Insider Trading Around IPO Lockup Arrangements:
The UK Evidence

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Abstract:

We analyse the trading behaviour of insiders around IPO lockup arrangements on the London stock exchange from 1999-2006. We find strong evidence of insiders selling and buying stocks before lockup expiry dates. We show that insiders' sell (buys) are preceded by significant price run ups (decreases), suggesting that such insider trades are probably pre-agreed with the underwriters. The sell trades can be considered as early releases following good performance, while the buy trades are likely to act as price support for failing IPOs. Such insider trading is particularly critical in the UK as the average lockup period of 365 days is significantly higher than the 180 days in the US. However, we find a significant price drop around lockup expiration and in the post lockup periods, suggesting that, in line with previous evidence, lockup arrangements are commitment mechanism as well as signals of firms' quality, and they reduce information asymmetry and mitigate agency problem to a higher extent compared to US.

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1. Introduction

Lockups are voluntary agreements between the underwriter and corporate insiders not to sell shares without the consent of the underwriters during a specified post-IPO period. Such agreements exist to mitigate the information asymmetries between managers and shareholders, and as such, insiders, in general, refrain from selling shares during this period for fear of conveying negative signals to the market (Brau and Fawcett (2006)). In the post-lockup pervious, previous studies document significant selling activity by insiders (e.g., Brav and Gompers (2003)). However, share prices tend to decline on the around the expiry day independently of whether insiders do actually trade (e.g., Brau et al. (2004), Brav and Gompers (1999, 2003), Bradley et al. (2000), Ofek and Richardson (2000), Field and Hanka (2001)). Several explanations have been offered in the literature to account for this impact. Ofek and Richardson (2000) examine several plausible explanations, including bid-ask bounce, liquidity effects and biased expectations of supply shocks, but find little support for any of these. Brau et al. (2004) find a significantly positive relationship between the percentage of management ownership after the IPO, their proxy for agency costs, and the five-day cumulative abnormal returns. Field and Hanka (2001) provide alternative hypotheses that may explain the observed pattern in the returns around the lockup expiration. Consistent with the downward-sloping demand curve hypothesis, they find that the abnormal return is more negative when the trading volume is abnormally high. They also find that the abnormal returns are significantly more negative when insiders sell shares around the expiry of the lock-in, but fail to support the decline is solely driven by worse-than-expected insider selling.

Recently, two papers try to explain the role of lockups in the going-public process. Brav and Gompers (2003) explained the role of lockup in IPO in terms of

three competing hypothesis i) signalling firms quality ii) the commitment hypothesis iii) rent seeking by underwriters. Their study finds evidence in favour of commitment hypothesis, refuting signalling hypothesis. They also find that insiders of firms that are associated with greater potential for moral hazard lockup their shares for longer time. Brau et. al. (2005) revisited these findings and provide support for the commitment and signalling hypotheses. They show that Brav and Gompers (2003) evidence of an inverse relationship between transparency and lockup length supports the signalling model at least as much as the commitment explanation. They also find that longer lockups are associated with high information asymmetries and low idiosyncratic risk.

In this paper, we contribute to the literature by analysing the trading behaviour of insiders around IPO lockups. We first relate the lockup length to the firms' quality, asymmetric information problems and agency problems. Following Brav and Gompers (2003) argument that it would be helpful if there were more research that exploits the rich variation in international differences in lockup options, we provide a deeper analysis of the UK experience.

The UK market can be an interesting case, due to the significant difference in institutional and legal frameworks and the observed practices of lockup agreements. For example, while in US the typical lockup length is 180 days (Brav and Gompers, 2003) we found in UK this is 365 days. There are also differences in terms of legal restrictions on the company insiders regarding the disposal of shareholdings and trading around announcements of price sensitive information. Our interest surges as Espenlaub et al. (2001) studied 188 IPOs from the London stock market[1] and report

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[1] Although there have been two attempts to analyze the lockups in context of UK market, the efforts are deterred by several factors. One of the problems was small sample size. For example, Espenlaub et al. (2001) studied 188 IPOs from the London stock market and they focus on the characteristics of the lock-in agreements in UK. As the sample was small and there was absolute lockup dates (calendar

statistically insignificant abnormal returns around the lockup expiry date which is in contrast with the recent US studies. It raises another fundamental question: Is UK market more efficient than US, so that the price reaction around lockup expiration is zero in UK. Is Espenlaub et. al. (2001) finding due to different institutional and legal framework in UK or was it sample dependent?

We contribute to the existing literature in several ways. First, we construct a unique data set on IPOs containing all lockup information from 1999-2006 from the London Stock Market. The data consists of IPOs in the Main Market and Alternative Investment Market (AIM), which is interesting to compare as the two markets are different in terms of size and other characteristics. The data allow us to focus on the institutional investor's role as well as venture backing, underwriter reputation in the lockup contracts in London Stock Market. Also, we determine the insider selling activity before the lockup expiration, which allow us to examine whether the price decline around lockup is a result of worse-than-expected insider selling before the lockup expiration.

Second, we examine the behaviour of IPO lockups in UK in presence of institutional shareholders[2]. Whereas a large majority of listed companies from Continental European countries have a dominating outside shareholder or investment

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dates) and relative lockup dates (dates relative to other corporate events like publication of annual reports) so it posses a serious challenge for them to determine the actual date where the lockup is a relative lockup date. Espenlaub et. al. (2001) find that 54 out of total 188 IPOs (29%) in their sample set lockup in terms of calendar date. Another study by Espenlaub et al. (2002) using the same IPO data analysed the trading by directors around the lockup expiry date. Both studies report statistically insignificant abnormal returns around the lockup expiry

[2] The UK is also very different from Continental Europe in terms of the importance of institutional investors, which is much higher in the former. From 1963 to 1992, ownership of UK equities by institutional shareholders has soared from around 30 per cent to 60 per cent (Stapledon 1996). Despite the fact that a large percentage of the aggregate UK market capitalization is held by institutions, these institutional investors are not major players from a principal-agent perspective. First, although their accumulated share stakes are significant, shareholdings in individual companies are small. The average of the largest shareholding owned by institutions amounts to a mere 5.5 per cent Hence, the potential benefits from active monitoring of UK corporations can hardly outweigh the costs of corporate control for institutions and urges institutions to free ride on corporate control (Shleifer and Vishny 1997). Second, in order to remain cost-efficient, institutional investors prefer to divest from poorly performing firms rather than to engage in active monitoring. In such a setting, it would be interesting to analyse the IPO lockup contracts where the insiders are and institutions holding shares of the same company monitors

group, most UK firms are controlled by their insider shareholders (Goergen and Renneboog, 2001). This topic is contentious as Franks, Mayer and Renneboog (2001) and Faccio and Lasfer (2002) argue that institutional shareholders in the UK do not monitor firms in which they invest and do not mitigate problems of asymmetric information. However, in US Chen, Jegadeesh and Wermers (2000), Chen, Hong & Stein (2002) and Ben Dor (2003) showed that they actively monitor the IPOs they invest and institutional ownership is positively related to performance. We examine the behaviour of lockups in presence of institutional investors. Do they behave similarly as the venture capitalists and underwriters or they don't monitor the IPO firms in which they invest as was documented in context of UK.

Third, lockup contracts reduce the information asymmetry and mitigate agency problems between the insider-managers and the outside shareholders (Brau et al, 2004). Ibbotson and Ritter (1995) state that investors are ready to pay more for a firm with a lockup agreement for two reasons: i) any negative information being withheld is likely to be revealed before the locked-up shares can be sold, reducing the benefit of withholding information, and ii) as long as insiders retain large holdings, their incentives are aligned with outsiders' incentives (Ibbotson and Ritter, 1995). Lockup agreements do not, however, completely mitigate informational asymmetries that exist between insiders and outsiders. Because many lockup periods in the US are relatively short[3], little information is disclosed between the IPO and the lockup expiration date. We showed that as UK lockups are higher so it is more likely that information production is higher from the time of IPO to lockup expiration and is likely to reduce the information asymmetry between insiders are outside shareholders. UK Lockup expiration will shed additional light on the level of asymmetric

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[3] The median lockup length is US was found as 180 days (Brav and Gompers, 2003) whereas in UK we report a median lockup length of 365 days. The means are different in two countries as well. For example Brav and Gompers (2003) reports 254 days as mean while we report 548 days.

information between the insiders and outside shareholders. As long as UK lockups are higher, and in most cases, insiders hold their IPO allocations it will mitigate the agency problems to a certain extent.

Our paper is related to numerous strands in the existing corporate finance literature. First, the paper relates to the literature that scrutinizes the role of reputation in the IPO process and the mitigation of adverse selection. Because the going-public process is potentially subject to Myers and Majluf (1984) adverse selection problems, it is in the firm's interest to exercise means that credibly convey its quality. A commitment not to sell any of equity for a pre-specified period of time can function as such a commitment mechanism (Welch, 1989, p. 437). Reputation can have a similar effect as in the case of adverse selection. Carter and Manaster (1990) demonstrate that investment banker reputation is negatively correlated to the IPO underpricing. They posit that the underwriter is able to mitigate some of the adverse selection problem at the time of the IPO by pledging its reputation of not taking advantage of outside investors. Similarly, Megginson and Weiss (1991) show how the reputation of venture capital investors can affect the first day return on IPOs. Franks, Mayer and Renneboog (2001) and Faccio and Lasfer (2002) argue that institutional shareholders in the UK do not monitor firms in which they invest and do not mitigate problems of asymmetric information. We show that over our sample period, a lower underpricing was associated with prestigious underwriter, venture capitalists presence and institutional presence in the firm.

A continuing issue in the corporate finance literature has been the impact of trading by informed insiders on securities prices. Starting with Manne (1966), an extensive body of research has examined the trading by corporate insiders. Most notably, Seyhun (e.g., 1986, 1988) has documented short and long-run price impacts

of trading by insiders in the US. Recent studies in UK found that insider purchases and sells trigger significant immediate market reactions (Korzack and Lasfer (2007), Fidrmuc, Goergen and Renneboog (2006)). We provide new empirical evidence regarding buy and sales by insiders before the lockup expiration. In addition, we explore the relationship between the timing of such sales and company characteristics in which insiders are likely to sell.

This study examines the role of lockup contracts in context of going-public procedure by using a unique data from London stock exchange over the period 1999-2006. We provide evidence that lockups serve as a commitment device to overcome potential adverse selection at the offering as well as signal firms' quality. Firms that are unprofitable, where institutional investor is not present, go public with lower quality underwriters, and are not venture capital-backed have significantly longer lock-ups. We find that 31% of the firms have insider purchases prior to the expiration of the lockup, whereas 14% of the firms have sells prior to lockup expiration. We find that firms with venture capital backing and which have done well in the past are likely to be released from the commitment. Insiders buy in firms which couldn't do well in terms of stock price performance to support prices. This is consistent with commitment as well as signalling quality hypothesis. In addition, we show a significant price reaction at the lock-up expiration of -1.23% on average. Firms with greater percentages of locked shares and firms backed by venture capitalists, and firms where institutional investor is present lead to smaller declines.

The paper is organized as follows: Section II describes the institutional features and lockup agreements in UK. Section III presents a discussion of our data and initial results regarding the structure of the lock-up. Determinants of lockup length is analysed in Section IV. Section V and VI analyses insider trading before the

time of the lock-up expiration. Abnormal price reaction subsequent to lock-up expiration is examined in Section VII. Section VIII concludes.

2. Institutional Features and Lockup Agreements in UK

The London stock exchange (LSE) has two markets, the main market (called Official List -OL) and the Alternative Investment Market (AIM). The main market is the London Stock Exchange's principal market for listed companies from the UK and overseas. It currently has approximately 1,600 companies listed including over 300 international companies in 2008. In 2007, 264 companies raised funds in London compared with 298 on the NYSE and NASDAQ combined. In 2007 companies on the London Stock Exchange raised US$87 billion compared to US$15 billion on the New York Stock Exchange and US$20 billion on NASDAQ.

Launched on June 1995, AIM is the exchange for smaller companies. AIM is to the main market as the AMEX and NASDAQ are to the NYSE. In 2007, 284 companies joined AIM, 182 of which were IPOs and a total of £6.5 billion was raised in new issues. There are approximately 1,700 companies (including more than 350 international companies) whose shares are traded on AIM. This market is less regulated than the Official List. For example, there is no requirement of three years trading statement, leading a way to any new company to be listed. Another advantage of AIM is the ability of firms to choose a method of listing from the three options: regular IPO, pure introduction which allows firms to list without issuing equity to the public within 5 years of listing, and two-stage offering which allows firms to first list without issuing equity and then raise funds from the public within 5 years of listing.

Lock-in Agreements in the UK[4]

Espenlaub *et al* (2001) report that for the UK there is a large variety not only with respect to the duration of the lockup period, but also with respect to the lockup characteristics. However, recently we found that there is standardization of the lockup length compared to the Espenlaub et al (2001) study period. The lockup expiry date may be stated as a definite calendar date (e.g. 1 June 2007), as it is the case in the U.S., or it may be related to a specific corporate event, such as the earnings announcement or the publication of the annual report. Finally, lockup may also be staggered, i.e. allow only for a gradual release of the locked shares before the expiry date.

While in the U.S. there are no legal rules about lock-in periods (Ofek and Richardson, 2000), in the UK certain types of companies are, or were in the past, subject to compulsory lock-ins. Until January 2000, lock-in agreements were compulsory for UK mineral and scientific research-based companies, which did not satisfy the standard minimum-age requirement of three years. More specifically, the directors and other key employees of these companies were not allowed to sell shares either in the IPO or during the period of two years commencing with the first day of listing. Shareholders holding at least 10 per cent of the securities were not allowed to sell during the first six months following the IPO or until the publication of the semi-annual results, whichever was longer. Also, they could not sell more than 40 per cent of their holdings during the first two years following the IPO. Changes to the Listing Rules were made in January 2000. Since then there have been no compulsory lock-in agreements for the types of companies mentioned above. However, these types of companies with less than three years of trading records are now required to include a

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[4] This section is based on Espenlaub et al. (2002).

statement in the prospectus specifying whether a lock-in agreement exists or not. If no lock-in agreement exists, the prospectus must specify the reasons for its absence.

An additional chapter on innovative high-growth companies was included to the Listing Rules in January 2000. According to this chapter, lock-in agreements are not compulsory for innovative high-growth companies. However, similar to mineral and scientific research based companies, if these firms do not satisfy the minimum age requirement of three years, they have to include a statement in their prospectuses about lock-ins. Again, if there is no agreement, the statement must specify the reasons.

3. Data Sources and Sample Description

Our Sample consists of the IPOs on the London Stock Exchange between January 1999 to 2006.LSE data provides information on market (AIM vs Main market), date of admission, country of incorporation, issue price, market value, money raised, name of the broker, name of the advisor (AIM only). Initially, 1117 IPOs were included in this period. We, then hand collect the information relating lockup from the company prospectuses. We collect prospectuses from Perfect Flings database. The prospectuses provide detailed information about IPOs. Specifically, we collect lockup dates, percentage of shares locked-up, directors' ownership before and after IPO, fraction of insider shares locked up, percentage sold in the IPO, institutional ownership, and venture capital backing.

We describe the filters that were used to construct the sample for IPOs. We begin with 1117 companies that went public in the AIM and London main market. For 76 companies we couldn't find the prospectuses in the Perfect Filings database. We couldn't find share price data using DataStream for another 15 companies. There is

some information missing for some other firms. Lockup date or ownership data are missing from the prospectuses for another 195 companies. The final sample size is 831 for which we have complete data.

We obtain the market data from DataStream. They include Price-to-book ratios, sales, return on assets and market capitalization of the companies. We use unadjusted prices to calculate the returns for the whole study. DataStream also provides delisting dates. As we have companies from both AIM and Main market we used two indices to calculate the abnormal returns. For the AIM companies we use AIM all share price index[5] and for main market companies we use FTSE all share price index.

Table-1 provides statistics for the 831 IPOs. In panel A we provide the annual number of IPOs for the period 1999-2006. The volume of IPOs was quiet high for 1999-2000 period, which is the 'Bubble' period. Then relatively quiet period 2001-2003, which is followed by a heavy IPO period of 2004-2006. Panel B provides various characteristics of the data, with mean,10th, 50th and 90th percentiles.

The initial analysis of lockup length shows considerable interesting results. The mean lockup length for UK companies are more than double compared to the US companies. The median of lockup length shows same behaviour. We found median lockup length of 365 days, while Brav and Gompers (2003) and Field and Hanka (2001) found a median of 180 days. In our study period, there are considerable amount of standardization of lockup contract compared to Espenlaub et al (2001)[6]. We found 560 companies out of full sample had a lockup length of 365 days. Field and Hanka (2001) and Brav and Gompers (2003) shows a considerable amount of lockup length standardization. The major difference with US companies is that while

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[5] As an alternative to AIM all share price index we used the Hoare Govett Smaller Companies (HGSC) Index as the market index. Our results are qualitatively similar as a change of the market index.
[6] Espenlaub et al. (2001) find 26% of their companies have a fixed expiry date out of 188 firms.

most of them have a lockup length of 180 days, while in UK it is 365 days[7]. In most of our cases, insiders lock 100 percent of their shares.

Panel C provides the information on distribution of the lockup length in calendar time starting from lowest (less than 90 days) to highest (1096 days, i.e., 3 years). It can be seen that most of the lockup occurs at semi-annual or annual frequency the most of them (67%) are based on one year. It also appears to be a clustering of lockup length corresponding to annual intervals.

Panel D represents additional information on the length of lockup, the percentage of shares hold by the insiders that are subject to lockup and underpricing. The panel separates IPO firms based on some firm characteristics. Rows 2 and 3 reports the cross sectional difference in of IPO firms by sorting them based on the size, as measured by market value of equity at IPO dates of the companies. Particularly, we examined the companies which are greater and smaller than medians. In terms of days lockup they appear not to be different, but fraction of post IPO insider shares locked and underpricing they are different. The smaller companies underpriced more compared to large companies which are in contrast with Brav and Gompers (2003). The next two rows shed light on the basis of prestigious and other underwriters. Prestigious underwriters[8] have shorter lockups compared to other underwriters. The underpricing is lower for prestigious underwriter compared to others. The next two rows compare the Venture capital backed firms and firms without venture capital

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[7] Espenlaub et al (2001) find that the mean lockup is 561 days and median is 730 days. The lockup contracts were compulsory during their sample period (1992-2000) for mineral and scientific research based companies with trading records of less than three years.
[8] The prestigious underwriters are defined as in Derrien and Kecskes (2007) and includes global investment banks like ABN AMRO (including Hoare Govett), Cazenove & Co., Credit Lynnais Securities, Dresdner Kleinwort Wassertein, HSBC Securities, Credit Suisse, Investec Hendersen Crosthwaite securities, KBC Securities, Peel Hunt, Lehman brothers, Nomura International, Schroder Salomon Smith Barney, SG securities, UBS, West LB, Merrill Lynch International, Goldman Sachs.

backing. In presence of venture capitalist, the lockup length declines and the underpricing is lower for the firms for which Venture capitalist are present.

We also examined the variation of firm characteristics if institutional investor present in that firm. In presence of institutional investors, the lockup length declines but there are no differences in underpricing. In rows 8 and 9 we investigated the difference that arises for differences in markets. We found AIM companies have lower lockups compared to Main market. The underpricing is considerably lower for AIM companies compared to main market. This finding is consistent with Burrowes and Jones (2004) for AIM companies.

We examined the time variation of the IPOs. In rows 12 and 13 we examined the bubble period and normal period[9]. There are no differences in lockup length but there are considerable differences in underpricing. The next two rows we divided the IPO sample into hot and cold market[10]. In the hot market the lockup length and underpricing is higher.

4. The Determinants of Lockup Length

We next explore the determinants of the lockup length. We report regression results which broadly support commitment story as well as signalling quality. The dependent variable is the logarithm of lockup length in days. Independent variables include log of market value of equity in 2008 constant pounds, the fraction of post-IPO insider shares locked, the firm's market-to-book ratio, percentage of the company's share issued in the IPO, cash flow margin, a dummy variable indicating whether the firm was financed by a venture capitalist, a dummy variable indicating whether underwriter was prestigious, a dummy variable indicating whether the firm has

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[9] Bubble period is defined as 1999-2000 period following Levis (2008).

[10] Hot market where the IPO volume increases significantly and includes two periods January 1999 to March 2001 and January 2004 to end of 2006. Cold market is the remaining sample period.

substantial shareholders, a dummy variable indicating whether the firm is in high-tech industry, a bubble period dummy and an AIM dummy.

We find that larger firms, firms with prestigious underwriter, firms backed by venture capitalist, and firms with institutional investors all have shorter lockups on average. Each of these variables is associated with less informational asymmetry about firm value in the aftermarket. Insider mangers in firms with high quality underwriters or venture capital backing will be less likely to take advantage of the outside investors and therefore have less need for commitment of a longer lockup. In presence of institutional investors in the firm there are less need for monitoring the insider mangers, that's why they agree a shorter lockup.

Higher market-to-book ratios, generally associated with high-growth, high-risk companies, are associated with longer lockup. As expected, higher cash flow margins are negatively related to lockup length. The high-tech companies should be positively related to longer lockup period as they are highly risky. Finally, the AIM companies have shorter lockups compared to main market companies (may be two stage IPOs in AIM), as the informational asymmetry reduced by the two stage companies.

5. Insider Selling Prior to Lockup Expiration

In this section we explore the behaviour of insider equity selling from IPO allocation prior to the lockup expiration. As the lockup agreement was not mandated by FSA, but is only an agreement between the underwriter and the IPO firm, insiders can sell equity prior to lockup expiration if the underwriter chooses to free them from the obligation to hold shares until lockup expiration. If the lockup is only a commitment mechanism, the firms that have generally reduced potential to take advantage of the outside shareholders will be released from the lockup restrictions. If lockup signals

firms' quality, then the firms which have done well in the past, insiders are more likely to be released from lockup. Following Brav and Gompers (2003), the commitment hypothesis predicts that firms with higher post-IPO abnormal returns, as well as firm with prestigious underwriters and venture backing, will be more likely to be released early from lockup restriction. Brau et al. (2005) postulates that, if Brav and Gompers commitment hypothesis is true it supports signalling hypothesis as much commitment hypothesis. We take the same strand as Brau et al. (2005).

We use a large database of directors' trades spanning from January 1999 to December 2007. The database of directors' trades is collected from Directors Deals Ltd. and includes news items on directors' trades disclosed by all U.K. companies to the Regulatory News Service (RNS). We exclude a number of observations that are not likely to be driven by private information, such as exercise of options or derivatives, script dividends, bonus shares, rights issues, awards made to directors under incentive plans or reinvestment plans. We also exclude all directors' transactions in investment companies. After screening, we had 36,943 insiders' trades from the UK market. We checked the data for errors and found that for 2949 trades the difference in announcement and transaction date is more than 5 days[11] (an error rate of 8%).We have excluded those data from our sample. We have 33,994 directors' trades in 2664 listed companies, split into 26,268 (77%) purchases and 7,723 (23%) sells. The insider trading data is detailed as it contains information like announcement and transaction date, price at which the transaction was done, amount, value, holding, holding change, name of the director, position of the director and so on.

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[11] The directors must inform their company as soon as possible after the transaction and no later than the fifth business day after a transaction for their own account or on behalf of their spouses and children (Hillier and Marshall (2002)). In turn, a company must inform the LSE without delay and no later than the end of the business day following receipt of the information. This implies that the information about insider transaction reach market as late as 6 days after transaction (Fidrmuc et al. (2006).

We matched the IPO sample with the insider trading data, which yields 4,762 transactions in 657 companies, split into 3,513(74%) buys and 1,249(26%) sells. The other 358 IPOs do not have any insider transactions. Out of these 1249 sells, we determine which of the insider sells are occurred prior to the lockup expiration and the sell should be from IPO allocation. We determine which sells prior to lockup expiration are from IPO allocation and retained those sells. The final sample consists of 186 events for 116 IPOs.

Table 3 presents a summary of insider sells prior to lockup expiration. We find that 14% of the firms have insider sells prior to the expiration of the lockup. Field and Hanka (2001) found this number as 17% and Brav and Gompers found it as 15%. The average number of insider transactions, conditional on having sells before lockup expiration is 2 and the median is 2 as well. The average and median sells occur 58% and 62% of the way from the IPO to the lockup date. It is also noteworthy that the size of the sells is quite small. Average sells relative to shares locked is 5.63% while the median is 0.51%. The average 40-day abnormal return prior to the sell is 9.72% with a median of 8.15%.

Table 4 presents summary statistics on firms that are released from lockups and those that are not released. The sample of insider sells consists of 186 events by 116 IPOs. We report descriptive statistics for both the samples where insider sells occurred versus where no insider sells occurred prior to lockup expiration. We find that insider sell prior to lockup expiration in firms that associated with less moral hazard and firms with less information asymmetry, that is, larger firms, firms with prestigious underwriter, firms with institutional presence, venture capital backed firms and firms with higher abnormal return prior to the sell (40-day abnormal return). Investors are likely to be concerned with insider selling activity at low-liquidity firms, firms not

backed by venture capitalist and firms with low returns because of the higher level of asymmetric information.

We estimate logit regressions (Table 5) to determine which firms are more likely to have insider sells prior to lockup expiration. The dependent variable takes 1 if the early insider sells occur prior to lockup expiration and zero otherwise. As predicted by the commitment and signalling hypothesis, firms that have reduced information asymmetry problems are more likely to have early insider sells. The abnormal return over the preceding 40 day period is positively related to the probability of early sells. Firms with higher return have done well in the past and investors are less likely to be concerned with the insiders cashing out. Similarly, venture capital backing and larger firm size are all related to early lockup release. Firms, with a greater fraction of post-IPO insider shares locked up are less likely to have insiders selling shares prior to the lockup expiration, consistent with the greater need for insiders in these firms to commit not to selling equity.

6. Insider purchases before lockup expiration

In this section we examine why insiders buy before lockup expiration when they have been allocated some shares from the IPO. There are two possibilities that we consider: i) the company is a good company and insiders want to increase their holdings and ii) the company is a doing badly and insiders buy to support the price. In first case, the test is consistent with the asymmetric information hypothesis put forward in context of insider trading, where ample evidence exists in literature. Brennan and Cao (1996) find that informed investors are contrarians where uniformed investors are trend chasers. If the insider purchases are driven by only information then the most important variable will be share price decline before the trade. In that case, other variables like venture capital backing, institutional investor presence may not be

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important. If insiders' purchases are done to support the price it is possible that the trades are pushed by the venture capitalists. In this case, we expect the insider purchases are concentrated in the companies in presence of venture capitalists.

Table 6 presents a summary of insider purchases before lockup expiration. We find that 31% of the firms have insider purchases prior to the expiration of the lockup, whereas 14% of the firms have sells prior to lockup expiration. The average number of insider transactions, conditional on having purchases before lockup expiration is 3 and the median is 2. The average and median sells occur 61% and 43% of the way from the IPO to the lockup date. It is also noteworthy that the size of the purchases is quite small compared to the sell prior lockup expiration. Average purchases relative to shares floated in the IPO is 0.213% while the median is 0.045%. The average 40-day abnormal return prior to the sell is -8.47% with a median of -4.64%.

Table 7 presents summary statistics on firms which have insider purchases before lockups and those firms in which insiders do not purchase before lockup expiration. The sample of insider purchases consists of 694 events by 254 IPOs. We report descriptive statistics for both the samples where insider purchases occurred versus where no insider purchases occurred prior to lockup expiration. We find that insider buy prior to lockup expiration in firms that associated with venture capital backed firms and firms with higher abnormal return prior to the buy (40-day abnormal return). Insiders seems to be contrarians

We estimate logit regressions (Table 8) to determine which firms are more likely to have insider purchases prior to lockup expiration. The dependent variable takes 1 if the early insider purchases occur prior to lockup expiration and zero otherwise. As

predicted by the commitment hypothesis, in firms that needs price support are more likely to have insider purchases. The abnormal return over the preceding 40 day period is negatively related to the probability of early purchases. In firms with lower return have done badly in the past and insiders are more likely to be concerned with supporting the price in those companies. Similarly, venture capital backing and larger firm size are all related to insider purchases before lockup expiration. Firms, with a lower fraction of post-IPO insider shares locked up are more likely to have insiders buying shares prior to the lockup expiration, consistent with the greater need for insiders in these firms to support price.

7. Event-day Abnormal Return

7.1 Market Reaction of Lockup Expiration

In this section we explore the market reaction of the lockup expiration. Because the lockup is a well known agreement at the time of the IPO and all the parameters of the Lockup are specified in the IPO prospectus, simple rational expectations would be the price reaction will not be statistically different from zero. We first test this hypothesis and then examine cross-sectional differences in abnormal returns around lockup expiration. By doing this, we would be able to provide additional light on the dynamics of the lockup contract and its role. The commitment and signalling hypothesis predicts lower abnormal returns for firms that have good news or are less subject to moral hazard.

As long as insiders retain large holdings, their incentives are aligned with outsiders' incentives (Ibbotson and Ritter, 1995). So, lockup expiration increases the potential for unaligned insider and outsider incentives, as insiders are allowed to sell their holdings at the lockup expiration. Assuming this lack of alignment adversely affects

general shareholders, potential agency costs are expected to decrease investor demand for shares (Brau et al., 2004). We argue that any pending information about corporate operations or future prospects is more likely to be negative than positive. Similarly, any change in alignment of incentives is more likely to be negative than positive. We predict both of these factors will result in negative abnormal returns around the lockup expiration date.

We calculate abnormal returns for each IPO for event window-10 to +10, as "0", being the event date. The abnormal returns were measured relative to the market index. For AIM companies we use AIM All Share Price Index[12] and for main market we use FTSE All Share Price index. In figure 1 we plot the average cumulative abnormal return (CAR) over the 21 event days. From day -10 to-3 days the abnormal returns tend to be very small. From -2 to 0 the abnormal returns are large and negative, with day 0 having the largest return. Prices drop 1.23% around lockup expiration. Brav and Gompers (2003) reports similar drops (1.5%), while Field and Hanka (2001) finds a drop of 2%. The lower magnitude of the price drop is consistent with lower level of information asymmetry and somehow mitigated agency problems as the lockup period on an average is higher in UK compared to US.

Though at initial glimpse the price decline appears to be consistent with a simple downward sloping demand curve story, it is hard to explain in a rational expectations framework. In the case of lockups, investors already know that a higher amount of shares are available after the lockup expiration day. The market should foresee the number of shares sold at expiration accurately, on average, and abnormal returns should be zero (Allen and Postlewaite, 1984). For downward-sloping demand curves

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[12] As an alternative to AIM all share price index we used the Hoare Govett Smaller Companies (HGSC) Index as the market index. Our results are qualitatively similar as a change of the market index.

to explain the price decline that we observe, as in the case of Field and Hanka (2001), the market must hold consistently inaccurate prior beliefs about the fraction of equity will be sold at expiration and hence must be consistently surprised by how many shares actually come to the market.

If the temporary mispricing is arbitraged away, we expect a price reaction which is zero. If it's not then there possibilities of significant price reactions. Costly arbitrage (Pontiff, 1996) possibly will prevent investors from undertaking investments that would correct the temporary mispricing, even if they know how many shares were coming to the market. Investors may possibly not want to attempt to gamble against the stock by selling it short, for the reason that these companies are very unstable. Good news may arrive to the market that increases the price and causes a loss on the short position before the expiration of the lockup. In fact, 40% of the event-day abnormal returns that we calculate are actually positive. So, this is possible not theoretically but empirically as well.

Furthermore, if the transaction cost is higher then the prices drop so it will not be possible to make money from any such actions taken by the investors. Actually, Brav and Gompers (2003) document that transaction costs, calculated as the percentage bid- ask spread related to the bid price, equal 6.3% on average, and are likely to eliminate the ability of investors to make money from the abnormal return that we document. After all, it may simply tough to borrow shares in order to create a short position given the small amount of shares that have been floated. As a result, even if the market have knowledge with a high degree of certainty the number of shares that will come to the market, costly arbitrage may imply that the price may still decline on average at the expiration of the lockup.

Table 9 provides the daily abnormal returns as well as the cumulative abnormal returns. The table reveals that each of the daily average abnormal returns (ARs) from day -5 to day +3 is negative, although the AR on day -2 to 0 is significant. Table 10 also tabulates the cumulative abnormal returns around lockup expiration. Cumulative abnormal returns peak at -2.63% and all cumulative abnormal returns are significantly negative from -3 to +10.

The propensity of the insiders to sell at the expiration of lockup leads us to naturally examine whether volume is abnormally high around the event. Some of this abnormal volume may represent the shares that are sold first time in the market. As insider trades convey information to the market, so one would expect higher volume as insiders are selling shares after the lockup expiration. Trading volume might increase as information flowing to the market as a result of insider selling. Our objective here is to analyse whether the price drops at the lockup expiration are associated with greater abnormal volume. We calculate the abnormal volume as in Field and Hanka (2001). We obtain the daily volume from DataStream and define normal volume as the mean daily volume in day t-71 through t-11 relative to the event day. Abnormal volume is the daily volume divided by the mean daily volume minus 1. To eliminate the effect of outliers in our analysis we set observation greater than 99th percentile in each event day equal to the median observation.

The results are presented in Figure 2. It shows that abnormal volume increase around 80 percent on the lockup expiration day. Volume than drops around 40 percent and remains approximately that level for the post event period. Field and Hanka (2001) and Brav and Gompers (2003) report similar volume increases for US IPO lockup expirations. As robustness check, we increase the post event window and find that abnormal volume does not revert back to zero.

7.2 Cross-sectional Differences in Abnormal Returns

In this section we examine additional information regarding the negative average abnormal documented in the previous section. Our objective is to whether cross-sectional differences in abnormal returns around the event can shed light on the competing hypothesis for the existence of lockups. The analysis presented in table-8 is similar to Brav and Gompers (2003). It is related to Field and Hanka (2001); while their focus is on downward sloping demand curves our focus is on the level of asymmetric information related to the firm value. The dependent variable is the CAR from -2 to +2 around the lockup. The independent variables are a dummy variable indicating whether the abnormal return between IPO and the lockup expiration is above the median, the log of market value of the IPO in 2008 constant Pound sterling, the percentage of post-IPO insider shares locked, the firms market-to-book ratio, a dummy variable whether the firm was financed by a venture capitalist, a dummy variable for prestigious underwriter, the firm's stock price volatility, the cash flow margin of the IPO firm, a dichotomous variable taking the value of one if insider sells occur before lockup expiration, a dummy variable for high-tech companies. The inclusion of the variable insider sells before lockup expiration controls for a reduced desire by the insiders in the firm to sell after the lockup expiration.

The regression results are consistent with the commitment hypothesis as well as signalling quality hypothesis. We find that the early insider sells are related to smaller price drops, though the number is statistically insignificant. Insiders of those firms are less likely to sell shares at lockup expiration so the information asymmetry is reduced to a large extent. We find early insider purchases are negatively related to

price drops. Insiders send a credible signal about the quality of the firm through their purchases, which reduces the information asymmetry. Additionally, to the extent that price volatility proxies for information asymmetry, the negative coefficient is consistent with larger negative abnormal returns. The negative coefficient is also consistent with the notion of costly arbitrage limits the ability of the arbitrageurs to short sell before the lockup expiration.

On the other hand, the presence of venture capitalist, presence of institutional investors and having a greater fraction of shares locked up are associated with smaller price declines, which is consistent with the lower level of asymmetric information and somewhat mitigated agency problems hypothesis. This is also consistent with, Brav and Gompers (2003), who report that a huge number of venture capitalist distributes shares to their investors at the lockup expiration date and many investors sell. As a result, a larger number of shares are likely to come to the market at the lockup expiration for venture capital backed firms.

Overall, the evidence from price decline at lockup expiration is consistent with the earlier results relating to the use of IPO lockups to overcome information asymmetry and mitigate agency problems. Price declines for firms which are less informationally sensitive appear to be smaller than other IPO firms.

8. Conclusion

This study addresses the role of lockup contracts in context of going-public procedure by using a unique data over the period 1999-2006. We find support for the notion that lock-ups serve as a commitment device to overcome potential adverse selection at the offering as well as signal firms' quality. Firms that are unprofitable, where institutional investor is not present, go public with lower quality underwriters, and are not venture capital-backed have significantly longer lock-ups. We find that in fourteen

percent of our firms, insiders sell equity prior to the expiration of the lock-up. We found that firms with venture capital backing and which have done well in the past are likely to be released from the commitment. This is consistent with commitment as well as signalling quality hypothesis.

In addition, we show a significant price reaction at the lock-up expiration of -1.23% on average. This abnormal return is potentially consistent with downward-sloping demand curves or investors' incorrect prior beliefs regarding the extent of insider sales. Firms with greater percentages of locked shares and firms backed by venture capitalists, and firms where institutional investor is present lead to smaller declines. Our paper is another in a recent series of papers that document that market frictions and the riskiness of arbitrage can lead to the persistence of mispricing in financial markets.

In general, the negative abnormal returns at the lockup expiration date are consistent with theoretical predictions based on informational asymmetries and reduced incentive alignment involving insiders and general shareholders. These results are interesting as the lockup expiration date is public information, yet significant abnormal returns occur in the days just prior to and on the expiration of the lockup date. The results of the cross-sectional regression points out on characteristics that affect market returns around the lockup expiration date. We find evidence that asymmetric information induced by the future actions taken by corporate insiders' is related to negative abnormal returns. Four variables appeared to be significant in our model: our proxy for good performance, percentage of post-IPO insider shares locked, percentage of company shares issued and firms stock price volatility. In addition, the results for the percentage of management ownership support an agency cost interpretation of the negative abnormal returns surrounding lockup expiration.

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Table 1
Descriptive Statistics

Panel A

Year	1999	2000	2001	2002	2003	2004	2005	2006
IPOs	39	144	59	44	39	159	201	146

Panel B

	10th Percentile	Median	Mean	90th Percentile
Market value of equity(2008 £ Million)	3.2	21.6	140.2	204.1
Market-to-book	0.88	3.01	11.56	11.15
Underpricing (%)	-1.5	9.9	20.3	51.3
Percent of offering as primary shares	12.6	32.9	38.6	78.0
Days of Lockup	306	365	548	390
Fraction of post-IPO insider shares locked (%)	1.5	24	29.4	68
Sales(2008 £ Million)	0.03	2.94	61.97	60.95
Return on Assets	52.6	-2.6	-34.6	11.1

Panel C

Lockup days	<89	90-180	181-364	365	366-550	551-720	721-1096
Observations	7	25	80	560	79	19	61
Percent of observations	0.84	3.00	9.63	67.38	9.50	2.28	7.34

Panel D

Sample	N	Days Locked	Fraction of post-IPO insider shares locked (%)	Underpricing (%)
1)Full Sample	831	548[365]	29.4[24]	27.5[9.9]
2) Market value>median	416	387[365]	25.97[18]	10.29[7.2]
3) Market value<median	415	395[365]	32.78[30]	28.9[14]
p-values for differences in means		0.23	0.00	0.00
4) prestigious underwriter	166	338[365]	25.19[18.45]	12.0[7.2]
5) other underwriter	665	403[365]	30.42[25]	22.0[10.6]
p-values for differences in means		0.00	0.00	0.00
6) venture capital backing	89	346[365]	19.75[15]	15.1[7.7]
7) Non-venture capital backing	734	396[365]	30.65[25]	22[10]
p-values for differences in means		0.00	0.00	0.00
8) AIM	694	334[365]	23.27[16]	9.3[7.7]
9) Main Market	141	402[365]	30.6[25]	22.5[10.4]
p-values for differences in means		0.00	0.00	0.00
10)Institution as a substantial shareholder	504	379[365]	25.4[20]	19.4[9.2]
11)No Institution as a substantial shareholder	314	411[365]	36[31.5]	21.1[10.5]
p-values for differences in means		0.00	0.00	0.28
12) Bubble Period	183	380[365]	35.2[33]	32.1[9.7]
13) Normal Period	648	388[365]	27[21]	16.4[10]
p-values for differences in means		0.20	0.00	0.00
14)Hot market	676	412[365]	28.5[23]	27.1[10]
15)Cold market	155	381[365]	33.7[29]	18.9[7.1]
p-values for differences in means		0.00	0.00	0.12

The sample is 831 IPOs from January, 1 1999 to 31 December 2006, for which we could find lockup information. Panel A provides annual distribution of our IPO sample. Panel B presents means, medians, 10th and 90th percentile information on the various characteristics for the sample. Market value in millions of pound sterling is in 2008 constant terms. Market value is calculated using the offering price and shares outstanding obtained from DataStream. Market-to-book ratio is the ratio of market capitalization at the IPO divided by the book value of the equity in the first reporting period after IPO. Underpricing is the percent return on the first day from the offering price to the closing price. Percentage of offering as primary shares is the fraction of offering that is new shares. Days of lockup are the length of lockup period. Fraction of post-IPO insider shares locked is the percentage of shares held by the insider that are subject to lockup restrictions. Sells is the amount of sells in the first reporting period after the IPO in 2008 constant millions of pound sterling. Return on assets is the net income divided by total assets in the first reporting period after the IPO. Panel C provides the distribution of the lockup length in calendar days. Panel D represents information on the length of lockup, percentage of shares locked up and the underpricing. Both means and Medians [in brackets] are reported. Prestigious underwriters are the global underwriters defined in Derrien and Kecskes (2007). AIM mean Alternative Investment Market and Main market is the Official List. Institution as a substantial shareholder means whether there are any institutional investors who hold more than 3% share at the time of IPO. Bubble period is defined as 1999-2000 period following Levis (2008). Hot market where the IPO volume increases significantly and includes two periods January 1999 to March 2001 and January 2004 to end of 2006. Cold market is the remaining sample period. We report the p-values for differences in mean (assuming unknown but equal variances)

Table 2

Regression results for Length of Lockup (Dependent Variable—log of the lockup days)

Constant	13.04	23.7
	[12.44]**	[12.28]**
Venture Capital Backed?	-0.07	-0.06
	[-2.01]*	[-1.98]*
Prestigious Underwriter?	-0.16	-0.13
	[-4.28]**	[-3.43]**
Institution as a substantial shareholder?	-0.03	-0.03
	[-2.26]*	[-2.15]*
Log of the market value of equity(2008 £ million)	-0.02	
	[-2.49]*	
Market-to-book ratio	0.0007	0.001
	[0.45]	[0.95]
Percent of Post-IPO insider shares locked	0.0006	0.0005
	[1.71]	[1.13]
Percent of the company shares issued in the IPO	-0.002	-0.002
	[-0.46]	[-0.26]
Cash flow margin	-0.0072	-0.0025
	[-0.93]	[-0.43]
Hot Market Dummy	-0.05	-0.05
	[-1.72]	[-2.01]*
High-tech Dummy	-0.05	-0.04
	[-1.35]	[-1.15]
AIM Dummy		0.17
		[3.70]**
Adjusted R^2	10.9	12.1
Number of Observations	831	831

The independent variables are: Market value in millions of pound sterling is in 2008 constant terms. Market value is calculated using the offering price and shares outstanding obtained from DataStream. Market-to-book ratio is the ratio of market capitalization at the IPO divided by the book value of the equity in the first reporting period after IPO. . Fraction of post-IPO insider shares locked is the percentage of shares held by the insider that are subject to lockup restrictions. The cash flow margin is the ratio of operating cash flow to sales. Venture capital backed is a dummy variable taking the value of 1 if venture capitalist was present at the time of IPO. Prestigious underwriters are a dummy variable taking a value of 1 if global underwriter was the underwriter for the float. . Institution as a substantial shareholder is a dummy variable and means whether there are any institutional investors who hold more than 3% share at the time of IPO. Hot market dummy taking the value of 1 if the IPO is within hot period and zero otherwise. High-tech dummy taking the value of one if the company belongs to the following industry: computer manufacturing, electronic equipment, computer and data processing services, optical, medical and scientific equipment. AIM dummy is a dichotomous variable taking the value of 1 if the company is trading on Alternative Investment Market in London stock exchange. To eliminate the possible effect of outliers, for each variable, we replace observations whose values are either lower than the 1st or higher than 99th percentiles by the sample median. T-statistics are in the brackets.

Table 3
Summary statistics on insider early sells prior to lockup expirations

	10th percentile	Median	Mean	90th Percentile
Number of early insider sales	1	2	2	4
Sell time as fraction of lockup length (%)	15	62	58	95
Shares locked relative to shares outstanding	7	59	55	78
Shares sold early relative to shares locked	0.06	0.51	5.63	10.25
40-day abnormal return prior to early sales	-6.15	8.15	9.72	25.48

We obtained insider holdings data for the period January 1999 to December 2007 from the Directors Deals. The information provided from this source was collected from Regulatory and News Services (RNS). We determine which of the early sells occurred prior to the lockup expiration and retained those transactions. The sample consists of 186 sells by 116 IPOs. Firms that do not appear in our insider holding database are firms with no transactions. We calculate 10th, 50th and 90th percentile and means for various early sells characteristics. In row 1 we report the distributional characteristics on the average number of early sells. Row 2 provides the average time of sell since IPO. If, for a given IPO, insiders sold shares on multiple events, we average the resulting ratio. In row 3 we calculate the insider shares locked compared to the shares outstanding. The next row provides the information on percentage of shares sold relative to shares locked. In row 5 we calculate Cumulative abnormal return for the 40 day pre-event window where sell is the event using the FTSE All Share Price Index for main market companies and AIM All Share Price Index for AIM companies.

Table 4
Characteristics of IPOs with and without early insider sell prior to lockup expirations

Sell prior to lockup expiration?	yes	no	p-value of differences in mean
Number of IPOs	116	715	
Average number of insider sells	2	–	
Sell time as fraction of lockup length (%)	58	–	
Shares locked relative to shares outstanding (%)	55	–	
40-day abnormal return prior to early sales	9.72	0.52	0.00
Market capitalization	274	125	0.05
Prestigious underwriter? (%)	23.2	19.6	0.18
How many are venture backed?(%)	19.22	11.49	0.05

For a detailed description of the construction of the insider database see Table 3. The sample of insider sells consists of 186 events by 116 IPOs. We report descriptive statistics for both the sample IPOs in which insider early sells occur versus in which sells did not occur. The variables average no of insider sells, sell time as a fraction of lockup length, shares locked relative to shares outstanding, 40-day abnormal return prior to early sales was defined in Table 3. For the no sale sample we measure the 40-day abnormal return as the abnormal return over the whole lockup period standardised to 40 days. Prestigious underwriters are defined in table 3. We report p-values for the mean difference test between early sale and no sale (assuming unknown but equal variances).

Table 5
Logit analysis of Early Sells by insiders

	Estimate	Standard Error	*p*-value
Intercept	-2.474	1.041	0.017
40-day prior abnormal return (%)	0.127	0.028	0.000
Underpricing (%)	-0.004	0.002	0.041
Venture Backed?	0.372	0.086	0.000
Institutional as substantial shareholder?	-0.29	0.22	0.189
Length of Lockup in days	0.003	0.001	0.000
Log of Market value of equity (£2008 million)	0.292	0.069	0.000
Percent of Post-IPO insider shares locked	0.012	0.004	0.003
High-tech Dummy	0.605	0.258	0.019
Annual time dummy	0.121	0.05	0.019
Pseudo R^2		18.53	

The sample of insider sells consists of 186 events by 116 IPOs and 715 IPOs where no sales occurred. We calculate the probability of early sales occur prior to lockup expiration. The explanatory variables are: the 40-day prior abnormal return calculated as Cumulative abnormal return for the 40 day pre-event window where sell is the event using the FTSE All Share Price Index for main market companies and AIM All Share Price Index for AIM companies. For the no sale sample we measure the 40-day abnormal return as the abnormal return over the whole lockup period standardised to 40 days. Underpricing is the percent return on the first day from the offering price to the closing price. Venture backed is dummy variable taking value of 1 if venture capitalist is present. Log of market value of equity is the market capitalisation in 2008 constant terms. Percentage of Post-IPO insider shares locked are the fraction of insider shares that are subject to lockup restrictions. High-tech dummy taking the value of one if the company belongs to the following industry: computer manufacturing, electronic equipment, computer and data processing services, optical, medical and scientific equipment. To eliminate the possible effect of outliers, for each variable, we replace observations whose values are either lower than the 1st or higher than 99th percentiles by the sample median.

Table 6

Summary statistics on insider purchases prior to lockup expirations

	10th percentile	Median	Mean	90th Percentile
Number of early insider purchases	1	2	3	5
Purchase time as fraction of lockup length (%)	9	43	61	93
Shares locked relative to shares outstanding	66	100	93	100
Shares bought early relative to shares sold in IPO	0.005	0.045	0.213	0.345
40-day abnormal return prior to early sales	-38.5	-4.64	-8.47	13.38

We obtained insider holdings data for the period January 1999 to December 2007 from the Directors Deals. The information provided from this source was collected from Regulatory and News Services (RNS). We determine which of the purchases occurred prior to the lockup expiration and retained those transactions. The sample consists of 694 purchases by 254 IPOs. Firms that do not appear in our insider holding database are firms with no transactions. We calculate 10th, 50th and 90th percentile and means for various early purchases characteristics. In row 1 we report the distributional characteristics on the number of early purchases. Row 2 provides the average time of purchases since IPO. If, for a given IPO, insiders bought shares on multiple events, we average the resulting ratio. In row 3 we calculate the insider shares locked compared to the shares outstanding. The next row provides the information on percentage of shares sold relative to shares sold in IPO. In row 5 we calculate Cumulative abnormal return for the 40 day pre-event window where purchase is the event using the FTSE All Share Price Index for main market companies and AIM All Share Price Index for AIM companies.

Table 7

Characteristics of IPOs with and without insider purchases prior to lockup expirations

Purchases prior to lockup expiration?	yes	no	p-value of differences in mean
Number of IPOs	254	461	
Average number of insider purchases	3	–	
Purchase time as fraction of lockup length (%)	61	–	
Shares locked relative to shares outstanding (%)	93	–	
40-day abnormal return prior to early purchases	-8.47	-3.01	0.00
Market capitalization	169.45	151.16	0.26
Prestigious underwriter? (%)	20.74	20.81	0.85
How many are venture backed? (%)	15.85	10.72	0.04

For a detailed description of the construction of the insider database see Table 3. The sample of insider sells consists of 694 events by 254 IPOs. We report descriptive statistics for both the sample IPOs in which insider early purchases occur versus in which purchases did not occur. The variables average number of insider purchases, purchase time as a fraction of lockup length, shares locked relative to shares outstanding, 40-day abnormal return prior to early purchases was defined in Table 3. For the no purchase sample we measure the 40-day abnormal return as the abnormal return over the whole lockup period standardised to 40 days. Prestigious underwriters are defined in table 3. We report p-values for the mean difference test between early purchase and no purchase (assuming unknown but equal variances).

Table 8

Early Purchase by Insiders

Logit analysis of Early Purchases by insiders

	Estimate	Standard Error	*p*-value
Intercept	-4.132	0.480	0.0000
40-day prior abnormal return (%)	-2.130	0.434	0.0000
Underpricing (%)	-0.0026	0.001	0.0511
Venture Backed?	0.505	0.180	0.0050
Institutional as substantial shareholder?	0.019	0.078	0.8063
Length of Lockup in days	0.003	0.0004	0.0000
Log of Market value of equity (£2008 million)	0.223	0.039	0.0000
Percent of Post-IPO insider shares locked	-0.009	0.003	0.0177
High-tech Dummy	0.046	0.214	0.8286
Annual time dummy	0.451	0.029	0.0000
Pseudo R^2		18.43	

Figure 1
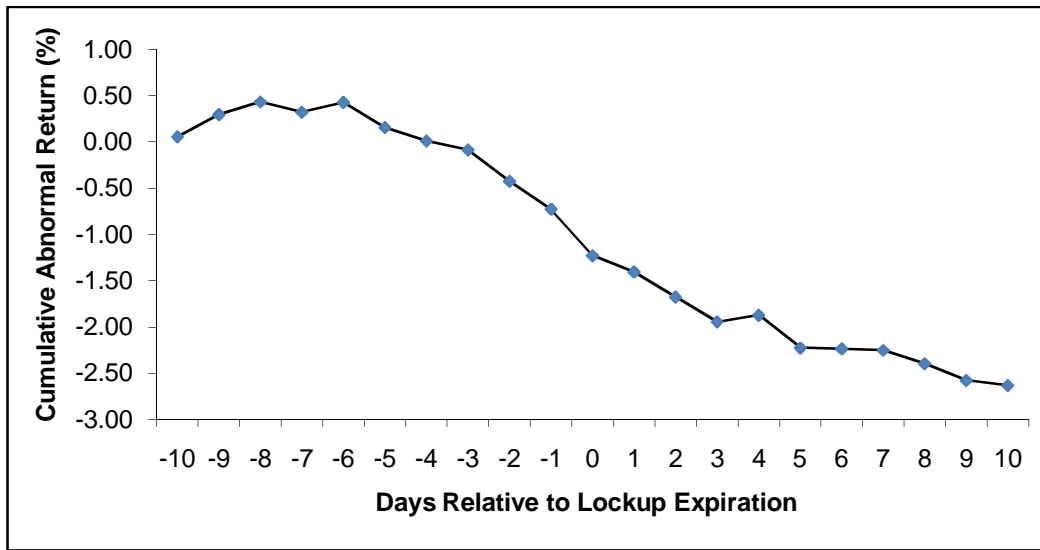**Cumulative Abnormal Returns around lockup expiration**

Figure 2
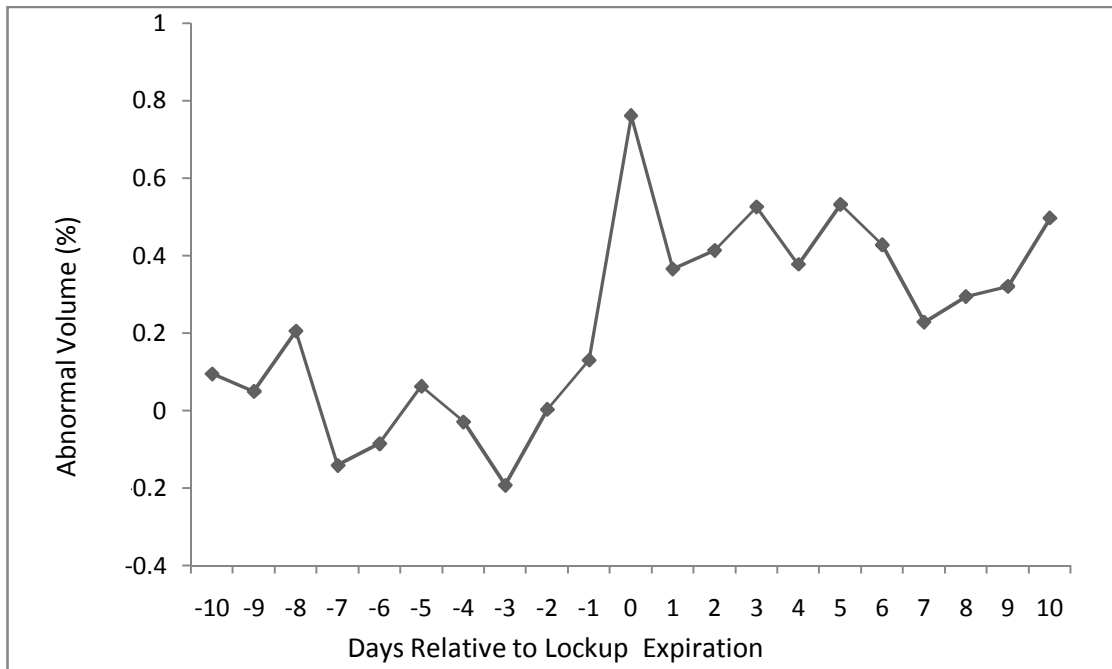**Abnormal Volume Around Lockup Expiration**

Table 9
Abnormal Returns around lockup expiration

Days relative to lockup expiration	AR (%)	t-statistics	Percent Negative	CAR (%)	t-statistics
-10	0.05	0.34	57.6	0.05	0.34
-9	0.24	1.54	55.8	0.29	1.87
-8	0.14	0.88	47.1	0.43	2.75
-7	-0.11	-0.72	55.5	0.32	2.03
-6	0.11	0.68	49.8	0.43	2.71
-5	-0.27	-1.73	59.5	0.15	0.99
-4	-0.15	-0.94	51.4	0.01	0.05
-3	-0.10	-0.61	52.1	-0.09	-0.56
-2	-0.34	-2.15	52.6	-0.43	-2.71
-1	-0.30	-1.93	53.8	-0.73	-4.64
0	-0.50	-3.20	57.6	-1.23	-7.84
1	-0.18	-1.12	55.8	-1.41	-8.96
2	-0.27	-1.72	51.4	-1.68	-10.68
3	-0.27	-1.71	55.2	-1.94	-12.39
4	0.07	0.45	52.7	-1.87	-11.94
5	-0.35	-2.25	57.7	-2.23	-14.19
6	-0.01	-0.05	52.1	-2.23	-14.24
7	-0.02	-0.10	46.9	-2.25	-14.34
8	-0.14	-0.92	50.0	-2.39	-15.26
9	-0.18	-1.15	54.3	-2.58	-16.42
10	-0.06	-0.36	54.1	-2.63	-16.78

Abnormal return and Cumulative abnormal returns around lockup expiration. The sample is 831 IPOs over the period 1999-2006. The benchmark return is FTSE All Share Price Index for main market companies and AIM All Share Price Index for AIM companies.

Table 10
Regression Results for Cumulative Abnormal Returns around Lockup Expirations

Constant	-0.88[-1.68]
Abnormal return Prior to lockup expiration above median abnormal return	1.71[2.20]*
Log of Market Value of Equity (£ 2008 Million)	0.01[1.36]
Price-to-book ratio	0.02[0.03]
Venture Backed?	-1.07[-0.69]
Prestigious Underwriter?	0.05[0.60]
Institutional Presence?	-0.86[0.99]
Percent of Post-IPO insider shares locked	-0.03[-2.51]*
Percent of the company shares issued in the IPO	0.04[2.65]**
Cash Flow Margin	-0.01[-1.15]
Firm's Stock price volatility	-0.53[-2.27]*
Insiders Sell Early?	0.96[1.02]
Insiders Buy before Lockup expiration?	-2.18[-2.85]**
High-tech Dummy	-0.50[-0.40]
Adjusted R^2	3.14

The dependent variable is Cumulative abnormal return from -2 to +2 around the lockup expiration date. A dichotomous variable taking the value of 1 if the cumulative abnormal return since the offering was higher than median abnormal return. Prestigious underwriters are a dummy variable taking a value of 1 if global underwriter was the underwriter for the float. . Institution as a substantial shareholder is a dummy variable and means whether there are any institutional investors who hold more than 3% share at the time of IPO venture backed is dummy variable taking value of 1 if venture capitalist is present. Log of market value of equity is the market capitalisation in 2008 constant terms. Percntage of Post-IPO insider shares locked are the fraction of insider shares that are subject to lockup restrictions. High-tech dummy taking the value of one if the company belongs to the following industry: computer manufacturing, electronic equipment, computer and data processing services, optical, medical and scientific equipment. Insider Sell early is a dummy variable taking the value of 1 if insiders sell prior to lockup expiration. Insiders buy early is a dummy variable taking the value of 1 if insiders buy before lockup expiration. Stock price volatility is measured as standard deviation of the daily returns of the firms abnormal return in the period beginning one day after IPO and ending 11 days before lockup expiration. To eliminate the possible effect of outliers, for each variable, we replace observations whose values are either lower than the 1st or higher than 99th percentiles by the sample median. t statistics are in the brackets.