-term returns. The results show that better country governance is positively associated with PIPE announcement returns, thus confirming my second hypothesis *(H2-2)* that PIPEs valuation is influenced by country institutional characteristics. Specifically, I see that the Control for Corruption, Rule of Law and Regulatory Quality coefficients are positive and significant, suggesting that PIPE issuers in countries with better governance quality where there is greater transparency, better legal rules, higher courts' efficiency and higher investor protection, outperform the others. Regulatory Quality and Control for Corruption also remain positive and significant after

[25] The correlation matrix for the variables used in the regressions, is presented in the Appendix 2-D.

the inclusion of a set of control variables. The results are economically significant as I see that a 1% increase in Regulatory Quality leads to an increase of 7.8% in the 10-day CARs, while a 1% increase in Control for Corruption leads to a 6.4% increase in the CARs over the same window.

Furthermore, consistent with the literature I find size to be negatively related to firms' performance, however, the relationship is not statistically significant. Leverage is negatively related to firms' announcement returns, suggesting that high levels of leverage may be associated with firms in poor condition, however, this relationship is soon reversed and I notice a positive relationship between leverage and long-term returns in line with the propositions of Eckbo and Masulis (1995); Jensen and Meckling (1976) and Modigliani and Miller (1958). In addition, in line with my expectations the R&D and the proceeds variables are positive and significant, while the multi-issuer indicator variable is negatively related to firms' returns. Furthermore, I find distressed firms to negatively affect firms' performance while pre-announcement returns do not seem to have a significant role in PIPE firms' valuations.

The coefficient of determination R^2, is relatively low especially on the regressions in the announcement returns. This can be explained by the nature of the data. It is standard in the literature and on empirical studies that regressions with stock returns as the dependent variable have a low R^2 (Bartholdy, Olson and Peare, 2007; Roll, 1988). De Long, Shleifer, Summers and Waldmann (1989,1990) suggest that a possible explanation is that prices not only respond to news but also to irrational noise trading. This noise trading leads to a low R^2 as fluctuations in prices cannot be fully explained by common return factors. Similar low R^2 values are reported in prior PIPE studies as in Floros and Sapp (2012) where on their regression of PIPE announcement returns over a set of firm characteristics they report an adjusted R^2 of 1.70%, Dai (2011) where on a similar regression the author reports an adjusted R^2 of 3.63% when using as dependent variable the announcement window (-4, +5) rising up to 8% for long-term returns and Brophy et al.

(2009) among others where they report an R^2 of 2.52% when they regress the cumulative announcement returns over firm characteristics, rising up to 10% when using long-term returns.

Contrary to the results on the announcement returns, country governance characteristics are no longer significant when assessing longer time intervals. These results suggest that the market in countries with better governance, where there are better quality investment opportunities for firms to use their proceeds and greater investment growth, the market overreacts in the announcement of capital raising through PIPEs. However, this positive valuation does not persist in the long-term as the over-reaction is corrected through time and country governance characteristics no longer affect PIPEs performance. Eckbo and Masulis (1995) suggest that capital structure change effects are unlikely to be closely related to the equity issue in the long-run as they may be offset by subsequent corporate actions. The findings confirm my hypotheses, as consistent with my expectations I find that firms in countries with higher governance quality, and thus higher transparency, better investor protection and monitoring perform significantly better than their counterparts in countries with lower governance quality. My findings also support the findings of Demirgüç Kunt and Maksimovic (1998); El Ghoul et al. (2017); Gompers et al. (2003); Hooper et al. (2009); La Porta et al. (1998) and Lombardo and Pagano (1999,2000), who associate better governance with higher firm valuations.

2.4.3 Robustness checks

As a robustness check, to ensure that the results are not driven by outliers, I repeat the regressions including an indicator variable that takes the value of 1 if the PIPE issue is the first PIPE issue of that company and 0 otherwise. The results are reported in Table 2-10 and show that the country governance variables are qualitatively similar to my previous findings. Meanwhile, the indicator variable is positive and significant in line with my findings that on average the first PIPE issue for each firm has marginally better (or less

negative) performance[26]. These findings also suggest that the markets learn over time as the positive reaction around the PIPE announcement declines on the follow-up PIPE issues. As an alternative robustness check, in order to ensure my results are not driven by a potential clustering of multiple and consecutive PIPE issues, especially in the announcement and short-term analysis, I repeat the estimations by including in the sample only 1 issue per year[27] for each firm. The results, which are not presented here for brevity, are qualitatively similar.

"Table 2-10 goes about here"

Finally, I ensure my results are not spurious by performing a placebo event study. In particular, I ensure my findings are not resulting from general market trends by using as the event day 50 trading days prior to the PIPE announcement. I then run the regressions on the announcement returns and national characteristics again using as the dependent variable the announcement CARs estimated with the placebo event-day. The results presented in Table 2-11, show that the national characteristics variables of interest are insignificant. This confirms the robustness of my results and shows that they are not due to general market trends but rather that legal and institutional frameworks play a key role in the market valuation of PIPEs.

"Table 2-11 goes about here"

2.5 Discussion and conclusion

This chapter documents the market valuation of PIPEs on a global setting between 1995 and 2015. Although, these issue types have grown in popularity around the world, I find that there is a decline in the market valuation of PIPEs surrounding their announcement, with decreased announcement returns being evident across all regions. This can be attributed to the poor fundamentals of the firms participating in the PIPE market during the last decade. In addition, I find strong evidence that the market valuation of PIPEs can be explained by

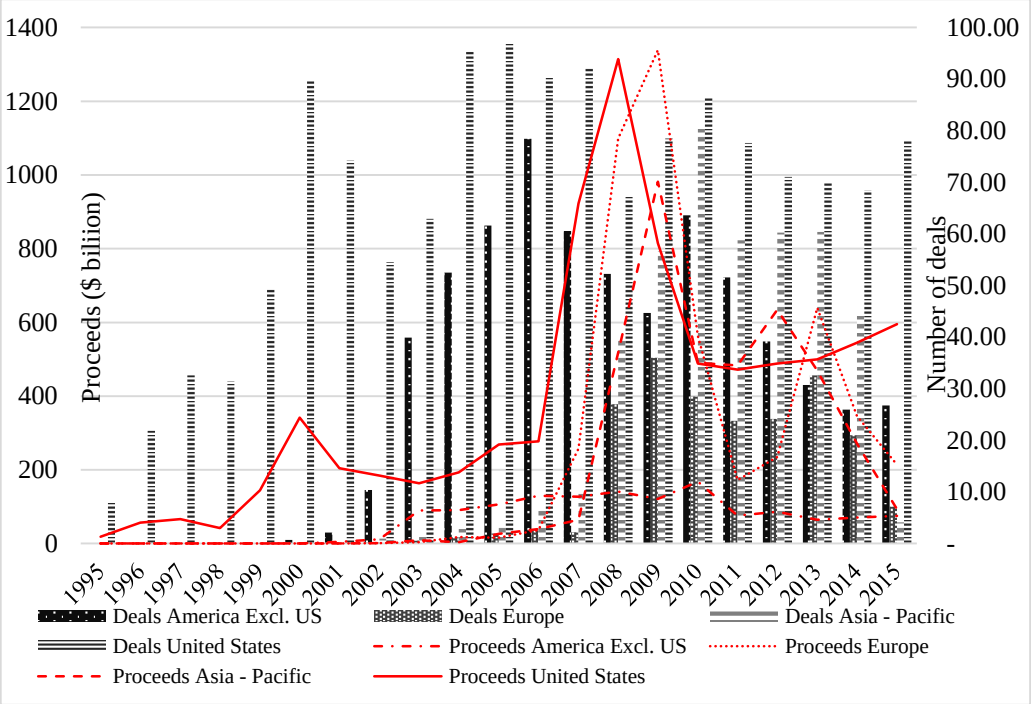
[26] See Appendix 2-C.
[27] For this test I exclude all PIPE issues of the same firm that occur within 255 trading days from the previous one, effectively keeping only 1 PIPE issue per trading year.

differences in institutional characteristics, such as the country level governance quality. For instance, I find that the quality of country level governance matters, as the market reaction around PIPEs is positively associated with lower governmental corruption rates, better regulatory quality and stronger law enforcement. These findings confirm my hypotheses and are consistent with the Law and Finance literature that suggests that more effective and less corrupt government systems enhance the efficiency of investment and increase equity returns.

Moreover, I find that smaller and financially distressed firms choose to raise equity through PIPEs during the last decade, which applies globally. Finally, I find that PIPEs are followed by a significantly negative stock performance in the long-run. The fact that this finding persists on a global setting suggests that the US findings are not driven by a sample bias, pointing to market inefficiency.

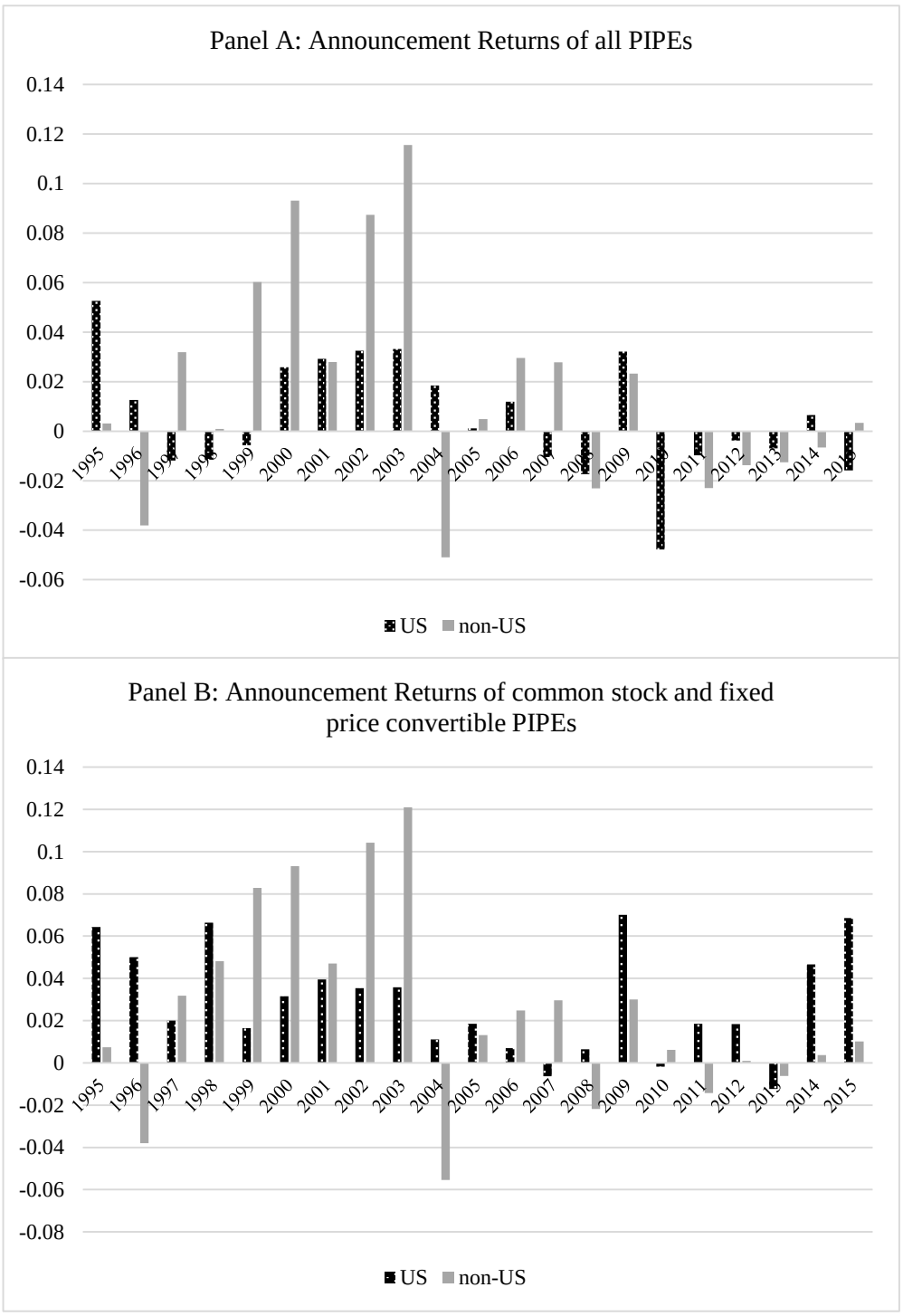
The findings of this chapter that show PIPEs to be associated with abnormal returns on their public announcement, may provide incentives for profit generation to those that are knowledgeable over the upcoming deal prior to its public announcement. Therefore, my next chapter focuses in assessing price-volume patterns during the PIPEs pre-announcement period in order to examine whether there is information leakage and illegal trading activities ahead of these issues.

Figure 2-1: PIPE issues and proceeds ($ billion) by region and year



The graph illustrates the number of PIPE deals and their respective proceeds in $ billion from 1995 to 2015 by region and year. Data of PIPE activity and proceeds are employed from Sagient Research, Placement Tracker database.

Figure 2-2: Announcement Cumulative Abnormal Returns by year



The figure illustrates the cumulative average abnormal returns on a10 days' window (-4, +5) around the announcement of the PIPE issues by issue type. Panel A includes all PIPE types while Panel B includes only common stock and fixed price convertible PIPEs. Issues are categorized into US and non-US, according to the issuers' nation. Stock data for US firms are retrieved from the CRSP database and for non-US firms from Thomson Reuters database. Abnormal returns are winsorised at the 1% and 99%.

Table 2-1: Sample selection

All issues 1995-2015	**39,249**	**100%**
Financial Firms	-3,665	-9%
OTC	-11,238	-29%
Legal structure: Rule 144-A	-1,411	-4%
Legal structure: Reg. S.	-185	0%
Legal structure: Secondary Private	-165	0%
Security type: Common Stock - Shelf Sale (Registered Direct)	-761	-2%
Security type: Common Stock - CMPO/Overnight Offering)	-444	-1%
No financial data	-10,903	-28%
American Depositary Receipts	-69	0%
Total	**10,408**	**27%**

The table presents a breakdown of the sample selection process.

Table 2-2: PIPE deals characteristics

Nation	Number of PIPEs	PIPEs per firm (max)	Number of firms	PIPEs per firm (mean)	Total Proceeds mil. $	Proceeds per firm mil. $ (max)	Proceeds per firm mil.$ (mean)
United States	2,747	37	1,045	3	128,000	4,000	122
Global non-US	7,661	19	3,411	2	274,400	14,000	80
Total	10,408	37	4,456	2	402,400	14,000	90
Region: America Excl. US							
Argentina	1	1	1	1	24	24	24
Bermuda	35	8	8	4	2,420	250	303
Brazil	1	1	1	1	450	450	450
Canada	2,411	19	1,013	2	33,500	1,800	33
Cayman Islands	1	1	1	1	26	26	26
Mexico	1	1	1	1	70	70	70
Total	**2,450**	**19**	**1,025**	**2**	**36,490**	**1,800**	**36**
Region: Asia-Pacific							
Australia	2,495	14	1,032	2	55,800	3,200	54
China	47	4	29	2	2,040	770	70
Hong Kong	794	11	403	2	40,100	2,400	100
India	4	1	4	1	402	180	101
Israel	11	3	8	1	169	47	21
Japan	15	11	3	5	2,130	1,600	710
Malaysia	8	4	5	2	56	20	11
New Zealand	6	1	6	1	249	230	42
Philippines	4	1	4	1	628	380	157
Singapore	10	1	10	1	1,950	1,000	195
Taiwan	7	3	5	1	776	360	155
Un. Arab Emir.	2	1	2	1	641	640	321
Total	**3,403**	**14**	**1,511**	**2**	**104,941**	**3,200**	**69**
Region: Europe							
Austria	1	1	1	1	45	45	45
Belgium	14	3	9	2	6,010	5,500	668
Cyprus	1	1	1	1	79	79	79
Finland	1	1	1	1	1,900	1,900	1,900
France	14	3	11	1	1,010	450	92
Germany	15	3	11	1	4,250	2,700	386
Greece	4	2	3	1	436	200	145
Ireland	43	19	15	3	1,440	300	96
Italy	10	4	2	5	109	34	55
Luxembourg	1	1	1	1	340	340	340
Monaco	5	2	4	1	212	150	53
Netherlands	8	2	6	1	4,420	3,100	737
Norway	11	2	10	1	1,490	700	149
Russia	2	1	2	1	205	190	103
Spain	3	1	3	1	189	100	63
Sweden	20	4	13	2	505	190	39
Switzerland	5	3	3	2	118	43	39
Un. Kingdom	1,650	15	779	2	104,000	14,000	134
Total	**1,808**	**19**	**875**	**2**	**126,758**	**14,000**	**145**

The table reports the summary statistics of all PIPE deals from 1995 to 2015 in my sample with available data on Datastream (non-US firms) and CRSP (US firms). The issues are categorised by the firms' region of operation. For each country the total number of PIPE issues is presented as well as the maximum and the average number of PIPE deals per firm along with their respective proceeds. All the proceeds are shown in million US dollars.

Table 2-3: PIPE issuers' distribution

Panel A: Region classification	***No. of firms***	***%***
America Excl. US	1,025	23.00
Asia-Pacific	1,511	33.91
Europe	875	19.64
United States	1,045	23.45
Panel B: FF 12 industry classification	***No. of firms***	***%***
Consumer Non-Durables	150	3.49
Consumer Durables	79	1.84
Manufacturing	214	4.98
Oil, Gas, and Coal Extraction and Products	485	11.28
Chemicals and Allied Products	68	1.58
Business Equipment	528	12.28
Telephone and Television Transmission	77	1.79
Utilities	99	2.3
Wholesale, Retail, and Some Services	237	5.51
Healthcare, Medical Equipment and Drugs	418	9.73
Other, Mines, Construction, Transportation	1,943	45.21
Panel C: PIPE type classification	***No. of firms***	***%***
Traditional	4,162	93.4
Structured	294	6.6
Panel D: Legal Origin classification	***No. of firms***	***%***
English	4,332	97.22
French	46	1.03
German	52	1.17
Scandinavian	24	0.54

The table presents the distribution characteristics of PIPE issuers from 1995 to 2015. Panel A shows the distribution of PIPE issuers by firms' region of operation. Panel B shows the issuers' industry distribution based on the Fama-French 12 industry classification system. Panel C presents the distribution of PIPE deals into traditional and structured. Panel D shows the legal origin distribution by issuers' nation, following the classification of La Porta et al. (1998).

Table 2-4: Descriptive statistics

Panel A: PIPE firms' characteristics									
Region	**Market Value**	**M/B**	**Leverage**	**Cash**	**R&D**	**EV**	**Cash burn**	**ROA (%)**	**CAR (-25,-5) (%)**
America Excl. US	181,160 (22,735) *2,178*	2.68 (1.42) *2,009*	0.25 (0.00) *2,264*	0.27 (0.18) *2,222*	0.11 (0.00) *2,280*	9.62 (1.57) *2,159*	-7.98 (0.75) *1,949*	-72.09 (-16.27) *2,272*	0.47*** (-0.65) *2,066*
Asia-Pacific	282,788 (33,213) *3,227*	2.58 (1.40) *3,242*	0.22 (0.01) *3,327*	0.29 (0.20) *3,317*	0.03 (0.00) *3,340*	2.41 (1.14) *3,224*	-2.58 (-0.31) *3,245*	-47.86 (-11.34) *3,314*	2.50*** (0.44) *3,207*
Europe	561,594 (44,914) *1,551*	2.67 (1.55) *1,564*	0.19 (0.05) *1,628*	0.23 (0.13) *1,606*	0.07 (0.00) *1,629*	2.38 (1.10) *1,548*	-3.72 (-0.30) *1,580*	-43.98 (-9.75) *1,630*	-1.01*** (-0.88) *1,539*
United States	694,465 (91,179) *2,323*	3.93 (2.49) *2,245*	0.25 (0.14) *2,403*	0.36 (0.25) *2,393*	0.23 (0.07) *2,406*	3.51 (1.72) *2,303*	-8.17 (-0.58) *2,237*	-58.78 (-32.54) *2,406*	0.11*** (-0.33) *2,355*
Total: All regions	408,600 (41,841) *9,279*	2.95 (1.61) *9,060*	0.23 (0.02) *9,622*	0.29 (0.19) *9,538*	0.10 (0.00) *9,635*	4.37 (1.33) *9,234*	-5.33 (-0.45) *9,011*	-55.65 (-15.12) *9,622*	0.84*** (-0.25) *9,167*

Panel B: PIPE firms' default probability		
Region	**% of firms in "unsafe" zone**	**% of firms with neg. operating income**
America Excl. US	85.66	68.95
Asia-Pacific	84.42	69.98
Europe	82.87	54.99
United States	81.45	55.45

Panel A reports the mean (medians are reported in the parentheses) values of PIPE issuers' characteristics over 1995 to 2015 by firms' region. Financial data are retrieved from Worldscope database and are from the fiscal year prior to the PIPE issue. Numbers in italic represent the total observations for each category. Market value is shown in thousand US dollars. The M/B is the market to book item from Datastream, leverage is the ratio of total debt over total assets, cash is computed as cash and cash equivalents over total assets, R&D is the ratio of research and development over total assets, EV is the ratio of enterprise value over total assets, cash burn is the ratio of operating income before depreciation over cash and cash equivalents if the firm has negative operating income and 0 otherwise, ROA is the return on assets computed at the ratio of net income over total assets and CAR (-25, -5) shows the cumulative abnormal returns over trading day -25 to -5 prior to the PIPE announcement. Panel B shows the percentage of PIPE firms with a z-score lower than 1.8 one year before the PIPE issue and the percentage of firms that have negative operating income during the two years prior to the issue, proxying for financial distress. All financial data are winsorised at the 1 and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 2-5: PIPEs performance

Panel A: Cumulative Abnormal Returns

	America Excl: US			Asia Pacific			Europe			United States		
	Tradit-ional %	**Struct-ured %**	**Diff. in means**	**Tradit-ional %**	**Struct-ured %**	**Diff. in means**	**Tradit-ional %**	**Struct-ured %**	**Diff. in means**	**Tradit-ional %**	**Struct-ured %**	**Diff. in means**
(-4,+5)	1.88***	-1.80***	3.68	-0.93***	-2.13***	1.20	-2.20***	-2.59***	0.38	2.28***	-4.28***	6.56***
	(-0.25)	(-0.20)		(-1.76)	(-1.76)		(-1.73)	(-1.99)		-0.16	(-4.00)	
(+6,+100)	-14.47***	-5.22***	-9.24	-12.48***	-29.16***	16.67**	-10.63***	-16.79***	6.16	-12.59***	-25.25***	12.67***
	(-13.82)	(-3.25)		(-11.15)	(-28.57)		(-9.61)	(-15.92)		(-10.63)	(-20.36)	
(+6,+250)	-38.89***	-24.60***	-14.29	-32.51***	-48.33***	15.81	-28.19***	-42.40***	14.22*	-32.56***	-55.74***	23.19***
	(-36.72)	(-18.54)		(-32.09)	(-35.11)		(-21.83)	(-30.16)		(-27.11)	(-42.85)	
(+6, +500)	-80.02***	-63.12***	-16.9	-64.85***	-69.61***	4.76	-55.16***	-81.53***	26.36**	-57.90***	-92.47***	34.57***
	(-76.11)	(-55.27)		(-61.64)	(-46.87)		(-42.87)	(-52.01)		(-47.51)	(-70.56)	

Panel B: Buy and Hold Abnormal Returns

	America Excl: US			Asia Pacific			Europe			United States		
	Tradit-ional %	**Struct-ured %**	**Diff. in means**	**Tradit-ional %**	**Struct-ured %**	**Diff. in means**	**Tradit-ional %**	**Struct-ured %**	**Diff. in means**	**Tradit-ional %**	**Struct-ured %**	**Diff. in means**
(-4,+5)	0.40***	-2.50***	2.90	-1.08***	-4.36***	3.27	-2.24***	-2.49***	0.25	1.74***	-3.62***	5.36***
	(-1.61)	(-1.03)		(-2.52)	(-2.58)		(-2.14)	(-2.85)		(-0.50)	(-4.26)	
(+6,+100)	-19.08***	-11.16***	-7.93	-13.13***	-27.29***	14.16**	-9.34***	-13.81***	4.47	-11.88***	-22.52***	10.64***
	(-25.66)	(-18.41)		(-18.58)	(-27.42)		(-12.47)	(-20.24)		(-16.50)	(-25.74)	
(+6,+250)	-38.93***	-33.58***	-5.36	-27.55***	-41.37***	13.82	-20.91***	-35.50***	14.59**	-25.27***	-43.67***	18.40***
	(-52.15)	(-43.77)		(-40.53)	(-43.47)		(-27.54)	(-44.92)		(-34.39)	(-50.19)	

(+6, +500)	-60.01***	-55.66***	-4.35	-47.39***	-38.39***	-9.01	-38.50***	-55.86***	17.36**	-41.95***	-72.81***	30.86***
	(-74.50)	(-61.58)		(-64.44)	(-68.22)		(-52.38)	(-70.12)		(-52.92)	(-78.44)	

The table summarises the mean (medians are reported in the parentheses) abnormal returns of PIPE issuing firms between 1995 and 2015 by issuers' region. The mean (median) ARs are computed over four time windows, measured in trading days around the announcement of the PIPE issue. Panel A presents the average Cumulative Abnormal Returns. Panel B presents the Average Buy and Hold Abnormal Returns. Abnormal returns are winsorised at the 1% and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 2-6: Announcement returns by security type

Traditional PIPEs	America Excl.: US	Asia Pacific	Europe	United States	N
Common Stock	2.03***	0.38***	-2.24***	3.54***	3,303
	(-0.25)	(-0.78)	(-1.73)	(1.04)	
Common Stock - Rights	1.17***	-6.15***	-3.37***	-2.35***	378
	(-0.34)	(-6.74)	(-3.50)	(-2.80)	
Convertible - Fixed	-0.65***	0.26***	-0.88***	0.90***	413
	(-0.20)	(-0.31)	(-0.48)	(-0.65)	
Non-Convertible	2.57***	8.37***	6.99***	-4.10***	67
	(-0.20)	(8.45)	(0.52)	(-2.52)	
Structured PIPEs					
ATM (At the Market)	-4.65***	-13.76***	-2.12***	-4.92***	86
	(-2.13)	(-13.76)	(-1.18)	(-4.14)	
Common Stock Reset				-3.87***	4
				(-4.26)	
Convertible - Company	0.03	-4.81***	-5.97***	-11.55***	20
	(-4.43)	(-4.81)	(-3.81)	(-12.91)	
Convertible - Floating	1.95***	2.97***	-3.81***	-3.76***	93
	(2.67)	(-3.48)	(-3.20)	(-5.93)	
Convertible - Reset	-3.31***	2.88***	-3.91***	-2.18***	41
	(0.08)	(3.36)	(-0.88)	(-4.32)	
Structured Equity Line	-0.02	-6.39***	-1.95***	-1.83***	50
	(0.28)	(-1.87)	(-2.20)	(-1.96)	

The table summarises the mean (median values are shown in the parentheses) abnormal returns of PIPE issuing firms between 1995 and 2015 by issuers' region and issue type. The mean (median) ARs are computed over a 10-day window (-4, +5) around the PIPE announcement. The last column shows the total number of each issue type in the sample. ARs are winsorised at the 1% and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 2-7: Announcement returns and issuers' characteristics before and after the performance shift

Panel A: Issuers' characteristics before and after the performance shift				
	1995-2003	**2004-2015**	**diff.**	**[p-value]**
Size	551,470	394,965	156,775**	[0.05]
Leverage	0.21	0.23	-0.02	[0.47]
Cash	0.33	0.29	0.04***	[0.00]
Cash burn rate	-2.22	-5.58	3.36**	[0.04]
Distressed	0.78	0.84	-0.07***	[0.00]
EV	3.97	4.39	-0.42	[0.74]
R&D	0.19	0.10	0.09***	[0.00]
EBITDA	-0.38	-0.45	0.07***	[0.01]
CAR (-25,-5)	1.98	0.70	1.28	[0.12]
CAR (-4,+5)	2.11	-0.45	2.56***	[0.00]
ROA	-0.53	-0.56	0.03	[0.52]

Panel B: Announcement Returns by firms' financial position			
Weak firms	**Not-weak firms**	**diff.**	**[p-value]**
-0.68%	0.31%	-0.99**	[0.02]
N 4,051	*4,303*		

Panel C: Announcement Returns by region and				
Period	**America - Excl.: US**	**Asia - Pacific**	**Europe**	**United States**
1995-2006	3.44%***	-2.66%***	3.18%***	1.62%***
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]
2007-2009	2.61%***	0.11%	-0.51%***	0.35%**
[p-value]	[0.00]	[0.18]	[0.00]	[0.05]
2010-2015	1.16%***	-1.26%***	-3.35%***	-1.21%***
(p-value)	[0.00]	[0.00]	[0.00]	[0.00]

Panel A presents the mean values of issuers' characteristics before and after the negative shift in PIPEs announcement returns. Size is the market capitalization in thousand US dollars, leverage is the ratio of total debt over total assets, cash is the ratio of cash and cash equivalents over total assets, cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise, distressed is an indicator variable that takes the value of 1 if a firm has a z-score lower than 1.8 one year prior to the PIPE issue, EV is the ratio of enterprise value over total assets, R&D is the ratio of research and development over total assets, EBITDA is the ratio of the earnings before interest tax amortization and depreciation over total assets. Cumulative abnormal returns are measured over 2 different day windows around the announcement of the PIPE using an OLS market model. ROA is the return on assets computed as the ratio of net income over total assets. Panel B shows the cumulative average abnormal returns as measured by the (-4, +5) window, by firms' fundamentals. Weak firms are considered those that have a cash burn rate lower than the median of all firms. Panel C shows the announcement Cumulative Average Abnormal Returns as measured by the (-4, +5) window by time period: before, during and after the financial crisis. All accounting and stock data are winsorised at the 1% and 99%. Accounting data are from the fiscal year end prior to the PIPE issue, p-values on differences are shown in brackets. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 2-8: Announcement returns and legal origins

Panel A: Differences in Average Announcement	**English**	**French**	**German**	**Scandinavia**
	-0.20***	1.38***	4.28***	-0.09
	[0.00]	[0.00]	[0.00]	[0.70]
F-test - Difference from		0.54	4.48**	0.00
		[0.46]	[0.03]	[0.98]
F-test - Difference from			0.93	0.14
			[0.33]	[0.71]
F-test - Difference from				1.20
				[-0.27]
Panel B: Panel	**(1)**		**(2)**	
French Civil Law	0.02		0.02	
	[0.38]		[0.40]	
German Civil Law	0.05***		0.07**	
	[0.01]		[0.04]	
Scandinavian Civil Law	0.01		0.03	
	[0.82]		[0.43]	
Size			-0.00	
			[0.62]	
Leverage			-0.00***	
			[0.00]	
Multi-issuer			-0.00	
			[0.55]	
Proceeds			0.00***	
			[0.00]	
CAR (-25, -5)			-0.02	
			[0.19]	
Distressed			-0.02***	
			[0.00]	
R&D			0.02***	
			[0.01]	
Constant	-0.02		-0.05	
	[0.54]		[0.41]	
Year effects	Yes		Yes	
Industry effects	Yes		Yes	
Security type effects	Yes		Yes	
$\mathbf{R^2}$	0.02		0.03	
N	*8,858*		*7,043*	

Panel A presents the Average Cumulative Abnormal Returns of PIPE issuers with different legal origins and the F-test statistics on the differences among them. The announcement returns are calculated on a 10 day (-4 +5) window around the PIPE announcement. Panel B reports the estimates of the panel regressions on the announcement returns (-4, +5) and legal origins. Legal origin variables follow the classification of La Porta et al. (1998). Size is measured by the natural logarithm of market capitalization, leverage is the ratio of total debt to total assets, multi-issuer is an indicator variable that takes the value of 1 if a firm has issued more than 1 PIPEs during the examination period and 0 otherwise, proceeds is the ratio of the total proceeds over the market capitalization, CAR (-25, -5) are the Cumulative Announcement Abnormal Returns from day -25 up to day -5 prior to the PIPE issue, distressed is an indicator variable that takes the value of 1 if a firm has a z-score lower than 1.8 one year prior to the PIPE issue and 0 otherwise, R&D is the ratio of research and development over total assets. All accounting measures are from the fiscal year end prior to the PIPE issue. Standard errors are heteroscedasticity robust, p-values are reported in brackets. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 2-9: Performance and country governance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Announcement				Short-term		Medium-term		Long-term	
Regulatory Quality	0.08***		0.08***		-0.09		-0.20		-0.10	
	[0.00]		[0.01]		[0.21]		[0.11]		[0.62]	
Rule of Law	0.08*		0.03		0.11		-0.14		-0.52	
	[0.08]		[0.58]		[0.38]		[0.50]		[0.11]	
Control for Corruption		0.11***		0.06*		0.11		0.02		-0.15
		[0.00]		[0.06]		[0.16]		[0.86]		[0.49]
Size			0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01
			[0.65]	[0.64]	[0.21]	[0.22]	[0.25]	[0.27]	[0.24]	[0.24]
Leverage			-0.00***	-0.00***	-0.00	0.00	0.01***	0.01***	0.01***	0.01***
			[0.00]	[0.00]	[0.17]	[0.16]	[0.00]	[0.00]	[0.00]	[0.00]
Multi issuer			-0.01	0.00	-0.01	-0.01	-0.02	-0.02	-0.10***	-0.10***
			[0.38]	[0.40]	[0.39]	[0.39]	[0.44]	[0.41]	[0.00]	[0.00]
Proceeds			0.00***	0.00***	0.00	0.00	0.00***	0.00***	0.00**	0.00*
			[0.00]	[0.00]	[0.34]	[0.29]	[0.00]	[0.00]	[0.02]	[0.02]
CAR (-25, -5)			-0.02	-0.02	0.02	0.02	-0.01	-0.01	-0.04	-0.04
			[0.19]	[0.20]	[0.45]	[0.45]	[0.78]	[0.78]	[0.45]	[0.46]
Distressed			-0.02***	-0.02***	-0.02	-0.02	-0.05**	-0.05**	-0.02	-0.02
			[0.00]	[0.00]	[0.17]	[0.17]	[0.01]	[0.02]	[0.48]	[0.55]
R&D			0.02***	0.02***	0.02	0.02	0.02	0.01	0.01	0.01
			[0.01]	[0.01]	[0.23]	[0.26]	[0.58]	[0.62]	[0.86]	[0.87]
Constant	-0.10*	-0.04	-0.14*	-0.10	-0.41*	-0.44**	-0.32	-0.62*	-0.28	-0.78*
	[0.06]	[0.26]	[0.09]	[0.16]	[0.08]	[0.03]	[0.43]	[0.09]	[0.59]	[0.07]
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Security type effects	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.01	0.01	0.03	0.03	0.11	0.11	0.11	0.11	0.16	0.16
N	8,829	8,829	7,020	7,020	7,020	7,020	7,020	7,020	7,020	7,020

The table reports the estimates of the panel regressions on PIPE issuers. Announcement returns are measured using the window (-4, +5) days around the PIPE issue, short-term, medium-term and long-term returns are measured over the windows (+6, +100), (+6, +250) and (+6, +500) respectively. Size is measured by the natural logarithm of market capitalization, leverage is the ratio of total debt to total assets, multi-issuer is an indicator variable that takes the value of 1 if a firm has issued more than 1 PIPEs during the examination period and 0 otherwise, proceeds is the ratio of the total proceeds over the market capitalization, CAR (-25, -5) are the Cumulative Announcement Abnormal Returns from day -25 up to day -5 relative to the PIPE issue, distressed is an indicator variable that takes the value of 1 if a firm has a z-score lower than 1.8 one year prior to the PIPE issue and 0 otherwise, R&D is the ratio of research and development over total assets. All accounting measures are from the fiscal year end prior to the PIPE issue. Standard errors are heteroscedasticity robust, p-values are shown in brackets. Abnormal returns are winsorised on the 1% and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 2-10: Performance and governance, first issues only

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Announcement				Short-term		Medium-term		Long-term	
Regulatory Quality	0.08***		0.08**		-0.09		-0.21		-0.11	
	[0.00]		[0.01]		[0.21]		[0.10]		[0.58]	
Rule of Law	0.08*		0.03		0.11		-0.14		-0.54*	
	[0.08]		[0.58]		[0.37]		[0.51]		[0.10]	
Control for Corruption		0.11***		0.06*		0.11		0.02		-0.16
		[0.00]		[0.06]		[0.16]		[0.86]		[0.47]
Size			0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01
			[0.66]	[0.66]	[0.22]	[0.23]	[0.27]	[0.28]	[0.26]	[0.26]
Leverage			-0.00***	-0.00***	0.00	0.00	0.01***	0.01***	0.01***	0.01***
			[0.00]	[0.00]	[0.12]	[0.11]	[0.00]	[0.00]	[0.00]	[0.00]
First Issue			0.01***	0.01***	0.03***	0.03***	0.05***	0.05***	0.08***	0.08***
			[0.01]	[0.01]	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]
Proceeds			0.00***	0.00***	0.00	0.00	0.00***	0.00***	0.00***	0.00***
			[0.00]	[0.00]	[0.39]	[0.32]	[0.00]	[0.00]	[0.01]	[0.01]
CAR (-25, -5)			-0.02	-0.02	0.02	0.02	-0.01	-0.01	-0.05	-0.04
			[0.17]	[0.18]	[0.49]	[0.49]	[0.74]	[0.74]	[0.44]	[0.45]
Distressed			-0.02***	-0.02***	-0.02	-0.02	-0.05**	-0.05**	-0.02	-0.02
			[0.00]	[0.00]	[0.18]	[0.19]	[0.02]	[0.02]	[0.55]	[0.63]
R&D			0.02***	0.02***	0.02	0.02	0.02	0.01	0.01	0.01
			[0.00]	[0.00]	[0.22]	[0.25]	[0.57]	[0.61]	[0.83]	[0.85]
Constant	-0.10*	-0.04	-0.15*	-0.11	-0.44*	-0.47**	-0.37	-0.67*	-0.4	-0.92**
	[0.06]	[0.26]	[0.07]	[0.12]	[0.06]	[0.02]	[0.37]	[0.06]	[0.45]	[0.03]
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Security type effects	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.01	0.01	0.03	0.03	0.11	0.11	0.11	0.11	0.16	0.16
N	8,828	8,828	7,019	7,019	7,028	7,028	7,028	7,028	7,028	7,028

The table reports the estimates of the panel regressions on PIPE issuers. Announcement returns are measured over the window (-4, +5) days around the PIPE issue, short-term, medium-term and long-term returns are measured over the windows (+6, +100), (+6, +250) and (+6, +500) respectively. Size is the natural logarithm of market capitalization, leverage is the ratio of total debt to total assets, first issue is an indicator variable equal to 1 for the first PIPE of the firm and 0 otherwise, proceeds is the ratio of the total proceeds over the market capitalization, CAR (-25, -5) are the cumulative ARs from day-25 to day-5 relative to the PIPE issue, distressed is an indicator variable that takes the value of 1 if a firm has a z-score lower than 1.8 one year prior to the PIPE issue and 0 otherwise, R&D is the ratio of R&D over total assets. All accounting measures are from the fiscal year end prior to the PIPE issue. Standard errors are heteroscedasticity robust, p-values are shown in brackets. ARs are winsorised at the 1% and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 2-11: Performance and country governance, placebo test

	(1)	(2)
	Placebo Announcement CAR	
Regulatory Quality	-0.02	
	[0.38]	
Rule of Law	-0.01	
	[0.74]	
Control for Corruption		-0.02
		[0.46]
Size	0.00	0.00
	[0.32]	[0.32]
Leverage	0.00	0.00
	[0.92]	[0.91]
Multi issuer	-0.01**	-0.01**
	[0.05]	[0.05]
Proceeds	0.00	0.00
	[0.33]	[0.33]
CAR (-25, -5)	-0.02*	-0.02*
	[0.07]	[0.07]
Distressed	-0.01	-0.01
	[0.16]	[0.15]
R&D	-0.01***	-0.01***
	[0.00]	[0.00]
Constant	0.11	0.09
	[0.14]	[0.15]
$\mathbf{R^2}$	0.02	0.02
N	*6,942*	*6,942*

The table reports the estimates of a placebo test, performed to mitigate the concerns that the results on the announcement returns and national characteristics, are driven by market trends. CARs are computed using an OLS market model with the placebo event date being 50 trading days prior to PIPE announcement. Announcement returns are measured using the window (-4, +5) days around the placebo event. Control for Corruption, Regulatory Quality and Rule of Law data are collected from the ICRG database. Size is measured by the natural logarithm of market capitalization, leverage is the ratio of total debt to total assets, multi-issuer is an indicator variable that takes the value of 1 if a firm has issued more than 1 PIPEs during the examination period and 0 otherwise, proceeds is the ratio of the total proceeds over the market capitalization, CAR (-25, -5) are the Cumulative Announcement Abnormal Returns from day -25 up to day -5 relative to the placebo event date, distressed is an indicator variable that takes the value 1 if a firm has a z-score lower than 1.8 one year prior to the PIPE issue and 0 otherwise, R&D is the ratio of research and development over total assets. All accounting measures are from the fiscal year end prior to the PIPE issue. Standard errors are heteroscedasticity robust, p-values are shown in brackets. Abnormal returns are winsorised at the 1% and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

3. Price runs ahead of Private Investments in Public Equity. A comparison between the US and the UK

3.1 Introduction

Academic studies consistently document price runs prior to the announcement of corporate events. Cornell and Sirri (1992) find that informed investors detect insiders' transactions and follow the same behaviour, thus, following a price run pattern. Keown and Pinkerton (1981) and King (2009) find evidence of excess returns prior to merger announcements due to leaked information. Damodaran and Liu (1993) examine excess returns on real estate operating companies and Real Estate Investment Trusts prior to property appraisals and find that insiders trade on this information to generate profits. Eyssell (1990) and Seyhun (1990) find trading volume to increase in line with the information level of insiders. Berkman et al. (2016) extend the discussion of price runs to private placement issues and find significant run-ups in short interest prior the announcements, providing evidence that investors that are tipped with inside information, engage in suspicious trading and take speculative positions prior to the announcement of the issue to gain profit.

In this chapter I examine price runs prior to Private Investments in Public Equity (PIPEs) and assess whether these can be explained by information leakage prior to PIPE announcements. PIPE transactions constitute an interesting environment for this examination for two main reasons. First, PIPE companies will typically question the interest of potential buyers before the offering is publicly announced. This practice, also referred as "wall crossing", can greatly concern regulators as it might create a fertile environment for information leakage and illegal trading. The issue process differs considerably from SEOs where the information is made public to the open market. PIPE issue process also differs to traditional private placements

and IPOs. Albeit there are private roadshows in the latter case, those issues refer to private firms where there is much less liquidity if someone wishes to trade on superior information. This study therefore focuses on publicly listed firms for potential information leakage during the pre-announcement period.

Second, PIPEs have significantly increased their activity and economic significance as an equity funding option in recent years, often surpassing public funding alternatives such as SEOs. Specifically, Bengtsson et al. (2014) report that PIPEs outnumbered SEOs on a ratio of almost 1 to 2 during the period 2003-2012 in line with similar results reported in Chen et al (2010) examining PIPEs versus SEOs between 2000 and 2002.

PIPEs have emerged as a convenient financing method for firms seeking additional equity capital. A distinguishing feature in PIPEs is that issuers are allowed to issue stock privately to a group of investors without the need to go through lengthy procedures such as registering the securities or compiling a prospectus, upon satisfying certain criteria. Therefore, they have the advantage of a fast closing of the deal and receipt of funds. PIPEs further have the additional benefit of enhanced liquidity for the participating investors, since the resale restriction period is considerably lower than the one of typical private placements[28]. However, due to the idiosyncratic contract type of PIPEs and various contract terms, PIPEs have often received criticism for potential price manipulation. For example, a reason for this criticism is that structured PIPEs[29] are typically based on floating price convertibles. Therefore, their price can change if the market conditions or the firms' fundamentals change. As argued in Hillion and Vermaelen (2004), PIPE investors holding convertible securities can potentially exploit this opportunity by short selling shares prior to the announcement of a PIPE and

[28] In traditional private placements the resale restriction can last up to two years, while for PIPEs the average period, that investors have to wait until the purchased stock can be resold, averages to 120 days after the public announcement (Chen et al., 2010).

[29] Contrary to traditional PIPEs that include common stock issues and fixed price convertibles, structured PIPEs are typically based on floating price convertibles. They also include structured equity lines and "At The Market offerings" (ATM).

during the conversion period. These actions can supress the issuer's stock price, so investors can benefit from receiving more stocks upon conversion.

The Securities Exchange Commission (SEC) has tried to address related concerns by initiating in 2002 a series of investigations and enforcement actions on PIPE transactions, aiming to reduce opportunities of market exploitation by specifically targeting short selling activities around PIPE issues[30]. Bengtsson et al. (2014) show that these PIPE enforcement actions, albeit in their majority did not win the respective legal cases, they created an unintended shift from structured PIPEs with investor friendly conversion rights to traditional PIPEs with more favourable terms for the issuers. The fact however that the SEC has chosen to take action, showcases the potential of investors trading on their inside or tipped information ahead of a PIPE announcement.

This study is of importance not only due to the interesting nature of PIPE transactions and contracts, but also because PIPEs activity has increased in recent years establishing their position in non US markets and especially in the UK, that constitutes the leading European country in PIPE issues. Albeit PIPEs are based on the same conceptual framework, there are important differences between the US and the UK markets, both in terms of the PIPEs regulatory environment and the insider trading treatment and regulations. In addition, interestingly although PIPEs are followed by significantly negative long-term returns in both markets, the announcement market reaction differs, with UK PIPEs triggering negative reaction and US PIPEs showing positive returns, which allows me to assess the trading patterns ahead of the same event when deemed positive or negative by the market. I consider the US and the UK to be a fertile ground for my examination for an array of reasons. First as mentioned earlier, regulations differ between the US and the UK and more specifically in the threshold that triggers a shareholder vote for an equity issue, the anti-dilution protection and the mandatory offer legislation. In addition, the UK is the largest PIPE market in Europe holding circa 87% of

[30] For a detailed description of legal cases see Bengtsson et al. (2014).

all European PIPE issues[31], which allows for the collection of sufficient data. Bris (2005) and Bhattacharya and Daouk (2002) illustrate that UK insider trading prosecutions seem less effective as defendants settle before going to trial in most cases, while the fines imposed are much lighter than those in the US. Effectively the UK has lower fines and lower chances of prosecutions, which generate higher expectations for illegal insider trading. On a 2007 speech, Margaret Cole the director of enforcement in the UK's regulator, formerly known as Financial Services Authority (FSA)[32], acknowledged the fact that the UK's successful prosecutions are often compared with the US records and stretched how difficult it is to build on a criminal prosecution case for insider trading. Siganos and Papa (2015) also argue that the UK shows overall signs that insiders are more susceptible to illegal insider trading compared to the US based on the legal framework of the two markets. Overall, the UK framework and prior literature suggest that insiders may be more likely to trade on their private information than their US counterparts.

The insider trading literature has often associated abnormal volume and abnormal returns with illegal insider trading as evident by studies on prosecuted cases (Cornell and Sirri, 1992; King, 2009; Meulbroek, 1992). Bris (2005) further suggests that although the existence of abnormal returns and abnormal volume ahead of a corporate event should not automatically infer illegal trades, it is a sufficient reason for further investigation. There are two competing hypotheses that may explain the price runs ahead of the corporate event announcements. The first is the information leakage hypothesis (Keown and Pinkerton, 1981) that suggests that the price runs are due to investors that trade upon leaked information of the forthcoming event, in order to benefit from the price jump upon the public announcement of the event, thus generating abnormal returns and higher volume than normal. The second hypothesis is the market anticipation (Jensen and Ruback, 1983) that

[31] Based on Sagient Research Placement Tracker data, the UK is the issuing country of 2,427 out of the 2,802 PIPE issues in Europe between 2008 and 2015.
[32] As of April 3, 2013, the Financial Services Authority (FSA) has been renamed to Financial Conduct Authority (FCA).

suggests that price runs can be explained by the market anticipating a potential corporate event based on rumours in the news or industry analysis. In this chapter, I assess abnormal returns and abnormal turnover ahead of the announcement of PIPE issues and question whether the pre-announcement price-volume levels and patterns differ in different or stricter regulatory and enforcement frameworks by examining the US and the UK PIPE market**.**

I find both Abnormal Returns (AR) and Abnormal Volume (AV) ahead of PIPEs, with the abnormal activity starting about 4 days and be more pronounced 2 days prior to the PIPE announcements both in the US and the UK markets. I further find support of the information leakage hypothesis for US PIPEs as observed by the contemporaneous relationship of price and trading volume. However contrary to my expectations, built on the view that the UK is more susceptible for insider trading compared to the US (Bhattacharya and Daouk, 2002; Bris, 2005), I do not find strong empirical support for the information leakage hypothesis as evidenced by the regressions on AR and AV for UK PIPE issues. Since however, abnormal behaviour is observed as evident by the UK PIPEs' prices and volume patterns before the public announcement, this finding could mean that information leakage is difficult to observe ahead of negative corporate events when assessing price-volume dynamics, suggesting that a future research focusing on short-selling activity may assist in gaining better insights over PIPEs' trading patterns before the public announcement in the UK.

The contribution of this chapter to the literature is threefold. First, I complement the insider trading literature by examining price-volume dynamics prior to PIPEs and contribute to the discussion of the information leakage hypothesis around corporate announcements, aiming to assist regulators understand investors' behaviour on a growing method of raising capital that is susceptible to market manipulation. In addition, the discussion and findings of this chapter aim to assist investors intending to participate in PIPE issues as well as current shareholders of the issuing firms to gain a better picture of the issue process and avoid potential situations of market

exploitation. Second, the regulatory and market differences between the US and the UK enable me to record investors' behaviour ahead of PIPEs outside the US, thus avoiding the potential bias that observed regularities in the US may be a function of data mining (Siganos and Papa, 2015). Third, as insider trading regulations apply to all European countries[33], inferences based on the UK market can be of use for the wider European PIPE market. This study can be of potential interest to both regulators monitoring PIPE transactions and investors to avoid situations of market exploitation and to showcase whether PIPEs need more regulatory attention.

This chapter continues as follows. Section 3.2 provides a literature background, describes the legal framework around PIPEs and develops the hypotheses. Section 3.3 describes the data selection process and presents the summary statistics. Section 3.4 reports and discusses the empirical results. Section 3.5 concludes.

3.2 Theoretical background and regulatory frameworks

3.2.1 Theoretical background

The Efficient Market Hypothesis (EMH) on its semi-strong form suggests that one could not take advantage of superior information to generate profit, as security market prices already reflect all the public information available (Fama, 1970). This statement suggests that only someone in possession of confidential or inside information could generate profit by trading on that information. Price runs preceding corporate announcements have been widely documented in the literature, such as on REITs' announcements (Damodaran and Liu, 1993), on mergers and acquisitions' announcements (Gupta and Misra, 1989; Jabbour et al., 2000; Keown and Pinkerton, 1981; King, 2009) or on tender offers' announcements (Jarrell and Poulsen, 1989).

There are two competing theories proposed for these price runs prior to corporate announcements. The information leakage hypothesis and the market anticipation hypothesis. The information leakage hypothesis suggests that price runs are due to either the insiders trading on their superior

[33] See EU 596/2014 regulation.

information, or due to outside investors trading on information that was leaked to them before the announcement is made public (Barclay and Warner, 1993; Keown and Pinkerton, 1981). Trading based on private information should generate abnormal returns, as the private information aids in price discovery. At the same time, there should be abnormal turnover due to non-discretionary trading motivated by increased trading volume prior to the corporate announcements (Keown and Pinkerton, 1981; King, 2009). In addition, illegal trades may be timed so they hide when the turnover is high. The illegal insider trading hypothesis further expects the abnormal returns to follow the same pattern as the abnormal volume, thus creating a significant contemporaneous relationship between stock prices and trading volume, while the reaction on the announcement should be significant but limited, due to the information leakage ahead of the announcement (King, 2009).

The market anticipation hypothesis (Jensen and Ruback, 1983) suggests that information provided typically in firm disclosures or various press releases can explain the price runs observed prior to corporate events. Studies report market anticipation to be based on press rumours (Gupta and Misra, 1989; Jarrell and Poulsen, 1989), while price runs are evident up to a month prior to the rumours due to arbitrageurs trading as the rumours develop (Zeckhauser and Pound, 1990). The rumours refer to pre-announcement published news about the potential corporate event. Specifically, Gupta and Misra (1989) find that price runs are significantly higher when firms are featured in the news as potential targets. In addition, Jarrell and Poulsen (1989) find that the presence of rumours in the media provides the strongest explanatory variable for the price runs ahead of the public announcement of tender offers. The market anticipation hypothesis is associated with abnormal returns being evident close to the announcement date and preceding the abnormal volume, as well as high and significant abnormal returns on the announcement of the event. PIPE announcements however are made public only after the deal has closed and therefore there are no press releases or rumours preceding the issue announcement, so by definition the market anticipation hypothesis should not explain potential price runs.

The main differences of the two hypotheses can be summarised as follows. The information leakage expects abnormal returns to occur on the same days with the abnormal volume and the announcement returns to be significant but limited. The market anticipation hypothesis expects the abnormal returns to be preceding the abnormal volume and the announcement returns to be high and significant.

The market reaction following a PIPE varies according to the country of issuance. In the UK PIPEs are followed by a short-term negative market reaction while PIPEs in the US trigger positive returns following the announcement of the issue. If insiders take advantage of the superior information they have over the upcoming issue and either take positions or tip others to trade according to their expectations of the market reaction on the announcement of the PIPE, I expect this to be evident on the stock returns and stock turnover prior to the issue. Specifically, I expect a positive contemporaneous relationship between abnormal returns and abnormal volume ahead of US PIPEs and negative abnormal returns and high turnover ahead of UK PIPE announcements. This leads me to my first hypothesis.

Hypothesis 3-1a: US PIPE issuers experience price run ups and abnormal turnover prior to the announcement of the issue.

Hypothesis 3-1b: UK PIPE issuers experience negative abnormal returns and abnormal turnover prior to the announcement of the issue.

3.2.2 The legal environment of PIPEs

PIPEs do not follow the standard lengthy equity issuance procedure. In particular, in the US[34] a company has an exemption of registration statement subject to satisfying certain criteria, such as to not engage in general advertisement of the securities, to make the offering to a specific number of accredited investors and to make the relevant information available to investors. In such cases, there is no SEC review required on the resale registration. Hence, the transaction can be executed as quickly as 1-2 weeks

[34] Rule 506 of Regulation D, section 4 of the Securities Act of 1933.

(Dresner and Kim, 2010), making PIPEs a time efficient equity funding choice with limited regulatory concerns. However, investors are restricted from reselling or short-selling their shares until the registration statement receives approval.

In addition to the federal rules applying to PIPEs there are also market rules dependent on the stock exchange that the PIPE company is listed. The so called "20% Rule" is a corporate governance condition that applies to all companies listed on the Nasdaq, the NYSE and the NYSE MKT stock exchanges, that aims to mitigate dilution based issues. A follow-on equity issue including PIPEs, increases the company's number of shares outstanding which dilutes the ownership percentage of existing shareholders. In addition to ownership changes, this dilution can potentially significantly affect the value of the shares, the Earnings Per Share (E.P.S.) and the voting rights. The Nasdaq, the NYSE and the NYSE MKT, as an anti-dilution provision, require a shareholder approval before the issuance of securities on a price below book or market value, or on voting rights exceeding 20% on a private offer[35]. This provision other than mitigating dilution, allows smaller existing shareholders that cannot participate in the private offering, to have time to vote for or sell their shares prior to the offering. A failure to meet the 20% rule requirements will lead to delisting from the specified stock exchanges. As the time required for a shareholders' vote is typically prohibitive for private placements, especially in cases where the issuer has an immediate need for cash, one way around this rule is the issuance of 19.99% of outstanding securities on a first step and more on a second step after having granted the shareholders' approval. In the case of PIPEs, typically the issuers have an immediate need

[35] Nasdaq Rule 5635(d) requires a shareholder approval for transactions other than public offerings, of securities at a price less than the greater of book or market value equal to or exceeding 20% of the common shares outstanding or voting rights prior to the issue. A similar rule applies to the NYSE MKT stated under section 713(a). NYSE Rule 312.03(c) requires a shareholder approval for issues that are equal to / exceed or will be equal to / exceed, upon issuance, of 20% or more of the voting power prior to the issue.

for cash, so there is a rationale for issues to amount to less than 20% of the outstanding common stock or to be split into staged financing.

In the UK there is a different treatment on PIPEs, as unlike the US there are no specific rules defined for these issues. The companies interested in PIPEs will have to conform to the legal and regulatory requirements applying to all listed companies in the UK. The main rules that apply are the listing rules, including the Transparency and Prospectus Directives. Transparency Directive prohibits selective disclosure of price sensitive information[36] (the disclosure and transparency rules require that such information should be immediately published). The Prospectus Directive similar to the legislation in the US, requires that a company listed on the Official List must publish a prospectus. However, in the UK the prospectus requirement addresses any issues to be made in any 12-month period equal to or exceeding the 10% of a listed class of shares from firms quoted in the Official List[37]. Similar to the US case, a prospectus can take sufficient time, typically four to six weeks, and substantial cost to be produced, as it requires an evaluation by the Financial Listing Authority.

A PIPE investor should also pay attention on the shareholding interest that has or will have, to avoid triggering a Rule 9 mandatory offer of the takeover code (Steele, 2009). The takeover code (The City Code on Takeovers and Mergers) mandates that if a person acquires shares equal to or exceeding 30% of the voting rights of a public company, or when the bidder that has not less than 30% but not more than 50% of the voting rights increases its holding, that person should make a mandatory offer in cash for all the remaining shares within 12 months' prior the announcement, unless there is a prior approval of the independent shareholders. An important note here is that there is no similar law in place for the US.

[36] The definition of price sensitive information although it is not specific, it includes all the information that if were made public, it would impact a firm's share price, either upwards or downwards.
[37] Directive 2010/73/EU.

An additional caveat for PIPEs in the UK is the limit on discount under the Listing Rules, according to which any firm listed in the Official List is generally prohibited to issue shares on non-preemptive basis at a discount higher than 10% unless prior approval of the shareholders (50% majority). However, institutional investors will typically agree to give approval for the disapplication of the pre-emption rights, if the issue complies to the Pre-emption Group guidelines which impose even stricter rules. Specifically, the Pre-emption group requires that a firm does not issue shares on non-preemptive basis at a discount higher than 5% or 7.5% within a 3 years' window, a fact that could reduce the interest of private investors. The main differences in PIPEs treatment between the UK and the US are summarized in Table 3-1.

"Table 3-1 goes about here"

3.2.3 Insider trading legislation and enforcement

In private placements, it is typical for firms to engage in a series of private and confidential conversations in order to find potential investors. As soon as the potential investors receive the confidential information, they are temporarily considered as insiders (Berkman et al., 2016). Therefore, they cannot trade on that information according to the Fair Disclosure regulation. Further to this, although PIPE contracts do not include resale restrictions (Bengtsson et al., 2014), the SEC considers short selling prior to the announcement of an issue as an illegal action whether this is from a speculative or from a hedging point (Berkman et al., 2016).

The legal systems acknowledge that price manipulation or market abusive strategies challenge the value that the markets induce to the society, nevertheless it has proven difficult for the legal systems to define explicitly which actions are deemed manipulative and prosecute such cases (Kyle and Viswanathan, 2008). Insider trading laws are put in place to mitigate market manipulation, however, what holds great importance is also the enforcement of the laws (Chen, Huang, Kusnadi and Wei, 2017). What is considered insider trading, the rules that govern it and the extent of their enforcement

differ significantly across the UK and the US. There are substantial differences on the definition of insiders and insider trading as well as the laws around it and their enforcement. In the US, insider trading is regulated by the SEC. The Securities and Exchange Act of 1934 Section 16(b), Section 10(b) and its amendments including the Rules 10b5-1 and 10b5-2 prohibit any person to use or engage in the purchase or sale of securities, when aware of holding non-public material information.

In the UK insider trading is regulated by the Financial Conduct Authority (FCA). However, the first attempt to address insider trading activities as illegal actions was with the Companies act of 1980 and the Company Securities Act of 1985 were it was mandated that when a person is associated with a company and holds non-public price sensitive information, it is illegal to trade on this information or advice any third parties to trade on that information. The Company Securities Act of 1985 was replaced by the Criminal Justice Act of 1993 that deems as legal offence any trading on the basis of non-public information which would affect the prices if made public. More recently the Companies Act of 1993 was replaced by the Market Abuse Regulation introduced by the European Union with effect on all European members. According to M.A.R. (596/2014) if an individual is in possession and uses inside information either for their own account or on the account of a third party, directly or indirectly, it is considered illegal. However, this latest regulation came into effect in the UK from the 3rd of July 2016 and therefore does not apply to my sample firms, as my examination period spans the years 2008 to 2015.

The level of insider laws enforcement also varies significantly between the two countries. In the UK under the Criminal Justice Act of 1993 the maximum penalty for insider trading is 7 years of imprisonment while an unlimited fine can be imposed. These penalties not only apply to insiders but to anyone that trades while aware of holding such information. In the US penalties are more stringent, specifically under section 32(a) of the Securities Exchange Act of 1934, penalties include up to 20 years of imprisonment and up to $5 million for individuals and $25 million for corporations for each

knowledgeable violation of the regulation. In addition, the civil penalty for a violator can amount up to three times the profit gained or loss avoided as a result of the insider trading violation. Further to higher enforcement, US also have more legal cases related to insider trading. In the fiscal year of 2016, the SEC has filed 548 independent or standalone enforcement actions regarding reporting related misconduct by companies and their executives as well as registrants and gatekeepers and obtained orders and judgements amounting to $4 billion in disgorgement and penalties (SEC enforcement results, 2016). In contrast, the FCA only reports the number of penalties imposed. For the year 2015/2016 the cases reported amount to 34 with total value on financial penalties of £884m. (FCA enforcement statistics, 2016). While the measures reported in the two markets are not directly comparable, the numbers indicate that there are far more times that insider trading misbehaving cases are discussed in the US compared to the UK.

Overall, the US has a higher enforcement record with more legal cases investigated as well as higher potential penalties. Studies find that UK prosecutions for illegal insider trades have not been as effective as in the US, mainly due to the lower penalties imposed in the UK in terms of monetary value and imprisonment sentences (Bhattacharya and Daouk, 2002; Bris, 2005). Siganos and Papa (2015) also find stronger indications of insider trading in the UK relative to the US, during the pre-announcement of mergers. This evidence generates an expectation of significant pre-announcement returns and volume for UK PIPE issuing firms, which leads me to my second hypothesis.

Hypothesis 3-2: UK firms experience a higher magnitude of abnormal returns and abnormal turnover prior to the PIPE announcement, relative to US firms.

The overall UK – US framework and insider trading regulation enforcement generate expectations of higher illegal insider trading activity prior to UK PIPE announcements. If the strict enforcement laws impact

insider trading activity, I would expect UK firms to have more pronounced price runs and abnormal volume ahead of PIPEs.

3.3 Data selection and summary statistics

3.3.1 Data collection

I collect data on PIPE announcement dates from the Sagient Research Placement Tracker database from 2008 to 2015. My starting point is 2008 as the UK's activity in PIPEs is large enough from that point on to allow me to assess an almost balanced sample of UK and US firms. Data on daily stock prices are collected from the Centre for Research in Security Prices (CRSP) database for US firms and from Thomson Reuters Datastream database for UK firms. Financial data are collected from Worldscope database and are complemented by Sagient Research Placement Tracker. I start with 15,383 issues which is the total number of issues made by UK and US firms as reported in the Placement Tracker database during the examined period. To be included in the final sample, a firm should have available stock data in CRSP (US firms) and Datastream (UK firms) and financial data in Datastream at least one year prior to the PIPE issue. These criteria exclude all firms traded in OTC and pink sheets. In addition, I exclude all American Depositary Receipts (ADRs). Following relevant studies, I also exclude financial firms (Brown and Floros, 2012; Dai, 2007) as financial firms' financial structure differs to the ones of non-financial firms. I further exclude Rule 144-A, Regulation S. and secondary issues as they do not satisfy the PIPE issue definition. Finally, I focus on common stock and fixed price convertible PIPEs[38]. These restrictions lead me to a final sample of 1,102 unique firms (of which 619 are UK firms and 483 are US firms) and 2,008 issues. The final sample includes more UK firms compared to US firms which comes in contrast with the larger number of firms issuing a PIPE in the US as seen in Chapter 2. This outcome is due to the criterion to focus on common

[38] I focus on these issues following previous PIPE studies (Berkman et al., 2016; Dai, 2007, 2011). In addition, structured PIPEs have a very limited activity with common stock and fixed price convertible issues to amount to more than 72% of the total PIPE issues.

stock and fixed price convertible issues. To alleviate concerns that my results are an outcome of the sample selection I repeat the empirical tests including all PIPE issues in the sample, thus restoring the balance of UK and US issues. The empirical results detailed in Appendix 3-B are qualitatively similar. A detailed break-down of the sample selection is presented on Table 3-2.

3.3.2 Issuers' characteristics and summary statistics

Table 3-3 presents the distribution of PIPE issues and their respective proceeds in $ billion in the UK and the US by year. One point to note is that the UK appears to have much higher proceeds in the earlier years of the examination period and particularly during 2008-2009 which drop afterwards, while in the US the proceeds are on average on the same levels each year of the sample period. The average deals per year are also approximately the same in the US while in the UK there is a greater fluctuation with an increased activity in 2009 and 2013 and a decrease during the last 2 years of the sample. Panel B of Table 3-2 presents the industry distribution of PIPE issuers by country. I categorize firms following the Fama and French 12 industries classification[39] using firms' primary SIC codes. Most of the UK firms are in the mining and construction industry (41%) followed by the oil, gas and extraction industry (20%), while in the US most firms also operate in the mining and construction industry (28%) followed by the healthcare industry (25%).

Table 3-4 presents the mean and median values as well as the lowest and highest percentiles of PIPE issuers' characteristics. Differences in means between the two countries are shown on the last column. All accounting data are from the fiscal year end prior to the PIPE issue. Consistent with the literature, I see that PIPE issuers are small, levered firms with high growth opportunities and cash needs. Specifically, UK firms are significantly smaller than US firms with a mean (median) market value of $300m ($40m) compared to US firms that have an average mean (median) of $561m ($92m). In addition, UK firms appear to have lower growth opportunities as measured

[39] The industry classification can be found on Kenneth's R. French website, available online at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/

by the M/B ratio. Issuers in both countries have approximately the same levels of sales and leverage. US firms hold significantly larger amounts of cash and are more R&D intensive, which is in line with the industry classification showing a quarter of PIPE issuers in the US to operate in the traditionally high R&D healthcare industry. In addition, UK firms have significantly higher cash burn rates, which means that these firms can run out of cash quickly (the more negative this ratio is, the quicker the firm burns its cash). Issuers in both countries have significantly negative profitability with the EBITDA ratios to range between -39% (UK) and -41% (US). Finally, an important difference is the market reaction to the announcement of a PIPE where UK issuers loose approximately 2.64% of their stock value around the PIPE announcement, while in the US there is a positive market reaction with observed excess returns of 2.19% on average. Overall, the summary statistics show US firms to be larger, with higher M/B ratios and more cash reserves, as well as to be more R&D intensive and to have higher leverage compared to UK issuers.

3.4 Empirical results

3.4.1 Abnormal returns and abnormal volume

Next, I estimate the abnormal returns and the abnormal volume around the PIPE announcement, in order to explore my first hypothesis on whether PIPE issuers experience price runs and abnormal volume before their public announcement. For the abnormal stock returns I follow a standard event study methodology and calculate the daily abnormal returns using an OLS market model following Brown and Warner (1985). Abnormal returns are estimated using the following formula:

$$AR_{i,t} = R_{i,t} - \hat{\alpha}_{i,t} - (\hat{\beta}_{i,t} * R_{m,t}) \qquad (3.1)$$

where $AR_{i,t}$ is the abnormal return of a security *i* on day *t.* $R_{i,t}$ is the logarithmic return of security *i* on day *t*, $\hat{\alpha}$ and $\hat{\beta}$ coefficients are estimated based on 150 trading days before day -100 relative to the announcement date and $R_{m,t}$ is the return of the market *m* on day *t*. As a market benchmark I use

the CRSP value weighted market indices for US firms and the FTSE All shares index for UK firms.

Figure 3-1 plots the Cumulative Average Abnormal Returns (CAARs) of all UK and US firms from day -50 to day +10 around the announcement of the PIPE issue. I observe that US PIPE issuers follow a small downtrend that is reversed a few days prior to the announcement of the PIPE which is evident from day -2. UK PIPE returns experience an abnormal drop prior to the public announcement of the PIPE which are evident from day -4 and are more pronounced from day -2. This increase in abnormal returns (US firms) and drop in the stock returns (UK firms) also reported as price runs, are consistent with the Hypothesis 3-1a *(H3-1a)* and 3-1b *(H31-b)*.

"Figures 3-1 & 3-2 go about here"

Next I examine the abnormal volume during the same window, as Bris (2005) argued that abnormal volume prior to the public announcement of a corporate event can indicate possible illegal transactions. Following the model of Bris (2005) and similar studies (King, 2009; Siganos and Papa, 2015), I estimate abnormal volume using the following formula:

$$AV_{i,t} = V_{i,t} - (\bar{V}_i + 2 * sd_{vol}) \; if \; V_{i.,t} > \; V_i + 2Ssd_{vol}, \; else \; \; AV_{i,t} = \tag{3.2}$$

Where $AV_{i,t}$ is the abnormal volume of a firm *i* on day *t*, $V_{i,t}$ is the volume of the firm *i* on day *t* scaled by the firm's number of common shares outstanding and $\bar{V}_i$ and sd_{vol} are the mean and standard deviation of firm's *i* volume over the shares outstanding throughout the estimation window (-250, -101). For the abnormal volume to be significant on a given day, the formula requires the abnormal volume on that day to be higher by at least the mean abnormal volume plus 2 standard deviations of the average volume over the estimation window. Thus by construction this model alleviates possible concerns over having firms in the sample that may be small and thinly traded and their stock is more or less liquid. This model is used in Bris (2005) who conducts a global study and as such his sample includes small and possibly

thinly traded firms. In addition, this model is used in Siganos and Papa (2015) study where they examine UK target firms with an average size of £356m which is similar to the average size of the firms in my dataset ($408.6m); as well as in King (2009) who examines Canadian firms, also known to be relatively small (average size $545m). Thus, this model can mitigate concerns due to PIPE firms being relatively small. For robustness I also estimate the abnormal volume employing a mean adjusted methodology, following the formula: $AV_{i,t} = V_{i,t} - \bar{V}_{i,t}$, Where $AV_{i,t}$ is the abnormal volume of a firm *i* on day *t*, $V_{i,t}$ is the volume of a firm *i* at day *t* over the number of shares outstanding. $\bar{V}_{i,t}$ is the average volume of a firm *i* over the estimation window (-250, -101). A similar mean adjusted model is used in Lim et al. (2018). The results are qualitatively similar.

Figure 3-2 plots the daily Cumulative Average Abnormal Volume (CAAV) around the announcement of the PIPE. US firms have a significant increase in the excess volume close to the PIPE announcement that begins approximately on day -2 while there is also an increase in excess volume, observed on days -1 and -2 ahead of the PIPE announcement in UK firms.

"Table 3-5 goes about here"

In order to get a better insight of the price and volume patterns around PIPEs, on Table 3-5 I report the daily Average Abnormal Returns (AAR) and Average Abnormal Volume (AAV) from day -20 up to day +2 and the Cumulative Abnormal Returns[40] and Cumulative Abnormal Volume over several windows prior to the PIPE announcement by issuing country.

For UK firms I observe that the abnormal returns are not statistically different from 0 except for days -1 an -2 where there are significantly negative

[40] The Abnormal Returns are qualitatively similar when using the Buy and Hold Abnormal Returns (BHAR) method following the formula: $BHAR_{i,t} = \prod_{t=1}^{N}(1 + R_{i,t}) - \prod_{t=1}^{N}(1 + R_{m,t})$, where $BHAR_{i,t}$ denotes the daily BHARs of security *i* on day *t*, $R_{i,t}$ is the logarithmic return of security on day *t* and $R_{m,t}$ is the daily return of market *m* on day *t*. For the market returns I use the CRSP value weighted indices for US firms and the FTSE all shares for UK firms.

abnormal returns. The fact that the abnormal returns are evidenced only shortly (2 days) prior to the public announcement could be explained by the short time span of the PIPE issue process. Specifically, PIPE negotiations could take 7 to 11 days before the closing of the deal, as such potential information leakage, if occurred, it should take place close to the announcement date. Lim et al. (2018) also find an increase in the abnormal volume the closer the examination window is to the PIPE closing date. In addition, the fact that on day 0 there are significant and negative abnormal returns (-1.23%) shows that the announcement effect is correctly captured by the model. There is also an increased abnormal volume starting from day -4. The abnormal returns during the 2 days prior to the PIPE announcement and the abnormal volume, can signal information leakage and illegal trading. The price and volume patterns are also evident in the CARs calculation where the CARs become negative the closer the window is to day 0.

Similarly, in the US PIPE issuing firms are experiencing on average positive and significant abnormal returns 2 days prior to the PIPE announcement, while there is an increased abnormal volume which is evident from day -6 onwards. Again, the market reaction in the announcement of the PIPE is correctly captured by the model as observed both by the AARs and AAVs. CARs become less negative the closer the window is to day 0, while they become positive and significant in the 10 days' window immediately prior to the PIPE announcement. The excess returns prior to the announcement of the issue confirm hypotheses 3-1a and 3-1b that abnormal returns and abnormal volume are observed before the issue is made public and can potentially indicate illegal trading.

3.4.2 Price – volume dynamics analysis

Next, in order to assess whether the price runs ahead of the PIPE announcements can be explained by the information leakage hypothesis, I examine the contemporaneous relationship between abnormal returns and abnormal volume, by employing a set of univariate and multivariate regressions. I use as the event period the 20 days' window immediately

preceding the PIPE announcement (-20, -1) and further use as a control period the 30 days' window prior to the event period (-50, -21), following the windows used by Berkman et al. (2016). Albeit these windows are chosen to fit the short time-frame of a PIPE issue, to ensure the validity of my results I repeat the empirical results using alternative windows. The results, detailed in Appendix 3-C, are qualitatively similar.

I first estimate univariate regressions assessing the abnormal returns as a function of the abnormal volume. The estimates of the regressions are presented on Table 3-6. The results are reported first for the UK firms (columns 1-4) and then for the US firms (columns 5-8). In addition, the first 2 columns for each country include only the ARs and AV during the event period, while the last two columns correspond to the ARs and AV of the control period. If the information leakage hypothesis holds, I would expect a contemporaneous relationship between the ARs and AV that is negative and significant for UK firms, since a PIPE in the UK is followed by a negative market reaction and a positive and significant relationship for US firms.

"Table 3-6 goes about here"

Contrary to my expectations and Hypothesis 3-2 *(H3-2)*, I do not find strong evidence of a contemporaneous relationship between ARs and AVs for UK firms. In addition, the relationship is positive and significant during the control period but is not statistically significant during the event period. This finding could be explained by the negative abnormal returns close to the PIPE announcement shown in Table 3-5, however these price runs are not accompanied by large volume increases during the same days. In contrast, in the US the relationship between ARs and AVs is positive and significant. More importantly the coefficient of the AV increases by almost 43% in the event period compared to the control period, showcasing the increased price-volume dynamics near the PIPE announcement. The results are qualitatively similar when using fixed and random effects. These findings are consistent with the information leakage hypothesis (King, 2009) suggesting that the price runs can be explained by illegal trades prior to the PIPE announcement

that generate the ARs and AV on the same days. Overall, the results are contradictive to my second hypothesis *(H3-2)* in which I expected more pronounced price-volume dynamics in UK PIPEs. The results are supportive of the information leakage hypothesis for US firms.

Next, I assess whether these results hold after the inclusion of a set of control variables. Specifically, I control for firms' size as measured by the natural logarithm of market capitalization, for market to book ratios, for R&D measured as the ratio of research and development expenses over total assets, for cash burn rates measured as the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and zero otherwise, and for leverage measured as the ratio of total debt over total assets. I include these control variables because PIPEs are reported to be small, levered firms with high M/B ratios and high cash burn rates (Brown and Floros, 2012; Chen et al., 2010; Floros and Sapp, 2012). I check the correlation of each pair of variables included in the regressions and there are no high significant correlations. The correlation matrix is shown on Appendix 3-A.

"Table 3-7 goes about here"

The results of the multivariate panel regressions are presented on Table 3-7. The first 2 columns correspond to the estimates of the regressions using UK firms, while the last 2 columns correspond to US issuers. Consistent with the univariate analysis, I observe that the variable of interest (AV) is not significant. In addition, the coefficient of AV turns insignificant even for the control period. Regarding the US issuers, the results hold after the inclusion of the control variables. Specifically, there is a pronounced increase both in the coefficient of the AV which increases from 0.195 to 0.321 during the event period but also on the significance level which is higher for the event period. Overall, the results for US firms are robust and in line with the information leakage hypothesis, while there is no strong support for the hypothesis for the UK firms.

For robustness and to see whether the US results are significantly different from the UK estimates, in Table 3-8 I estimate pooled regressions including all firms in the sample and a "US" indicator variable that takes the value 1 if the issuer is a United States firm and 0 if the issuer is a United Kingdom firm. I then interact this indicator variable with abnormal volume. The results are in line with those of Table 3-7 and show that there is a strong contemporaneous relationship between abnormal returns and abnormal volume only for US firms. In addition, consistent with my expectations the coefficient of the interaction between US and AV variables is not significant for the control period, highlighting that the effect is pronounced only during the pre-announcement period.

The finding that there is no relationship between ARs and AVs as observed by the regressions on UK firms may be explained by the fact that PIPEs in the UK are followed by a negative market reaction. If investors are tipped with information leaked by insiders regarding a positive event, then investors may buy shares of the firm based on their privileged information to benefit from the upcoming positive event. If however, investors are tipped with information about a negative event, they might sell if they hold shares of the company but if they do not currently hold shares of that company they will either take no action or they could short sell the stock. Volume information includes both buys and sells and may provide noisy estimates when assessing a negative event. In addition, the fact that there are price runs and excess volume ahead of UK PIPEs as evidenced in Figures 3-1 & 3-2 may indicate that the price-volume dynamics is not a good method to assess illegal trading, while a future research focusing on the short selling activity could provide better insights. The study of short selling around PIPEs in this chapter is hindered by the lack of available UK short selling data.

3.4.3 Robustness tests

In order to examine whether the results reported on Table 3-7 hold after the inclusion of all PIPE types, I re-run the panel regressions including in the sample all PIPE issues. The results which are presented in the Appendix 3-B

are qualitatively similar, suggesting that my findings are not the outcome of the data selection and specific PIPE contract types.

As an alternative robustness check, in order to assess if the results are affected by the choice of the event and control period windows, I repeat the multivariate regressions of Table 3-7 using alternative windows. Specifically, I use as the event period the window (-30, -1) and as the control period the window (-31, -60). The results which are presented in the appendix 3-C are qualitatively similar, both for the UK and the US firms, confirming my previous findings and alleviating any concerns that the results are driven by the specific windows chosen.

In addition, aiming to address concerns over the potential contamination of the results by other corporate events, I exclude from the sample all firms that had an M&A announcement, 3 months prior to the PIPE announcement date. Data on M&A announcements are collected from Thomson Financial database. In the results, shown in the Appendix 3-D, I observe that the evidence from the price-volume dynamics is robust, while the difference in the relationship between the AR and the AV for US firms during the event and the control period is even more pronounced, confirming my earlier findings.

Finally, in order to assess whether my results hold when changing model specification, as a robustness I estimate the abnormal returns using the Fama – French 3 factor model estimation method (Fama and French, 1993), following the formula:

$$AR_{i,t} = R_{i,t} - (\hat{a}_i + \hat{\beta}_{iM} * RMRF_t + \hat{\beta}_{iS} * SMB_t + \hat{\beta}_{iV} * HML_t) \quad (3.3)$$

Where, $AR_{i,t}$ is the abnormal return of firm *i* at time *t*, $R_{i,t}$ is the return of firm *i* at time *t*, $RMRF$ is the excess return on the market, $SMB$is the average return on 3 Small minus 3 Big portfolios and HML is the average return of 3

High minus 3 Low value portfolios[41], $\hat{a}$, $\hat{\beta}_{iM}$, $\hat{\beta}_{iS}$ and $\hat{\beta}_{iV}$ coefficients are estimated using the model parameters, 150 trading days before day -100 relative to the announcement date.

After estimating the abnormal returns, I re-run the multivariate regression. The results are presented in Appendix 3-E, in columns (1) – (4) I repeat the results of Table 3-7 for comparability purposes and columns (5) – (8) correspond to the results using ARs estimated using the Fama – French three factor model. The findings are qualitatively similar, showing that my results are not due to the estimation method chosen.

3.5 Discussion and conclusion

The literature has widely documented price runs ahead of the announcement of corporate events (Damodaran and Liu, 1993; Gupta and Misra, 1989; Keown and Pinkerton, 1981; King, 2009). These price runs have been associated either to market anticipation of the upcoming event (Jabbour et al., 2000; Jensen and Ruback, 1983) or to illegal trading based on leaked information (Cornell and Sirri, 1992; Keown and Pinkerton, 1981; King, 2009). In this chapter I examine the stock price behaviour before the announcement of PIPEs, which constitute a fertile environment for this assessment as due to their nature, they can raise concerns over information leakage. Specifically, prior to a PIPE announcement, the issuer will question the interest of potential private investors. These private investors are then considered "wall crossers" or temporary insiders as they have privileged knowledge of the upcoming event. I therefore examine the price patterns ahead of the announcement for potential price runs. Studies in the literature have also associated abnormal trading volume with illegal insider trading (Bris, 2005), so to gain better insights over PIPEs pre-announcement patterns, I further examine the abnormal volume ahead of PIPEs. I focus on the UK

[41] The factors for US firms, are downloaded from Kenneth R. French website, available at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html For UK firms the factors are downloaded from the university of Exeter website: http://business-school.exeter.ac.uk/research/centres/xfi/famafrench/files/ (Gregory, Tharyan and Christidis, 2013).

and US markets because the differences in the regulatory treatment of PIPEs and the differences in insider trading regulations in the two markets, allow me to gauge whether the price-volume behaviour is affected by different insider trading regulatory and enforcement regimes.

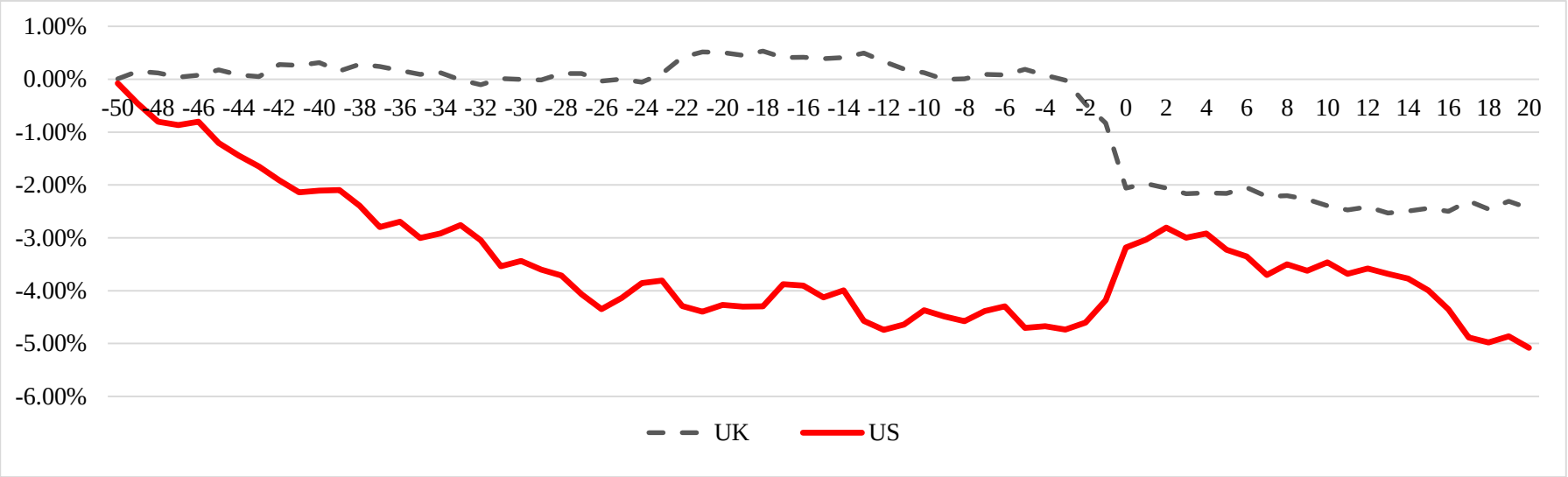
I find both abnormal returns and abnormal volume initiating approximately 4 days and be significantly pronounced 2 days before the announcement of the PIPE issue in both markets. However, although the abnormal returns and abnormal volume are evident before the issue[42], I only find support of the information leakage hypothesis for US PIPEs, as observed by the contemporaneous relationship between the abnormal returns and the abnormal trading volume. These findings hold when employing several robustness checks, including using different time windows, excluding firms conducting an M&A before the PIPE or widening the dataset. However, contrary to my expectations, I do not find a significant contemporaneous relationship between abnormal returns and abnormal volume ahead of UK PIPEs. Since the announcement of a PIPE triggers a negative market reaction in the UK, a future research examining short-selling activity prior to PIPEs may shed more light on price runs ahead of UK PIPEs.

The PIPE issue process that includes negotiations with potential investors, other than being susceptible for leakage of information also shows that firms' insiders are knowledgeable of the upcoming issue prior to its public announcement. This is because insiders may consider and decide on the issue, as well as think of potential investors in advance of the closing of the deal. Albeit the price – volume dynamics test does not provide empirical support for the information leakage hypothesis in the UK, there is a drop in the price and an increase in trading volume approximately 2 days before the public announcement of the PIPE that may link to illegal trading. This price reaction together with the potential privileged information about the PIPE issue, lead me to assess insiders' trading behaviour ahead of the deals' public announcements. Therefore, in the next chapter I assess registered insiders'

[42] See Figures 3-1 and 3-2.

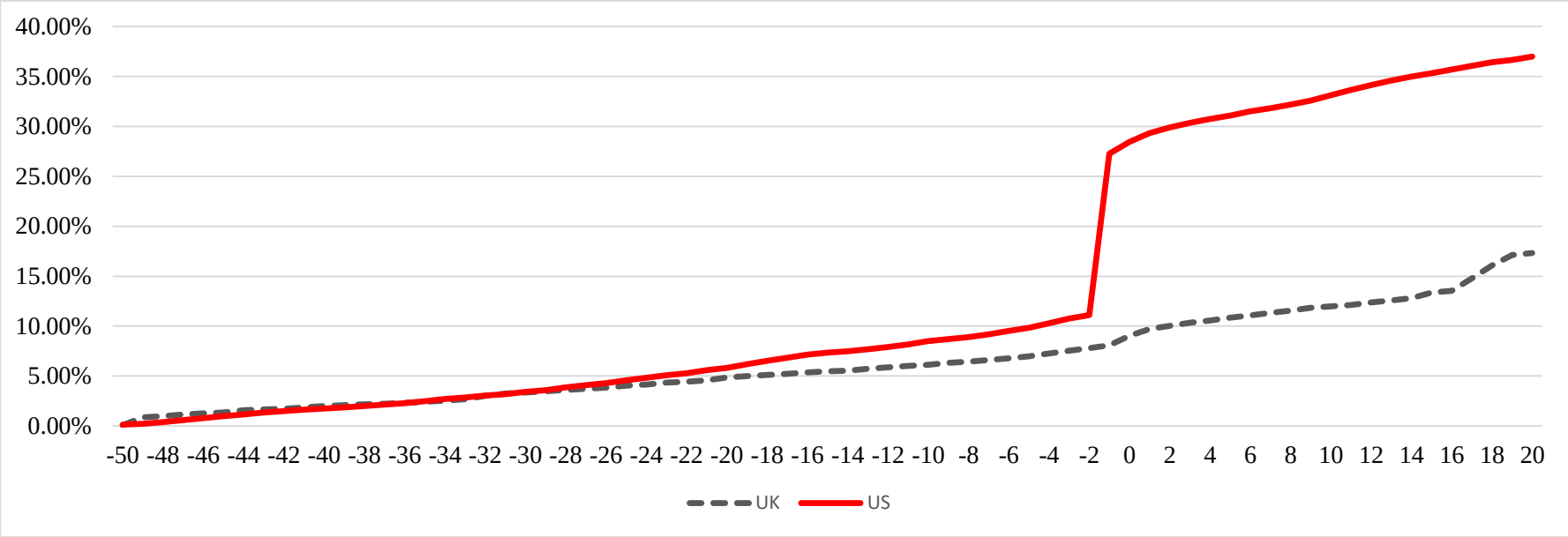
purchases and sales in order to document whether the latter adjust their trading patterns prior to the PIPE issues for their benefit.

Figure 3-1: Cumulative Average Abnormal Returns (CAARs) around the PIPE announcement



The figure presents the daily Cumulative Average Abnormal Returns (CAARs) 50 days prior and 20 days after the announcement of the PIPE. ARs are calculated using an OLS market model. I use as a benchmark for the OLS market model the FTSE All Shares for UK firms and the CRSP value weighted indices for US firms. The estimation period is between day -250 and day -101. Stock data are collected from Thomson Financial (UK firms) and CRSP (US firms). All financial data are winsorised at the 1% and 99%.

Figure 3-2: Average Abnormal Volume (AAV) and Cumulative Average Abnormal Volume (CAAV) around the PIPE announcement



The figure presents the daily average abnormal volume (AAV) and the cumulative average abnormal volume (CAAV) 50 days prior and 20 days after the announcement of the PIPE. Following Bris (2005), I calculate abnormal volume using the following formula: $AV = V_{i,t} - (\overline{V_i} + 2\sigma_{Volume})$ if $V_{i,t} > \overline{V_i} + 2\sigma_{Volume}$ else AV = 0 The estimation period is between day -250 and day -101. Volume data are collected from Thomson Financial (UK firms) and CRSP (US firms). All financial data are winsorised at the 1% and 99%.

Table 3-1: Overview of PIPE legislation in the UK and the US

	Shareholders' Vote Requirements	Prospectus Requirements	Takeover Code
UK	A Shareholders vote is required for issues exceeding 5% of share capital in any year or 7.5% in any cumulative 3 years' basis.	A prospectus is required unless the placing corresponds to less than 10% of issued share capital in any year.	If a person acquires shares equal to or exceeding 30% of the voting rights of a public company, or when the bidder that has not less than 30% but not more than 50% of the voting rights increases its holding, that person should make a mandatory offer in cash for all the remaining shares, within 12 months prior to the announcement, unless there is a prior approval of the independent shareholders.
US	All companies listed on Nasdaq, NYSE or NYSE MKT should receive a shareholder approval to issue 20% or more of their common stock outstanding or voting rights in a private offering.	Section 4, Regulation D of the Securities Act offers an exemption of registration statement when the offering is made to a specific number of accredited investors, information for the investments is made available to investors by the company and the company does not engage in general advertisement to market the securities.	No requirement for a mandatory offer.

The table summarises the main regulatory differences applying to PIPEs between the UK and the US.

Table 3-2: Sample selection

Sample selection	N	%
All issues	15,383	100.00
Legal Structure : 144-A, Reg. S, Secondary Private	-1,751	-11.38
Financial firms	-1,815	-11.80
American Depositary Receipts	-40	-0.26
No financial data	-9,002	-58.52
Not common stock or fixed convertibles	-767	-4.99
Total	**2,008**	**13.05**

The table presents a breakdown of the sample selection process. Data on PIPE issues are collected from the Sagient Research Placement Tracker database. Stock data are employed from Thomson Reuter Datastream (UK issuers) and the CRSP database (US issuers). The period under examination is between 2008 and 2015.

Table 3-3: Descriptive statistics

Panel A: PIPE issues distribution 2008-2015				
	United Kingdom		**United States**	
Year	# of Issues	Proceeds in $bn.	# of Issues	Proceeds in $bn.
2008	193	21.60	93	9.29
2009	212	8.57	113	5.15
2010	165	5.96	96	3.80
2011	164	3.50	85	3.84
2012	146	3.08	91	7.76
2013	175	4.08	89	5.59
2014	123	2.88	115	4.24
2015	32	2.32	116	9.34

Panel B: Industry Distribution	**United Kingdom**		**United States**	
Industry	# of issues	%	# of issues	%
Consumer Non-Durables: Food, Tobacco	42	3.47	20	2.51
Consumer Durables: Cars, TV's, Furniture	21	1.74	23	2.88
Manufacturing: Machinery, Trucks, Planes	61	5.04	35	4.39
Oil, Gas, and Coal Extraction and Products	242	20	66	8.27
Chemicals and Allied Products	26	2.15	12	1.50
Business Equipment: Computers, Software	174	14.4	133	16.67
Telephone and Television Transmission	14	1.16	27	3.38
Utilities	20	1.65	26	3.26
Wholesale, Retail, and Some Services	37	3.06	32	4.01
Healthcare, Medical Equipment, and Drugs	80	6.61	201	25.19
Other: Mines, Constr., Trans, Hotels	493	40.7	223	27.94

Panel A presents the number of issues and their respective proceeds in $ billion by year and issuers' country. Panel B presents the industry distribution of the sample by issuers' country, following the Fama and French 12 industries classification using firms' primary SIC codes.

Table 3-4: PIPE issuer characteristics

	United Kingdom				United States				Diff. in means	p-value
	mean	median	p10	p90	mean	median	p10	p90		
Market value	300,163	39,048	5,937	361,471	561,810	92,428	16,275	1,100,000	-261,647***	0.00
M/B	2.66	1.60	0.25	6.57	3.56	2.25	-1.34	9.90	-0.89**	0.03
Cash	0.23	0.13	0.02	0.64	0.32	0.19	0.03	0.85	-0.08***	0.00
Sales	0.73	0.45	0.02	1.55	0.70	0.47	0.04	1.74	0.03	0.63
R&D	0.07	0.00	0.00	0.17	0.21	0.02	0.00	0.59	-0.14***	0.00
Leverage	0.19	0.03	0.00	0.44	0.24	0.14	0.00	0.60	-0.05**	0.03
Cash Burn	-4.17	-0.40	-5.42	0.00	-1.80	-0.46	-3.93	0.00	-2.37***	0.00
EBITDA	-0.39	-0.08	-0.92	0.13	-0.41	-0.14	-1.21	0.12	0.02	0.87
Announce. Returns (%)	-2.64	-1.88	-21.04	15.39	2.19	0.90	-20.80	25.67	-4.83***	0.00

The table reports the mean, median and top and lowest decile values of the characteristics of PIPE issuing firms between 2008 and 2015 by issuers' nation. Financial data are retrieved from Datastream database and are from the fiscal year end prior to the PIPE issue. Market value is shown in US dollars. The M/B is the market to book item from Datastream. Cash, sales and R&D are scaled by total assets, leverage is the ratio of total debt over total assets, cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise, EBITDA is the ratio of the Earnings Before Interest Tax Depreciation and Amortization over total assets. Announcement Returns are the Cumulative Abnormal Returns over a 10 days' window CAR (-4, +5) around the PIPE issue. All financial data are winsorised at the 1% and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 3-5: Abnormal returns and abnormal volume

	United Kingdom		United States	
Day	**AAR (%)**	**AAV (%)**	**AAR (%)**	**AAV**
-20	-0.01	0.27*	0.13	0.23***
-19	-0.05	0.13***	-0.03	0.37***
-18	0.08	0.13***	0.00	0.35***
-17	-0.12	0.11***	0.42**	0.31***
-16	0.01	0.13***	-0.03	0.31**
-15	-0.02	0.11***	-0.22	0.20***
-14	0.02	0.08***	0.13	0.17***
-13	0.08	0.18***	-0.58***	0.17***
-12	-0.16	0.15***	-0.17	0.25***
-11	-0.14	0.13***	0.10	0.26***
-10	-0.07	0.12***	0.27	0.33***
-9	-0.13	0.21***	-0.12	0.21***
-8	0.01	0.11***	-0.09	0.20***
-7	0.08	0.16***	0.19	0.27***
-6	-0.01	0.19***	0.09	0.34***
-5	0.11	0.19***	-0.41**	0.32***
-4	-0.11	0.28***	0.03	0.47***
-3	-0.09	0.27***	-0.07	0.47***
-2	**-0.45*** **	0.27***	**0.14***	0.35***
-1	**-0.36*** **	0.26***	**0.42** **	0.38***
0	**-1.23*** **	0.97***	**1.00*** **	1.20***
1	0.09	0.69***	0.15	0.86***
2	-0.09	0.30***	0.22	0.56***
(-50, -21)	0.51***	4.07***	-4.39***	5.55***
(-20, -1)	-1.35***	3.87***	0.18***	5.64***
(-50, -41)	0.26***	1.63*	-2.14***	5.91***
(-40, -31)	-0.25***	1.24	-1.40***	6.11***
(-30, -21)	0.50***	1.19	-0.86***	6.21***
(-20, -11)	-0.32***	2.03**	-0.24***	6.31***
(-10, -1)	-1.02***	1.84**	0.42***	6.32***
(-4, -1)	-1.02***	0.97	0.52***	1.66***
(-2, -1)	-0.81***	0.47	0.56***	0.73***
(-1, +1)	-1.50***	1.80	1.57***	2.42***

The table presents the Average Abnormal Returns (AARs) and Average Abnormal Volume (AAV) on a daily basis from day -20 to day +2 and on various cumulative windows around the PIPE announcement. ARs are calculated using an OLS market model. I use FTSE all shares as a benchmark for UK firms and CRSP value weighted indices for US firms. AV is calculated as the number of daily transactions over the firms' total shares outstanding. Following Bris (2005), I calculate AV using the following formula: $AV = V_{i,t} - (\overline{V_i} + 2\sigma_{Volume})$ if $V_{i,t} > \overline{V_i} + 2\sigma_{Volume}$ else AV = 0 The estimation window is between day -250 and day -101. Stock prices and volume data are collected from Thomson Financial (UK firms) and CRSP (US firms). All financial data are winsorised at the 1% and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 3-6: Univariate regressions - price volume dynamics

	United Kingdom				United States			
	(1) (-20,-1)	**(2) (-20,-1)**	**(3) (-50,-21)**	**(4) (-50,-21)**	**(5) (-20,-1)**	**(6) (-20,-1)**	**(7) (-50,-21)**	**(8) (-50,-21)**
	Random effects	**Fixed effects**	**Random effects**	**Fixed effects**	**Random effects**	**Fixed effects**	**Random effects**	**Fixed effects**
AV	0.014	0.009	0.051*	0.047*	0.308***	0.376***	0.228**	0.262***
	[0.416]	[0.512]	[0.067]	[0.064]	[0.000]	[0.000]	[0.010]	[0.008]
Constant	-0.001**	-0.001***	0.000	0.000**	-0.001*	-0.001***	-0.002***	-0.002***
	[0.020]	[0.000]	[0.798]	[0.016]	[0.077]	[0.000]	[0.000]	[0.000]
N	19,100	19,100	28,568	28,568	12,852	12,852	19,286	19,286
R^2	0.000	0.000	0.002	0.002	0.017	0.017	0.005	0.005
Adj. R^2		0.000		0.001		0.017		0.005

The table explores the contemporaneous relationship between daily abnormal returns and daily abnormal volume. I use univariate panel regressions, with fixed and random effects. The time window (-20, -1) refers to the event period, while the time window (-50, -21) is used as a control period. Columns (1) – (4) present the estimates of the regressions on UK firms and columns (5) – (8) show the results of the estimates of the regressions on US firms. Abnormal returns are calculated employing an OLS market model, using FTSE All Shares as a benchmark for UK firms and CRSP value weighted indices for US firms. The estimation period is between day -250 and day -101. Following Bris (2005), I calculate abnormal volume using the following formula: $AV = V_{i,t} - (\overline{V_i} + 2\sigma_{Volume})$ if $V_{i,t} > \overline{V_i} + 2\sigma_{Volume}$ otherwise AV=0 The estimation period is the same as in the AR specification. Prices and volume data for UK firms are collected from Thomson Financial and for US firms from CRSP database. Financial data are winsorised at the 1% and 99%. p-values are reported in brackets *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 3-7: Multivariate regressions - price volume dynamics

	United Kingdom		United States	
	(1) (-20,-1)	(2) (-50,-21)	(3) (-20,-1)	(4) (-50,-21)
AV	0.011	0.046	0.321***	0.195**
	[0.458]	[0.106]	[0.000]	[0.023]
Size	0.000	0.000	0.000	0.000
	[0.729]	[0.199]	[0.124]	[0.690]
M/B	0.000	0.000	0.000	0.000
	[0.337]	[0.562]	[0.269]	[0.330]
R&D	-0.002**	-0.001**	-0.001	-0.002*
	[0.039]	[0.021]	[0.534]	[0.083]
Cash Burn	0.000	0.000	0.000	0.000
	[0.862]	[0.902]	[0.135]	[0.664]
Leverage	0.001*	0.000	0.000	-0.001
	[0.099]	[0.130]	[0.933]	[0.428]
Constant	-0.003	-0.002	-0.005	-0.003
	[0.202]	[0.395]	[0.174]	[0.354]
N	16,281	24,283	9,798	14,697
R^2	0.003	0.005	0.022	0.006

The table presents the results of the panel regressions on the contemporaneous relationship between daily abnormal returns and daily abnormal volume. The time window (-20, -1) refers to the event period, while the time window (-50, -21) is used as a control period. Columns (1) & (2) present the estimates of the regressions on UK firms and columns (3) & (4) show the results of the estimates of the regressions on US firms. The dependent variable is the abnormal returns. Abnormal returns are calculated employing an OLS market model, using FTSE All Shares as a benchmark for UK firms and CRSP value weighted indices for US firms. The estimation period is between day -250 and day -101. AV is the daily abnormal volume. Following Bris (2005), I calculate abnormal volume using the following formula: $AV = V_{i,t} - (\overline{V_i} + 2\sigma_{Volume})$ if $V_{i,t} > \overline{V_i} + 2\sigma_{Volume}$ otherwise AV=0. The estimation period is the same as in the AR specification. Size is the natural logarithm of market capitalisation, M/B is the market to book item from Datastream, R&D is the ratio of research and development over total assets, cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise, leverage is the ratio of total debt over total assets. Financial data are retrieved from Worldscope database and are from the fiscal year prior to the PIPE issue. Prices and volume data for UK firms are collected from Thomson Financial and for US firms from CRSP database. All financial data are winsorised at the 1% and 99%. p-values are reported in brackets. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 3-8: Pooled regressions – interaction between issuing country and abnormal volume

	(1) (-20,-1)	(2) (-50,-21)
AV	0.012	0.046
	[0.451]	[0.107]
US	0.001	-0.001*
	[0.149]	[0.068]
US * AV	0.308***	0.147
	[0.000]	[0.101]
Size	0.000	0.000
	[0.153]	[0.653]
M/B	0.000	0.000
	[0.210]	[0.166]
R&D	-0.001	-0.001**
	[0.242]	[0.040]
Cash Burn	0.000	0.000
	[0.494]	[0.911]
Leverage	0.000	0.000
	[0.354]	[0.188]
Constant	-0.005**	-0.003
	[0.022]	[0.157]
N	26,079	38,980
R^2	0.011	0.005

The table presents the results of the pooled panel regressions on the contemporaneous relationship between daily abnormal returns and daily abnormal volume. The time window (-20, -1) refers to the event period, while the time window (-50, -21) is used as a control period. The dependent variable is the abnormal returns. Abnormal returns are calculated employing an OLS market model, using FTSE All Shares as a benchmark for UK firms and CRSP value weighted indices for US firms. The estimation period is between day -250 and day -101. AV is the daily abnormal volume. Following Bris (2005), I calculate abnormal volume using the following formula: $AV = V_{i,t} - (\overline{V_i} + 2\sigma_{Volume})$ if $V_{i,t} > \overline{V_i} + 2\sigma_{Volume}$ otherwise AV=0. The estimation period is the same as in the AR specification. US is an indicator variable that takes the value 1 if the issuer's country is United States and 0 if the issuer's country is the United Kingdom. US*AV is the interaction between the US indicator variable and the abnormal volume. Size is the natural logarithm of market capitalisation; M/B is the market to book item from Datastream, R&D is the ratio of research and development over total assets, cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise, leverage is the ratio of total debt over total assets. Financial data are retrieved from Worldscope database and are from the fiscal year end prior to the PIPE issue. Prices and volume data for UK firms are collected from Thomson Financial and for US firms from CRSP database. All financial data are winsorised at the 1% and 99%. p-values are reported in brackets. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

4. Registered insider trading patterns ahead of Private Investments in Public Equity

4.1 Introduction

Corporate announcements can have substantial impact on companies as they can quickly lead their stock prices up or down (Eckbo and Masulis, 1995; Loughran and Ritter, 1995; Ritter, 1991; Spiess and Affleck Graves, 1995). Corporate events however, such as mergers takeovers or equity issues do not happen overnight. Firms' insiders, especially those in higher corporate ranks, may know of the upcoming event well in advance of its announcement. The inside information, taken together with the substantial change in stock prices following the announcement of the corporate event, can create a tempting environment for insiders to profitably trade over their information of the upcoming event. The literature has shown that this in fact is the case over several corporate events (Agrawal and Nasser, 2012; Ali and Hirshleifer, 2017; Harlow and Howe, 1993; Jaffe, 1974; Karpoff and Lee, 1991; Lakonishok and Lee, 2001; Seyhun and Bradley, 1997) where insiders are found to profitably trade on their private accounts before the announcement of a corporate event. Other than academic interest, insider trading has also drawn media attention, reporting occasionally cases of insiders engaging in profitable informed trading prior to an event while also pointing out on how challenging insider trading cases can be for regulators to prove (Enrich, 2014).

Private Investments in Private Equity offer an interesting ground to assess insiders' activity because prior to a PIPE, firms typically have to assess the interest of potential private investors by discussing with them the upcoming deal. This behaviour other than sharing the information of the upcoming deal with potential investors, shows that firms' insiders are knowledgeable of the PIPE ahead of its announcement, creating the opportunity for profitable trading upon this information. Although in the previous chapter there is no

significant evidence of insider trading based on leakage of information on UK PIPEs, examined by the contemporaneous relationship between firms' abnormal returns and abnormal volume, the nature of PIPE negotiations prior to their public announcement and the existence of abnormal returns and abnormal volume close to the announcement date lead me to further examine insiders' trade patterns. I do so to assess whether insiders adjust their trading strategies upon their information of the upcoming PIPE announcement. Therefore, the main focus of this chapter is the examination of registered[43] insiders' transactions prior to PIPE announcements.

Although the literature on insider trading is mostly focused on mergers and acquisitions (M&As), which is a major corporate event known to affect stock performance, regulators are concerned with insider trading over a wide spectrum of corporate events. For instance, the Securities Exchange Commission (SEC) has initiated in 2002 a series of investigations and enforcement actions in PIPE transactions, aiming to reduce opportunities of market exploitation over the forthcoming deals, by targeting short-selling activities ahead of PIPEs. In a recent study Berkman et al. (2016), assess short selling activity prior of US private placements and find evidence of abnormal short-sells ahead of the issues indicating information leakage.

I use the UK market for my examination for various reasons. First, the UK is the largest PIPE market in Europe[44]. Second, contrary to the US where a PIPE announcement is followed by a positive market reaction, UK PIPEs are followed by a negative announcement performance.[45] This provides me with the opportunity to assess whether insiders adapt their trading strategies relative to this negative corporate event to generate profit. Third, as insider

[43] By registered insiders, according to Section 96b of FSMA, I refer to the firms' directors, executives, non-executives and any individual that can take managerial decisions also known as Persons Discharging Managerial Responsibilities (PDMRs). In this chapter the terms director and insider are used interchangeably.
[44] According to Sagient Research, Placement Tracker data 2,427 of the 2,802 PIPEs deals in Europe between 2008 and 2015 are issued from UK firms, which is approximately 86% of the total European issues and 66% of the total European PIPE proceeds.
[45] See table 4-4.

trading laws are unified across Europe, emphasized with the recent Market Abuse Regulation (MAR)[46] the findings of this study could aid other European markets and increase their understanding, so governments can be proactive as PIPEs expand their activity throughout Europe. This study addresses the gap in the literature of the limited coverage of insiders' behaviour over equity issues and especially private placements, it provides an understanding of their legal environment in the UK and contributes to the small but growing literature on PIPEs.

I assess the patterns of registered insiders' behaviour by examining insider purchases, sales and net sales, measuring the number of individual insiders that trade ahead of each PIPE issue, the amount of shares traded and the monetary (GBP) value of the shares traded. I follow a difference in difference approach as in (Agrawal and Nasser, 2012) that allows to simultaneously control for firm specific and time specific effects. Specifically, I first examine the pre-announcement insider trades relative to a control period prior to the pre-announcement period. This difference which is the time-series control, serves as a control for firm specific characteristics because it allows me to assess the same firms (and hence same firm characteristics) over two different time periods. Second, I assess insider trades of PIPE firms relative to a matched sample of control firms. This second difference, which is the cross-sectional control, offers a time specific control as I compare similar firms over the same time period. Finally, I estimate the difference of the differences described above, which serves as a simultaneous control for both firm characteristics and time effects, thereby controlling for firm and time effects and is hence the difference of interest here. The methodology is described in detail in section 4.5.

This study faces the limitations that typically apply to insider trading studies. First, I assume that all insider trades are reported as required by law. Second, insiders might trade through extended family or friends. Finally, a PIPE specific issue, is related to "wall crossers", individuals that are

[46] See EU 596/2014 regulation.

confidentially informed about the forthcoming PIPE issue when the company is discussing the interest of potential investors. These individuals are considered as temporary insiders with regards to trading, as soon as they learn of the upcoming deal (Berkman et al., 2016). However, as the definition of a wall crosser is vague, there is the potential to trade on this information without these trades being reported.

Insider trading has drawn a lot of academic and regulatory interest. The literature shows that even reported trades can be informed trades, as studies find insiders to profitably trade prior to corporate events such as on stock repurchases (Lee, Mikkelson and Partch, 1992), on Seasoned Equity Offerings (Karpoff and Lee, 1991), on dividend announcements (John and Lang, 1991), on earnings announcements (Ali and Hirshleifer, 2017), on takeovers (Agrawal and Nasser, 2012) on bankruptcy (Seyhun and Bradley, 1997) among others as well as ahead of accounting scandals and earnings manipulation revelations (Agrawal and Cooper, 2015). In addition, as inferred in the insider trading literature, insiders do not first learn of a corporate event on its announcement or on the news. Insiders can take advantage of their superior information in two ways. They can either engage in "active insider trading" (John and Lang, 1991; Karpoff and Lee, 1991) by selling the company's securities prior to a negative event or by buying additional securities prior to the announcement of a positive corporate event. Active insider trading would therefore be a straightforward way to profit from their privileged information. However, insiders motive to profit from superior information could be offset by criminal sanctions or fines (Harlow and Howe, 1993). In such cases insiders that are not willing to take that risk but still wish to trade on their information, they might engage in another type of insider trading, known as "passive insider trading" as introduced by the latter authors. In passive insider trading, insiders that anticipate a negative corporate event, may deviate from their normal buying patterns and refrain from buying additional shares before a negative corporate event. What is important to examine in such cases is the net effect (net sales or net purchases)

and whether this net effect of insiders' transactions is the result of an increase/decrease in buying or due to an increase/decrease in selling.

This study contributes to the literature by providing patterns of insider trading ahead of PIPEs by assessing insider purchases and sales (active insider trading) and net sales (passive insider trading) and examines whether insiders need closer monitoring on their transactions. The findings from the cross sectional and time series controls as well as the difference in differences do not support the active insider trading hypothesis as I find no evidence that insiders actively increase their selling prior to PIPE announcements. In contrast, I find even a reduction in the number of insiders that are selling shares during the pre-announcement period, which can be a sign that insiders are careful to avoid potential accusations of violating insider trading laws. The results however point to the passive insider trading hypothesis as I find that insiders increase their net sales by deviating from their normal trading behaviours and significantly refraining from buying shares prior to the PIPE announcement. The results show that insiders net sale figures increase when measuring individual insiders or the monetary value of the shares traded with the results being significant whether I use time-series, cross-sectional or simultaneous (Diff. in Diff.) controls.

The rest of the chapter is organised as follows. Section 4-2 describes PIPEs legal environment and insider trading regulations in the UK. Section 4-3 presents the literature review and the hypotheses development. Section 4-4 defines the sample and data collection process and presents the summary statistics. Section 4-5 presents the empirical results. Section 4-6 concludes.

4.2 A description of the regulatory environment

4.2.1 PIPEs legal environment in the UK

Firms considering a PIPE issue in the UK have to comply with the regulatory and legal requirements applying to all listed companies in the UK. More specifically, UK listed companies have to comply with the Transparency and

Prospectus directives. The Transparency directive (2004/109/EC)[47] requires issuers to make their actions transparent by prohibiting selective disclosure of price sensitive information or in other words information that could affect the prices of securities, and mandates that such information should be immediately published. The Prospectus directive [2003/71/EC][48] further requires that listed companies publish a prospectus for security offers equal to or exceeding 10% of a listed class of shares that is made within a 12-month period. It also prescribes the content of the prospectus. The compilation of the prospectus however constitutes a time-consuming procedure and is therefore seen as unattractive for PIPE issues.

Another important consideration for PIPE issuing firms is the treatment of the pre-emptive rights. In the UK, a firm cannot issue equity without first making the offer to existing shareholders, unless they receive their shareholders' approval. Issuers typically, request a disapplication of the pre-emptive rights in their annual meetings (Hamilton and Newton, 2009), however the disapplication levels are strict. According to the pre-emptive group guidelines[49] only issues of less than 5% within a year or less than 7.5% within a 3 years' period and discounted no higher than 5%, pass customarily and without engaging into in depth discussions with the shareholders.

Further considerations for large PIPE issues include the Rule 9 mandatory offer of the Takeover Code (The City Code on Takeovers and Mergers), which requires any person acquiring shares that are equal to or exceed 30% of the voting rights of a listed company or when a person that previously held more than 30% but less than 50% increase their holdings, they are to make a mandatory offer in cash to acquire all the remaining shares. Both the pre-emptive rights and anti-takeover laws are considered caveats as private

[47] The Transparency Directive (2004/109/EC) was amended by the 2013/50/EU Directive with member states required to transpose to it by 26 November 2015.
[48] The Prospectus directive was implemented in the UK via the Prospectus Regulations 2005 (SI 2005/1433) and was amended by Directive 2010/73/EU.
[49] The group mainly consists of representatives of institutional investors, listed companies, banks and financial institutions. It was formed in 2005 to provide guidance to listed companies with regards to pre-emption rights procedures.

investors may demand to acquire a large percentage of shares and therefore the issuing firms should address such issues cautiously. Finally, a further caveat to the PIPE issuing procedure is that investors will typically expect a thorough due diligence process. However, disclosing information privately to investors would not allow investors to trade as it would be against the insider dealing and market abuse regulations. A detailed analysis on insider trading regulation follows in the next section.

4.2.2 Insider trading regulations in the UK

The current UK regulator for insider trading is the Financial Conduct Authority (FCA). The Market Abuse Regulation M.A.R. (596/2014) introduced by the European Union with effect on all European members, deems illegal any individual that uses inside information to trade on their own or on the account of a third party either directly or indirectly. While the M.A.R. was employed by the European Union across all member countries, the regulation was not implemented at the same time across all countries. In the UK the MAR came into effect on the 3rd of July 2016 which is after my examination period that spans the years 2008 – 2015. As such the relevant regulation applying to my study is the Criminal Justice Act of 1993.

The Criminal Justice Act of 1993 and Insider Dealing Directive (89/592/EEC), considers as offence any individual trading on price affected securities when having information as an insider or any individual that has information as insider and tips this information to other individuals or encourage them to trade on that information, whether or not the latter know that the information is price sensitive. In addition, pursuant to the Financial Services Authority Act 2000, it is considered market abuse if an individual attempts to trade when in position of inside information.

Obviously, who is considered an insider is very important for regulatory purposes as insiders are required to report their trades. In the UK as insiders are deemed the members of the board including executives and non-executives. Insiders have to inform the company about their trades or their

spouses' or children's trades as soon as possible and within 5 business days of their trades (Hillier and Marshall, 2002).

4.3 Literature review and hypotheses development

Corporate finance literature suggests that changes in equity convey information signals to the market (Myers and Majluf, 1984), while changes in equity are also evident to have significant impact on stock prices (Aggarwal and Rivoli, 1990; Loughran and Ritter, 1995; Ritter, 1991; Spiess and Affleck Graves, 1995). It is widely reported that there is an information asymmetry between inside and outside investors, as outside investors get only aggregated news for a company at specific points in time while inside investors have better screening and continuous knowledge of the firm's behaviour (Aboody and Lev, 2000). Insiders can therefore take advantage of their superior information about the upcoming issue and trade on their personal accounts to generate profit. Empirical studies report that insiders possess and are willing to trade on superior information by showing that firm insiders can predict abnormal stock price reactions (Ahern, 2017; Finnerty, 1976; Gider and Westheide, 2016; Hillier, Korczak and Korczak, 2015; John and Lang, 1991; Kallunki, Mikkonen, Nilsson and Setterberg, 2016; Kallunki, Kallunki, Nilsson and Puhakka, 2018; Lakonishok and Lee, 2001; Seyhun, 1986). In line with this evidence, more recent studies confirm that insiders adjust their trading strategies and gain abnormal returns by taking advantage of the information asymmetry or more specifically their information advantage over other investors (Aboody and Lev, 2000; Agrawal and Nasser, 2012). Lee, Lemmon, Li and Sequeira (2014) report that insiders engage in profitable trading even when their firm voluntarily applies insider trading restrictions, while profitable insider trading may be evidenced when there are automated surveillance systems and exchange trading rules for insider trading in place (Aitken, Cumming and Zhan, 2015). Albeit, profit generation may motivate insiders to engage in anticipatory trading, this motive may be off-set by potential criminal sanctions and legal penalties associated with insider trading. In addition, other than legal issues, actively trading upon privileged information may lead to loss of reputation as well as loss of job and career

prospects (Agrawal and Cooper, 2015). However, Karpoff and Lee (1991) provide evidence that the benefit from such trades overweighs the potential cost associated with legal penalties, which highlights the potential of insiders' exploitation of superior information ahead of issues.

PIPE announcements in the UK are associated with negative short-term and long-term returns. The insiders of a firm contemplating a PIPE are likely to know about the forthcoming deal well before its public announcement, mainly for the purpose of gauging the interest of potential investors as described earlier. Hence, if insiders possess information of the upcoming PIPE issue, thereby anticipating a stock price decrease and are willing to trade on that information, I expect an abnormal increase in insider sales prior to the PIPE issue. This formulates my first hypothesis:

Hypothesis 4-1: There is an abnormal increase in insider sales prior to the announcement of a PIPE.

Increasing selling activity in anticipation of the announcement of an event that triggers a negative market reaction may not be the only way for insiders to act. This form of trading also called active trading is more likely to catch attention. Alternatively, insiders may choose to follow a passive strategy (Agrawal and Nasser, 2012; Harlow and Howe, 1993) in which they refrain from buying shares prior to the announcement of the unfavourable information, effectively increasing their net sales. Therefore, if insiders adjust their strategies based on the information of the upcoming PIPE and engage in passive trading, I would expect less purchases in the pre-announcement period and higher net sales. This formulates my second hypothesis:

Hypothesis 4-2: Informed insiders abnormally refrain from buying shares increasing their net sales.

4.4 Data and summary statistics

4.4.1 PIPE firms' sample

My dataset includes all PIPE issues from firms listed in the UK between 2008 and 2015. I collect data on PIPE announcement dates from Sagient Research

Placement Tracker which is a popular database for PIPE data. Data on insider transactions are collected from Directors Deals database. Daily stock prices and firms' financials data are collected from Thomson Reuters, Datastream and Worldscope databases respectively. My initial dataset includes 2,521 issues. I keep only legal structures defined explicitly as PIPEs, thereby excluding Registration S[50] and secondary private issues. Following earlier studies on PIPEs (Brown and Floros, 2012; Dai, 2007) I further exclude financial firms. To be included in the final sample I also require that a firm has available financial data in Datastream at least one year prior to the PIPE issue.

The final PIPE dataset is then matched with Director Deals data. I exclude 542 issues that did not have any insider transactions data on Directors Deals. I further exclude all director transactions reported by former directors[51] and trades reported due to transfer, award, option exercise or give away of shares[52] from the final dataset. Table 4-1 describes the sample collection process in detail. The data collection criteria lead to a final sample of 1,007 issues reported by 501 unique firms. Table 4-2 presents the distribution of the PIPE deals in the final dataset by year. PIPEs in the final sample have raised over £37 billion between 2008 and 2015 with an average of £37.5mil per firm a year, showcasing their importance as a funding choice. Table 4-3 presents the distribution of PIPE issues by industry according to the Fama-French 12 industries classification system. It is noticeable that most of PIPE issuing firms are operating in the oil & gas and mining & construction industries.

"Tables 4.1 – 4.3 go about here"

[50] Registration S. issues require a registration statement prior to the issue and therefore deviate from the typical PIPE definition.
[51] According to Directors Deals database definition, a former executive is no longer a member of the board and his/her transactions do not have to be reported under the listing rules but may be in some cases.
[52] I exclude these director deals as they refer to the acquisition or sale of shares on a value below the market price that may even be nil.

4.4.2 Control firms' sample

In order to match each PIPE firm to a comparable control firm, I download all the FTSE All Shares constituents between 2008 and 2015. I download the FTSE constituents every year for my examination period to ensure that I match with a firm that was listed on the year of the PIPE issue. I exclude all investment trusts and firms with no available market capitalisation or M/B data. I rank these companies first according to year, then by industry classification and finally by the market capitalisation and M/B ratio one year prior to the PIPE issue. For the industry classification I use the 12 Fama-French Industries[53], based on firms' primary SIC codes. I match each PIPE company to a control firm that did not issue a PIPE and has the smallest sum of market capitalisation and M/B ratio deviation from the PIPE firm.

4.4.3 Summary statistics

Table 4-4 presents the mean and median values of PIPE (treatment group) and control firms' financials between 2008 and 2015. Typical treatment firms have lower market value from their control counterparts as observed by the median values, in line with my expectations, as PIPE firms are reported to be small firms (Brown and Floros, 2012; Dai, 2007; Haggard, Zhang and Ma, 2009). Treatment firms have also relatively high growth rates, proxied by the M/B ratios and are levered firms. Treatment firms have also higher R&D ratios and high cash burn rates, in line with prior evidence showing PIPE firms to be R&D intensive firms that burn cash quickly in order to finance their projects (Floros and Sapp, 2012). It can also be observed that treatment firms lose about 2.3% of their valuation around the announcement of the PIPE, while CARs are not statistically significant for control firms as expected. Treatment firms have also lower stock liquidity while volatility is approximately the same in treatment and control firms with medians of 3% and 2.55% respectively.

"Table 4.4 goes about here"

[53] The definition of the 12 industries classification can be found at Kenneth French's website available at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/

4.5 Empirical results

4.5.1 Insiders trades' cross-sectional and time-series controls

In this section I compare insider purchases, insider sales and net sales of PIPE firms relative to a control period prior to the pre-announcement period and relative to a matched control firms' sample. The two comparisons provide time-series (pre-pre-announcement) and cross-sectional (matched firms) controls respectively, while the difference in differences in means of the two controls described above, provide a dual test which simultaneously controls for firm characteristics and time effects. I choose as the event period 1 quarter prior to the announcement (-63, -1 trading days prior to the PIPE announcement) and for the control period 1 quarter prior to the event period (-125, -64 trading days prior to the PIPE announcement). I separately assess insider purchases and sales since I want to examine whether the net sales effect, if any, is due to an increase in selling or due to a reduction in purchases during the pre-announcement period. This practice of separately analysing purchases and sales is also followed in the studies of Seyhun (1986), Karpoff and Lee (1991) and Lakonishok and Lee (2001), while there are also studies reporting that insider sales and insider purchases have a different informational value (Alldredge and Cicero, 2015; Bonaime and Ryngaert, 2013; Dai, Fu, Kang and Lee, 2016; Gregory, Matatko and Tonks, 1997; Gregory, Matatko, Tonks and Purkis, 1994; Pope, Morris and Peel, 1990).

Investors are not allowed to trade before an event that can have material impact on the company, upon having information of that event prior to its public announcement. However, the definition of price sensitive information is at best vague while insiders may want to allow for sufficient time between their trades and the corporate event announcement, in order to be on the safe side and not be accused of any illegal actions. PIPE transactions typically have a quite short timetable with the negotiations process amongst the issuer, the placement agent and potential investors spanning a few days (Dresner and Kim, 2010). Once a PIPE issuer receives a definite purchase commitment, they are able to close the transaction and receive the funds typically within 7-10 days. Following the closing of the transaction the issuer will have to

publicly announce the deal, else the participating investors will be holding material information that restricts them from trading. Therefore, the issuer announces the deal typically in 1-2 business days. Nevertheless, firm insiders may know of and discuss the potential PIPE issue several weeks/months before its final decision and announcement and adjust their trades accordingly. Therefore, I consider the event period, in which corporate insiders are highly likely to have privileged information of the upcoming PIPE, as 1 trading days' quarter prior to the announcement of the PIPE and use as a control period for "normal" trades 1 quarter prior to the event period.

"Tables 4.5 – 4.7 go about here"

Tables 4-5 through 4-7 present the results on insider trade purchases, sales and net sales respectively. I use 3 measures of insider trades: the number of insider individuals trading during the event (control) period, the amount of shares traded in thousand units and the amount of shares traded in thousands GBP value. Overall, the results on the time series control as seen in column "(I) - (II)" show that the sales in PIPE firms during the event period do not increase, as one would expect upon the knowledge of a forthcoming negative event. In contrast, the sales are decreasing during the event period, a result which is contradictive to my first hypothesis *(H4-1)* of active insider trading. The difference in means on sales however is not significant for 2 of the 3 insider trade measures used. Interestingly, the results also show that purchases during the event period decrease significantly as measured by both the number of insiders trading and GBP value of shares traded. These results are consistent with Seyhun (1986) who also finds insiders to refrain from buying additional shares prior to unfavourable events. In addition, the decrease in purchases during the event period is larger than the decrease in sales observed, resulting on higher net sales during the event period relative to the control period as seen on Table 4-7.

Generally, the anticipation of a dilutive effect will have a negative impact on stock valuations, due to the increase in the total number of shares outstanding that can drive existing shareholders' holdings to decrease. Indeed, a PIPE announcement is followed by a negative market reaction. The

results of Tables 4-5 through 4-7 however, show that insiders do not increase their sales prior to the PIPE announcement but they do refrain from buying additional shares, deviating from their "normal" purchasing behaviour, evident from the significant increase in net sales before the event. Contrary to the results of the treatment group, the time-series control in the control firms sample, as shown by the column "(III) - (IV)", the differences in means / medians between the event and control period are insignificant, showing no deviations from normal trading patterns during the same time period for non-PIPE issuing firms.

The results on the cross-sectional control shown in column "(I) - (III)" show that purchases on treatment group are significantly less than those of the control firms during the same (event) period which confirms the earlier results that treatment firms refrain significantly from buying additional shares prior to the PIPE announcement. Again, contrary to the active insider trading hypothesis *(H4-1)* which would expect treatment firms' insiders to increase their sales during the event period, the results show that control firms have significantly more sales than treatment firms. However, the results of the cross-sectional control on net sales, are consistent with the time-series control, showing that treatment firms have significantly higher net sales during the event period compared to non-PIPE issuing firms (control group) as measured by the number of insiders and the GBP value of shares traded. I also note here that the results using the amount of shares traded, as the insider trading measure, do not yield statistical significant results, while in some cases the results are insignificant but contradictive to the other two measures used. A possible explanation to that is that the amount of shares traded is subjective and very dependent on the value of each share. Therefore, a high amount of shares purchased or sold could mean that the share value is very small rather than showing a bigger trading signal.

The results on the dual control, that captures both time-series and cross-sectional differences shown in column "(I - II) – (III – IV)", are consistent with the earlier results and show that treatment firms have significantly higher

net sales relative to the control sub-sample and control period. These results are supportive of the passive insider trading hypothesis *(H4-2)*.

4.5.2 Multivariate regressions

Next, I estimate cross-sectional regressions in order to examine insider trades, controlling for other potential insider trading determinants. I use the following regression specifications:

$$IT_{i,t} = \beta_0 + \beta_1 * event\ period_{i,t} + \beta_2 * size_{i,t-1} + \beta_3 * {}^{M}/_{B_{i,t-1}} + \beta_4 * \sigma_{i,t} + \beta_5 * \Delta\sigma_{i,t} + \beta_6 * R\&D_{i,t-1} + \beta_7 * announcement\ return_{i,t} + \beta_8 * cash\ burn_{i,t-1} + \beta_9 * stock\ liquidity_{i,t} + \gamma * year + \vartheta * industry + \varepsilon_i \quad (4.1)$$

$$IT_{i,t} = \beta_0 + \beta_1 * treatment\ group_{i,t} + \beta_2 * size_{i,t-1} + \beta_3 * {}^{M}/_{B_{i,t-1}} + \beta_4 * \sigma_{i,t} + \beta_5 * \Delta\sigma_{i,t} + \beta_6 * R\&D_{i,t-1} + \beta_7 * announcement\ return_{i,t} + \beta_8 * cash\ burn_{i,t-1} + \beta_9 * stock\ liquidity_{i,t} + \gamma * year + \vartheta * industry + \varepsilon_i \quad (4.2)$$

Specification (4.1) refers to the time-series control (Table 4-8) and includes the treatment firms sample. As dependent variables I use the 3 measures used on the previous tests, the number of individual insiders, the number of shares traded (in thousand units) and the nominal value of shares traded (in thousand GBP). The variable of interest is the event period which is an indicator variable that takes the value of 1 if the trade occurred during the event period and 0 if it occurred during the control period. This variable effectively indicates whether the insider trades increase/decrease during the event / control period. I further use a set of independent variables controlling for PIPE firm characteristics and insider trading determinants according to the literature. PIPE issuers are reported to be small firms with high M/B ratios (Brown and Floros, 2012; Chen et al., 2010; Dai, 2007). Small firms are also reported to have more insider purchases in insider trading literature (Seyhun, 1986) while insiders are argued to believe their firms to be undervalued (overvalued) when they have low (high) valuations and therefore buy when the stocks are in low valuations and sell when the stocks are in higher valuations (Jenter, 2005). I therefore control for

firms' size, measured by the natural logarithm of market capitalisation 1 year prior to the PIPE issue, and for M/B measured as the ratio of market value to book value of equity 1 year prior to the PIPE issue.

The literature also reports that in highly volatile (risky) firms managers tend to sell their shares (Meulbroek, 2000), while Aggarwal and Samwick (1999,2003) and Agrawal and Nasser (2012) conjecture that changes in equity risk are linked to changes in managers' shareholdings through purchases and sales. I therefore control for risk, measured by the volatility of the returns (σ) during the estimation period of (-66, -33 days) prior to the announcement date (for the event period) or prior to the event period (for the control period). I further control for changes in equity risk measured by the changes in volatility (Δσ) estimated as σ (-32, -1) - σ (-66, -33). PIPEs are further reported to be R&D intensive firms that use PIPE proceeds to finance their R&D expenses (Brown and Floros, 2012). R&D activity is also argued to contribute greatly to information asymmetries between inside and outside investors while insiders may try to exploit this information asymmetry to generate profit (Aboody and Lev, 2000). I therefore control for R&D, as measured by the ratio of R&D expenses over total assets. In addition, I control for the announcement returns in order to take into account the market reaction on the PIPE announcement. As argued by Agrawal and Nasser (2012), insiders may be more incentivised to trade, the larger the impact of the announcement is to the stock price. Announcement returns are measured by the Cumulative Abnormal Returns over a 10 days' window around the announcement of the issue $CAR_i(-4,+5)$. They are estimated using an OLS market model (see equation 3.1) relative to the FTSE All shares index.

I further control for stock liquidity, measured as the daily average trading volume over the number of shares outstanding, during the event period (-63, -1) trading days relative to the event, as insiders are reported to trade when stock turnover is high, effectively hiding the informed trading behind high liquidity and liquidity traders (Holmström and Tirole, 1993; Kyle, 1985). PIPE firms are reported to be of a distressed nature and burn cash quickly (Floros and Sapp,

2012). I therefore control for financial distress using as a proxy the cash burn rate, measured as the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise, following Chaplinsky and Haushalter (2010). Finally, I include year and industry fixed effects in order to mitigate the concerns that year and industry characteristics may be driving the results. The firm financials independent variables are lagged one year to mitigate endogeneity effects (Chen, Leung and Evans, 2018).

My panel dataset includes both time-series and cross-sectional variation. However, the main variation is likely to come from the cross-section of firms as I have 501 firms in my sample (1,007 issues) and 2 time-series options – the PIPE pre-announcement period and a period before that which is used as a control period, thus suggesting that statistically the cross-sectional variation dominates the sample (Chen et al., 2018). This lack of variation is argued to lead to a loss of significant relationships if firm fixed effects are implemented (Zhou, 2001). As such, I do not include firm fixed effects as a lack or little within firm variation as in shareholder trades and ownership, can lead to biased results (Hermalin and Weisbach, 1991)[54].

Specification (4.2) corresponds to the cross-sectional (Table 4-9) and the dual control (Table 4-10). In the cross-sectional control, the sample consists of both treatment and control firms. The variable of interest is the "treatment group" which is an indicator variable that takes the value 1 if the firm is in the treatment group and 0 if the firm is in the control group. This variable indicates whether the insider trades during the event period, increase/decrease if the firm is a PIPE issuing firm or a matched non-PIPE issuing firm. The dependent and control variables are the same as in specification (4.1).

In the dual control (Table 4-10), the sample consists of both treatment and control firms. The variable of interest is again the "treatment group" which takes the value 1 if the firm is in the treatment group and 0 if the firm is in the

[54] As a robustness, I increase the industry classification indicator variables from 12 to 48, the results are qualitatively similar.

control group. The dependent variables are the differences between treatment and control firms' insider trades, during the event and the control period (treatment group event period insider trades - treatment group control period insider trades) - (control group event period insider trades - control group control period insider trades). Insider trades are measured using the 3 measures described earlier: the individual insiders trading, the amount of shares traded in thousands and the GBP value of shares traded in thousands.

The first measure of insider trades, individual insiders purchases and sales, corresponds to count data as it measures the number of insiders buying / selling during the period of interest. There is also an observable over-inflation on value 0. For example, the insider purchases variable in the treatment group takes values between 0 and 7, with 90% of the observations being 0, 6% of the observations being 1, 2% of the observations being 2 and with the rest 2% taking the value 3 or more. I therefore use the zero inflated negative binomial regression when regressing these variables[55]. For the insiders' net sales, the variable can take both negative and positive values and hence I use OLS regressions. The second and third measures of insider trades, the amount of shares traded and the GBP value of shares traded variables, when measuring the purchases and sales, are censored from below at zero. I therefore use Tobit regressions when using these variables. For the net sales on the later measures I use OLS regressions as the variables are continuous.

"Tables 4.8 – 4.10 go about here"

The regression results are presented on Tables 4-8 to 4-10. Columns (1) – (3) correspond to insider purchases, columns (4) – (6) correspond to insider sales and columns (7) – (9) correspond to insider net sales, calculated as sales minus purchases. Table 4-8 shows the estimates of the regression on insider trades of treatment firms during the event and control period (time-series control). The coefficient on the event period variable, which is the variable of

[55] Initially I test whether the Poisson regression best fits my data, however, in untabulated results I find that the variance of my data is higher than the mean, which is a sign of over-dispersion in which case the negative binomial regression offers a better fit.

interest, is negative and significant for purchases on the 3 insider trading measures used, showing that insiders decrease their purchases significantly close to the PIPE announcement in line with the results of Table 4-5. The results on sales are also negative, contrary to the active insider trading hypothesis, but insignificant except for the individual insiders measure. Similarly, the results on net sales are significant and positive only for the individual insiders measure.

Table 4-9 presents the estimates of the regressions using the cross-sectional control. The test of focus here is again on the net sales estimates, where similar to the time-series control, I see that the treatment group which is the variable of interest, is positive and significant only on the individual insiders measure. Although, the results on the regressions of Tables 4-8 and 4-9 are important, the main focus is on Table 4-10 that presents the estimates of the regressions of the simultaneous controls, calculated through the Diff. in Diff. method. The coefficient on the treatment group variable is negative and significant for purchases when using the individual insiders and shares GBP value measures, suggesting that insiders decrease their purchases relative to the control period more than the insiders of the control firms' group. The estimates of the regressions when assessing sales are not significantly different than 0. Finally, the results on the net sales are positive and significant for 2 of the 3 measures used, indicating that treatment firms' insiders increase their net sales during the pre-announcement period relative to their usual trading behaviour more than the insiders of the control firms' sample.

Overall, the results confirm my second hypothesis as they show that insiders deviate from their usual trading behaviour and increase their net sales during the pre-announcement period due to the reduction in purchases. These findings are supportive of the passive insider trading hypothesis *(H4-2)*. The results hold when I include time-series or cross-sectional benchmarks. While active insider trading is prohibited based on insider trading laws, there is no regulation to prevent passive insider trading. The findings of this study however show that insiders do adjust their trades based on superior information prior to PIPE announcements, which points to the limitations of insider trading laws, an issue

often discussed in insider trading studies (Agrawal and Nasser, 2012) as well as legal studies (Fried, 2003; Salbu, 1993).

4.5.3 Sensitivity analysis, insiders' profitability

In this section I conduct a sensitivity analysis to measure abnormal profits generated by insiders' transactions during the event period. To measure the insiders' transactions abnormal returns, I use 3 empirical methods. Specifically, I employ the Capital Asset Pricing Model (CAPM), the Fama and French (1993) 3-factor model and the Carhart (1997) 4-factor model and estimate the 4, 6, 12 and 18 month abnormal returns. This practice for estimating insiders' profits is also followed in Dai et al. (2016); Kallunki et al. (2016) and Kallunki et al. (2018). Abnormal returns of sales are multiplied with -1 so they can be interpreted as profits generated by insiders. As such, a higher value should be interpreted as more profitable trading. The results, presented in Table 4-11, show that insiders who (net) sell their shares during the PIPE pre-announcement period avoid losses of circa 18% on average within 6 months of their trade, showcasing that insiders can predict stock movements in line with Ahern (2017); Finnerty (1976); Gider and Westheide (2016); John and Lang (1991); Kallunki et al. (2016); Kallunki et al. (2018); Lakonishok and Lee (2001) and Seyhun (1986).

4.6 Discussion and conclusion

This chapter examines registered insider trades prior to PIPE announcements in the UK, aiming to assess whether insiders change their trading strategies in the anticipation of a PIPE issue, a corporate event that is followed by negative market valuation. In anticipation of a negative corporate event insiders with privileged information that are willing to use this information, may either decrease their sales or refrain from purchasing additional shares prior to the unfavourable event. I assess insider trades relative to cross sectional and time series benchmarks and find that insiders contrary to the active insider trading hypothesis do not increase their sales prior to the announcement of the issue. This finding suggests that insiders may be cautious of insider trading regulations, as increases in sales prior to a negative announcement are likely to

draw significant attention. However, in line with the passive insider trading literature, I find an increase in insiders' net sales during the pre-announcement period which arises due to an abnormal decrease in insider purchases and can be interpreted as private inside information. The results are consistent with evidence of studies on registered insider trades ahead of other corporate events (Agrawal and Nasser, 2012; Harlow and Howe, 1993). Albeit there is no active insider trading ahead of PIPEs which would constitute an illegal action, the findings are of regulatory significance as I show that insiders change their trading behaviour and limit their purchases before a PIPE issue. Overall the results suggest, allowing for the assumptions and limitations faced in insider trading studies as detailed in the introduction, that a greater attention may be required on insiders' actions prior to PIPEs.

Table 4-1: Sample selection

Sample selection	N	%
All PIPEs issues	2,521	100
Legal Structure: Reg. S.	-7	-0.28
Legal Structure: Secondary Private	-37	-1.47
Legal Structure: 144-A	-4	-0.16
Financial firms	-507	-20.11
No financial data	-417	-16.54
Not matched with Directors Deals data	-542	-21.50
	1,007	40

The table presents a breakdown of the sample selection. PIPE data are collected from the Sagient Research Placement Tracker database. All financial data are collected from Thomson Reuter Datastream and Worldscope database. Data on insider trades are collected from Directors Deals database. The period under examination is between 2008 and 2015.

Table 4-2: PIPEs distribution by year

Year	PIPE issues	PIPE proceeds mil. £ (total)	PIPE proceeds mil. £ (mean)
2008	121	2,940	24.30
2009	210	17,000	81.10
2010	160	5,320	33.30
2011	125	2,070	16.60
2012	125	3,020	24.10
2013	132	3,130	23.70
2014	117	2,850	24.30
2015	17	1,380	81.30
Total	1,007	37,700	37.50

The table presents the distribution of PIPE issues in my sample by year. For each year the number of PIPE transactions, the total proceeds in million GBP and the average proceeds per firm are reported. Data on PIPE issues are obtained from the Sagient Research Placement Tracker database.

Table 4-3: Industry distribution

Fama-French 12 industry classification	Number of Issues	% of issues	Number of unique firms
Business Eq.: Computers and Software	79	7.85	57
Chemicals and Allied Products	26	2.58	11
Consumer Durables: Cars, TV's, Furniture	16	1.59	10
Consumer Non-Durables: Food, Tobacco	48	4.77	22
Healthcare, Medical Equipment, and Drugs	76	7.55	34
Manufacturing: Machinery, Trucks, Planes	69	6.85	43
Oil, Gas, and Coal Extraction and Products	231	22.94	82
Other: Mines, Constr., BldMt, Trans, Hotels	386	38.33	195
Telephone and Television Transmission	13	1.29	7
Utilities	19	1.89	11
Wholesale, Retail, and Some Services	44	4.37	29
Total	1,007	100	501

The table shows the issuers' industry distribution based on the Fama-French 12 industry classification system using firms' primary SIC codes.

Table 4-4: PIPE and control firms' characteristics

	PIPE firms		Control firms	
	mean	median	mean	median
Size	10.92	10.77	12.11	11.82
M/B	2.37	1.52	1.83	1.50
Cash	0.20	0.11	0.12	0.08
Leverage	0.20	0.06	0.23	0.20
R&D	0.06	0.00	0.01	0.00
Cash burn rate	-2.78	-0.25	-0.03	0.00
σ (%)	3.27	3.00	2.84	2.55
Δσ (%)	0.02	-0.06	-0.11	-0.12
CAR (-4, +5) (%)	-2.30	-1.87	0.64	0.36
Stock Liquidity (%)	0.08	0.04	0.25	0.14

The table reports the mean and median values of PIPE and control firms' characteristics over 2008 to 2015. Financial data are retrieved from Worldscope database and are from the fiscal year end prior to the PIPE issue. Size is the natural logarithm of market capitalization. The M/B is the market to book item from Datastream, cash is computed as cash and cash equivalents over total assets, leverage is the ratio of total debt over total assets, R&D is the ratio of research and development over total assets, cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise, CAR (-4, +5) show the Cumulative Abnormal Returns over a 10 days' window around the PIPE issue, σ shows the standard deviation of the daily stock returns over (-63, -33) trading days prior to the PIPE announcement and Δσ is calculated as σ(-32, -1) – σ(-63, -33) relative to the announcement of the PIPE. Stock liquidity is measured as the average daily volume over the number of shares outstanding during the previous quarter (-63, -1). All financial data are winsorised at the 1 and 99%.

Table 4-5: Insider purchases

	PIPE firms				*Control firms*				*Diff. in Diff.*			
	(I) Event Period	**(II) Control Period**	**(I) - (II) Diff.**	**p-value**	**(III) Event Period**	**(IV) Control Period**	**(III) - (IV) Diff.**	**p-value**	**(I) - (III) Diff.**	**p-value**	**(I-II) - (III-IV) Diff.**	**p-value**
Panel A: Number of insiders												
N	83	183	-100		211	196	15		-128		-115	
mean	0.09	0.20	-0.11	0.00***	0.24	0.23	0.02	0.57	-0.15	0.00***	-0.12	0.00***
median	0.00	0.00	0.00	0.00***	0.00	0.00	0.00	0.63	0.00	0.00***	0.00	0.00***
Panel B: Shares (amount in '000)												
N	53,300	53,600	-300		6,411	6,053	358		46,889		-658	
mean	57.12	57.36	-0.25	0.99	7.37	6.96	0.41	0.80	49.75	0.01**	-0.66	0.98
median	0.00	0.00	0.00	0.00***	0.00	0.00	0.00	0.63	0.00	0.00***	0.00	0.00***
Panel C: Shares (GBP value in '000)												
N	4,670	8,027	-3,357		12,600	11,200	1,400		-7,930		-4,757	
mean	5.00	8.59	-3.59	0.10*	14.50	12.90	1.60	0.54	-9.50	0.00***	-5.19	0.08*
median	0.00	0.00	0.00	0.00***	0.00	0.00	0.00	0.62	0.00	0.00***	0.00	0.00***

The table presents insiders' purchases on matched pairs of PIPE and control firms over the event period (1 quarter prior to the announcement of the event) and the control period 1 quarter prior to the event period). Panel A reports the number of individual insider purchases. Panel B reports the amount of shares purchased in thousands and Panel C reports the GBP value of shares purchased in thousands. P-values of differences in means and medians are presented next to each sample, while the last column reports the p-values of the difference in differences. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 4-6: Insider sales

	PIPE firms				*Control firms*				*Diff. in Diff.*			
	(I) Event Period	**(II) Control Period**	**(I) - (II) Diff.**	**p-value**	**(III) Event Period**	**(IV) Control Period**	**(III) - (IV) Diff.**	**p-value**	**(I) - (III) Diff.**	**p-value**	**(I-II) - (III-IV) Diff.**	**p-value**
Panel A: Number of insiders												
N	15	30	-15		67	67	0.00		-52		-15	
mean	0.02	0.03	-0.02	0.07*	0.08	0.08	0.00	1.00	-0.06	0.00***	-0.02	0.36
median	0.00	0.00	0.00	0.03***	0.00	0.00	0.00	0.93	0.00	0.00***	0.00	0.36
Panel B: Shares (amount in '000)												
N	15,200	33,200	-18,000		5,365	6,885	-1,520		9,835		-16,480	
mean	16.23	35.57	-19.34	0.57	6.17	7.91	-1.74	0.40	10.06	0.31	-17.60	0.60
median	0.00	0.00	0.00	0.03***	0.00	0.00	0.00	0.96	0.00	0.00***	0.00	0.22
Panel C: Shares (GBP value in '000)												
N	5,754	4,868	886		15,800	21,400	-5,600		-10,046		6,486	
mean	6.16	5.21	0.95	0.75	18.18	24.61	-6.43	0.31	-12.02	0.01***	7.38	0.27
median	0.00	0.00	0.00	0.03***	0.00	0.00	0.00	0.96	0.00	0.00***	0.00	0.26

The table presents insiders' sales on matched pairs of PIPE and control firms over the event period (1 quarter prior to the announcement of the event) and the control period (1 quarter prior to the event period). Panel A reports the number of individual insider sales. Panel B reports the amount of shares sold in thousands and Panel C reports the GBP value of shares sold in thousands. P-values of differences in means and medians are presented next to each sample, while the last column reports the p-values of the difference in differences. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 4-7: Insider net sales

	PIPE firms				*Control firms*				*Diff. in Diff.*			
	(I) Event Period	**(II) Control Period**	**(I) - (II) Diff.**	**p-value**	**(III) Event Period**	**(IV) Control Period**	**(III) - (IV) Diff.**	**p-value**	**(I) - (III) Diff.**	**p-value**	**(I-II) - (III-IV) Diff.**	**p-value**
Panel A: Number of insiders												
N	-68	-153	85		-144	-129	-15		76.00		100	
mean	-0.07	-0.16	0.09	0.00***	-0.17	-0.15	-0.02	0.62	0.09	0.00***	0.11	0.00***
median	0.00	0.00	0.00	0.00***	0.00	0.00	0.00	0.73	0.00	0.00***	0.00	0.02**
Panel B: Shares (amount in '000)												
N	-38,200	-20,400	-17,800		-1,046	831	-1,877		-37,154		-15,923	
mean	-40.89	-21.79	-19.10	0.64	-1.20	0.96	-2.16	0.41	-39.69	0.08*	-16.94	0.68
median	0.00	0.00	0.00	0.00***	0.00	0.00	0.00	0.82	0.00	0.01**	0.00	0.02**
Panel C: Shares (GBP value in '000)												
N	1,084	-3,160	4,244		3,203	10,200	-6,997		-2,119		11,241	
mean	1.16	-3.38	4.54	0.22	3.68	11.71	-8.03	0.24	-2.52	0.63	12.57	0.08*
median	0.00	0.00	0.00	0.00***	0.00	0.00	0.00	0.81	0.00	0.00***	0.00	0.05**

The table presents insiders' net sales on matched pairs of PIPE and control firms over the event period (1 quarter prior to the announcement of the event) and the control period (1 quarter prior to the event period). Net sales are computed as Sales - Purchases. Panel A reports the number of individual insider net sales. Panel B reports the amount of shares traded in thousands and Panel C reports the GBP value of shares traded in thousands. P-values of differences in means and medians are presented next to each sample, while the last column reports the p-values of the difference in differences. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 4-8: Regression analysis, time series control, Diff (I) - (II)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Purchases			Sales			Net Sales		
	Insiders	Shares Amount	Shares Value (£)	Insiders	Shares Amount	Shares Value (£)	Insiders	Shares Amount	Shares Value (£)
Event period	-0.72***	-534.90***	-62.39***	-0.70**	-1,709.28	-157.99	0.09***	-11.73	5.20
	[0.00]	[0.00]	[0.00]	[0.05]	[0.21]	[0.13]	[0.00]	[0.79]	[0.21]
Size	0.14***	91.04*	16.22***	0.39***	923.38**	134.21***	-0.02	-3.20	2.51
	[0.00]	[0.09]	[0.01]	[0.00]	[0.04]	[0.00]	[0.11]	[0.71]	[0.24]
M/B	-0.01	5.10	0.52	-0.04*	-100.44	-9.17	0.00	-1.32	0.04
	[0.61]	[0.61]	[0.63]	[0.10]	[0.23]	[0.15]	[0.69]	[0.49]	[0.68]
σ	7.53	8,858.81	774.57	-0.31	-15,297.88	-2,471.52	-0.93	-301.73	-113.61
	[0.20]	[0.13]	[0.20]	[0.99]	[0.72]	[0.66]	[0.23]	[0.67]	[0.33]
Δσ	-0.59	-7,390.45	-909.14	-5.67	-57,485.92	-3,703.09	0.2	-1,159.57	87.5
	[0.94]	[0.31]	[0.21]	[0.76]	[0.39]	[0.50]	[0.84]	[0.59]	[0.40]
R&D	-0.15	-375.12	-63.68	-0.69	-1053.4	-20.43	-0.01	2.69	7.64
	[0.69]	[0.43]	[0.27]	[0.70]	[0.74]	[0.94]	[0.86]	[0.93]	[0.45]
Announcement	-0.27	412.01	29.03	0.31	-1,458.95	-51.99	0.03	-165.95	-4.65
	[0.64]	[0.47]	[0.63]	[0.79]	[0.59]	[0.87]	[0.73]	[0.13]	[0.71]
Cash burn	0.09**	84.54**	9.47***	0.02	22.44*	4.23	-0.00**	-0.34	-0.01
	[0.02]	[0.01]	[0.01]	[0.33]	[0.06]	[0.22]	[0.03]	[0.33]	[0.74]
Stock Liquidity	-61.13	-74,731.82	-6,600.74	29.98	89,666.03	12,696.69	4.21	5,645.07	686.52
	[0.17]	[0.23]	[0.24]	[0.65]	[0.58]	[0.47]	[0.31]	[0.59]	[0.19]
Constant	-2.48	-3,165.25***	-379.55***	-7.74***	-23,140.43**	-2,928.92***	-0.06	43.74	-30.12

	[0.16]	[0.01]	[0.00]	[0.00]	[0.03]	[0.00]	[0.70]	[0.68]	[0.21]
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,675	1,675	1,675	1,675	1,675	1,675	1,675	1,675	1,675
R^2							0.028	0.004	0.019
pseudo R^2		0.014	0.024		0.036	0.051			

The table presents the estimates of the regressions on insider trades of PIPE issuers (treatment group). Measures of insider trades include the number of individual insiders trading during the event (control) period *(Insiders)*, the amount of shares traded in thousands during the event (control) period *(Shares Amount)* and the value of shares traded in thousand £ *(Shares Value £)* during the event (control) period. Columns (1) -(3) report the estimates of insider purchases, (4) – (6) report the estimates of insider sales and (7) – (9) report the estimates of net sales calculated as Sales – Purchases. Event period is an indicator variable that takes the value 1 if the trade occurred during the event period (1 quarter prior to the PIPE announcement) and 0 if the trade occurred during the control period (1 quarter prior to the event period). Size is the natural logarithm of market capitalisation, M/B is the market to book item from Datastream, σ is the standard deviation of the daily stock returns over (-63, -33) trading days prior to the PIPE announcement and Δσ is calculated as σ (-32, -1) – σ (-63, -33) relative to the announcement of the PIPE. R&D is the ratio of research and development over total assets, Announcement show the cumulative abnormal returns over a 10 days' window (-4, +5) around the PIPE issue, Cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise, Stock liquidity is measured as the average daily volume over shares outstanding during the previous quarter (-63, -1). Financial data are retrieved from Worldscope database and are from the fiscal year end prior to the PIPE issue. Stock data are retrieved from Datastream. All financial and stock data are winsorised at the 1 and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 4-9: Regression analysis, cross-sectional control, Diff (I) - (III)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Purchases			Sales			Net Sales	
	Insiders	Shares	Shares	Insiders	Shares	Shares Value	Insiders	Shares	Shares
Treatment group	-0.82***	-449.78**	-97.57***	-1.07***	-503.60**	-330.83***	0.13***	-25.77	2.96
	[0.00]	[0.03]	[0.00]	[0.00]	[0.02]	[0.00]	[0.00]	[0.24]	[0.64]
Size	0.18***	60.87	18.35**	0.48***	214.98**	139.94***	0.00	2.17	2.91
	[0.01]	[0.17]	[0.01]	[0.00]	[0.05]	[0.00]	[0.84]	[0.73]	[0.27]
M/B	-0.01	7.04	0.67	-0.02	-13.16	-8.90	0.00	-0.10	-0.21
	[0.70]	[0.59]	[0.74]	[0.45]	[0.37]	[0.30]	[0.60]	[0.88]	[0.31]
σ	6.52	2,303.86	102.7	-17.92	-7,064.83	-8,785.17	-0.85	-131.9	-315.58**
	[0.29]	[0.62]	[0.89]	[0.28]	[0.32]	[0.10]	[0.31]	[0.79]	[0.05]
Δσ	10.59	-4,125.07	-508.92	-11.74	-519.46	-812.67	-1.00	1,159.58	29.43
	[0.28]	[0.54]	[0.57]	[0.57]	[0.96]	[0.90]	[0.45]	[0.30]	[0.85]
R&D	-1.38	-3,363.68	-456.05	0.41	330.45	251.22	0.02	33.24	18.8
	[0.52]	[0.20]	[0.16]	[0.53]	[0.48]	[0.31]	[0.61]	[0.21]	[0.31]
Announcement	0.36	667.95	86.17	-0.99	-1,288.11	-504.49	-0.04	-148.78	-14.06
	[0.70]	[0.36]	[0.30]	[0.47]	[0.32]	[0.30]	[0.66]	[0.23]	[0.44]
Cash burn	0.06*	36.48**	5.24*	0.00	8.51	3.66	-0.00**	0.13	-0.01
	[0.06]	[0.04]	[0.06]	[0.60]	[0.51]	[0.53]	[0.02]	[0.60]	[0.93]
Stock Liquidity	-63.04	-100,944.60*	-17,690.38***	45.94	40,426.21	11,531.40	9.33	9,493.72	552.76
	[0.39]	[0.08]	[0.00]	[0.61]	[0.37]	[0.66]	[0.10]	[0.22]	[0.46]
Constant	-2.55**	-2,063.04**	-366.16***	-8.13***	-5,538.01**	-3,008.11***	-0.26	-4.67	-24.14
	[0.03]	[0.03]	[0.00]	[0.00]	[0.03]	[0.00]	[0.11]	[0.94]	[0.42]
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

N	1,624	1,624	1,624	1,624	1,624	1,624	1,624	1,624	1,624
R^2							0.039	0.014	0.039
Pseudo R^2		0.02	0.038		0.04	0.057			

The table presents the estimates of the regressions on insider trades of PIPE issuing firms and a matched sample of control firms during the event period (1 quarter prior to the PIPE issue). Measures of insider trades include the number of individual insiders *(Insiders*), the amount of shares traded in thousands *(Shares Amount)* and the value of shares traded in £ thousand *(Shares Value £)*. Columns (1) -(3) report the estimates of insider purchases, (4) – (6) report the estimates of insider sales and (7) – (9) report the estimates of net sales calculated as Sales – Purchases. Treatment group is an indicator variable that takes the value 1 if the deal refers to a PIPE firm and 0 if it refers to a control firm. Size is the natural logarithm of market capitalisation, M/B is the market to book item from Datastream, σ is the standard deviation of the daily stock returns over (-63, -33) trading days prior to the PIPE announcement and Δσ is calculated as σ (-32, -1) – σ (-63, -33) relative to the announcement of the PIPE. R&D is the ratio of research and development over total assets, Announcement show the cumulative abnormal returns over a 10 days' window (-4, +5) around the PIPE issue, Cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise, Stock liquidity is measured as the average daily volume over shares outstanding during the previous quarter (-63, -1). Financial data are retrieved from Worldscope database and are from the fiscal year end prior to the PIPE issue. Stock data are retrieved from Datastream. All financial and stock data are winsorised at the 1 and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 4-10: Regression analysis, time-series & cross-sectional control, Diff (I-II) - (III-IV)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Purchases			Sales			Net Sales	
	Insiders	Shares Amount	Shares Value (£)	Insiders	Shares Amount	Shares Value (£)	Insiders	Shares Amount	Shares Value (£)
Treatment group	-0.14***	-11.96	-7.40**	-0.01	17.43	9.90	0.13***	29.39	17.30*
	[0.00]	[0.62]	[0.05]	[0.61]	[0.12]	[0.24]	[0.01]	[0.27]	[0.06]
Size	-0.01	-5.00	-1.96	0.00	-2.92	-0.14	0.01	2.08	1.82
	[0.59]	[0.52]	[0.24]	[0.86]	[0.55]	[0.97]	[0.56]	[0.82]	[0.61]
M/B	0.00	0.55	0.01	0.00	2.79	-0.84	0.00	2.24	-0.85
	[0.70]	[0.41]	[0.87]	[0.42]	[0.40]	[0.15]	[0.43]	[0.51]	[0.15]
σ	3.08**	-178.58	59.67	-0.37	-2,815.88	-139.17	-3.44**	-2,637.31	-198.84
	[0.03]	[0.81]	[0.59]	[0.46]	[0.32]	[0.53]	[0.02]	[0.37]	[0.42]
Δσ	1.88	-1,038.41	-223.19	-0.18	-7,285.87	-23.89	-2.06	-6,247.46	199.3
	[0.28]	[0.46]	[0.26]	[0.76]	[0.30]	[0.89]	[0.27]	[0.38]	[0.46]
R&D	-0.08	-45.07	-0.88	0.03	27.48	24.19	0.12*	72.56	25.08
	[0.12]	[0.29]	[0.70]	[0.18]	[0.39]	[0.22]	[0.07]	[0.20]	[0.21]
Announcement	0.22	94.48	20.92	-0.03	-10.74	4.49	-0.25	-105.22	-16.42
	[0.16]	[0.42]	[0.11]	[0.54]	[0.90]	[0.80]	[0.13]	[0.47]	[0.47]
Cash burn	0.00	-0.29	-0.04	0.00	-0.09	0.13	0.00	0.19	0.17*
	[0.82]	[0.20]	[0.22]	[0.44]	[0.88]	[0.16]	[0.61]	[0.79]	[0.09]
Stock Liquidity	0.64	-2,901.9	-36.49	2.99	12,088.17	1,459.74	2.35	14,990.07	1,496.24
	[0.93]	[0.32]	[0.96]	[0.49]	[0.19]	[0.25]	[0.79]	[0.13]	[0.31]

Constant	0.06	54.75	25.04	-0.08	99.55	9.20	-0.14	44.8	-15.84
	[0.78]	[0.60]	[0.29]	[0.48]	[0.22]	[0.81]	[0.55]	[0.74]	[0.72]
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,624	1,624	1,624	1,624	1,624	1,624	1,624	1,624	1,624
R^2	0.031	0.012	0.017	0.009	0.018	0.008	0.025	0.019	0.01

The table presents the estimates of the regressions on differences of insider trades of PIPE issuing firms and a matched sample of control firms, between the event period (1 quarter prior to the PIPE issue) and the control period (1 quarter prior to the event period). The dependent variables refer to the Diff. in Diff. estimates of Table 5-7 tests. Measures of insider trades include the number of individual insiders *(Insiders)*, the amount of shares traded in thousands *(Shares Amount)* and the value of shares traded in £ thousand *(Shares Value £)*. Columns (1) - (3) report the estimates of purchases, (4) – (6) report the estimates of sales and (7) – (9) report the estimates of net sales calculated as Sales – Purchases. Treatment group is an indicator variable that takes the value 1 if the deal refers to a PIPE firm and 0 if it refers to a control firm. Size is the natural logarithm of market capitalisation, M/B is the market to book item from Datastream, σ is the standard deviation of the daily stock returns over (-63, -33) trading days prior to the PIPE issue and Δσ is calculated as σ (-32, -1) – σ (-63, -33) relative to the announcement of the PIPE. R&D is the ratio of research and development over total assets, Announcement show the cumulative abnormal returns over a 10 days' window (-4, +5) around the PIPE issue, Cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise. Stock liquidity is measured as the average daily volume over shares outstanding during the previous quarter (-63, -1). Financial data are retrieved from Worldscope database and are from the fiscal year prior to the PIPE issue. Stock data are retrieved from Datastream. All financial and stock data are winsorised at the 1 and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Table 4-11: Sensitivity analysis - investor profitability

	4-months	6-months	12-months	18-months
CAPM	15.49%***	19.27%***	25.81%***	38.46%***
	(0.06)	(0.10)	(0.11)	(0.18)
3-factor model	-13.73%***	-17.75%***	-23.44%***	-36.45%***
	(0.06)	(0.09)	(0.11)	(0.18)
4-factor model	-13.88%***	-18.47%***	-23.87%***	-39.37%***
	(0.07)	(0.10)	(0.11)	(0.18)

The table presents the cumulative abnormal returns 4, 6, 12, and 18 months following insider trades. The abnormal returns are estimated using the Capital Asset Pricing Model (CAPM), the Fama and French (1993) 3-factor model and the Carhart (1997) 4-factor model. Daily stock returns are retrieved from Datastream database. Stock data are winsorised at the 1% and 99%. Standard errors are reported in the parentheses. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

5. Concluding remarks

5.1 Overview and discussion

This PhD thesis consists of three essays, exploring Private Investments in Public Equity. PIPEs are an equity funding choice for public firms, to raise capital through a group of private investors. They differ from traditional public placements, as these issues can be completed in a quick and cost effective manner. Specifically, subject to satisfying specific criteria, a PIPE issue does not have to engage into time consuming issuance procedures, as for example awaiting a SEC review or compiling a prospectus. In addition, PIPE issuers have the option to directly negotiate with the investors, effectively limiting all the direct issuance costs. However, PIPEs also differ from the typical private placements, with a major difference being in the length of the resale restrictions. An investor is typically able to trade the securities purchased from a PIPE issue within 3 - 4 months, while on a typical private placement the restriction period may last up to 2 years (Chen et al., 2010). Thus a PIPE issue provides enhanced liquidity to the participating investors,

PIPE benefits have led to increased market attention, as their activity has spread across the world. PIPEs constitute a popular funding choice in the US with a total of 19,566 issues between 1995 and 2015 and an average of $46 billion raised per annum during the last decade of the sample. This equity funding choice has also a strong presence outside the US with activity levels however varying significantly. Specifically, America has 8,980 issues followed by Asia with 5,922 issues and Europe with 2,929 over the sample period.

PIPEs can be distinguished in two main categories. Traditional PIPEs comprising common stock issues and fixed price convertibles and structured PIPEs that are typically based on floating price convertibles. Private equity issuers are typically small, levered, risky, poorly performing (Dai, 2007,

2009; Gomes and Phillips, 2012; Wu, 2004) R&D intensive firms with high information asymmetries (Brown and Floros, 2012). The literature suggests that one reason for choosing to privately issue equity, rather than going through an open public offering, is high levels of information asymmetry (Chemmanur, 1993). Similarly, studies in PIPEs literature explore the choice between PIPE issues and traditional public placements, such as SEOs, and suggest that firms may chose PIPEs because they do not satisfy the transparency and profitability criteria of large public issues or due to their critical need for cash (Chen et al., 2010; Floros and Sapp, 2012). In addition, studies suggest that PIPEs may offer a financing of last resort for firms that do not have access to public offerings due to their financial position, effectively suggesting that PIPE issuers are financially distressed firms (Brophy et al., 2009; Chaplinsky and Haushalter, 2010).

The growth in PIPEs activity has attracted academic interest in gauging the performance of these deals. However, the evidence so far mainly comes from the US. PIPE issuers are reported to have a negative relationship between announcement and long-term returns, experiencing a positive market reaction following their public announcement and a long-term underperformance (Berkman et al., 2016; Chen et al., 2010; Dai, 2011). However, PIPEs stock performance differs drastically between investor classes or contract types. For instance, structured PIPEs and hedge fund investors are associated with worse performance (Brophy et al., 2009; Ellis and Twite, 2008) while PIPEs funded by venture capitalists are reported to outperform the others (Dai, 2011).

PIPEs popularity as a funding choice, the different levels of activity amongst regions, the scarce evidence on non-US deals and the mixed evidence on the stock performance when assessing different investor and contract types, form the motivation for the second chapter and more specifically to assess PIPEs global performance and the impact of cross country institutional characteristics on PIPEs valuation. I find a decrease in the announcement market valuation of PIPEs, which holds across all regions.

This negative shift in the performance can be explained by the poor financials of firms participating in the PIPE market in the most recent years. I further find that traditional PIPEs perform better than structured PIPEs almost across all regions and windows assessed. In addition, consistent with studies in the Law and Finance and International Business literature, I find a variation in the valuation of PIPEs across regions which can be explained by cross country institutional characteristics. Specifically, I find PIPE issuers operating in countries with more robust regulatory environments, where there is better regulatory quality and transparency, less corruption in the political system and superior law enforcement, to outperform the others. Finally, I find that PIPEs are followed by negative long-term returns with this evidence being robust globally. Long-term underperformance is widely reported to follow other equity issues as well, such as IPOs (Loughran and Ritter, 1995; Ritter, 1991) and SEOs (Eckbo and Masulis, 1995; Spiess and Affleck Graves, 1995).

The third chapter is motivated by the nature of the PIPE issuance process. A PIPE issue is publicly announced only after the closing of the deal. However, a company contemplating a PIPE, typically questions the interest of potential investors, thereby sharing with them information of the upcoming issue. This process raises concerns over information leakage. The literature systematically reports price run patterns ahead of corporate announcements (Cornell and Sirri, 1992; Damodaran and Liu, 1993; Seyhun, 1990) that are associated with information leakage (Berkman et al., 2016; King, 2009) due to trading based on tipped inside information with the purpose of generating profit. In addition, academic studies suggest that abnormal volume may provide an indication of illegal insider trading (Bris, 2005). I therefore assess the stock price patterns and trading volume ahead of the public announcement of PIPEs.

For this examination I focus in two markets, the UK and the US, both of which are significantly active in PIPE issues. In addition, the two markets have differences in the regulatory regimes towards insider trading, with the

UK investors to potentially be more likely to trade based on leaked information, due to the lower rates of insider trading prosecutions and lower fines imposed (Bhattacharya and Daouk, 2002; Bris, 2005; Siganos and Papa, 2015) compared to the US. I find abnormal returns and abnormal volume ahead of PIPEs especially pronounced during the 2 days prior to the PIPE public announcement. In addition, the evidence on the contemporaneous relationship between the stock prices and trading volume is in line with the information leakage hypothesis for US PIPE issuers.

The fourth chapter focuses on registered insider trades ahead of PIPE issues. This examination is motivated by the superior information firms' insiders have over the upcoming PIPE deals, especially when they have to negotiate with potential investors prior to the public announcement of the issue. This superior information, along with the substantial impact that corporate events have on firms' stock prices (Eckbo and Masulis, 1995; Loughran and Ritter, 1995; Ritter, 1991; Spiess and Affleck Graves, 1995) may incentivize investors to trade on their privileged information over the forthcoming issue in order to generate profit. The insider trading literature widely reports insiders to engage in profitable trading ahead of the announcement of corporate events, either in the form of active insider trading or in the form of passive insider trading (Agrawal and Nasser, 2012; Harlow and Howe, 1993; John and Lang, 1991; Karpoff and Lee, 1991; Lee et al., 1992; Seyhun and Bradley, 1997). UK PIPEs are followed by a negative market reaction. Active insider trading prior to an unfavourable event, would expect insiders to sell their shares prior to the announcement of the issue. In contrast, in passive insider trading, insiders may not sell their shares, which is an action likely to attract attention as trading upon private information is deemed illegal, but they may refrain from buying additional shares, thus deviating from their normal purchasing behavior and effectively increasing their net sales.

I separately assess insider purchases, sales and net sales using three measures, the number of individual insiders, the amount of shares traded and

the GBP value of shares traded. I find evidence in line with the passive insider trading hypothesis, as insiders adjust their trading strategies ahead of the announcement of PIPEs, by increasing their net sales due to the reduction in purchases ahead of the public announcement of the PIPE. These results are robust when comparing with a control period and a control firms' group.

5.2 Contribution and implications

This study makes several contributions to the existing literature and to our knowledge. The main contribution and implications can be summarized as follows. I provide empirical evidence on the announcement, short-term, medium-term and long-term performance of PIPE issuers from 37 countries around the world. This evidence increases our understanding of the patterns, behaviour and wealth creation following PIPE deals globally, contributing to the growing PIPEs literature. To my knowledge this is the first study addressing the international PIPEs performance. The study further adds to our knowledge regarding the impact of institutional characteristics on equity valuations and provides empirical evidence that cross-country institutional characteristics affect PIPEs performance. Specifically, I show that consistent with the Law and Finance (La Porta et al., 2002; La Porta et al., 1997, 1998) and International Business (Himmelberg et al., 2004; Klapper and Love, 2004; Lombardo and Pagano, 1999) literature, issuers in countries with superior regulatory quality and law enforcement, outperform their counterparts. I also show that PIPEs are followed by significant negative long-term returns that apply across all regions and persist to date. In addition, I document that traditional PIPEs overperform structured PIPEs globally. The findings of this study assist investors considering to participate in a PIPE offering, as well as existing shareholders as they provide an understanding of PIPE firms' performance post the announcement of the issue. Furthermore, these findings assist firms in gaining an understanding of the impact of a PIPE issue to the company's performance in the short-term and in the long-term. Moreover, I contribute to the insider trading literature by documenting the stock price and trading volume patterns, ahead of the public announcement of PIPEs and by providing evidence of the information leakage hypothesis for US issuers. Finally, I provide insights on insiders' behaviour ahead of PIPEs, by documenting registered insider purchases, sales and net sales. I show that insiders adjust their trading strategies

and engage in passive insider trading by increasing their net sales ahead of the PIPE issue. The latter findings, assist regulators and policy makers in understanding the nature of these deals and shifting the interest towards a corporate event that can be susceptive of market manipulation, while it contributes to the discussion of passive insider trading and the absence of relevant legislation. Finally, since PIPEs are a funding choice that offers capital to firms in need, one could argue that they contribute to the growth of the economy and in extension to our society, thereby making the findings of this research relevant to anyone in our society.

This study has several implications. First the study is of interest to PIPE issuing firms and PIPE practitioners / investors as it provides insights on firm value, performance and wealth creation of these deals. Second, the results of this study are relevant to regulators in gaining better insights of PIPEs pre-announcement stock price patterns as well as insiders' behaviour, showcasing that insiders' trades should be closely monitored around PIPEs. Third, since the Market Abuse Regulation addresses all European countries and the PIPEs market reaction is similar across Europe, the findings of Chapter 4, based on UK evidence, may be extrapolated to all European countries so to act proactively as PIPEs increase their activity throughout Europe. Fourth, a global study alleviates the concerns that findings based on US evidence may be a function of data mining.

5.3 Limitations

This section discusses the limitations faced by this PhD thesis. This is an empirical study and as such is affected by the limitations imposed by the data collection sources. I am using three main databases for the collection of my data, the Thomson Reuters Datastream (TRD) and Worldscope databases, the CRSP and the Sagient Research Placement Tracker. TRD has wide and deep data coverage making it suitable for a global study, however it is reported to have poor quality compared to US databases such as CRSP. Specifically, Ince and Porter (2006) find data employed from TRD to have errors including typos, incorrect dates and anomalies in observations which lead to extreme daily returns, while they also find shortcomings when trades are suspended. I therefore, use CRSP for US stock prices and trading volume, while for the

non-US data employed by TRD, I follow various cleaning steps in order to ensure the quality of the data. First in order to correct the data from possible typos and anomalous observations, I winsorize all stock returns and trading volume at the 1% and 99%. In addition, following Manconi et al. (2017) I remove all non-trading days and further replace all zero returns with missing values to clean the data from stale prices due to firms' delisting.

One limitation applying to performance studies, is that long-term returns are reported to be sensitive to the methodology employed, as Fama (1998) suggest that long-term anomalies could be based on chance and may disappear when changing model specification. I therefore, use alternative methods to calculate abnormal returns including an OLS market adjusted model, the Fama - French three factor model and the Buy and Hold Abnormal Returns. My findings are qualitatively similar.

Finally, this study faces the standard limitations that relate to insider trading studies. Specifically, I make the assumption that all the trades realized by companies' insiders, are reported as mandated by the law. In addition, I face the limitation that insiders may trade through their friends' or relatives' accounts whose trades are not required to be reported.

5.4 Suggestions for further research

This study focuses in exploring firms' stock performance around PIPE issues. While stock performance is of major importance for companies and investors, an often neglected area is the study of how other security types react in the announcement of corporate announcements. In perfect capital markets a firm's value should be independent of its capital structure (Modigliani and Miller, 1958). However, corporate finance literature widely discusses the potential conflict that arise between different stakeholder types within a firm (Jensen and Meckling, 1976; Shleifer and Vishny, 1997) as for example between debtholders and stockholders. There are competing views with regards to the effect of stockholders' profits on bondholders' wealth. One view is that the stockholders' profits may come in the expense of bondholders (Shleifer and Summers, 1988) while Jensen (1986) argues that this is unlikely

to affect bondholders. An interesting examination would be to study bondholders' reaction to the announcement of a PIPE, which constitutes a voluntary managerial decision that leads to a capital increase. There are several hypotheses related to the effects of equity announcements on debt securities performance. Specifically, studies suggest that a finding of a positive relationship between common stockholders' and bondholders' returns could indicate that the issue conveys a negative signal to the market about the firms' condition (Kalay and Shimrat, 1987). Other studies suggest that a negative relationship between common stock returns and bond returns may be associated with wealth transfer effects between the two groups (Maxwell and Rao, 2003; Maxwell and Stephens, 2003; Warga and Welch, 1993) or to leverage reduction that can benefit bondholders due to the reduced cost of financial distress (Elliott, Prevost and Rao, 2009). An examination of senior securities could give us a better understanding of the wealth creation and impact of the announcement of a PIPE to the financial markets.

Another avenue for further research is motivated by the findings of Chapter 4 for UK firms, which indicate that the assessment of stock price and trading volume dynamics in order to explain price run patterns ahead of the public announcement of PIPEs, may not be a good assessment method. Specifically, PIPEs are perceived as an unfavourable event by the market. When willingly trading based on privileged information regarding a forthcoming positive event, it is rational to expect an increase in the firm's volume due to increased purchases. However, if the expectation is a negative event those with privileged information may sell if they hold shares but in the opposite case (no shareholdings in the company) they may choose to either do nothing, which would not affect the volume, or they would short-sell the firms' securities. In the latter case, volume examination may be a noisy indicator. In light of that, the examination of short selling activity around PIPEs seems promising in yielding more clear results. Therefore, future research could focus on the comparison of short sales during the PIPE pre-announcement and post-announcement period.

Appendix

Appendix 1-A: A PIPE example

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 8-K

CURRENT REPORT
Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Date of Report (Date of Earliest Event Reported): **January 27, 2014**
(January 21, 2014)

Aastrom Biosciences, Inc.
(Exact name of registrant as specified in its charter)

Item 1.01. Entry into a Material Definitive Agreement.

On January 21, 2014, Aastrom Biosciences, Inc. (the "Company") entered into a purchase agreement (the "Purchase Agreement"), together with a registration rights agreement (the "Registration Rights Agreement"), with Lincoln Park Capital Fund, LLC ("Lincoln Park"), pursuant to which the Company has the right to sell to Lincoln Park up to $15,000,000 in shares of its common stock, no par value ("Common Stock"), subject to certain limitations.

Under the terms and subject to the conditions of the Purchase Agreement, Lincoln Park is obligated to purchase up to $15,000,000 in shares of Common Stock (subject to certain limitations) from time to time over the 30-month period commencing on the date that a registration statement (the "Initial Registration Statement"), which the Company agreed to file with the Securities and Exchange Commission (the "SEC") pursuant to the Registration Rights Agreement, is declared effective by the SEC and a final prospectus in connection therewith is filed. The Company may direct Lincoln Park, at its sole discretion and subject to certain conditions, to purchase up to

50,000 shares of Common Stock in regular purchases, increasing to amounts of up to 100,000 shares depending upon the closing sale price of the Common Stock. In addition, the Company may direct Lincoln Park to purchase additional amounts as accelerated purchases if on the date of a regular purchase the closing sale price of the Common Stock equals or exceeds $3.00 per share. The purchase price of shares of Common Stock related to the future funding will be based on the prevailing market prices of such shares at the time of sales (or over a period of up to 10 business days leading up to such time), but in no event will shares be sold to Lincoln Park on a day the Common Stock closing price is less than the floor price of $2.50, subject to adjustment. The Company will control the timing and amount of any sales of Common Stock to Lincoln Park.

This current report on Form 8-K shall not constitute an offer to sell or a solicitation of an offer to buy any shares of Common Stock, nor shall there be any sale of shares of Common Stock in any state or jurisdiction in which such an offer, solicitation or sale would be unlawful prior to registration or qualification under the securities laws of any such state or other jurisdiction. The foregoing descriptions of the Purchase Agreement and the Registration Rights Agreement and the transactions contemplated thereby are qualified in their entirety by reference to the full text of the Purchase Agreement and the Registration Rights Agreement, copies of which are attached hereto as Exhibit 10.1 and 10.2, respectively, and each of which is incorporated herein in its entirety by reference. In addition, the Purchase Agreement and the Registration Rights Agreement have been included to provide investors with information regarding their respective terms, and are not intended to provide any other factual information about the Company. The representations, warranties and covenants contained in the Purchase Agreement and the Registration Rights Agreement were made only for purposes of such agreements and as of specific dates, were solely for the benefit of the parties to such agreements, and may be subject to limitations agreed upon by the contracting parties, including being qualified by confidential disclosures exchanged between the parties in connection with execution of the

agreements. Accordingly, investors should not rely on the representations and warranties as characterizations of the actual state of facts at the time they were made or otherwise. The Company also issued a press release on January 27, 2014 to disclose the transaction with Lincoln Park, a copy of which is attached as Exhibit 99.1 and incorporated herein by reference.

Item 3.02 Unregistered Sales of Equity Securities.

In connection with the Purchase Agreement, the information contained above in Item 1.01 is hereby incorporated by reference into this Item 3.02. The issuance and sale of shares of Common Stock by the Company to Lincoln Park under the Purchase Agreement was made without registration under the Securities Act of 1933, as amended (the "Act"), or the securities laws of the applicable state, in reliance on the exemptions provided by Section 4(2) of the Act and Regulation D promulgated thereunder, and in reliance on similar exemptions under applicable state law, based on the offering of such securities to one investor, the lack of any general solicitation or advertising in connection with such issuance, the representation of such investor to the Company that it was an accredited investor (as that term is defined in Rule 501(a) of Regulation D), and the representation of such investor that it was purchasing the shares for its own account and without a view to distribute them.

Item 8.01 Other Events.

On January 27, 2014, the Company issued a press release announcing the execution of the Purchase Agreement and Registration Rights Agreement. A copy of the press release is attached as Exhibit 99.1 hereto and incorporated by reference herein.

Item 9.01. Financial Statements and Exhibits.

(d) Exhibits.

10.1 Purchase Agreement, dated as of January 21, 2014, by and between the Company and Lincoln Park Capital Fund, LLC.

10.2 Registration Rights Agreement, dated as of January 21, 2014, by and between the Company and Lincoln Park Capital Fund, LLC.

99.1 Press Release issued January 27, 2014.

Appendix 2-A: Variables definitions

Variable Name	Definition	Source
Control for Corruption	Control for Corruption measures the corruption in the political system. The score ranges from 0 to 1 with 1 showing the lowest levels of corruption and 0 showing the highest levels of corruption e.g.: low efficiency in government and business, people assume position through patronage rather than skills.	International Country Risk Guide (ICRG) available at: info.worldbank.org/governance/wgi/pdf/PRS.xlsx
Rule of Law	Rule of Law is measured by two components, the law and the order. Law measures the impartiality of the legal system and order measures the compliance to the law. The score ranges from 0 to 1 with 0 being the lowest, meaning that the country suffers from high criminality and ignorance to the law and 1 being a good judicial system.	International Country Risk Guide (ICRG) available at: info.worldbank.org/governance/wgi/pdf/PRS.xlsx
Regulatory Quality	Regulatory Quality is a measure of the investment profile, it assesses the factors affecting the risk to investment and it is derived by 3 components: contract viability, profits repatriation and payment delays. The score ranges from 0 to 1 with 0 showing very high risk and 1 showing very low risk.	International Country Risk Guide (ICRG) available at: info.worldbank.org/governance/wgi/pdf/PRS.xlsx
Market Value	Market Value is the market price at the end of the year multiplied by the common shares outstanding (item WC08001).	Thomson Reuters Worldscope
Market to Book	Market to Book ratio is employed by Datastream (item MTBV).	Thomson Reuters Datastream
Leverage	Leverage is the ratio of total debt (item WC03255) to total assets (item WC02999).	Thomson Reuters Worldscope
Cash	Cash is defined as the cash and cash equivalents (item WC02005) over total assets.	Thomson Reuters Worldscope
R&D	R&D is defined as the ratio of research and development (item WC01201) over total assets.	Thomson Reuters Worldscope
Cash burn	Cash burn ratio is defined as the ratio of operating income before depreciation (item WC18155) over cash and cash equivalents. This ratio is set to zero if the firm's operating income is positive in the fiscal year end prior to the PIPE issue.	Thomson Reuters Worldscope
Distressed	Distressed is an indicator variable that takes the value 1 if a firm has a z-score (Altman, 1968) lower than 1.8 one year prior to the PIPE announcement and 0 otherwise.	Thomson Reuters Worldscope

Size	Size is defined as the natural logarithm of market value.	Thomson Reuters Worldscope
Dilution	Dilution is calculated as follows: for common stock deals: [(Number of Securities Sold) + (Amount of Warrants)] / (Closing Shares Outstanding), for Fixed Convertible deals: [(Gross Proceeds / Fixed Conversion Price) + (Amount of Warrants)] / (Closing Shares Outstanding), for Floating Convertible deals: [(Gross Proceeds / Closing Market Price) + (Amount of Warrants)] / (Closing Shares Outstanding), for Non-Convertible deals: (Amount of Warrants) / (Closing Shares Outstanding), for Structured Equity Lines: [(Commitment Amount/Market Price at Closing) + (Amount of Warrants)] / (Closing Shares Outstanding), for At-the-Market deals: (Amount of Warrants, if any) / (Closing Shares Outstanding).	Sagient Research Placement Tracker
Proceeds	Proceeds are defined as the gross proceeds scaled by the market capitalization.	Sagient Research Placement Tracker
EV	EV is defined as the ratio of enterprise value (item WC18100) over total assets.	Thomson Reuters Worldscope
EBITDA	EBITDA is defined as the ratio of Earnings Before Interest, Taxes & Depreciation (item WC18198) over total assets.	Thomson Reuters Worldscope
ROA	Return on Assets is the ratio of net income (item WC01751) over total assets.	Thomson Reuters Worldscope
Multi-issuer	Multi-issuer is an indicator variable that takes the value of 1 if a firm has issued at least 2 PIPEs during the period 1995-2015 and 0 otherwise.	Sagient Research Placement Tracker
Structured PIPE	Structured PIPE is an indicator variable that takes the value of 1 if the issue refers to a structured PIPE and 0 if it refers to a traditional PIPE.	Sagient Research Placement Tracker

This table presents the main variables' definition and calculation. A1l financial variables are winsorised at the 1% and 99%.

Appendix 2-B: Legal origins classification

Country	Legal origin	Country	Legal origin
Argentina	French	Japan	English
Australia	English	Luxembourg	French
Austria	German	Malaysia	English
Belgium	French	Mexico	French
Bermuda	English	Monaco	French
Brazil	French	Netherlands	French
Canada	English	New Zealand	English
Cayman Islands	English	Norway	Scandinavian
China	German	Philippines	French
Cyprus	French	Russia	(Socialist)
Finland	German	Singapore	English
France	French	Spain	French
Germany	German	Sweden	Scandinavian
Greece	French	Switzerland	German
Hong Kong	English	Taiwan	German
India	English	United Arab Emirates	English
Ireland	English	United Kingdom	English
Israel	English	United States	English
Italy	French		

The table presents the legal origin break-down of the firms in my sample. For the legal origins of each country I follow the classification employed by La Porta et al. (1998) and categorise countries into English common law, French civil law, German civil law, and Scandinavian civil law. For countries that are not classified in La Porta et al. (1998) study, I collect the legal origins data from the World Factbook website. Russian issuing firms are excluded from the legal origin tests, due to the scarcity of observations with socialist legal origin. There are only 2 unique firms issuing 2 PIPEs with a socialist legal origin in my dataset.

Appendix 2-C: Cumulative abnormal returns – sub samples

	Traditional PIPEs				*Structured PIPEs*			
CARs	**(-4, +5)**	**(+6, +100)**	**(+6, +250)**	**(+6, +500)**	**(-4, +5)**	**(+6, +100)**	**(+6, +250)**	**(+6, +500)**
Panel A: All issues								
America Excl: US	1.889***	-14.479***	-38.899***	-80.029***	-1.80***	-5.22***	-24.60***	-63.12***
Asia - Pacific	-0.939***	-12.489***	-32.519***	-64.859***	-2.13***	-29.16***	-48.33***	-69.61***
Europe	-2.209***	-10.639***	-28.199***	-55.169***	-2.59***	-16.79***	-42.40***	-81.53***
United States	2.289***	-12.599***	-32.569***	-57.909***	-4.28***	-25.25***	-55.74***	-92.47***
N								
Panel B: Initial issues								
America Excl: US	2.67***	-12.98***	-37.10***	-83.89***	-0.86***	11.91***	-17.03***	-53.37***
Asia - Pacific	0.03***	-10.75***	-25.78***	-48.17***	2.17***	-27.43***	-32.36***	-59.66***
Europe	-0.54***	-9.31***	-20.65***	-36.58***	-2.71***	-22.91***	-36.40***	-53.04***
United States	1.29***	-12.08***	-33.92***	-55.64***	-2.68***	-27.63***	-63.13***	-102.22***
N								
Panel C: Follow up issues								
America Excl: US	1.37***	-15.42***	-40.03***	-77.55***	-2.11	-10.94***	-27.12***	-66.37***
Asia - Pacific	-1.66***	-13.79***	-37.57***	-77.39***	-4.51***	-30.11***	-57.14***	-75.10***
Europe	-3.73***	-11.83***	-35.10***	-72.22***	-1.74***	-14.99***	-47.83***	-98.90***
United States	2.83***	-12.87***	-31.81***	-59.15***	-4.87***	-24.39***	-53.05***	-88.92***
N								
Panel D: One issue per year								
America Excl: US	1.79***	-14.44***	-38.74***	-79.77***	-0.99*	-6.01***	-26.34***	-64.89***
Asia - Pacific	-1.04***	-11.71***	-30.61***	-59.94***	-2.57***	-27.74***	-47.39***	-62.45***
Europe	-1.87***	-11.05***	-27.08***	-51.19***	-1.42***	-16.00***	-43.51***	-74.34***

United States	1.78***	-11.84***	-31.42***	-54.55***	-3.34***	-26.68***	-57.77***	-92.20***
N								

The table summarises the mean abnormal returns of PIPE issuing firms between 1995 and 2015 by issuers' region. The mean abnormal returns are computed over four time windows, measured in trading days around the announcement of the PIPE issue. Stock data for US firms are retrieved from the CRSP and for non-US firms from Datastream. Abnormal returns are computed using the following OLS market model: $AR_{i,j,t} = R_{i,j,,t} - a_{i,j,t} - \beta_{i,j,t} * R_{m,j,t}$. For US firms I use as a benchmark the CRSP value weighted indices while for non-US firms I use the Datastream country indices. Panel A includes all issues. Panel B includes only the first PIPE issue of each firm. Panel C excludes the first PIPE issue of each firm and includes all the following issues. Panel D excludes all issues that occur in less than 255 trading days from the previous issue. Abnormal returns are winsorised at the 1% and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Appendix 2-D: Correlation matrix

	CAR (-4,+5)	CAR (+6,+100)	CAR (+6,+250)	CAR (+6,+500)	Control for Corruption	Regulatory Quality	Rule of Law	Size	Leverage	Multi issuer	Proceeds	CAR (-25, -5)	Distressed
CAR (+6,+100)	0.06***												
CAR (+6,+250)	0.06***	0.67***											
CAR (+6,+500)	0.07***	0.50***	0.78***										
Control for Corruption	0.01	-0.00	-0.03***	-0.06***									
Regulatory Quality	0.05***	0.01	0.02*	0.04***	0.22***								
Rule of Law	0.02***	-0.02	-0.05***	-0.07***	0.41***	0.04***							
Size	-0.01	-0.02*	-0.02***	-0.03***	-0.02***	-0.00	-0.00						
Leverage	-0.01	0.00	0.03***	0.01	0.01	0.01	-0.00	0.00					
Multi issuer	-0.00	0.01	-0.01	-0.05***	0.03***	0.01	0.04***	-0.00	0.00				
Proceeds	0.01	0.01	0.02***	0.02***	-0.02***	-0.01	-0.01	0.01	-0.00	-0.02*			
CAR (-25, -5)	0.02***	0.06***	0.06***	0.06***	-0.00	-0.01	0.02***	-0.03***	-0.00	-0.01	-0.01		
Distressed	-0.03***	-0.01	0.01	0.04***	-0.18***	0.05***	-0.20***	0.00	0.04***	-0.04***	0.01	-0.03***	
R&D	0.03***	0.01	0.01	-0.00	-0.04***	0.06***	-0.04***	-0.00	0.05***	0.03***	-0.00	-0.03***	-0.00

The table reports the correlations among the variables used in the regression analysis. The Cumulative Abnormal Returns are calculated over the windows [(-4, +5), (+6, +100), (+6, +250) and (+6, +500)] around the PIPE announcement. Control for Corruption, Regulatory Quality and Rule of Law data are collected from the International Country Risk Guide (ICRG) database. Size is measured by the natural logarithm of market capitalization, leverage is the ratio of total debt over total assets, multi-issuer is an indicator variable that takes the value 1 if a firm has issued more than one PIPEs during the examination period and 0 otherwise, proceeds are the gross proceeds scaled by the market capitalization, CAR (-25, -5) are the Cumulative Abnormal Returns between day -25 and day -5 relative to the PIPE issue, distressed is an indicator variable that takes the value 1 if a firm has a z-score lower than 1.8 one year prior to the PIPE issue and 0 otherwise, R&D is the ratio of research and development over total assets. All accounting measures are from the fiscal year end prior to the PIPE issue. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Appendix 3-A: Correlation matrix

	Abnormal Returns	Abnormal Volume	Size	M/B	R&D	Cash Burn
Abnormal Volume	0.001					
Size	0.002	-0.001				
M/B	-0.002	-0.007*	-0.014*			
R&D	-0.005*	-0.001	-0.005*	-0.041*		
Cash Burn	-0.003	-0.005*	0.014*	0.143*	-0.044*	
Leverage	-0.004*	-0.000	-0.021*	-0.072*	0.101*	-0.119*

The table reports the correlations among the variables used in the regression analysis. Abnormal returns are calculated employing an OLS market model, using FTSE All Shares as a benchmark for UK firms and CRSP value weighted indices for US firms. The estimation period is between day -250 and day -100. Abnormal Volume is calculated following Bris (2005) as follows: $AV = V_{i,t} - (\overline{V_i} + 2\sigma_{Volume})$ if $V_{i,t} > \overline{V_i} + 2\sigma_{Volume}$ otherwise AV=0 The estimation period is the same as in the AR specification. Size is the natural logarithm of market capitalisation, M/B is the market to book item from Datastream, R&D is the ratio of research and development over total assets, cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise; leverage is the ratio of total debt over total assets. Financial data are retrieved from Worldscope database and are from the fiscal year prior to the PIPE issue. Prices and volume data for UK firms are collected from Thomson Financial and for US firms from CRSP database. All financial data are winsorised at the 1% and 99%. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Appendix 3-B: Multivariate regressions, robustness test I: all issue types

	(1)	(2)	(3)	(4)
	United Kingdom		Unites States	
	(-20,-1)	(-50,-21)	(-20,-1)	(-50,-21)
AV	0.012	0.047	0.200***	0.166***
	[0.457]	[0.106]	[0.003]	[0.000]
Size	0.000	0.000	0.000	0.000
	[0.807]	[0.110]	[0.847]	[0.365]
M/B	0.000	0.000	-0.00**	0.000
	[0.402]	[0.864]	[0.039]	[0.579]
R&D	-0.002**	-0.001**	-0.001	-0.001
	[0.029]	[0.017]	[0.555]	[0.180]
Cash Burn	0.000	0.000	-0.000*	0.000
	[0.147]	[0.129]	[0.085]	[0.934]
Leverage	0.000	0.000	-0.001	-0.001
	[0.191]	[0.332]	[0.480]	[0.566]
Constant	-0.003	-0.001	-0.003	-0.001
	[0.246]	[0.706]	[0.391]	[0.675]
N	19,330	28,860	18,052	27,079
R^2	0.004	0.005	0.014	0.001

The table presents the estimates of the multivariate regressions on price volume dynamics. This test serves as a robustness check to assess whether my main findings hold after the inclusion of all PIPE issue types. The time window (-20, -1) refers to the event period, while the time window (-50, -21) is used as a control period. Columns (1) & (2) present the estimates of the regressions on UK firms and columns (3) & (4) show the results of the estimates of the regressions on US firms. The dependent variable is the abnormal returns. Abnormal returns are calculated employing an OLS market model, using FTSE All Shares as a benchmark for UK firms and CRSP value weighted indices for US firms. The estimation period is between day -250 and day -101. AV is the daily abnormal volume. Following Bris (2005), I calculate abnormal volume using the following formula: $AV = V_{i,t} - (\overline{V_i} + 2\sigma_{Volume})$ if $V_{i,t} > \overline{V_i} + 2\sigma_{Volume}$ otherwise AV=0. The estimation period is the same as in the AR specification. Size is the natural logarithm of market capitalisation; M/B is the market to book item from Datastream, R&D is the ratio of research and development over total assets, cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise, leverage is the ratio of total debt over total assets. Financial data are retrieved from Worldscope database and are from the fiscal end year prior to the PIPE issue. Prices and volume data for UK firms are collected from Thomson Financial and for US firms from CRSP database. All financial data are winsorised at the 1% and 99%. p-values are reported in brackets. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Appendix 3-C: Multivariate regressions, robustness test II: alternative windows

	(1)	(2)	(3)	(4)
	United Kingdom		Unites States	
	(-30,-1)	(-60,-31)	(-30,-1)	(-60,-31)
AV	0.017	0.04	0.258***	0.224*
	[0.394]	[0.113]	[0.004]	[0.088]
Size	0.000	0.000	0.000**	0.000
	[0.590]	[0.346]	[0.028]	[0.670]
M/B	0.000	0.000	0.000	0.000
	[0.362]	[0.529]	[0.555]	[0.935]
R&D	-0.002**	-0.001	-0.001	0.000
	[0.034]	[0.205]	[0.316]	[0.779]
Cash Burn	0.000	0.000	-0.000**	0.000
	[0.851]	[0.900]	[0.042]	[0.221]
Leverage	0.000	0.000	-0.001	0.001
	[0.900]	[0.825]	[0.314]	[0.262]
Constant	-0.002	-0.002	-0.007**	0.001
	[0.373]	[0.384]	[0.032]	[0.800]
N	24,401	24,173	14,697	14,697
R^2	0.003	0.003	0.01	0.005

The table presents the estimates of the multivariate regressions on price volume dynamics. This test serves as a robustness check to alleviate potential concerns that the results are driven by the windows chosen. The time window (-30, -1) refers to the event period and the time window (-60, -31) is used as a control period. Columns (1) & (2) present the estimates of the regressions on UK firms and columns (3) & (4) show the results of the estimates of the regressions on US firms. The dependent variable is the abnormal returns. Abnormal returns are calculated employing an OLS market model, using FTSE All Shares as a benchmark for UK firms and CRSP value weighted indices for US firms. The estimation period is between day -250 and day -100. AV is the daily abnormal volume. Following Bris (2005), I calculate abnormal volume using the following formula: $AV = V_{i,t} - (\overline{V_i} + 2\sigma_{Volume})$ if $V_{i,t} > \overline{V_i} + 2\sigma_{Volume}$ otherwise AV=0. The estimation period is the same as in the AR specification. Size is the natural logarithm of market capitalisation; M/B is the market to book item from Datastream, R&D is the ratio of research and development over total assets, cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise, leverage is the ratio of total debt over total assets. Financial data are retrieved from Worldscope database and are from the fiscal year prior to the PIPE issue. Prices and volume data for UK firms are collected from Thomson Financial and for US firms from CRSP database. All financial data are winsorised at the 1% and 99%. p-values are reported in brackets. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Appendix 3-D: Multivariate regressions, robustness test III: no firms with M&A announcements

	(1)	(2)	(3)	(4)
	United Kingdom		Unites States	
	(-20,-1)	(-50,-21)	(-20,-1)	(-50,-21)
AV	0.011	0.045	0.322***	0.194**
	[0.462]	[0.106]	[0.000]	[0.022]
Size	0.000	0.000	0.000	0.000
	[0.640]	[0.122]	[0.185]	[0.449]
M/B	0.000	0.000	0.000	0.000
	[0.242]	[0.506]	[0.316]	[0.296]
R&D	-0.002**	-0.001**	-0.001	-0.002*
	[0.045]	[0.014]	[0.416]	[0.097]
Cash Burn	0.000	0.000	-0.000*	0.000
	[0.911]	[0.995]	[0.080]	[0.530]
Leverage	0.000	0.000	-0.001	-0.001
	[0.159]	[0.299]	[0.792]	[0.476]
Constant	-0.004	-0.002	-0.004	-0.004
	[0.193]	[0.506]	[0.272]	[0.285]
N	15,812	23,575	9,278	13,917
R^2	0.003	0.005	0.023	0.006

The table presents the estimates of the multivariate regressions on price volume dynamics. This test serves as a robustness check to alleviate potential concerns of contamination of the results from other events. Specifically, I exclude from the sample all firms with an M&A announcement 3 months prior to the announcement of the PIPE. The time window (-20, -1) refers to the event period while the time window (-50, -21) is used as a control period. Columns (1) & (2) present the estimates of the regressions on UK firms and columns (3) & (4) show the results of the estimates of the regressions on US firms. The dependent variable is the abnormal returns.

Abnormal returns are calculated employing an OLS market model, using FTSE All Shares as a benchmark for UK firms and CRSP value weighted indices for US firms. The estimation period is between day -250 and day -100. AV is the daily abnormal volume. Following Bris (2005), I calculate abnormal volume using the following formula: $AV = V_{i,t} - (\overline{V_i} + 2\sigma_{Volume})$ if $V_{i,t} > \overline{V_i} + 2\sigma_{Volume}$ otherwise AV=0. The estimation period is the same as in the AR specification. Size is the natural logarithm of market capitalisation, M/B is the market to book item from Datastream, R&D is the ratio of research and development over total assets, cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise, leverage is the ratio of total debt over total assets. Financial data are retrieved from Worldscope database and are from the fiscal year end prior to the PIPE issue. Prices and volume data for UK firms are collected from Thomson Financial and for US firms from CRSP database. All financial data are winsorised at the 1% and 99%. p-values are reported in brackets. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

Appendix 3-E: Multivariate regressions, robustness test IV: Fama – French 3 factor model ARs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	United Kingdom		United States		United Kingdom		United States	
	market model				3-factor model			
	(-20,-1)	(-50,-21)	(-20,-1)	(-50,-21)	(-20,-1)	(-50,-21)	(-20,-1)	(-50,-21)
AV	0.011	0.046	0.321***	0.195**	0.012	0.047	0.326***	0.207**
	[0.458]	[0.106]	[0.000]	[0.023]	[0.450]	[0.106]	[0.000]	[0.015]
Size	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.729]	[0.199]	[0.124]	[0.690]	[0.504]	[0.260]	[0.112]	[0.427]
M/B	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.337]	[0.562]	[0.269]	[0.330]	[0.496]	[0.560]	[0.174]	[0.506]
R&D	-0.002**	-0.001**	-0.001	-0.002*	-0.002	0.000	-0.001	-0.001
	[0.039]	[0.021]	[0.534]	[0.083]	[0.128]	[0.474]	[0.703]	[0.351]
Cash Burn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.862]	[0.902]	[0.135]	[0.664]	[0.192]	[0.210]	[0.108]	[0.161]
Leverage	0.001*	0.000	0.000	-0.001	0.000	-0.001**	0.000	-0.001
	[0.099]	[0.130]	[0.933]	[0.428]	[0.348]	[0.013]	[0.888]	[0.398]
Constant	-0.003	-0.002	-0.005	-0.003	-0.004	-0.002	-0.003	-0.002
	[0.202]	[0.395]	[0.174]	[0.354]	[0.186]	[0.514]	[0.503]	[0.608]
N	16,281	24,283	9,798	14,697	16,083	23,999	9,698	14,547
R^2	0.003	0.005	0.022	0.006	0.003	0.005	0.022	0.007

The table presents the results of the panel regressions on the contemporaneous relationship between daily abnormal returns and daily abnormal volume. The time window (-20, -1) refers to the event period, while the time window (-50, -21) is used as a control period. The dependent variable is the abnormal returns. In columns (1) – (4) abnormal returns are calculated employing an OLS market model, using FTSE All Shares as a benchmark for UK firms and CRSP value weighted indices for US firms. In columns (5) – (8) as a robustness the abnormal returns are calculated using the Fama – French 3 Factor model. The estimation period is between day

-250 and day -101. AV is the daily abnormal volume. Following Bris (2005), I calculate abnormal volume using the following formula: $AV = V_{i,t} - (\overline{V_i} + 2\sigma_{Volume})$ if $V_{i,t} > \overline{V_i} + 2\sigma_{Volume}$ otherwise AV=0. The estimation period is the same as in the AR specification. Size is the natural logarithm of market capitalisation, M/B is the market to book item from Datastream, R&D is the ratio of research and development over total assets, cash burn is the ratio of operating income before depreciation over cash and cash equivalents if a firm has negative operating income and 0 otherwise, leverage is the ratio of total debt over total assets. Financial data are retrieved from Worldscope database and are from the fiscal year prior to the PIPE issue. Prices and volume data for UK firms are collected from Thomson Financial and for US firms from CRSP database. All financial data are winsorised at the 1% and 99%. p-values are reported in brackets. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.

References

Aboody, D. & Lev, B. 2000. Information asymmetry, R&D, and insider gains. *The Journal of Finance,* 55**,** 2747-2766.

Aggarwal, R. & Rivoli, P. 1990. Fads in the initial public offering market? *Financial Management,* 19**,** 45-57.

Aggarwal, R. K. & Samwick, A. A. 1999. The other side of the trade-off: The impact of risk on executive compensation. *Journal of Political Economy,* 107**,** 65-105.

Aggarwal, R. K. & Samwick, A. A. 2003. Performance incentives within firms: The effect of managerial responsibility. *The Journal of Finance,* 58**,** 1613-1650.

Agrawal, A. & Cooper, T. 2015. Insider trading before accounting scandals. *Journal of Corporate Finance,* 34**,** 169-190.

Agrawal, A. & Nasser, T. 2012. Insider trading in takeover targets. *Journal of Corporate Finance,* 18**,** 598-625.

Ahern, K. R. 2017. Information networks: Evidence from illegal insider trading tips. *Journal of Financial Economics,* 125**,** 26-47.

Aitken, M., Cumming, D. & Zhan, F. 2015. Exchange trading rules, surveillance and suspected insider trading. *Journal of Corporate Finance,* 34**,** 311-330.

Albuquerue, R. & Wang, N. 2008. Agency conflicts, investment, and asset pricing. *The Journal of Finance,* 63**,** 1-40.

Ali, U. & Hirshleifer, D. 2017. Opportunism as a firm and managerial trait: Predicting insider trading profits and misconduct. *Journal of Financial Economics,* 126**,** 490-515.

Alldredge, D. M. & Cicero, D. C. 2015. Attentive insider trading. *Journal of Financial Economics,* 115**,** 84-101.

Altman, E. I. 1968. Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance,* 23**,** 589-609.

Anson, M. 2001. Playing the PIPEs: the benefits and risks of private investments in public entities. *The Journal of Private Equity***,** 66-73.

Barber, B. M. & Lyon, J. D. 1997. Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics,* 43**,** 341-372.

Barclay, M. J., Holderness, C. G. & Sheehan, D. P. 2007. Private placements and managerial entrenchment. *Journal of Corporate Finance,* 13**,** 461-484.

Barclay, M. J. & Warner, J. B. 1993. Stealth trading and volatility: Which trades move prices? *Journal of Financial Economics,* 34**,** 281-305.

Bartholdy, J., Olson, D. & Peare, P. 2007. Conducting event studies on a small stock exchange. *The European Journal of Finance,* 13**,** 227-252.

Bengtsson, O., Dai, N. & Henson, C. 2014. SEC enforcement in the PIPE market: Actions and consequences. *Journal of Banking & Finance,* 42**,** 213-231.

Berkman, H., Mckenzie, M. D. & Verwijmeren, P. 2016. Hole in the wall: Informed short selling ahead of private placements. *Review of Finance,* 21**,** 1047-1091.

Berkowitz, D., Pistor, K. & Richard, J. F. 2003. Economic development, legality, and the transplant effect. *European Economic Review,* 47**,** 165-195.

Bhattacharya, U. & Daouk, H. 2002. The world price of insider trading. *The Journal of Finance,* 57**,** 75-108.

Billett, M. T., Elkamhi, R. & Floros, I. V. 2015. The influence of investor identity and contract terms on firm value: Evidence from PIPEs. *Journal of Financial Intermediation,* 24**,** 564-589.

Bonaime, A. A. & Ryngaert, M. D. 2013. Insider trading and share repurchases: Do insiders and firms trade in the same direction? *Journal of Corporate Finance,* 22**,** 35-53.

Bris, A. 2005. Do insider trading laws work? *European Financial Management,* 11**,** 267-312.

Brockman, P., Tresl, J. & Unlu, E. 2014. The impact of insider trading laws on dividend payout policy. *Journal of Corporate Finance,* 29**,** 263-287.

Brophy, D. J., Ouimet, P. P. & Sialm, C. 2009. Hedge funds as investors of last resort? *Review of Financial Studies,* 22**,** 541-574.

Brown, J. R. & Floros, I. V. 2012. Access to private equity and real firm activity: Evidence from PIPEs. *Journal of Corporate Finance,* 18**,** 151-165.

Brown, S. J. & Warner, J. B. 1985. Using daily stock returns: The case of event studies. *Journal of Financial Economics,* 14**,** 3-31.

Campbell, J. Y., Lo, A. W. & Mackinlay, A. C. 1997. Event-study analysis. *The Econometrics of Financial Markets***,** 149-180.

Carhart, M. M. 1997. On persistence in mutual fund performance. *The Journal of Finance,* 52**,** 57-82.

Carpentier, C., L'her, J. F. & Suret, J. M. 2011. Private investment in small public entities. *Small Business Economics,* 41**,** 149-168.

Chaplinsky, S. & Haushalter, D. 2010. Financing under extreme risk: Contract terms and returns to private investments in pulic euity. *Review of Financial Studies,* 23**,** 2789-2820.

Chemmanur, T. J. 1993. The pricing of initial public offerings: A dynamic model with information production. *The Journal of Finance,* 48**,** 285-304.

Chen, H. C., Dai, N. & Schatzberg, J. D. 2010. The choice of equity selling mechanisms: PIPEs versus SEOs. *Journal of Corporate Finance,* 16**,** 104-119.

Chen, J., Leung, W. S. & Evans, K. P. 2018. Female board representation, corporate innovation and firm performance. *Journal of Empirical Finance,* 48**,** 236-254.

Chen, Z., Huang, Y., Kusnadi, Y. & Wei, K. J. 2017. The real effect of the initial enforcement of insider trading laws. *Journal of Corporate Finance,* 45**,** 687-709.

Chiou, W. J. P., Lee, A. C. & Lee, C. F. 2010. Stock return, risk, and legal environment around the world. *International Review of Economics & Finance,* 19**,** 95-105.

Chou, D. W., Gombola, M. & Liu, F.-Y. 2009. Long-run underperformance following private equity placements: The role of growth opportunities. *The Quarterly Review of Economics and Finance,* 49**,** 1113-1128.

Cornell, B. & Sirri, E. R. 1992. The reaction of investors and stock prices to insider trading. *The Journal of Finance,* 47**,** 1031-1059.

Cumming, D., Fleming, G. & Schwienbacher, A. 2006. Legality and venture capital exits. *Journal of Corporate Finance,* 12**,** 214-245.

Cumming, D. & Walz, U. 2009. Private equity returns and disclosure around the world. *Journal of International Business Studies,* 41**,** 727-754.

Cumming, D. J. & Johan, S. A. 2013. Venture capital and private equity contracting: An international perspective, Academic Press.

Dahiya, S., Klapper, L., Parthasarathy, H. & Singer, D. 2017. Equity raising by Asian firms: Choosing between PIPEs and SEOs. *Journal of Corporate Finance,* 45**,** 64-83.

Dai, L., Fu, R., Kang, J.-K. & Lee, I. 2016. Corporate governance and the profitability of insider trading. *Journal of Corporate Finance,* 40**,** 235-253.

Dai, N. 2007. Does investor identity matter? An empirical examination of investments by venture capital funds and hedge funds in PIPEs. *Journal of Corporate Finance,* 13**,** 538-563.

Dai, N. 2009. The rise of the PIPE market. *Working Paper*.

Dai, N. 2011. Monitoring via staging: Evidence from private investments in public equity. *Journal of Banking & Finance,* 35**,** 3417-3431.

Damodaran, A. & Liu, C. H. 1993. Insider trading as a signal of private information. *Review of Financial Studies,* 6**,** 79-119.

De Long, J. B., Shleifer, A., Summers, L. H. & Waldmann, R. J. 1989. The size and incidence of the losses from noise trading. *The Journal of Finance,* 44**,** 681-696.

De Long, J. B., Shleifer, A., Summers, L. H. & Waldmann, R. J. 1990. Noise trader risk in financial markets. *Journal of Political Economy,* 98**,** 703-738.

Demirgüç Kunt, A. & Maksimovic, V. 1998. Law, finance, and firm growth. *The Journal of Finance,* 53**,** 2107-2137.

Demsetz, H. & Lehn, K. 1985. The structure of corporate ownership: Causes and consequences. *Journal of Political Economy,* 93**,** 1155-1177.

Dittmar, A., Mahrt Smith, J. & Servaes, H. 2003. International corporate governance and corporate cash holdings. *Journal of Financial and Quantitative Analysis,* 38**,** 111-133.

Djankov, S., Mcliesh, C. & Shleifer, A. 2007. Private credit in 129 countries. *Journal of Financial Economics,* 84**,** 299-329.

Dresner, S. & Kim, E. K. 2010. PIPEs: A guide to private investments in public equity, John Wiley & Sons.

Eckbo, B. E. & Masulis, R. W. 1995. Seasoned equity offerings: A survey. *Handbooks in Operations Research and Management Science,* 9**,** 1017-1072.

Eckbo, B. E., Masulis, R. W. & Norli, Ø. 2000. Seasoned public offerings: Resolution of the 'new issues puzzle'. *Journal of Financial Economics,* 56**,** 251-291.

El Ghoul, S., Guedhami, O. & Kim, Y. 2017. Country-level institutions, firm value, and the role of corporate social responsibility initiatives. *Journal of International Business Studies,* 48**,** 360-385.

Elliott, W. B., Prevost, A. K. & Rao, R. P. 2009. The announcement impact of seasoned equity offerings on bondholder wealth. *Journal of Banking & Finance,* 33**,** 1472-1480.

Ellis, K. & Twite, G. 2008. Are PIPEs a bet on growth options? *Working Paper*.

Enrich, D. 2014. U.K. agency struggles in fight against insider trading; critics point to rapid staff turnover, insufficient financial expertise; 'FCA hasn't yet had a big scalp'. *The Wall Street Journal,* Jan 4, 2014.

Eyssell, T. H. 1990. Corporate insiders, toehold acquisitions, and information leakage: Do insiders tip their hands? *Akron Business and Economic Review,* 21**,** 90.

Fama, E. F. 1970. Efficient capital markets: A review of theory and empirical work. *The Journal of Finance,* 25**,** 383-417.

Fama, E. F. 1998. Market efficiency, long-term returns, and behavioral finance. *Journal of Financial Economics,* 49**,** 283-306.

Fama, E. F. & French, K. R. 1993. Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics,* 33**,** 3-56.

Fan, J. P., Rui, O. M. & Zhao, M. 2008. Public governance and corporate finance: Evidence from corruption cases. *Journal of Comparative Economics,* 36**,** 343-364.

Finnerty, J. E. 1976. Insiders and Market Efficiency. *The Journal of Finance,* 31**,** 1141-1148.

Floros, I. V. & Sapp, T. R. A. 2012. Why do firms issue private equity repeatedly? On the motives and information content of multiple PIPE offerings. *Journal of Banking & Finance,* 36**,** 3469-3481.

Fried, J. M. 2003. Insider abstention. *Yale Law Journal,* 113**,** 455.

Fu, F. & Huang, S. 2016. The persistence of long-run abnormal returns following stock repurchases and offerings. *Management Science,* 62**,** 964-984.

Furceri, D. & Mourougane, A. 2012. The effect of financial crises on potential output: New empirical evidence from OECD countries. *Journal of Macroeconomics,* 34**,** 822-832.

Furceri, D. & Zdzienicka, A. 2012. How costly are debt crises? *Journal of International Money and Finance,* 31**,** 726-742.

Giannetti, M. & Simonov, A. 2006. Which investors fear expropriation? Evidence from investors' portfolio choices. *The Journal of Finance,* 61**,** 1507-1547.

Gider, J. & Westheide, C. 2016. Relative idiosyncratic volatility and the timing of corporate insider trading. *Journal of Corporate Finance,* 39**,** 312-334.

Gomes, A. & Phillips, G. 2012. Why do public firms issue private and public securities? *Journal of Financial Intermediation,* 21**,** 619-658.

Gompers, P., Ishii, J. & Metrick, A. 2003. Corporate governance and equity prices. *The Quarterly Journal of Economics,* 118**,** 107-156.

Gregory, A., Matatko, J. & Tonks, I. 1997. Detecting information from directors' trades: signal definition and variable size effects. *Journal of Business Finance & Accounting,* 24**,** 309-342.

Gregory, A., Matatko, J., Tonks, I. & Purkis, R. 1994. UK directors' trading: The impact of dealings in smaller firms. *The Economic Journal***,** 37-53.

Gregory, A., Tharyan, R. & Christidis, A. 2013. Constructing and testing alternative versions of the Fama–French and Carhart models in the UK. *Journal of Business Finance & Accounting,* 40**,** 172-214.

Gupta, A. & Misra, L. 1989. Public information and pre-announcement trading in takeover stocks. *Journal of Economics and Business,* 41**,** 225-233.

Haggard, K. S., Zhang, Y. J. & Ma, T. 2009. PIPEs around the world. *The Journal of Private Equity***,** 57-68.

Haider, Z. A., Liu, M., Wang, Y. & Zhang, Y. 2017. Government ownership, financial constraint, corruption, and corporate performance:

International evidence. *Journal of International Financial Markets, Institutions and Money*.

Hail, L. & Leuz, C. 2006. International differences in the cost of equity capital: Do legal institutions and securities regulation matter? *Journal of Accounting Research,* 44**,** 485-531.

Hamilton, I. & Newton, J. 2009. PIPE investments in UK listed companies an equity capital raising alternative. *Capital Markets Law Journal,* 5**,** 21-29.

Harlow, W. V. & Howe, J. S. 1993. Leveraged buyouts and insider nontrading. *Financial Management***,** 109-118.

Harvey, C. R. 1995. Predictable risk and returns in emerging markets. *The Review of Financial Studies,* 8**,** 773-816.

Hermalin, B. E. & Weisbach, M. S. 1991. The effects of board composition and direct incentives on firm performance. *Financial Management***,** 101-112.

Hertzel, M., Lemmon, M., Linck, J. S. & Rees, L. 2002. Long-run performance following private placements of equity. *The Journal of Finance,* 57**,** 2595-2617.

Hertzel, M. & Smith, R. L. 1993. Market discounts and shareholder gains for placing equity privately. *The Journal of Finance,* 48**,** 459-485.

Hillier, D., Korczak, A. & Korczak, P. 2015. The impact of personal attributes on corporate insider trading. *Journal of Corporate Finance,* 30**,** 150-167.

Hillier, D. & Marshall, A. P. 2002. Are trading bans effective? Exchange regulation and corporate insider transactions around earnings announcements. *Journal of Corporate Finance,* 8**,** 393-410.

Hillion, P. & Vermaelen, T. 2004. Death spiral convertibles. *Journal of Financial Economics,* 71**,** 381-415.

Himmelberg, C., Hubbard, R. & Love, I. 2004. Investor protection, ownership, and the cost of capital. *Working Paper*.

Holmström, B. & Tirole, J. 1993. Market liquidity and performance monitoring. *Journal of Political Economy,* 101**,** 678-709.

Hooper, V., Sim, A. B. & Uppal, A. 2009. Governance and stock market performance. *Economic Systems,* 33**,** 93-116.

Ince, O. S. & Porter, R. B. 2006. Individual equity return data from Thomson Datastream: Handle with care! *Journal of Financial Research,* 29**,** 463-479.

Jabbour, A. R., Jalilvand, A. & Switzer, J. A. 2000. Pre-bid price run-ups and insider trading activity: Evidence from Canadian acquisitions. *International Review of Financial Analysis,* 9**,** 21-43.

Jaffe, J. F. 1974. Special information and insider trading. *The Journal of Business,* 47**,** 410-428.

Jandik, T. & Kali, R. 2009. Legal systems, information asymmetry, and firm boundaries: Cross-border choices to diversify through mergers, joint ventures, or strategic alliances. *Journal of International Business Studies,* 40**,** 578-599.

Jarrell, G. A. & Poulsen, A. B. 1989. Stock trading before the announcement of tender offers: insider trading or market anticipation? *Journal of Law, Economics, & Organization,* 5**,** 225-248.

Jensen, M. C. 1986. Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review,* 76**,** 323-329.

Jensen, M. C. & Meckling, W. H. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics,* 3**,** 305-360.

Jensen, M. C. & Ruback, R. S. 1983. The market for corporate control: The scientific evidence. *Journal of Financial Economics,* 11**,** 5-50.

Jenter, D. 2005. Market timing and managerial portfolio decisions. *The Journal of Finance,* 60**,** 1903-1949.

John, K. & Lang, L. H. 1991. Insider trading around dividend announcements: Theory and evidence. *The Journal of Finance,* 46**,** 1361-1389.

Kalay, A. & Shimrat, A. 1987. Firm value and seasoned equity issues: Price pressure, wealth redistribution, or negative information. *Journal of Financial Economics,* 19**,** 109-126.

Kallunki, J.-P., Mikkonen, J., Nilsson, H. & Setterberg, H. 2016. Tax noncompliance and insider trading. *Journal of Corporate Finance,* 36**,** 157-173.

Kallunki, J., Kallunki, J.-P., Nilsson, H. & Puhakka, M. 2018. Do an Insider's Wealth and Income Matter in the Decision to Engage in Insider Trading? *Journal of Financial Economics*.

Karpoff, J. M. & Lee, D. 1991. Insider trading before new issue announcements. *Financial Management***,** 18-26.

Keown, A. J. & Pinkerton, J. M. 1981. Merger announcements and insider trading activity: An empirical investigation. *The Journal of Finance,* 36**,** 855-869.

Khanna, T. & Palepu, K. G. 2010. Winning in emerging markets: A road map for strategy and execution, Harvard Business Press.

King, M. R. 2009. Prebid run-ups ahead of Canadian takeovers: how big is the problem? *Financial Management,* 38**,** 699-726.

Klapper, L. F. & Love, I. 2004. Corporate governance, investor protection, and performance in emerging markets. *Journal of Corporate Finance,* 10**,** 703-728.

Kyle, A. S. 1985. Continuous auctions and insider trading. *Econometrica: Journal of the Econometric Society***,** 1315-1335.

Kyle, A. S. & Viswanathan, S. 2008. How to define illegal price manipulation. *American Economic Review,* 98**,** 274-79.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A. & Vishny, R. W. 1996. Trust in large organizations. National Bureau of Economic Research.

La Porta, R., Lopez De Silanes, F. & Shleifer, A. 1999. Corporate ownership around the world. *The Journal of Finance,* 54**,** 471-517.

La Porta, R., Lopez De Silanes, F., Shleifer, A. & Vishny, R. 2002. Investor protection and corporate valuation. *The Journal of Finance,* 57**,** 1147-1170.

La Porta, R., Lopez De Silanes, F., Shleifer, A. & Vishny, R. W. 1997. Legal determinants of external finance. *The Journal of Finance***,** 1131-1150.

La Porta, R., Lopez De Silanes, F., Shleifer, A. & Vishny, R. W. 1998. Law and finance. *Journal of Political Economy,* 106**,** 1113-1155.

Lakonishok, J. & Lee, I. 2001. Are insider trades informative? *The Review of Financial Studies,* 14**,** 79-111.

Lee, D. S., Mikkelson, W. H. & Partch, M. M. 1992. Managers' trading around stock repurchases. *The Journal of Finance,* 47**,** 1947-1961.

Lee, I., Lemmon, M., Li, Y. & Sequeira, J. M. 2014. Do voluntary corporate restrictions on insider trading eliminate informed insider trading? *Journal of Corporate Finance,* 29**,** 158-178.

Lim, J., Schwert, M. W. & Weisbach, M. S. 2018. The Economics of PIPEs. National Bureau of Economic Research.

Lins, K. V., Servaes, H. & Tamayo, A. 2017. Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis. *The Journal of Finance,* 72**,** 1785-1824.

Liu, M. & Magnan, M. 2011. Self-dealing regulations, ownership wedge, and corporate valuation: International evidence. *Corporate Governance: An International Review,* 19**,** 99-115.

Lombardo, D. & Pagano, M. 1999. Law and equity markets: A simple model. *Corporate Governance Regimes: Convergence and Diversity***,** 343-362.

Lombardo, D. & Pagano, M. 2000. Legal determinants of the return on equity. *Corporate and Institutional Transparency for Economic Growth in Europe***,** 235-270.

Loughran, T. & Ritter, J. R. 1995. The new issues puzzle. *The Journal of Finance,* 50**,** 23-51.

Low, S. W., Kew, S. R. & Tee, L. T. 2011. International evidence on the link between quality of governance and stock market performance. *Global Economic Review,* 40**,** 361-384.

Manconi, A., Peyer, U. & Vermaelen, T. 2017. Are buybacks good for long-term shareholder value? Evidence from buybacks around the world. *Working Paper*.

Maxwell, W. F. & Rao, R. P. 2003. Do spin-offs expropriate wealth from bondholders? *The Journal of Finance,* 58**,** 2087-2108.

Maxwell, W. F. & Stephens, C. P. 2003. The wealth effects of repurchases on bondholders. *The Journal of Finance,* 58**,** 895-920.

Meulbroek, L. K. 1992. An empirical analysis of illegal insider trading. *The Journal of Finance,* 47**,** 1661-1699.

Meulbroek, L. K. 2000. Does risk matter? Corporate insider transactions in Internet-based firms. *Working Paper*.

Modigliani, F. & Miller, M. H. 1958. The cost of capital, corporation finance and the theory of investment. *The American Economic Review,* 48**,** 261-297.

Myers, S. C. & Majluf, N. S. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics,* 13**,** 187-221.

Pope, P. F., Morris, R. C. & Peel, D. A. 1990. Insider trading: Some evidence on market efficiency and directors'share dealings in Great Britain. *Journal of Business Finance & Accounting,* 17**,** 359-380.

Putnam, R. D. 2001. Bowling alone: The collapse and revival of American community, Simon and Schuster.

Ritter, J. R. 1991. The long-run performance of initial public offerings. *The Journal of Finance,* 46**,** 3-27.

Roll, R. 1988. R2. *The Journal of Finance,* 43**,** 541-566.

Salbu, S. R. 1993. Tipper credibility, non-informational tippee trading, and abstention from trading: An analysis of gaps in the insider trading laws. *Washington Law Review,* 68**,** 307.

Schwert, G. W. 2003. Anomalies and market efficiency. *Handbook of the Economics of Finance,* 1**,** 939-974.

Seyhun, H. N. 1986. Insiders' profits, costs of trading, and market efficiency. *Journal of Financial Economics,* 16**,** 189-212.

Seyhun, H. N. 1990. Do bidder managers knowingly pay too much for target firms? *Journal of Business***,** 439-464.

Seyhun, H. N. & Bradley, M. 1997. Corporate bankruptcy and insider trading. *Journal of Business,* 70**,** 189-216.

Shleifer, A. & Summers, L. H. 1988. Breach of trust in hostile takeovers. *Corporate takeovers: Causes and consequences.* University of Chicago Press.

Shleifer, A. & Vishny, R. W. 1986. Large shareholders and corporate control. *Journal of Political Economy,* 94**,** 461-488.

Shleifer, A. & Vishny, R. W. 1997. A survey of corporate governance. *The Journal of Finance,* 52**,** 737-783.

Siganos, A. & Papa, M. 2015. FT coverage and UK target price run-ups. *The European Journal of Finance,* 21**,** 1070-1089.

Spiess, D. K. & Affleck Graves, J. 1995. Underperformance in long-run stock returns following seasoned equity offerings. *Journal of Financial Economics,* 38**,** 243-267.

Steele, A. 2009. PIPEs – Will They Take Off in Europe? : Bloomberg Finance L.P.

Stewart, T. M. & Shroff, C. S. 2007. Investing in Indian PIPEs. *The Journal of Private Equity***,** 87-95.

Warga, A. & Welch, I. 1993. Bondholder losses in leveraged buyouts. *The Review of Financial Studies,* 6**,** 959-982.

Watson, A. 1974. Legal transplants: An approach to comparative law, University of Georgia Press.

Wruck, K. H. 1989. Equity ownership concentration and firm value: Evidence from private equity financings. *Journal of Financial Economics,* 23**,** 3-28.

Wu, Y. 2004. The choice of equity-selling mechanisms. *Journal of Financial Economics,* 74**,** 93-119.

Zeckhauser, R. J. & Pound, J. 1990. Are large shareholders effective monitors? An investigation of share ownership and corporate performance. *Asymmetric information, corporate finance, and investment.* University of Chicago Press.

Zhou, X. 2001. Understanding the determinants of managerial ownership and the link between ownership and performance: comment. *Journal of Financial Economics,* 62**,** 559-571.