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Essays in Corporate Equity Transactions

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Abstract

This dissertation presents two essays dealing with corporate equity transactions. The first essay concerns an equity issuing transaction, the initial public offering (IPO), and specifically lockups, which restrict sales by pre-IPO shareholders. We improve upon the methodology for testing theory related to lockup length through the use of a multinomial logit as well as explore the reasons for and implications of multiple lockup agreements. We find that multiple lockups are associated with dual class equity structures, high book-to-market values, and more secondary shares offered. Offerings that include multiple lockups are more likely to deviate in (weighted average) length from the typical 180 day lockup term. Additionally, we are the first to associate lockup decisions with long run stock performance.

The second essay addresses a corporate equity reducing transaction, the accelerated share repurchase (ASR). In an ASR, the repurchasing firm receives substantially all of the shares subject to the repurchase immediately instead of over a longer period of time as in an open market repurchase (OMR). In this second essay, we investigate whether the immediacy of the ASR allows the firm to increase earnings per share by distributing earnings over fewer shares, and indeed we find that firms that would be expected to fall two or more cents shy of median earnings expectations are very significantly more likely to elect an ASR as compared to an OMR. In contrast, those firms that would be expected to exceed earnings by two or more cents are weakly significantly less likely to elect an ASR. Further, the form of repurchase does not impact earnings performance in the four quarters subsequent to a repurchase. Despite the higher abnormal returns associated with the announcement of an ASR, the market does

not appear to be able to tell at the time of announcement whether the repurchase is manipulative. In the long run, manipulative repurchasers perform more poorly than non-manipulative repurchasers, but perform better than those firms that miss expectations.

Chapter 1. Introduction

1.1 Initial Public Offerings

While firms are able to generate equity financing through sources such as the founders, angel investors, and venture capital, the general public cannot contribute equity capital until the firm conducts it's initial public offering (IPO). The decision to undertake an IPO brings with it a number of potential benefits to the firm beyond the obvious benefit of raising capital although that is certainly a major consideration. Being publically traded allows the firm to establish a market value for its shares, allows pre-IPO insiders to diversity their holdings by selling firm shares in a more liquid public market, drastically increases the ownership base of the firm, permits pre-IPO investors to cash out and realize a return on their early investment, and eases future acquisitions among other reasons. In their survey of CFOs of IPO firms, Brau and Fawcett (2006) find that the desire to ease future acquisitions is the most important motivation for IPO with establishing a market value as the second greatest reason, and firm reputation enhancement is the third most compelling reason for going public.

However, an IPO is not without its costs. Beyond the direct costs paid to underwriters; in going public, the firm must conform to the additional legal requirements for a public firm, which represents an ongoing cost for the firm. Also, there are the opportunity costs required of the time spent by management in navigating the IPO process. Additionally, public firms must make periodic disclosures that are not required of a private firm, which could potentially relay valuable information to competitors.

The cost of IPO that is perhaps most extensively covered in the literature is that of IPO underpricing. IPO underpricing, the difference between the IPO offer price and

the first day's closing price, averaged 18.8% over the 1980-2001 period although this figure varies over time (Ritter and Welch, 2002). This underpricing essentially represents money left on the table by the issuing firm. Had the offer been priced at the price at which the shares closed, the firm would have received a substantially greater infusion of capital.

A number of possible explanations for this underpricing have been proposed. Rock's (1986) "winner's curse" posits that two broad classes of investors exist, informed and uninformed investors. In his model, there are too few informed investors to fully subscribe to an offering. In overpriced offerings, informed investors will shy away from buying leaving the uninformed to purchase all the shares. In attractive (underpriced) offerings, informed investors will bid for shares, reducing the allocation available for the uninformed. The uninformed investors will receive a large allocation of poor offerings while their allocation of good offerings is relatively sparse creating negative returns for the uninformed. As such, offerings must on average be underpriced to allow the uninformed to at least break even and ensure their continued participation in the IPO markets.

Alternatively, IPO underpricing may be a mechanism by which investors are incented to reveal their private information regarding the issuing firm's value. In Benveniste and Spindt (1989), the book building process in which the offer's underwriter devises an initial price range and gauges interest from potential investors can help with this information production. Firms with relatively low bids are allocated fewer shares than those that bid at the top of the range or higher. In this manner, firms whose private information leads them to believe the offering to be worth more are incentivized to

reveal this information through aggressive bidding to receive a larger allocation. Still, the offering must be underpriced for this information revelation mechanism to be incentive-compatible to investors.

Signaling is yet another possible information asymmetry based explanation for the underpricing phenomenon. In Welch's (1989) version, firms have superior information regarding their value. High value firms underprice their IPO as a signal of quality to investors so that the firm can obtain favorable pricing in future equity offerings. When combined with imitation costs, the costs of underpricing induce low quality firms to self identify. Chemmanur (1993) also gives a signaling based explanation for underpricing. In his formulation, high and low quality firms are pooled. However, high quality firms underprice to compensate investors for their information production costs. This information production then leads to higher valuations for further offerings by the high quality firms.

Moving away from information-based explanations, the allocation of shares to either encourage or discourage monitoring by outside shareholders has been given as a reason for underpricing. Stoughton and Zechner (1998) propose that underwriters ration shares to individuals on behalf of the issuer so that the firm captures the benefits of improved monitoring by institutional investors. In contrast, Brennan and Franks (1997) find that underpricing is used to ensure oversubscription, allowing the firm to ration shares and reduce the block size of new shareholders. As such management is less susceptible to outside monitoring and changes in control.

In an IPO two types of shares can be offered. The first type, primary shares, is issued by the firm itself with the proceeds from sale accruing to the firm. In contrast,

secondary shares are sold not by the firm but by pre-IPO shareholders. As such, the shareholder receives the value of these shares and the capital of the firm is not increased by their sale. Over the period 1980-2001, 56.6% of offerings were purely primary offerings while the rest contain secondary shares. Of those offerings with secondary shares, the average offering was 72% primary shares (Brau et al., 2007).

Field and Hanka (2001) find that over the period from 1988-1997, 33% of the post IPO shares are sold in the offering leaving over two-thirds of the post IPO shares in the hands of pre-IPO shareholders. As such, it is common for the IPO underwriting agreements to contractually prohibit many of these pre-IPO shareholders from selling these shares for a specified amount of time. These agreements, called lockups, are the focus of our first essay.

1.2 Payout Policy

The ways in which the firm distributes its free cash flows (FCF), that is those cash flows generated from operations that exceed those funds reinvested in the firm, form the basis of the payout policy decision and its corresponding literature. Miller and Modigliani (1961) presents the famous dividend irrelevance proposition. Under the assumptions of perfect markets, rational behavior, and perfect certainty, the authors demonstrate that payout policy has no bearing on firm value, “given investment policy”. In this setting, for a given level of investment, total payout for a period is simply equal to the period’s FCF. While this analysis presents a convenient result, the assumptions needed to achieve this convenient conclusion are quite restrictive and not reflective of the prevailing circumstances of the non-theoretical world. If for instance, management were to choose to exchange dividends for sub-optimal investments or to fail to render

the full FCFs to shareholders, firm value is impacted by these payout policy decisions (DeAngelo, DeAngelo, & Skinner, 2008).

The introduction of asymmetric information further complicates the payout decision. Under the framework of Myers and Majluf (1984), firm managers hold superior information relative to outside investors, and this super knowledge is known by both managers and investors. This information asymmetry creates the famous "pecking order" in which internal financing of investment opportunities is preferable to external financing. This preference for internal financing would indicate a need for the firm to not fully payout FCF as realized as in Miller & Modigliani but to retain "slack" to fund future positive net present value (NPV) opportunities.

Unfortunately, Jensen (1986) challenges the wisdom of cash retention due to the agency conflict between investors and management. Because management doesn't fully bear the costs of sub-optimal decision making, it can be to their benefit to engage in activities such as empire-building or the taking of perquisites. In this case, paying out FCF through dividends or repurchases reduces the ability of management to mismanage the firm's funds and reduce shareholder value.

However, Jensen argues that debt is a more effective disciplinary mechanism than payout policy because dividends are not an obligation as are interest payments and are subject to reduction at management's discretion. In contrast to this perceived weakness of payout policy, dividends are notoriously sticky. Lintner (1956) notes that the dividend decision begins with whether a change to the previous dividend is desirable. Only after the desirability of a change is determined is the rate of change decided. Brav et. al (2005) report that, in their survey of chief financial officers and

treasurers, 94% of firms try to avoid dividend reductions while 90.1% try to maintain a smooth stream of dividends.

Given the professed tendency to avoid dividend reductions, it may seem counter-intuitive that 66.5% of firms in 1978 paid dividends while only 20.8% of firms were dividend payers in 1999 (Fama & French, 2001). Fama and French attribute this overall decline in dividend payers to two primary factors. First, following 1978, there is a large number of new listings of the firms which are characteristic of non-dividend payers (i.e. small, low earnings, and/or high growth opportunities). Additionally, firms that have never paid dividends become less likely to being doing so after 1978.

While dividends were once the preeminent payout method, share repurchases became much more prominent in the 1980's. Grullon and Michaely (2002) report that repurchase expenditures grew from 4.8% of earnings in 1980 to 41.8% in 2000. They posit that firms began to use repurchases as a substitute for increases in dividends. Jagannathan, Stephens and Weisbach (2000) link the repurchase decision to the permanence of the cash to be returned to shareholders. More sustainable operating cash flows tend to be returned in the form of dividends while temporary cash flows are paid out through repurchase, which reflects the contrast in the stickiness of dividends and the flexibility offered by open market repurchases. These open market repurchases have tended to be the dominant method of repurchase (Peyer & Vermaelen, 2005); however, beginning in the early 2000's, a relatively new form of repurchase, the accelerated share repurchase, began to gain importance. It is this newer form of repurchase and more specifically its potential ability to affect earnings per share that we explore in the second essay.

Chapter 2. Initial Public Offering Lockups

2.1 Introduction

When a firm makes a public equity offer, the underwriter of the offer typically requires certain existing shareholders to refrain from selling their shares or securities that can be converted into shares or entering into a transaction which would in effect do so for a specified period of time following the equity issuance. These agreements between firm insiders and underwriters, lockups, are extremely common with Karpoff, Lee, and Masulis (2013) finding that over the 1996-2006 period 96.6% of initial public offerings (IPOs) include a lockup provision while 93.8% of seasoned equity offerings (SEOs) over the period include the feature. In our sample spanning 2000-2012, all firms that met our screening requirements included a lockup agreement. For IPOs, information regarding the number of shares subject to the lockup agreement is usually disclosed in the prospectus under the section “Shares Eligible for Future Sale” while more specific information about the nature of prohibited activities can normally be found in the prospectus’s “Underwriting” section. Appendix A contains excerpts from prospectuses demonstrating the disclosure of lockup agreements.

The vast majority of IPOs have a single lockup whose length is 180 days from the IPO issue. For our sample, as shown in Table 2.1, 88.1% of firms have a single lockup while 95.8% of firms include a 180 day lockup. 96.0% of single lockup firms have a 180 day lockup and 94.1% of multiple lockup firms include a 180 day length for one of their lockups. However, because these lockups are the result of contracting

Table 2.1: Distribution of Sample Observations by Number of Lockups and Lockup Length

	Sample	Single Lockup		Two Lockups		3 or More Lockups		<170 days		170 - 190 days		>190 days	
2000	297	265	89.2%	20	6.7%	12	4.0%	14	4.7%	271	91.2%	12	4.0%
2001	54	48	88.9%	4	7.4%	2	3.7%	2	3.7%	49	90.7%	3	5.6%
2002	53	48	90.6%	4	7.5%	1	1.9%	0	0.0%	50	94.3%	3	5.7%
2003	63	57	90.5%	5	7.9%	1	1.6%	0	0.0%	57	90.5%	6	9.5%
2004	148	128	86.5%	19	12.8%	1	0.7%	4	2.7%	133	89.9%	11	7.4%
2005	141	104	73.8%	29	20.6%	8	5.7%	7	5.0%	116	82.3%	18	12.8%
2006	130	106	81.5%	16	12.3%	8	6.2%	3	2.3%	112	86.2%	15	11.5%
2007	131	123	93.9%	7	5.3%	1	0.8%	8	6.1%	115	87.8%	8	6.1%
2008	18	18	100.0%	0	0.0%	0	0.0%	0	0.0%	18	100.0%	0	0.0%
2009	37	33	89.2%	2	5.4%	2	5.4%	0	0.0%	33	89.2%	4	10.8%
2010	78	76	97.4%	1	1.3%	1	1.3%	1	1.3%	73	93.6%	4	5.1%
2011	66	62	93.9%	3	4.5%	1	1.5%	2	3.0%	62	93.9%	2	3.0%
2012	75	70	93.3%	2	2.7%	3	4.0%	3	4.0%	70	93.3%	2	2.7%
Total	1,291	1,138.00	88.1%	112	8.7%	41	3.2%	44	3.4%	1,159	89.8%	88	6.8%

This table reports the number and percentage of observations yearly by number of lockups and length of lockup where, for multiple lockup length, overall length is determined by an average of length weighted by number of shares released at each lockup. Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds.

between issuers and underwriters and are not due to legal or regulatory requirements, those shareholders subject to the agreements can be released from the lockup early if the underwriter consents. Brav & Gompers (2003) find that this early release occurs about 15% of the time. These lockups affect a substantial number of shares with a mean (median) of 81.8% (72.1%) of post-offer shares being subject to the lockup provision. In nearly all cases, the firm's executives and directors are subject to the lockup provisions.

Additionally, the ability of the pre-IPO shareholders to sell their shares is further restricted by the Securities Exchange Commission (SEC). Because the shares held prior to the IPO (other than those sold as secondary shares in the offering) have not been registered with the SEC, they are subject to the limitations of Rule 144, which imposes several constraints on the sale of unregistered shares. Among these constraints is a one year holding period, volume limitations and disclosure to the SEC of sales of greater than 500 shares or $10,000 for affiliates[1], and the issuing firm's compliance with reporting requirements. These reporting requirements create what is essentially a 90-day lockup for those pre-IPO shareholders even if they meet the holding requirement at the time of the IPO.

Two primary possibilities, both rooted in information asymmetries, have been proposed to explain the existence of these lockups. Brau, Lambson, and McQueen (2005) argue that lockups are a response to adverse selection and are used as a costly

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1 An affiliate is someone such as an executive, director, or large shareholder who is in a position of control with the issuing firm. For these shareholders, they are limited to sales in any given three month period which do not exceed the greater of either 1% of the shares outstanding or the average weekly trading over the four weeks preceding the sale.

signal of the underlying firm quality with managers of good quality firms willing to take on longer lockups so that the true quality of their firm is more likely to be revealed prior to lockup expiration. On the other hand, Brav and Gompers (2003) conclude that their results support the idea of the lockup as a commitment device designed to mitigate the moral hazard presented by the agency problem. Because the firm has taken on outside investment, management nolonger bears the full cost of any decisions made that are not value maximizing such as empire building, avoiding risky positive NPV projects or using perquisites. By preventing management from selling their holdings in the firm, the lockup ensures that management at least shares in the costs of this sub-optimal behavior and is therefore less likely to exhibit such behaviors.

2.2 Literature Review

The bulk of the extant lockup literature falls under one of two topics: the first being the market reaction to lockup expiration while the second concerns the motivations behind differing lockup length arrangements. Field and Hanka (2001) is perhaps the seminal paper regarding IPO lockup agreement expiration. In this paper, the authors explore the market's reaction to lockup expiration as well as some possible explanations for those reactions. For their sample spanning 1988-1997, they find a significant average 5 day cumulative abnormal return of -1.9%. Bradley et. al (2001) note a similar 5 day CAR of -1.61% which is persistent through the following 30 days.

After splitting the sample into VC financed and non-VC financed firms, Field and Hanka (2001) find that both return and volume effects are much stronger in the VC sample with abnormal returns that are roughly 3 times greater in magnitude and trading volumes that are 5 times greater than that of the non-VC sample. These effects are

consistent with their finding that venture capitalists exit the firm more aggressively than other insiders, which is based on a comparison of immediate post IPO holdings with holdings 1 year post IPO. Bradley et. al (2001) focuses primarily on this VC effect and note that the drop for VC firms is about 4 times greater than that of non-VC firms. They also find that returns are worse for firms in high tech industries (as classified by SDC); however, the VC effect still persists among firms in these industries. The authors notice a trend towards the standardization of the 180 day lockup and find that for the median firm 63.3% of post IPO shares are locked up with the 25th percentile having 51.6% locked up. Consequently, over 75% of firms have the potential for a doubling in the number of shares available upon expiration.

Additionally, in decile sorts firms with the strongest post IPO performance experience the poorest performance upon lockup expiration while the firms with the worst post IPO performance are the least affected by the lockup expiration effect. They find a significant increase in volume upon lockup expiration with the effect being much stronger in VC backed firms, which is similar to the finding by Field and Hanka that trading volume spikes significantly on the day following lockup expiration to a level that is 80% above pre-unlock volume that then falls to a level that is 40% higher where it remains for the remainder of their 50 day event window. Bradley et. al notes that this increase in trading volume is also related to the extent of the return drop.

Garfinkle et. al (2002) find similarly negative abnormal returns and increases in trading volume upon lockup expiration using a 3 year sample that includes only 180 day lockups. Interestingly, they note negative returns in advance of the lockup expiration, which would seem to indicate an anticipation of the lockup drop.

When exploring explanations for their findings, Field and Hanka consider several possibilities including a bid-ask effect induced by insiders submitting sell orders executed at the bid. However, the evidence does not support this reasoning as both the bid and ask prices experience permanent parallel drops following expiration. Based on the permanent nature of the price drop, they also rule out temporary price pressure as the cause of the observed negative returns. Similarly, they rule out an increase in trading costs based on the parallel nature of the bid and ask price drops. Due to the evidence, they conclude that the negative abnormal return is due in part to downward sloping demand curves; however, they find that firms whose trading volumes represent less than 1% of the publicly available shares also experience negative returns at unlock which indicates that downward sloping demand curves are not solely responsible for the price drop. As a final possibility, the authors look to insider sales. Those firms with insider sales around the unlock date experience worse returns than those firms without insider sales indicating that the lockup expiration return behavior may be due in part to worse than expected insider sales; however, those firms without insider sales also experience significantly negative returns indicating that this does not fully explain the phenomenon.

Ofek and Richardson (2000) use lockup expiration as a setting in which to explore downward sloping demand curves. They document a decline in price at lockup expiration and explore possible explanations including bid-ask bounce, liquidity effects, and biased expectations of supply shocks. They find little support for any of these explanations noting that liquidity increases upon expiration which is inconsistent with liquidity effects being the driver of the returns. Also, the price effect seems permanent

and transactions are fairly evenly split between the bid and ask prices which does not support a bid-ask bounce effect. They find that the price effect is consistent throughout time which is inconsistent with biased expectations. The authors also document that an increase in short interest is associated with a larger drop in price and that an increase in the standard deviation of earnings estimates, which they take as a demand curve variable, is associated with more strongly negative return reactions at lockup expiration.

The second major strand of literature is related to the underlying reasoning behind lockups and more specifically the length of the lockup agreement. Brav and Gompers (2003) explore the motivations behind the existence of lockup agreements. The authors pose three possible explanations for the existence of lockups: a signal of quality, a commitment mechanism, a way for underwriters to extract additional compensation. Their evidence indicates that firms with VC backing, quality underwriters, secondary sales, and high cash flow margins have shorter lockups while firms with low book-to-market ratios have longer lockups. They claim these findings support their commitment device hypothesis and the shorter lockup length associated with underwriter reputation is in opposition to the compensation extraction hypothesis.

To test the signaling hypothesis, the authors examine price revisions, SEOs, and dividend initiation. They find that firms with shorter lockups have more positive price revisions, have a higher probability of further offerings, and more often initiate divisions which they believe refute the signaling hypothesis. Brav and Gompers conclude the evidence supports the commitment device hypothesis and rejects the other two possibilities.

However, Brau et. al (2005) refute the earlier criticisms of Brav & Gompers of the lockup as a signaling device and claim that the evidence the earlier authors found in support of the commitment hypothesis could also be supportive of the lockup as a signal. The authors develop a formalized signaling model of the IPO lockup from which they generate and test several implications.

They find that larger firms (by revenue) have shorter lockups and that SEO lockups tend to be shorter than IPO lockups. Since there should be less informational asymmetry for already public firms, the authors argue there is less need for the lockup signal; as such, the SEO lockup should be shorter. Further, investment funds and regulated utilities, which would be easier to value, have shorter lockups. Firms whose quality has been certified by a reputable underwriter or large auditor have a shorter lockup length. Additionally, higher idiosyncratic risk leads to shorter lockups as predicted by the model; however, this result is only significant at the 10% level. The intuition here is that high idiosyncratic risk would impose a higher cost through lack of diversification on bad firms mimicking good firms.

Arthurs et. al (2009) also explores the use of lockup period length as a signal of quality, but in their context it is a signal when other, more preferable signals such as VC backing or a reputable underwriter are not available. They find negative relationships between VC backing & underwriter reputation and lockup length, a positive relationship between lockup length and the existence of a going concern issue, and finally find that a longer lockup period when combined with the existence of a going concern issue can reduce underpricing.

On the other hand, Yung & Zender (2010) attempt to synthesize the two competing potential sources for lockups, commitment device or signal, by creating a bifurcated sample. One group consists of firms for which asymmetric information is the dominant issue attempting to be remedied by the lockup. The other group's use of the lockup is driven by the moral hazard problem. To split the sample, they use firm size and underwriter reputation as proxies for asymmetric information.

Consistent with their hypotheses, they find a positive correlation between lockup length and underpricing for the asymmetric information subsample but not for the moral hazard sample. They also find a negative correlation between lockup length and insider holdings for the moral hazard sample. For the asymmetric information sample, volatility (the proxy for asymmetric information) is positively correlated with lockup length but is not significant for the moral hazard sample. From CFO's perspectives the lockup period is viewed as a relatively important mechanism to align management's interests with those of shareholders. (Brau & Fawcett, 2006)

Chen et. al (2012) attempt to attribute the motivations for insider sales in the 6 months following lockup expiration to one of two hypotheses, portfolio diversification or informative selling. In general, they find that sales by top executives have negative informational content in contrast to sales by other insiders which are more consistent with portfolio diversification.

In most studies of IPO lockups, a number of screening criteria are used to craft the sample. As such penny stocks and REITS are excluded from the analysis. Two papers focus explicitly on these topics. Bradley et. al (2006) considers the issues of lockup length, underpricing, initial returns, underwriter fees, and long run performance

of penny stocks. They find that penny stock IPOs have longer average lockup periods, but 19% of penny stock IPOs have lockups of 180 days or less compared to 86% for ordinary IPOs. As is typical, VC backing and underwriter reputation mitigate lockup length somewhat.

Chen et. al (2011) explore the nature of lockup agreements in the context of REIT IPOs and find that lockup lengths tend to be longer than that of industrial IPOs with an average length of 325 days. They do note a trend towards convergence towards the 180 day lockup with 14% prior to 1997 having a 180 day lockup whereas 68% had a 180 day lockup over the 1997 to 2006 period. As explanation, they offer the possibility of a learning curve where, during the development of the REIT structure, the lockup was used as a sign of commitment. They also find that self-managed REITs have a longer lockup than externally managed. Additionally, they do not find, in general, a significantly negative market reaction to expiration of the lockup.

The role of Rule 144 garners attention by Anderson & Dyl (2008) who try to explain why NYSE eligible firms would instead choose to list on the Nasdaq. They find that VC backing and post-ipo sales of restricted shares are the most likely reasons for an NYSE eligible firm to instead choose Nasdaq because of the way in which trading volume is determined for each exchange with the double counting of trades in the Nasdaq dealer market allowing for higher volumes from which to calculate the number of restricted shares that are allowed to be sold under SEC rule 144. For the average Nasdaq firm, the 1% option is the binding constraint 19% of the time while it is the binding constraint 41% of the time for the average NYSE firm.

The expiration of lockup agreements is also used as a setting to explore other issues in finance. Cao et. al (2004) investigates the impact of insider trading upon market liquidity. They note that 23% of firms report sales by insiders within the month after lockup expiration with the bulk of these sales coming from executives who account for two-thirds of the sales. For these firms, spreads actually decrease following lockup expiration.

2.3 Hypothesis Development and Empirical Design

2.3.1 Hypothesis Development

Based on previous work in the area of IPO lockups, we can develop several hypotheses to guide our exploration of lockup determinants and subsequent market performance of the issuing firms. Brav & Gompers (2003) and Brau et. al (2005) offers some concrete predictions about those variables, which might influence the chosen length of the lockup. Following the former, we should expect young firms, more volatile firms, and low book-to-market firms to have longer lockups. According to Brau et. al, we should expect firms suffering from greater information asymmetry and those with lower idiosyncratic risk to compensate by locking up shares for a longer period of time. Unfortunately, testing this assertion is complicated by the prevalent use of idiosyncratic risk as a proxy for asymmetric information (see for example, Moeller et. al (2007)).

Other factors may lead us to expect firms to either differ from or conform to the typical lockup length of 180 days. As noted by Field and Hanka (2001), venture capitalists, in general, wish to distribute shares to their investors as soon as is possible. As a result, we would expect VC backed firms to favor shorter lockup periods. However, with a staged lockup, true firm insiders could be locked up for the typical 180

days or even longer while allowing simple finance providers such as VCs to exit quickly. As such, we would expect to see a higher incidence of multiple lockup use by VC backed firms. Alternatively, as underwriting contracts have become more standardized over time, we would expect firms utilizing more reputable, powerful underwriting to concentrate at the more standard 180 day, single lockup arrangement. If the lockup acts as a commitment device for firm executives, we could also expect a difference in behavior for those firm's with multiple equity classes. Typically these multiple classes are used to confer greater voting power to firm management and founders. We could expect that firms with voting privileged insiders would me more likely to use multiple lockups so that those insiders who have already been given a privileged voting status would be asked to commit to maintaining that power.

After looking at the possible determinants of length and number of lockup provisions, we next turn our attention to the market impact of their release. As Miller (1977) notes, the assumption of homogenous expectations might make for a compelling pricing model as in the capital asset pricing model, but the assumption itself is often not a realistic one. He goes on to demonstrate that when expectations about the future performance of a stock diverge, the demand curve for the stock's shares is downward sloping. The extent of this slope is attenuated by the level of uncertainty concerning the stock's true value; as such, we should expect a greater decline in share price at lockup expiration for those firms suffering from greater information asymmetry. In the presence of downward sloping demand curves, we should also expect that those firms that experience greater sales by pre-IPO shareholders would have poorer event returns upon lockup expiration. Accordingly, those firms with VC backing and those with the

greatest abnormal volume upon lockup release should perform relatively worse than their counterparts.

2.3.2 Empirical Design

We test for election of multiple lockups using a logit regression in which the dependent variable takes a value of 1 if the firm employs multiple lockups and 0 otherwise. Because most firms with more than one lockup use only 2 lockup expiration dates, we treat all multiple lockup firms equally rather than treating them differentially and running a multinomial logistic regression. We include a number of possible explanatory variables in the various regression specifications including three measures of information asymmetry. The first is simply the number of analysts covering the firm. The other two measures, forecast error and forecast standard deviation, are based on the accuracy of these analysts predictions of earnings per share. We also include firm age from Jay Ritter, a measure of volatility, an indicator for the presence of venture capital backing, the book-to-market ratio, the percent of the offering that is primary shares, an indicator for multiple classes of equity, offer underpricing, lead underwriter rank, leverage, an indicator for firms in high tech industries, the average bid ask spread, and three possible measures of size: total assets, offer size, and the market value of equity. We include annual fixed effects and utilize robust standard errors.

When investigating the length of the lockup, we diverge from the extant literature somewhat. Instead of using ordinary least squares as do Field and Hanka (2001) or a tobit regression as in Brau et. al (2005), we use a multinomial logit regression with a value of 0 if the lockup is short, 1 for typical length lockups, and 2 for long lockups. To determine the lockup length, we calculate the average lockup length using the

percentage of locked up shares subject to the lockup as a weighting mechanism. Lockups with a weighted average length less than 170 days are classified as short; those lockups with a weighted average length longer than 190 days are classified as long, and those with a length between 170 and 190 days are classified as typical. We employ this methodology because of the vast majority of lockups are at 180 days. Those that do differ from this that are shorter tend to cluster at 90 days, while longer lockups tend to cluster at 9 months and 12 months. Our treatment allows us to test those effects that result in the election of a shorter or longer lockup without necessarily needing to draw a distinction between a 90 day average lockup and a 95 day average lockup, for instance. We again include annual fixed effects and employ robust standard errors in our regressions.

To determine the reaction upon lockup expiration, we employ standard event study methodology with cumulative abnormal returns (CARs) of 41, 21, 11, 7, 5, and 3 days in length centered about the lockup expiration event. Abnormal returns are calculated each day as the market model residual using the CRSP value-weighted index as the market proxy. Parameters for the model are determined using a 40 day runup period that extends from 60 days prior to the event to 21 days prior. Additionally, we determine daily abnormal volume during these same event windows as the ratio of the day's volume to the average volume over the 40 day pre-event runup period.

We regress the 3 day CARs on a number of potential explanatory variables from the extant literature including the abnormal volume (AVOL), a venture capital indicator, a high tech firm indicator, a New York Stock Exchange Indicator, the stock runup prior to expiration, the underwriter rank, and the percent of shares subject to lockup using an

ordinary least squares regression. We also include indicators for lockup length, whether the lockup is the second lockup, or is the third or subsequent lockup, variables potentially related to the lockup decision including firm age, analyst coverage, and volatility as well as controls for size, leverage, and asset composition. We first perform this regression using all lockups then using only the largest (by number of shares locked up) for each firm. Finally, we replace the CAR as the dependent variable with the abnormal volume, and include the 3-day CAR as an independent variable. We run the same regressions as with the 3-day CARs using all lockups then the largest lockup. For all of these regressions, we use annual fixed effects and robust standard errors.

When constructing the long-term buy and hold return (BHAR) performance measures for the issuing firms, we nominally follow the methodology of Loughran and Ritter (1995) by matching the issuing firm to a non-issuing firm to serve as a reference. However, we change some of the specifics of the matching process to more closely reflect the process currently used by Ritter to produce his more recent long run performance measures. For the size matched BHARs, the market value for the non-issuing firms is determined at the end of each month while the market value for the issuing firms is taken on the date of their first appearance in CRSP. On this date, the issuing firm is matched to the next largest firm. If the matched firm is delisted, the issuing firm is then matched to the next largest firm. For the book-to-market matching, size deciles are determined based on NYSE firms at the end of each month. Each issuing firm with a positive book-to-market value is then matched to the firm in its size decile that has the closest book-to-market value. Again, should the matched firm be delisted, the match is replaced by the firm in the issuer's size decile with the next

nearest book-to-market value. For those issuers with zero or negative book-to-market values, the match is the non-issuing firm closest in size that also has a zero or negative book-to-market ratio. In all cases, matching firms must have at least 5 years of return data, must not have issued equity within the past 5 years, and must have a single class of stock outstanding to be an eligible match.

2.4 Data and Sample Selection

2.4.1 Sample Construction

To construct our primary sample, we start with the SDC Platinum New Issues database and pull all US IPOs with a prospectus date between January 1, 2000 and December 31, 2012. These offerings are then subjected to an initial screening with non-original IPOS, unit offerings, ADRs, REITS, mutual to stock conversions, spinoffs, non-common stock offerings, and offerings priced below five dollars removed from the sample leaving us a sample with 1291 observations. From SDC we obtain the IPO date, presence of venture capital (VC) backing, offering price, and offer size.

We next turn to the Securities and Exchange Commission's (SEC) Edgar system to hand collect lockup expiration information from the IPO prospectuses, filing 424B. The required information is most often found in the prospectuses' "Shares Eligible for Future Sale" section; however, the "Risk Factors" section sometimes contains additional information about the number of shares subject to lockup. In the most opaque of prospectuses, only the categories of shareholders subject to lockup are given, and an estimate of the number of shares locked up must be constructed from the disclosed shareholder ownership numbers. Although SDC provides information for number of lockups, time to lockup expiration, and number of shares released, some discrepancies

between the prospectuses and SDC information have been noted in the literature. Most importantly for our sample, many of the observations from the year 2000 which were flagged as not having a lockup did indeed contain provisions for one or more lockups. These observations were corrected after reviewing the issuers' prospectuses. Other variables were obtained from a variety of sources. Accounting statement information such as the value of the firm's assets, cash holdings, leverage, net income, and the book value of equity and expenses for research and development and capital expenditures was obtained from Compustat. Analyst information including the number of analysts covering a firm, the forecast error, and the forecast standard deviation comes from Thomson Reuters I/B/E/S. The high tech variable is constructed based on firm SIC code according to Cliff and Denis (2004). Additionally several variables were taken from the website of Jay Ritter[2] including issuer age at the time of the offering, an indicator for firms with multiple classes of stock, and rankings for the issuers' lead underwriters. These underwriter rankings follow the methodology of Carter and Manaster (1990) and Carter, Dark, and Singh (1998) but are updated to cover the later time period needed for our study.

2.4.2 Descriptive Statistics

Table 2.2 lists descriptive statistics. Firms that include a single lockup agreement tend to be larger than those including multiple lockups with mean (median) total assets of $853.8 ($74.5) million versus $550.1 ($59.0) million for multiple lockup firms. Additionally, their capital structure that is more heavily debt financed as indicated by the higher leverage and lower book value of equity than that of their multiple lockup

[2] http://bear.warrington.ufl.edu/ritter/ipodata.htm

counterparts. Multiple lockup firms tend to have greater cash holdings, use less reputable underwriters, and raise relatively more money in their IPO, which taken with the differences in capital structure, may indicate that these firms have difficulty accessing debt markets. There is relatively little difference between the two firm types with respect to their use of venture capital, but a greater number of single lockup firms are high-tech firms and display greater investments in research and development along with lower investments in capital. Multiple lockup firms tend to have less analyst coverage and, excepting median standard deviation, the analysts tend to be less accurate for multiple lockup firms. Firms with multiple lockups tend to be slightly younger, have a mean book-to-market ratio that is nearly twice that of single lockup firms, and experience greater underpricing. Finally, multiple lockup firms have multiple share classes about twice as often as single lockup firms.

When looking at lockup length, a few trends are noticeable. Firm size as measured by total assets is larger for firms with shorter lockups than longer as are cash holdings and capital expenditures. Short lockup firms also tend towards more reputable underwriters and have greater analyst following though there tends to be more dispersion in these analysts estimates. Despite the certification provided by a well-respected underwriter, short lockup firms experience greater underpricing relative to those firms with lockups of greater length. Firms with lockups around 180 days in length tend toward high tech industries and have the greatest amount of venture capital backing while those firms with long lockups tend to have much less VC backing, which is consistent with the idea that venture capitalists want to be able to distribute to their investors quickly rather than remain locked in to the issuing firm. Firms with a

Table 2.2: Sample Descriptive Statistics

Panel A: Descriptive Statistics by Number of Lockups						
	Full Sample		Single Lockup Firms		Multiple Lockup Firms	
	Mean	Median	Mean	Median	Mean	Median
Total Assets	818.66364	70.746	853.7697	74.493	550.08993	59.037
Cap. Expenditure/Sales	0.07442	0.0426	0.07348	0.04162	0.08136	0.0539
Cash/Sales	0.24137	0.14627	0.23843	0.14011	0.26366	0.18601
Net Income	-0.62947	-1.542	-1.95023	-1.9875	9.36399	-0.295
Sales	356.99879	59.666	355.37726	62.5555	369.26798	38.274
Book Equity	102.93306	21.279	94.35794	21.147	168.53572	23.437
Venture Capital Indicator	0.52595	1	0.5246	1	0.53595	1
High Tech	0.43455	0	0.43937	0	0.39869	0
Return on Assets	-0.32313	-0.01916	-0.32186	-0.01936	-0.33275	-0.00341
Leverage	0.25683	0.0858	0.2665	0.08926	0.18262	0.06667
Research & Development/Sales	0.34993	0.18601	0.36008	0.18669	0.2743	0.17289
Number of Analysts	3.5306	3	3.54218	3	3.44444	3
Analyst Forecast Error	0.53305	0.18634	0.51874	0.18577	0.64908	0.18987
Analyst Forecast Std. Deviation	0.19911	0.06364	0.17095	0.06531	0.44376	0.05319
Firm Age	17.16746	9	17.36673	9	15.66216	8
Dual Share Class Indicator	0.07049	0	0.06327	0	0.12418	0
Lead Underwriter Rank	8.1014	9	8.1469	9	7.76316	9
Underpricing	0.23666	0.1	0.23293	0.09743	0.2644	0.11111
Primary Shares Sold	0.8685	1	0.87356	1	0.8309	1
Book-to-market Ratio	0.12736	0.05831	0.11491	0.05827	0.2225	0.0608
Offering Proceeds	156,476.60	84,000.00	142,686.47	84,000.00	259,046.32	85,500.00
Market Value of Equity	799,785.79	396,299.17	735,096.28	405,912.00	1,280,517.66	340,441.75
Volatility	0.04311	0.03525	0.04309	0.03526	0.04325	0.035

(Table 2.2 continued)

Panel B: Descriptive Statistics by Lockup Length

	Short Lockup Firms		Typical Length Lockup Firms		Long Lockup Length	
	Mean	Median	Mean	Median	Mean	Median
Total Assets	934.3168	98.505	819.69546	71.693	744.05191	53.813
Cap. Expenditure/Sales	0.07878	0.04614	0.07501	0.04322	0.06387	0.03294
Cash/Sales	0.27575	0.19987	0.24558	0.15673	0.16439	0.06559
Net Income	11.64739	-0.433	-1.94101	-2.073	11.51429	0.44
Sales	208.62129	21.191	351.28569	61.561	516.00092	53.745
Book Equity	115.19112	31.759	98.03847	21.076	165.77696	20.612
Venture Capital Indicator	0.5	0.5	0.54875	1	0.23864	0
High Tech	0.40909	0	0.45125	0	0.22727	0
Return on Assets	-0.19278	-0.0044	-0.32284	-0.02128	-0.39571	0.0125
Leverage	0.13313	0.06504	0.26574	0.08757	0.19479	0.07715
Research & Development/Sales	0.29839	0.28644	0.36224	0.18738	0.15668	0.05522
Number of Analysts	3.95455	3	3.61432	3	2.21591	1.5
Analyst Forecast Error	0.6813	0.16667	0.53281	0.18692	0.43591	0.18869
Analyst Forecast Std. Deviation	0.33366	0.07547	0.19659	0.06431	0.14399	0.0449
Firm Age	18.925	7	16.99038	9	18.75904	9
Dual Share Class Indicator	0.11364	0	0.06212	0	0.15909	0
Lead Underwriter Rank	8.32558	9	8.2159	9	6.49432	8
Underpricing	0.57925	0.18018	0.22881	0.1	0.16873	0.06036
Primary Shares Sold	0.90143	1	0.86921	1	0.84269	1
Book-to-Market Ratio	0.15487	0.05012	0.11641	0.05759	0.26778	0.08588
Offering Proceeds	208,533.99	110,117.50	155,525.94	84,800.00	142,968.49	55,700.00

(Table 2.2 continued)

	Short Lockup Firms		Typical Length Lockup Firms		Long Lockup Length	
	Mean	Median	Mean	Median	Mean	Median
Market Value of Equity	2312795.743	745,901.63	761,184.67	406,525.39	551,236.50	195,593.30
Volatility	0.04361	0.02879	0.04326	0.03539	0.0407	0.03451

Descriptive statistics for the sample by number of lockups and by lockup length of lockup where, for multiple lockup length, overall length is determined by an average of length weighted by number of shares released at each lockup. Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds. Total assets, capital expenditures, cash holdings, net income, sales, book equity, and research & development expense are from Compustat. The variable high tech is an indicator that is set to 1 if the firm is an industry defined as a technology industry as in Cliff and Denis (2004). Number of analysts, forecast error, and standard deviation are all from I/B/E/S coverage in the third month following IPO. Firm age, the dual class indicator, which has a value of 1 if the firm has multiple classes of stock outstanding, and the lead underwriter ranking were obtained from Jay Ritter's website. Underpricing is the percent difference between the offering price and the first day's closing price. Volatility is the standard deviation of the market model residual over seventy days prior to lockup expiration excluding the 20 days prior to lockup.

more standard lockup length are also the most highly levered, have the highest R&D spending, and lowest book-to-market ratio. Despite having larger overall issues, short lockup firms issue fewer secondary shares than firms with longer lockups, which may indicate a trade off between the ability to realize some sales early with forgoing the ability to sell shares post-IPO for a longer period of time. Firms with multiple share classes tend to deviate more from the standard lockup length in both directions. Evidence on age and price volatility prior to lockup expiration is mixed with short lockup firms being the oldest (youngest) and most (least) volatile when judged by mean (median) values.

2.5 Results

2.5.1 Logit Regression for Multiple Lockups

We begin by performing a logit regression in which the dependent variable is an indicator taking a value of 1 if the firm includes more than one lockup. Table 2.3 presents results. For the various specifications we use three possible measure of firm size: total assets, the market value of equity, and offering proceeds. Similarly we also use three possible proxies for information asymmetry based on I/B/E/S analyst coverage: forecast error, forecast standard deviation, and the number of analysts. The number of analysts provides us with the greatest number of observations, as error requires at least one analyst to cover while forecast standard deviation requires at least two analysts to provide coverage. Number of analysts is only weekly significant in specification (1), while forecast error is not significant in any specification. Forecast standard deviation is highly significant for all cases; however, this power appears to result from the larger reduction in the number of applicable observations as number of

Table 2.3: Logistic Regression for Presence of Multiple Lockups

	(1) mult_lu	(2) mult_lu	(3) mult_lu	(4) mult_lu	(5) mult_lu	(6) mult_lu	(7) mult_lu	(8) mult_lu	(9) mult_lu
Total Assets (log)	-0.211**	-0.133	-0.0706						
	-0.031	(0.233)	(0.570)						
High Tech Indicator	-0.356	-0.185	-0.216	-0.254	-0.106	-0.158	-0.231	-0.0953	-0.150
	(0.102)	(0.451)	(0.401)	(0.241)	(0.663)	(0.532)	(0.282)	(0.692)	(0.551)
Venture Capital Indicator	0.235	0.252	0.422	0.327	0.354	0.520	0.351	0.366	0.519
	(0.374)	(0.407)	(0.215)	(0.224)	(0.239)	(0.116)	(0.190)	(0.212)	(0.109)
Leverage	-0.250	-0.975**	-1.042*	-0.383	-1.177**	-1.267**	-0.425	-1.170**	-1.206**
	(0.538)	(0.0323)	(0.0514)	(0.421)	(0.0172)	(0.0271)	(0.368)	(0.0142)	(0.0278)
Firm Age	0.000	0.002	0.000	-0.003	0.000	-0.001	-0.003	0.000	-0.001
	(0.999)	(0.780)	(0.947)	(0.619)	(0.995)	(0.892)	(0.560)	(0.958)	(0.839)
Dual Share Class Indicator	1.009***	0.990**	1.007**	0.940**	0.870**	0.858**	0.929**	0.909**	0.944**
	(-0.009)	(0.018)	(0.017)	(0.011)	(0.038)	(0.043)	(0.011)	(0.023)	(0.021)
Average Bid Ask Spread	-0.055	-0.108	-0.225	-0.052	-0.065	-0.068	-0.046	-0.051	-0.054
	(0.322)	(0.894)	(0.873)	(0.356)	(0.604)	(0.679)	(0.264)	(0.376)	(0.451)
Lead Underwriter Rank	-0.101	-0.147	0.008	-0.159**	-0.211**	-0.055	-0.199**	-0.250**	-0.093
	(0.207)	(0.128)	(0.949)	(0.0435)	(0.0307)	(0.647)	(0.0126)	(0.0108)	(0.444)
Underpricing	0.088	0.345	0.354	0.102	0.293	0.270	-0.006	0.122	0.064
	(0.683)	(0.171)	(0.250)	(0.627)	(0.164)	(0.186)	(0.977)	(0.598)	(0.774)
Primary Shares (%)	-1.161***	-1.335***	-1.342***	-1.127***	-1.210***	-1.175***	-1.043***	-1.164***	-1.195***
	(0.005)	(0.002)	(0.003)	(0.005)	(0.004)	(0.008)	(0.008)	(0.006)	(0.006)
Book-to-Market Ratio	0.618***	0.646***	0.766***	0.421**	0.532***	0.704***	0.441**	0.589***	0.790***
	(0.00725)	(0.00303)	(0.00485)	(0.0239)	(0.00483)	(0.00345)	(0.0179)	(0.00371)	(0.00247)
Volatility	11.48**	4.915	2.320	13.99***	7.458	4.411	14.48***	7.654	4.368
	(0.027)	(0.391)	(0.696)	(0.007)	(0.194)	(0.457)	(0.006)	(0.182)	(0.463)

(Table 2.3 continued)

	(1) mult_lu	(2) mult_lu	(3) mult_lu	(4) mult_lu	(5) mult_lu	(6) mult_lu	(7) mult_lu	(8) mult_lu	(9) mult_lu
Number of Analysts	0.0899*			0.0700			0.0432		
	(0.091)			(0.208)			(0.422)		
Analyst Forecast Error		0.0644			0.0656			0.0658	
		(0.139)			(0.128)			(0.128)	
Analyst Forecast Std. Deviation			0.162***			0.159***			0.159***
			(0.002)			(0.002)			(0.002)
Proceeds (log)				-0.0520	0.102	0.214			
				(0.772)	(0.634)	(0.294)			
Market Value of Equity							0.126	0.219	0.291*
							(0.396)	(0.173)	(0.066)
Constant	-0.761	-0.0333	-1.323	-0.682	-1.473	-3.829	-2.618	-2.905	-4.872**
	(0.361)	(0.973)	(0.304)	(0.732)	(0.538)	(0.113)	(0.152)	(0.149)	(0.021)
Annual Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,158	1,011	944	1,158	1,011	944	1,158	1,011	944

Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds. The dependent variable is an indicator taking the value of 1 if the offering firm has multiple lockup expiration dates. The variable high tech is an indicator that is set to 1 if the firm is an industry defined as a technology industry as in Cliff and Denis (2004). Number of analysts, forecast error, and standard deviation are all from I/B/E/S coverage in the third month following IPO. Firm age, the dual class indicator, which has a value of 1 if the firm has multiple classes of stock outstanding, and the lead underwriter ranking were obtained from Jay Ritter's website. Underpricing is the percent difference between the offering price and the first day's closing price. Volatility is the standard deviation of the market model residual over seventy days prior to lockup expiration excluding the 20 days prior to lockup. Robust p-value in parentheses. *** p<0.01, ** p<0.05, * p<0.1

analysts also gains significance when applied only to the firms for which standard deviation is available.

The size of the offering does not appear to be a strong indicator of the number of lockups a firm will use. The IPO proceeds variable is never significant, the value of equity is weakly significant in only one specification, and the value of the firm's assets is significant in only one specification when paired with the number of analysts measure.

Several variables do appear to be significantly related to the choice for a firm to agree to multiple lockups. The percent of the offering made in primary shares is highly negatively related to the decision to undertake multiple lockups. This finding is consistent with the idea of firms agreeing to multiple lockups in exchange for allowing some of the pre-IPO holdings to be sold during the offering. Further, firms with dual class structures are more likely to undertake an offer with multiple lockup dates, as this variable is significantly positive under all specifications. Finally, we see a strong, positive relationship between book-to-market value and the presence of multiple lockups with the variable being significant in two specifications and highly significant in the remaining seven specifications. Value firms are more likely to have multiple lockup dates included in their underwriting agreement.

2.5.2 Multinomial Logit Regression for Lockup Length

Although we have determined those factors that relate to the election of more than one lockup, we do not know how those differences affect the overall length of the lockup agreement, or how other factors might influence the length of the lockup. In Table 2.4, we perform a multinomial logit in which the dependent is an indicator that takes a value of 0 if the weighted average lockup length is less than 170 days, 2 if the

length is greater than 190 days, and 1 if the length is between 170 and 190 days, inclusive. For the purposes of the regression, a value of 1 is treated as the base case.

In panel A, we utilize the full sample, with single and multiple lockup firms included. We find that the lead underwriter rank is significantly negatively associated with long lockups, perhaps indicating the certification role of a reputable underwriter, which would offset the need for signaling provided by the longer lockup. Further, we find that the presence of venture capital backing is significantly, negatively related to lockup length. In this case, this finding is consistent with the desire for venture capitalists to be able to distribute shares to their investors more quickly, and consequently preferring to forgo a long lockup. High tech firms are also less likely to take on long lockups.

In contrast, the presence of a dual class structure is positively related to lockup length with the variable showing significance in two specifications and weak significance in the third. This result could indicate a desire for a stronger commitment from those pre-IPO insiders that hold disproportionate voting rights. Interestingly, firms with a greater percentage of shares under lockup are more likely to deviate in both directions from a typical 180-day lockup. Volatility is positively related to lockup length; however, as we see later, it is most likely acting as a proxy for the presence of multiple lockups.

In Panel B, we repeat the previous analysis but include an indicator variable that takes a value of 1 if the observation is for a firm with multiple lockups. We find that the number of analysts is significantly negatively related to having a longer lockup, which is consistent with idea of this additional monitoring providing an outside measure of quality that lessens the need for firm insiders to indicate firm quality through lockup length.

Table 2.4: Multinomial Logit Regression of Lockup Length

Panel A: Full Sample						
	(1)		(2)		(3)	
	Short	Long	Short	Long	Short	Long
Number of Analysts	0.0944	-0.172	0.102*	-0.216**		
	(0.163)	(0.106)	(0.083)	(0.026)		
Primary Shares (%)	0.566	-1.391**	0.552	-1.170**	0.299	-0.920*
	(0.535)	(0.016)	(0.552)	(0.033)	(0.723)	(0.090)
High Tech Indicator	-0.243	-0.691**	-0.257	-0.640**	-0.203	-0.681**
	(0.517)	(0.031)	(0.471)	(0.044)	(0.572)	(0.032)
Lead Underwriter Rank	-0.004	-0.237***	0.006	-0.306***	0.056	-0.402***
	(0.982)	(0.007)	(0.970)	(0.000)	(0.738)	(0.000)
Venture Capital Indicator	-0.100	-0.654**	-0.116	-0.611*	-0.0880	-0.658**
	(0.770)	(0.050)	(0.726)	(0.065)	(0.798)	(0.045)
Shares Locked Up (%)	0.232**	0.349**	0.232**	0.338**	0.272**	0.320**
	(0.043)	(0.029)	(0.041)	(0.034)	(0.049)	(0.022)
Dual Share Class Indicator	0.473	1.270**	0.498	1.111**	0.575	0.944*
	(0.405)	(0.024)	(0.358)	(0.036)	(0.282)	(0.060)
Proceeds (log)	0.0500	-0.338				
	(0.860)	(0.142)				
Book-to-Market Ratio	0.0308	0.161	0.033	0.178	0.008	0.172
	(0.839)	(0.459)	(0.828)	(0.416)	(0.960)	(0.399)
Volatility	1.386	17.71**	1.164	19.97**	1.348	21.12**
	(0.847)	(0.023)	(0.864)	(0.015)	(0.844)	(0.012)
Constant	-4.439	2.711	-3.938**	-0.789	-3.928**	-0.773
	(0.206)	(0.296)	(0.015)	(0.508)	(0.015)	(0.520)
Annual Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,194	1,194	1,194	1,194	1,194	1,194

(Table 2.4 continued)

Panel B: Full Sample With Multiple Lockup Indicator

	(4)		(5)		(6)	
	Short	Long	Short	Long	Short	Long
Number of Analysts	0.0244	-0.184**	0.0285	-0.221***		
	(0.780)	(0.037)	(0.649)	(0.005)		
Primary Shares (%)	1.422	-0.213	1.386	0.0542	1.311	0.273
	(0.222)	(0.751)	(0.237)	(0.932)	(0.220)	(0.672)
High Tech Indicator	-0.173	-0.882**	-0.181	-0.820**	-0.163	-0.893**
	(0.664)	(0.0257)	(0.629)	(0.0313)	(0.671)	(0.0172)
Lead Underwriter Rank	-0.0415	-0.259**	-0.037	-0.330***	-0.0283	-0.417***
	(0.808)	(0.033)	(0.827)	(0.004)	(0.861)	(0.000)
Venture Capital Indicator	-0.785*	-1.570***	-0.777*	-1.566***	-0.751*	-1.673***
	(0.067)	(0.000)	(0.060)	(0.000)	(0.077)	(0.000)
Shares Locked Up (%)	0.129	0.293**	0.132	0.278**	0.215	0.172
	(0.364)	(0.014)	(0.350)	(0.021)	(0.145)	(0.162)
Dual Share Class Indicator	0.231	1.164**	0.258	1.038**	0.157	0.936*
	(0.726)	(0.020)	(0.685)	(0.032)	(0.808)	(0.057)
Proceeds (log)	0.0249	-0.342				
	(0.941)	(0.258)				
Book-to-Market Ratio	-0.123	-0.135	-0.126	-0.135	-0.153	-0.0596
	(0.591)	(0.583)	(0.567)	(0.580)	(0.497)	(0.808)
Volatility	-7.85	8.02	-8.5	10.82	-8.282	14.52
	(0.500)	(0.566)	(0.463)	(0.460)	(0.472)	(0.314)
Multiple Lockup Indicator	4.450***	4.640***	4.447***	4.650***	4.481***	4.613***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-4.823	1.457	-4.515**	-2.12	-4.555**	-2.251
	(0.225)	(0.681)	(0.0130)	(0.238)	(0.0106)	(0.214)
Annual Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1194	1194	1194	1194	1194	1194

(Table 2.4 continued)

Panel C: Single Lockup Firms

	(7)		(8)		(9)	
	Short	Long	Short	Long	Short	Long
Number of Analysts	-0.158	-0.034	-0.172	-0.173		
	(0.570)	(0.851)	(0.551)	(0.223)		
Primary Shares (%)	-0.603	1.862	-0.567	2.205	-0.350	2.596
	(0.620)	(0.454)	(0.636)	(0.365)	(0.745)	(0.294)
High Tech Indicator	-0.490	-1.639**	-0.479	-1.642**	-0.452	-1.697**
	(0.591)	(0.024)	(0.584)	(0.028)	(0.604)	(0.026)
Lead Underwriter Rank	0.361	-0.332**	0.334	-0.478***	0.218	-0.554***
	(0.418)	(0.019)	(0.436)	(0.000)	(0.569)	(0.000)
Venture Capital Indicator	-0.790	-2.598***	-0.756	-2.632**	-0.802	-2.602**
	(0.398)	(0.010)	(0.412)	(0.012)	(0.402)	(0.013)
Shares Locked Up (%)	0.224	0.181	0.223	0.170	0.240*	0.186
	(0.113)	(0.318)	(0.114)	(0.352)	(0.071)	(0.323)
Dual Share Class Indicator	0.428	1.530*	0.390	1.155	0.225	1.012
	(0.459)	(0.080)	(0.495)	(0.158)	(0.755)	(0.209)
Proceeds (log)	-0.098	-0.703				
	(0.861)	(0.101)				
Book-to-Market Ratio	-0.044	0.048	-0.043	0.030	-0.027	0.051
	(0.855)	(0.850)	(0.855)	(0.918)	(0.897)	(0.846)
Volatility	-49.24*	12.39	-48.49*	14.95	-44.10*	16.03
	(0.091)	(0.225)	(0.089)	(0.153)	(0.089)	(0.136)
Constant	-3.592	4.819	-4.530	-1.951	-4.484	-2.276
	(0.607)	(0.306)	(0.184)	(0.425)	(0.188)	(0.362)
Annual Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,055	1,055	1,055	1,055	1,055	1,055

(Table 2.4 continued)

Panel D: Multiple Lockup Firms

	(10)		(11)		(12)	
	Short	Long	Short	Long	Short	Long
Number of Analysts	0.0851	-0.384***	0.105	-0.342**		
	(0.552)	(0.008)	(0.328)	(0.011)		
Primary Shares (%)	4.456*	0.0815	4.349*	-0.352	3.198*	-0.138
	(0.064)	(0.936)	(0.072)	(0.694)	(0.056)	(0.879)
High Tech Indicator	0.333	-0.0499	0.301	-0.105	0.371	-0.184
	(0.612)	(0.928)	(0.648)	(0.847)	(0.567)	(0.713)
Lead Underwriter Rank	-0.187	-0.222	-0.158	-0.145	-0.120	-0.275*
	(0.448)	(0.218)	(0.512)	(0.362)	(0.582)	(0.051)
Venture Capital Indicator	0.138	-0.879	0.131	-0.861	0.145	-1.089**
	(0.821)	(0.113)	(0.829)	(0.123)	(0.818)	(0.035)
Shares Locked Up (%)	-0.071	0.013	-0.045	0.0624	0.246	-0.065
	(0.818)	(0.963)	(0.885)	(0.818)	(0.415)	(0.776)
Dual Share Class Indicator	0.900	1.694**	0.785	1.762**	0.243	1.243*
	(0.442)	(0.050)	(0.502)	(0.043)	(0.863)	(0.095)
Proceeds (log)	0.128	0.417				
	(0.759)	(0.378)				
Book-to-Market Ratio	-0.183	-0.127	-0.168	-0.138	-0.203	-0.0167
	(0.553)	(0.723)	(0.588)	(0.698)	(0.521)	(0.961)
Volatility	-24.19	-3.848	-25.21	-8.765	-21.54	-0.961
	(0.207)	(0.838)	(0.168)	(0.617)	(0.238)	(0.959)
Constant	-2.539	-1.899	-1.223	2.714	-0.596	2.449
	(0.669)	(0.746)	(0.732)	(0.263)	(0.852)	(0.292)

(Table 2.4 continued)

	(10)		(11)		(12)	
	Short	Long	Short	Long	Short	Long
Annual Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	139	139	139	139	139	139

This table reports results of a multinomial logit regression in which the dependent variable takes a value of 0 if the average lockup length, weighted by shares released upon expiration, is less than 170 days, 1 if the length is between 170 and 190 days, or 2 if the length is greater than 190 days. The typical length, 170-190 days, is taken as the base case. Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds. The variable high tech is an indicator that is set to 1 if the firm is an industry defined as a technology industry as in Cliff and Denis (2004). Number of analysts is from I/B/E/S coverage in the third month following IPO. Firm age, the dual class indicator, which has a value of 1 if the firm has multiple classes of stock outstanding, and the lead underwriter ranking were obtained from Jay Ritter's website. Underpricing is the percent difference between the offering price and the first day's closing price. Volatility is the standard deviation of the market model residual over seventy days prior to lockup expiration excluding the 20 days prior to lockup.

Multiple lockup firms, as one would expect, are much more likely to deviate from the standard lockup length. High-tech, lead underwriter rank, and the presence of VC backing remain strongly negatively associated with long lockups while the dual class structure is still positively associated with long lockups.

In Panel C (D), we repeat the analysis for single (multiple) lockup firms only. Panel C shows that the underwriter rank, high-tech, and presence of venture capital backing are the dominant determinants of lockup length for single lockup firms. We also see a weakly negatively relationship between volatility and short lockups, perhaps indicating that underwriters are unwilling to let more uncertain firms bargain for a shorter lockup. For the multiple lockup firms of Panel D, we see the dual class variable remains consistent in effect with the findings in Panels A and B. Firms in which the offering is more greatly composed of primary shares, are weakly more likely to use multiple lockups to shorten the lockup length. We also find that the number of analysts variable seem to derive from the multiple lockup group; however, when the variable is excluded in specification 12, underwriter rank and the venture capital variable become at least weakly significant, which may indicate similar certification roles for analysts, underwriters, and VC providers.

2.5.3 Cumulative Abnormal Returns and Abnormal Volume

We find that the market generally reacts negatively to lockup expiration based on the CARs surrounding expiration dates; Table 2.5 documents these findings. Panel A reports results for the first lockup for the full sample, those firms with a single lockup, and those with multiple lockups along with the reaction to the second lockup and third and subsequent lockups for the multiple lockup firms. For the sample as a whole and

for single lockup firms, the reaction is highly significantly negative for all event windows with 3 day CARs of -1.74% and -1.81% respectively. For multiple lockup firms, the first lockup expiration is received negatively regardless of window; however, the significance of the finding varies depending on the window. The 21 and 41 day windows are highly significant while the 11 and 5 day windows are significant at the 5% level, and the 3 and 7 day windows are only weakly significant. Interestingly, the 3-day window is lower in magnitude as compared to single lockup firms while all other windows are greater in magnitude than their single lockup counterparts. The second expiration for multiplelockup is generally negative but is only weakly significant for the 3 day window at -1.21%. In contrast, for the third and subsequent expirations the reaction is generally positive except for the 3-day window.

Panel B shows that in our sample VC backed firms continue to experience poorer performance surrounding expiration. The full sample and the single lockup sample continue to show a significantly lower event return for VC backed firms. For those firms with multiple lockups, the difference isn't, however, significant. In fact, the difference for all windows is smaller than for the single lockup firms. In short, VC backing seems to make less of a difference for multiple lockup firms.

Results for high tech firms and high abnormal volume firms reported in Panels C&D are largely similar to those split by VC backing. When considering either the full sample or single lockup firms solely, high tech firms and those with above median abnormal volume at expiration have significantly greater losses than non-high tech and low abnormal volume firms. The differences for multiple lockup firms are generally insignificant with a few exceptions. For the second lockup expiration, high abnormal

Table 2.5: Event Window Cumulative Abnormal Returns

Panel A: Cumulative Abnormal Returns

	All Firms	Single Lockup Firms	Multiple Lockup Firms		
Event Period	1st Lockup	1st Lockup	1st Lockup	2nd Lockup	3rd or Higher Lockup
Day -20 to +20	-3.93***	-3.16***	-10.05***	-2.13	8.82
	(0.001)	(0.010)	(0.004)	(0.488)	(0.135)
Day -10 to +10	-3.49***	-3.06***	-6.91***	-0.22	7.25
	(0.000)	(0.000)	(0.003)	(0.898)	(0.199)
Day -5 to +5	-2.55***	-2.40***	-3.77**	-0.48	5.52*
	(0.000)	(0.000)	(0.024)	(0.720)	(0.096)
Day -3 to +3	-1.67***	-1.58***	-2.35*	-0.91	2.38
	(0.000)	(0.001)	(0.072)	(0.404)	(0.346)
Day -2 to +2	-1.83***	-1.83***	-1.87**	-.88	0
	(0.000)	(0.000)	(0.043)	(.300)	(.999)
Day -1 to +1	-1.74***	-1.81***	-1.18*	-1.25*	-1.21
	(0.000)	(0.000)	(0.117)	(0.088)	(.633)

Panel B: Cumulative Abnormal Returns by Venture Capital Backing

	All Firms 1st Lockup			Single Lockup Firms 1st Lockup		
Event Period	Non VC	VC Backed	Difference	Non VC	VC Backed	Difference
Day -20 to +20	-1.25	-6.33***	5.08**	-0.47	-5.60***	5.14**
Day -10 to +10	-1.11	-5.61***	4.51***	-0.45	-5.41***	4.96***
Day -5 to +5	0.42	-5.21***	5.63***	0.83	-5.32***	6.15***

(Table 2.5 continued)

	All Firms 1st Lockup			Single Lockup Firms 1st Lockup		
Event Period	Non VC	VC Backed	Difference	Non VC	VC Backed	Difference
Day -3 to +3	0.49	-3.60***	4.09***	0.76	-3.70***	4.46***
Day -2 to +2	0.16	-3.61***	3.77***	0.26	-3.71***	3.91***
Day -1 to +1	-0.01	-3.27***	3.26***	-0.02	-3.42***	3.40***

	Multiple Lockup Firms 1st Lockup			Multiple Lockup Firms 2nd Lockup		
Event Period	Non VC	VC Backed	Difference	Non VC	VC Backed	Difference
Day -20 to +20	-7.82*	-11.88***	4.07	-1.09	-2.99	1.9
Day -10 to +10	-6.61***	-7.16*	0.55	0.17	-0.53	0.70
Day -5 to +5	-3.01*	-4.40*	1.39	0.20	-1.04	1.25
Day -3 to +3	-1.75	-2.84	1.09	-0.97	-0.86	-0.10
Day -2 to +2	-0.68	-2.85**	2.17	-0.04	-1.56	1.53
Day -1 to +1	0.04	-2.18**	2.22	-1.33	-1.25	-0.15

Panel C: Cumulative Abnormal Returns by High Tech Industry

	All Firms 1st Lockup			Single Lockup Firms 1st Lockup		
Event Period	Non High Tech	High Tech	Difference	Non High Tech	High Tech	Difference
Day -20 to +20	-1.51	-7.08***	5.59**	-0.47	-6.61***	6.14**
Day -10 to +10	-1.65*	-5.86***	4.21***	-1.14	-5.50***	4.36***
Day -5 to +5	-1.24**	-4.23***	32.98***	-0.83	-4.37***	3.53***
Day -3 to +3	-0.67	-2.94***	2.27**	-0.22	-3.30***	3.08***

(Table 2.5 continued)

	All Firms 1st Lockup			Single Lockup Firms 1st Lockup		
Event Period	Non High Tech	High Tech	Difference	Non High Tech	High Tech	Difference
Day -2 to +2	-0.80*	-3.16***	2.36***	-0.52	-3.49***	2.97***
Day -1 to +1	-0.65*	-3.14***	2.48***	-0.51	-3.46***	2.95***

	Multiple Lockup Firms 1st Lockup			Multiple Lockup Firms 2nd Lockup		
Event Period	Non High Tech	High Tech	Difference	Non High Tech	High Tech	Difference
Day -20 to +20	-9.25**	-11.21**	1.96	-0.87	-3.95	3.09
Day -10 to +10	-5.49*	-8.99**	3.50	0.93	-1.88	2.81
Day -5 to +5	-4.27	-3.04	-1.24	0.49	-1.90	2.39
Day -3 to +3	-4.04**	0.12	-4.16	0.21	-2.53	2.74
Day -2 to +2	-2.91**	-0.35	-2.57	0.37	-2.69**	3.05*
Day -1 to +1	-1.71	-0.40	-1.31	-0.33	-2.56**	2.22

Panel D: Cumulative Abnormal Returns by Abnormal Volatility at Lockup Expiration

	All Firms 1st Lockup			Single Lockup Firms 1st Lockup		
Event Period	Low AVOL	High AVOL	Difference	Low AVOL	High AVOL	Difference
Day -20 to +20	-1.64	-6.23***	4.60**	-0.39	-5.60***	5.21**
Day -10 to +10	-2.11**	-4.87***	2.77*	-1.29	-4.60***	3.31**
Day -5 to +5	-0.92	-4.19***	3.28***	-0.25	-4.27***	4.02***
Day -3 to +3	-0.54	-2.79***	2.25***	-0.17	-2.81***	2.64***

(Table 2.5 Continued)

	All Firms 1st Lockup			Single Lockup Firms 1st Lockup		
Day -2 to +2	-0.56	-3.11***	2.54***	-0.41	-3.07***	2.67***
Day -1 to +1	-0.55**	-2.92***	2.37***	-0.43	-3.01***	2.57***

	Multiple Lockup Firms 1st Lockup			Multiple Lockup Firms 2nd Lockup		
Event Period	Low AVOL	High AVOL	Difference	Low AVOL	High AVOL	Difference
Day -20 to +20	-7.69**	-17.70**	10.01	-1.18	-3.07	1.89
Day -10 to +10	-6.05**	-9.72	3.67	1.01	-1.44	2.45
Day -5 to +5	-4.12***	-2.66	-1.46	0.08	-1.05	1.14
Day -3 to +3	-2.34*	-2.38	0.04	1.00	-2.82	3.82*
Day -2 to +2	-1.30	-3.73	2.44	0.86	-2.61**	3.47**
Day -1 to +1	-1.13	-1.35	0.22	1.1	-3.59***	4.69***

This table reports market model abnormal returns centered about the lockup expiration date where the CRSP value weighted index is used as the market proxy. Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds. P-values are given in parentheses.

volume firms experience significantly worse performance in the 3 and 5 day windows and high tech firms are weakly significantly worse over the 5 day window.

In Figures 2.1 and 2.2, we show the abnormal trading volume about lockup expiration. Figure 2.1 splits the expiration events by 1st lockup, 2nd lockup, and 3rd or later lockup expiration where all lockups subsequent to the 2nd are grouped together into a single classification. For all expirations, there is a spike in trading volume upon expiration followed by a decline in volume to a level that is still markedly higher than the pre-event volume. The magnitude of the spike in volume is greater for earlier lockups. That is, the 1st lockup spike is greater than the 2nd lockup spike which is greater than the 3rd or subsequent lockup spike; however, there is not a discernable difference in the post event volume between 1st and 2nd lockup whereas volume following 3rd or later events trend downward. Figure 2.2 displays the volume reaction for each firm's largest lockup split by VC backed and non-VC backed firms. Consistent with previous works, we find that VC backed firms have a much larger reaction to expiration.

We further explore these findings in a multivariate context in Tables 2.6 and 2.7. Tables 2.6 and 2.7 report regressions in which the 3-day cumulative abnormal returns at lockup expiration act as the independent variable; however, the composition of the samples differs between the two tables. Table 2.6 pools all lockup expirations while Table 2.7 considers only the largest lockup, measured by number of shares subject to lockup, for each firm. As indicated by the univariate statistics from Table 2.5, VC backed firms, high tech firms, and firms with high abnormal volume at lockup expiration all experience significantly lower returns upon lockup release in the regression setting as well. These findings hold true for both samples.

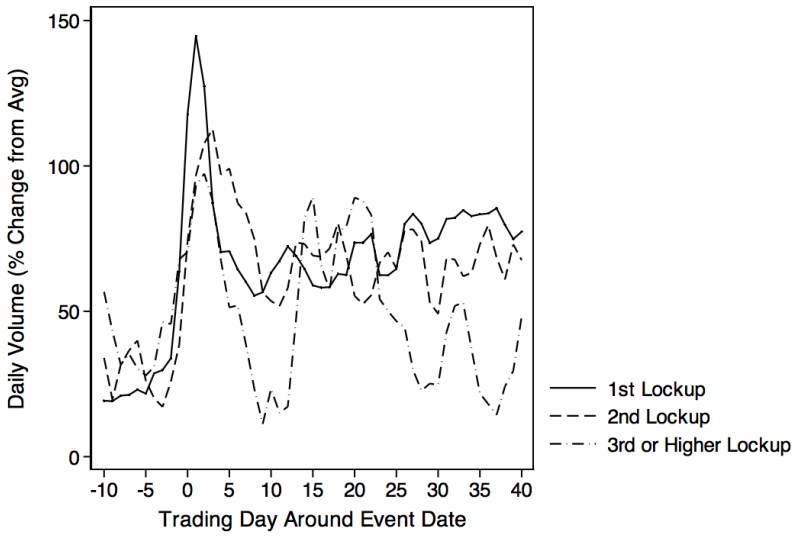

Figure 2.1: Abnormal Trading Volume by Lockup Expiration

Abnormal volume is the daily volume scaled by the 40 day average volume over days -60 through -21 where day 0 is the expiration date for either the first, second, or third or higher lockup as indicated by line type. Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds.

For the sample of all lockup releases reported in Table 2.6, price increases prior to lockup release, or runup, is negatively associated with lockup expiration returns indicating a price reversal; however, this result does not hold true when we only consider each firm's largest lockup as significance is lost although the coefficient remains consistently negative and is only slightly smaller in magnitude. Effectively, we have removed some first lockup observations for firms with more than one lockup period. As such, we might expect the increase in available shares to ease any short sell constraints so that investors can better counteract any runup effects prior to the release

of later lockup agreements due to the increase in available shares from the first lockup release.

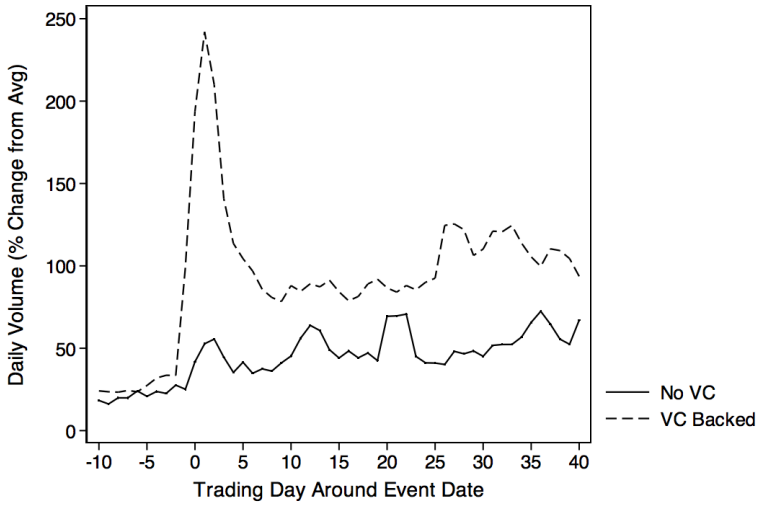

Figure 2.2: Abnormal Trading Volume by Venture Capital Backing

Abnormal volume is the daily volume scaled by the 40 day average volume over days -60 through -21 where day 0 is the expiration date for each firm's largest lockup as measured by number of shares released. Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds.

Knowing that abnormal trading volume at lockup expiration is significantly related to abnormal returns at expiration, we next look at determinants of abnormal volume in Tables 2.8 and 2.9. As before, these Tables differ by the samples under inspection with Table 2.8 including all lockup releases while Table 2.9 only uses the largest lockup expiration for each firm. In both cases, the presence of VC backing is strongly positively related to higher volume supporting the notion that VCs disperse shares when they are able. Additionally, firms with higher volatility prior to release tend towards significantly lower volume upon release. When considering all lockups, the presence of multiple lockups has a strong, negative correspondence with expiration volume, but this

Table 2.6: Cumulative Abnormal Return Regressions for All Lockups

	(1)	(2)	(3)	(4)	(5)	(6)
	Cumulative Abnormal Return					
Abnormal Volume	-0.197*	-0.203*	-0.196*	-0.196*	-0.199*	-0.202*
	(0.0953)	(0.0859)	(0.0969)	(0.0962)	(0.0930)	(0.0873)
Venture Capital Indicator	-1.899**	-1.866**	-1.851**	-1.852**	-1.870**	-1.856**
	(0.0150)	(0.0168)	(0.0195)	(0.0182)	(0.0172)	(0.0177)
Lead Underwriter Rank	0.374	0.353	0.391	0.391	0.402	0.395
	(0.130)	(0.151)	(0.121)	(0.121)	(0.111)	(0.115)
Primary Shares (%)	-0.503	-0.641	-0.668	-0.666	-0.467	-0.522
	(0.551)	(0.441)	(0.423)	(0.420)	(0.584)	(0.536)
Book-to-Market Ratio	0.125	0.177	0.207	0.206	0.161	0.185
	(0.744)	(0.638)	(0.604)	(0.600)	(0.677)	(0.632)
Firm Age	0.00232	0.00221	0.00116	0.00117	0.00231	0.00218
	(0.801)	(0.809)	(0.901)	(0.900)	(0.801)	(0.812)
Dual Share Class Indicator	-1.303	-1.192	-1.332	-1.332	-1.421	-1.387
	(0.233)	(0.271)	(0.230)	(0.230)	(0.201)	(0.211)
Number of Analysts	0.120	0.127	0.114	0.114	0.107	0.108
	(0.319)	(0.296)	(0.350)	(0.349)	(0.370)	(0.367)
High Tech Indicator	-1.577**	-1.614**	-1.595**	-1.595**	-1.642**	-1.661**
	(0.0397)	(0.0360)	(0.0373)	(0.0373)	(0.0319)	(0.0308)
Shares Locked Up (%)	0.478	0.511	0.421	0.421	0.438	0.449
	(0.202)	(0.170)	(0.275)	(0.275)	(0.250)	(0.239)
NYSE Indicator	0.507	0.518	0.540	0.540	0.480	0.485
	(0.400)	(0.388)	(0.370)	(0.370)	(0.427)	(0.421)
Runup	-1.485**	-1.458**	-1.489**	-1.490**	-1.489**	-1.463**
	(0.0229)	(0.0249)	(0.0233)	(0.0226)	(0.0230)	(0.0247)
Underpricing	-1.209	-1.192	-1.389	-1.389	-1.198	-1.189
	(0.259)	(0.265)	(0.204)	(0.203)	(0.263)	(0.266)
Proceeds (log)	-0.397	-0.383	-0.346	-0.346	-0.437	-0.432
	(0.511)	(0.525)	(0.566)	(0.564)	(0.469)	(0.473)
Multiple Lockup Indicator	0.714		-0.0122		0.549	
	(0.370)		(0.988)		(0.577)	
Short Length Indicator			2.483	2.474		
			(0.160)	(0.164)		
Long Length Indicator			0.679	0.670		
			(0.509)	(0.482)		
2nd Lockup Indicator					-0.314	0.139
					(0.793)	(0.878)

(Table 2.6 continued)

	(1)	(2)	(3)	(4)	(5)	(6)
	Cumulative Abnormal Return					
3rd or Greater Lockup Indicator					2.624	3.063
					(0.319)	(0.242)
Volatility	-16.40	-14.96	-16.05	-16.06	-17.25	-16.55
	(0.621)	(0.650)	(0.628)	(0.627)	(0.604)	(0.618)
Total Assets (log)	-0.389	-0.417	-0.438	-0.438	-0.399	-0.412
	(0.171)	(0.135)	(0.127)	(0.121)	(0.160)	(0.145)
Leverage	0.505	0.477	0.567	0.567	0.577	0.567
	(0.482)	(0.507)	(0.439)	(0.439)	(0.434)	(0.443)
Intangible Assets (%)	1.742	1.780	1.842*	1.842*	1.742	1.765
	(0.120)	(0.114)	(0.0975)	(0.0977)	(0.120)	(0.119)
Constant	3.856	4.067	3.454	3.457	4.192	4.283
	(0.567)	(0.547)	(0.605)	(0.604)	(0.533)	(0.526)
Annual Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,251	1,251	1,251	1,251	1,251	1,251
R-squared	0.043	0.042	0.045	0.045	0.045	0.044

This table reports regression results for all lockup expirations. The dependent variable is the three-day cumulative abnormal return using the CRSP value weighted index as the market proxy. Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds. The variable high tech is an indicator that is set to 1 if the firm is an industry defined as a technology industry as in Cliff and Denis (2004). Number of analysts is from I/B/E/S coverage in the third month following IPO. Firm age, the dual class indicator, which has a value of 1 if the firm has multiple classes of stock outstanding, and the lead underwriter ranking were obtained from Jay Ritter's website. Underpricing is the percent difference between the offering price and the first day's closing price. Volatility is the standard deviation of the market model residual over seventy days prior to lockup expiration excluding the 20 days prior to lockup. Runup is the cumulative return from IPO until day -20. Abnormal volume is the ratio of the day's volume to the average volume over the 40-day pre-event runup period accumulated over the three-day event window. P-value in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 2.7: Cumulative Abnormal Return Regressions for Each Firm's Largest Lockup

	(1)	(2)	(3)	(4)	(5)	(6)
	Cumulative Abnormal Return					
Abnormal Volume	-0.227*	-0.230*	-0.226*	-0.226*	-0.229*	-0.229*
	(0.0715)	(0.0685)	(0.0721)	(0.0725)	(0.0692)	(0.0691)
Venture Capital Indicator	-1.712**	-1.687**	-1.670*	-1.682**	-1.621*	-1.621*
	(0.0411)	(0.0443)	(0.0507)	(0.0476)	(0.0569)	(0.0567)

(Table 2.7 continued)

	(1)	(2)	(3)	(4)	(5)	(6)
	Cumulative Abnormal Return					
Lead Underwriter Rank	0.288	0.275	0.308	0.307	0.302	0.302
	(0.312)	(0.336)	(0.286)	(0.286)	(0.294)	(0.293)
Primary Shares (%)	-0.291	-0.401	-0.519	-0.497	-0.502	-0.502
	(0.742)	(0.646)	(0.553)	(0.568)	(0.567)	(0.567)
Book-to-Market Ratio	0.239	0.294	0.363	0.352	0.358	0.357
	(0.605)	(0.519)	(0.457)	(0.464)	(0.462)	(0.458)
Firm Age	0.000627	0.000270	0.000289	0.000380	0.00159	0.00159
	(0.949)	(0.978)	(0.977)	(0.969)	(0.872)	(0.872)
Dual Share Class Indicator	-1.474	-1.387	-1.462	-1.468	-1.573	-1.573
	(0.221)	(0.242)	(0.233)	(0.229)	(0.198)	(0.197)
Number of Analysts	0.173	0.176	0.158	0.157	0.160	0.160
	(0.217)	(0.214)	(0.267)	(0.269)	(0.240)	(0.238)
High Tech Indicator	-1.603*	-1.638**	-1.613*	-1.610*	-1.667**	-1.666**
	(0.0537)	(0.0478)	(0.0513)	(0.0514)	(0.0447)	(0.0446)
Shares Locked Up (%)	0.530	0.559	0.471	0.470	0.489	0.489
	(0.233)	(0.207)	(0.299)	(0.299)	(0.280)	(0.277)
NYSE Indicator	0.273	0.281	0.333	0.334	0.274	0.274
	(0.674)	(0.664)	(0.609)	(0.608)	(0.672)	(0.672)
Runup	-1.246	-1.252	-1.261	-1.262	-1.232	-1.232
	(0.120)	(0.120)	(0.117)	(0.116)	(0.124)	(0.123)
Underpricing	-1.165	-1.160	-1.354	-1.348	-1.154	-1.154
	(0.314)	(0.316)	(0.249)	(0.251)	(0.318)	(0.318)
Proceeds (log)	0.00181	0.0102	0.0476	0.0424	-0.0665	-0.0665
	(0.998)	(0.987)	(0.938)	(0.945)	(0.913)	(0.913)
Multiple Lockup Indicator	0.803		-0.197		-0.0074	
	(0.466)		(0.852)		(0.996)	
Short Length Indicator			4.777*	4.646*		
			(0.0597)	(0.0748)		
Long Length Indicator			0.415	0.287		
			(0.743)	(0.804)		
2nd Lockup Indicator					-0.0163	-0.0233
					(0.993)	(0.983)
3rd or Greater Lockup Indicator					4.978	4.971
					(0.250)	(0.232)
Volatility	-21.28	-20.66	-20.28	-20.34	-22.47	-22.47
	(0.550)	(0.560)	(0.568)	(0.567)	(0.529)	(0.529)

(Table 2.7 continued)

	(1)	(2)	(3)	(4)	(5)	(6)
	Cumulative Abnormal Return					
Total Assets (log)	-0.402	-0.423	-0.478	-0.474	-0.419	-0.419
	(0.208)	(0.179)	(0.138)	(0.136)	(0.189)	(0.188)
Leverage	0.597	0.592	0.692	0.689	0.715	0.715
	(0.448)	(0.452)	(0.395)	(0.397)	(0.385)	(0.385)
Intangible Assets (%)	1.348	1.368	1.495	1.495	1.356	1.356
	(0.231)	(0.224)	(0.185)	(0.184)	(0.230)	(0.232)
Constant	-0.0749	0.0993	-0.326	-0.295	0.873	0.872
	(0.991)	(0.988)	(0.962)	(0.966)	(0.899)	(0.899)
Annual Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,110	1,110	1,110	1,110	1,110	1,110
R-squared	0.044	0.043	0.048	0.048	0.047	0.047

This table reports regression results for each firm's largest lockup measured by number of shares subject to lockup. The dependent variable is the three-day cumulative abnormal return using the CRSP value weighted index as the market proxy. Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds. The variable high tech is an indicator that is set to 1 if the firm is an industry defined as a technology industry as in Cliff and Denis (2004). Number of analysts is from I/B/E/S coverage in the third month following IPO. Firm age, the dual class indicator, which has a value of 1 if the firm has multiple classes of stock outstanding, and the lead underwriter ranking were obtained from Jay Ritter's website. Underpricing is the percent difference between the offering price and the first day's closing price. Volatility is the standard deviation of the market model residual over seventy days prior to lockup expiration excluding the 20 days prior to lockup. Runup is the cumulative return from IPO until day -20. Abnormal volume is the ratio of the day's volume to the average volume over the 40-day pre-event runup period accumulated over the three-day event window. P-value in parentheses. *** p<0.01, ** p<0.05, * p<0.1

lower volume upon release. When considering all lockups, the presence of multiple lockups has a strong, negative correspondence with expiration volume, but this effect loses significance when only the largest lockup is included in the sample. Lastly, for the sample containing only the largest lockups, underwriter rank is strongly, positively associated with increased volume.

Table 2.8: Abnormal Volume Regressions for All Lockups

	(1)	(2)	(3)	(4)	(5)	(6)
	Abnormal Volume					
Cumulative Abnormal Return	-0.0255	-0.0264	-0.0254	-0.0255	-0.0263	-0.0256
	(0.116)	(0.104)	(0.118)	(0.117)	(0.106)	(0.116)
Venture Capital Indicator	1.162***	1.132***	1.190***	1.128***	1.143***	1.191***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lead Underwriter Rank	0.122	0.146	0.135	0.135	0.141	0.140
	(0.287)	(0.208)	(0.227)	(0.228)	(0.233)	(0.221)
Primary Shares (%)	-0.142	0.00818	-0.107	0.0209	-0.0321	-0.0999
	(0.607)	(0.977)	(0.700)	(0.941)	(0.910)	(0.719)
Book-to-Market Ratio	-0.136	-0.194**	-0.153	-0.205**	-0.175*	-0.148
	(0.175)	(0.0422)	(0.140)	(0.0363)	(0.0687)	(0.159)
Firm Age	-0.004	-0.004	-0.004*	-0.003	-0.004	-0.004*
	(0.105)	(0.111)	(0.0948)	(0.148)	(0.117)	(0.0905)
Dual Share Class Indicator	0.194	0.0727	0.142	0.112	0.105	0.119
	(0.480)	(0.793)	(0.611)	(0.692)	(0.708)	(0.669)
Number of Analysts	-0.0690	-0.0771	-0.0632	-0.0726	-0.0741	-0.0666
	(0.170)	(0.125)	(0.209)	(0.149)	(0.142)	(0.188)
High Tech Indicator	0.0349	0.0742	0.0416	0.0704	0.0592	0.0309
	(0.891)	(0.772)	(0.871)	(0.783)	(0.818)	(0.903)
Shares Locked Up (%)	0.171*	0.136	0.169*	0.163*	0.144	0.163*
	(0.0550)	(0.120)	(0.0582)	(0.0683)	(0.105)	(0.0683)
NYSE Indicator	0.177	0.166	0.160	0.157	0.166	0.157
	(0.371)	(0.404)	(0.413)	(0.423)	(0.404)	(0.423)
Runup	0.0457	0.0149	0.0630	0.0271	0.00897	0.0763
	(0.815)	(0.940)	(0.747)	(0.891)	(0.964)	(0.696)
Underpricing	-0.0277	-0.0470	-0.0218	0.0158	-0.0425	-0.0161
	(0.924)	(0.870)	(0.941)	(0.956)	(0.883)	(0.956)
Proceeds (log)	-0.171	-0.188	-0.159	-0.198	-0.187	-0.165
	(0.436)	(0.392)	(0.471)	(0.366)	(0.396)	(0.456)
Multiple Lockup Indicator	-0.782***		-0.911***			-1.161***
	(0.000)		(0.000)			(0.000)
Short Length Indicator			-0.118	-0.785***		-0.155
			(0.665)	(0.00185)		(0.553)

(Table 2.8 continued)

	(1)	(2)	(3)	(4)	(5)	(6)
			Abnormal Volume			
Long Length Indicator			0.456*	-0.176		0.440
			(0.0975)	(0.489)		(0.112)
2nd Lockup Indicator					-0.471**	0.412
					(0.0225)	(0.254)
3rd or Greater Lockup Indicator					-0.110	0.687
					(0.712)	(0.124)
Volatility		-	-		-	-
	-29.03***	30.81***	29.40***	-30.44***	30.51***	29.36***
	(.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Total Assets (log)	-0.149	-0.119	-0.147	-0.111	-0.128	-0.148
	(0.107)	(0.193)	(0.115)	(0.224)	(0.162)	(0.112)
Leverage	-0.394***	-0.366**	-0.391**	-0.393***	-0.367**	-0.383**
	(0.00883)	(0.0141)	(0.0102)	(0.00997)	(0.0151)	(0.0113)
Intangible Assets (%)	-0.0388	-0.0798	-0.0825	-0.104	-0.0743	-0.0765
	(0.902)	(0.798)	(0.796)	(0.742)	(0.812)	(0.811)
Constant	5.198**	5.002*	4.921*	5.157**	5.097*	4.963*
	(0.0469)	(0.0561)	(0.0568)	(0.0455)	(0.0528)	(0.0560)
Annual Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,251	1,251	1,251	1,251	1,251	1,251
R-squared	0.084	0.079	0.085	0.080	0.080	0.086

This table reports regression results for all lockup expirations. The dependent variable is the three-day abnormal volume where abnormal volume is the ratio of the day's volume to the average volume over the 40-day pre-event runup period. Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds. The variable high tech is an indicator that is set to 1 if the firm is an industry defined as a technology industry as in Cliff and Denis (2004). Number of analysts is from I/B/E/S coverage in the third month following IPO. Firm age, the dual class indicator, which has a value of 1 if the firm has multiple classes of stock outstanding, and the lead underwriter ranking were obtained from Jay Ritter's website. Underpricing is the percent difference between the offering price and the first day's closing price. Volatility is the standard deviation of the market model residual over seventy days prior to lockup expiration excluding the 20 days prior to lockup. Runup is the cumulative return from IPO until day -20. Cumulative abnormal return is the three-day cumulative abnormal return using the CRSP value weighted index as the market proxy. P-value in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 2.9: Abnormal Volume Regressions for Each Firm's Largest Lockup

	(1)	(2)	(3)	(4)	(5)	(6)
	Abnormal Volume					
Cumulative Abnormal Return	- 0.029***	- 0.030***	- 0.029***	- 0.029***	- 0.030***	- 0.030***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Venture Capital Indicator	1.077***	1.064***	1.080***	1.051***	1.078***	1.089***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lead Underwriter Rank	0.266***	0.274***	0.267***	0.264***	0.270***	0.270***
	(0.008)	(0.006)	(0.008)	(0.009)	(0.007)	(0.007)
Primary Shares (%)	-0.145	-0.0794	-0.146	-0.0904	-0.128	-0.163
	(0.787)	(0.882)	(0.786)	(0.866)	(0.812)	(0.763)
Book-to-Market Ratio	-0.279	-0.312	-0.278	-0.305	-0.295	-0.260
	(0.363)	(0.307)	(0.366)	(0.319)	(0.336)	(0.400)
Firm Age	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
	(0.405)	(0.425)	(0.405)	(0.426)	(0.413)	(0.423)
Dual Share Class Indicator	0.282	0.231	0.280	0.265	0.267	0.247
	(0.578)	(0.648)	(0.582)	(0.603)	(0.599)	(0.629)
Number of Analysts	-0.102*	-0.104*	-0.101*	-0.105*	-0.102*	-0.104*
	(0.0898)	(0.0833)	(0.0919)	(0.0820)	(0.0896)	(0.0854)
High Tech Indicator	0.0862	0.107	0.0869	0.0948	0.0935	0.0800
	(0.746)	(0.689)	(0.745)	(0.723)	(0.726)	(0.765)
Shares Locked Up (%)	0.0974	0.0808	0.0965	0.0929	0.0832	0.0957
	(0.574)	(0.640)	(0.579)	(0.593)	(0.631)	(0.583)
NYSE Indicator	0.0519	0.0472	0.0516	0.0521	0.0532	0.0460
	(0.883)	(0.893)	(0.884)	(0.883)	(0.880)	(0.896)
Runup	0.155	0.159	0.156	0.154	0.159	0.157
	(0.524)	(0.515)	(0.523)	(0.528)	(0.515)	(0.521)
Underpricing	0.0364	0.0333	0.0342	0.0505	0.0368	0.0335
	(0.894)	(0.903)	(0.902)	(0.855)	(0.893)	(0.904)
Proceeds (log)	-0.129	-0.134	-0.128	-0.141	-0.136	-0.134
	(0.571)	(0.555)	(0.575)	(0.536)	(0.550)	(0.560)
Multiple Lockup Indicator	-0.474		-0.494			-0.899
	(0.210)		(0.291)			(0.275)
Short Length Indicator			0.0404	-0.287		0.0137
			(0.958)	(0.684)		(0.986)
Long Length Indicator			0.0362	-0.284		0.0922
			(0.951)	(0.573)		(0.879)

(Table 2.9 continued)

	(1)	(2)	(3)	(4)	(5)	(6)
	Abnormal Volume					
2nd Lockup Indicator					-0.404	0.428
					(0.394)	(0.616)
3rd or Greater Lockup Indicator					0.00310	0.835
					(0.997)	(0.458)
Volatility	-	-	-	-	-	-
	30.29***	30.72***	30.30***	30.49***	30.65***	30.38***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Total Assets (log)	-0.158	-0.146	-0.159	-0.147	-0.154	-0.159
	(0.168)	(0.202)	(0.170)	(0.202)	(0.180)	(0.169)
Leverage	-0.397	-0.395	-0.395	-0.406	-0.387	-0.384
	(0.167)	(0.169)	(0.170)	(0.159)	(0.179)	(0.184)
Intangible Assets (%)	-0.0979	-0.109	-0.0987	-0.0982	-0.117	-0.0872
	(0.867)	(0.852)	(0.867)	(0.867)	(0.842)	(0.882)
Constant	3.903	3.806	3.886	3.970	3.928	3.941
	(0.112)	(0.122)	(0.117)	(0.109)	(0.111)	(0.113)
Annual Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,110	1,110	1,110	1,110	1,110	1,110
R-squared	0.095	0.093	0.095	0.094	0.094	0.095

This table reports regression results for each firm's largest lockup measured by number of shares subject to lockup. The dependent variable is the three-day abnormal volume where abnormal volume is the ratio of the day's volume to the average volume over the 40-day pre-event runup period. Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds. The variable high tech is an indicator that is set to 1 if the firm is an industry defined as a technology industry as in Cliff and Denis (2004). Number of analysts is from I/B/E/S coverage in the third month following IPO. Firm age, the dual class indicator, which has a value of 1 if the firm has multiple classes of stock outstanding, and the lead underwriter ranking were obtained from Jay Ritter's website. Underpricing is the percent difference between the offering price and the first day's closing price. Volatility is the standard deviation of the market model residual over seventy days prior to lockup expiration excluding the 20 days prior to lockup. Runup is the cumulative return from IPO until day -20. Cumulative abnormal return is the three-day cumulative abnormal return using the CRSP value weighted index as the market proxy. P-value in parentheses. *** p<0.01, ** p<0.05, * p<0.1

2.5.4 Long Run Returns

Table 2.10 reports long run returns for the sample firms with market and style adjustments. The market-adjusted returns are constructed using the CRSP value weighted index as the market proxy. Style adjusted returns use a firm matched by size or by size and book-to-market value as the adjustment reference. For the sample as a whole, issuing firms consistently underperform their reference for the 3 years after issue. The degree of underperformance is worst when measured against size matched firms whereas market and book-to-market adjusted returns are similar for the first year with book-to-market adjusted returns in years 2 and 3 being worse than the market adjusted. When comparing firms with single lockups versus those with multiple lockups, no readily discernable pattern is apparent. By the market-adjusted measure, single lockup firms outperform those with multiple lockups; however, multiple lockup firms are the better performers using size-adjusted returns. Results are mixed according to the book-to-market measure. When lockup length is considered, those firms with short lockups underperform the typical lockup length firms when measured by market adjusted returns, but are generally better at yearly intervals when using style adjusted returns. Again, results are mixed by the book-to-market measure. Long lockup firms are generally poorer performers as compared to typical length firms with the exception of the second six months following issue and three-year returns as measured by book-to-market matched returns and two-year returns measured against size matched firms.

In Tables 2.11 and 2.12, we run regressions with long run returns as the dependent variable. In Table 2.12, we have excluded offerings from the year 2000 as Ritter and Welch (2002) note that the significance of underpricing on long run

Table 2.10: Buy and Hold Long Run Returns by Number of Lockups and Lockup Length

Panel A: Full Sample					
	1st 6 Months	2nd 6 Months	1 Year	2 Year	3 Year
Market Adjusted	-7.625	-5.625	-8.439	-7.976	-6.043
Size Adjusted	-11.480	-9.299	-16.863	-21.692	-18.931
Book-to-market Adjusted	-7.357	-6.065	-8.771	-11.771	-14.709

Panel B: Single Lockup					
	1st 6 Months	2nd 6 Months	1 Year	2 Year	3 Year
Market Adjusted	-8.195	-5.478	-8.882	-8.070	-4.900
Size Adjusted	-12.270	-10.148	-18.944	-23.552	-19.706
Book-to-market Adjusted	-7.178	-6.317	-9.041	-11.465	-15.276

Panel C: Multiple Lockup					
	1st 6 Months	2nd 6 Months	1 Year	2 Year	3 Year
Market Adjusted	-6.545	-9.427	-9.827	-13.381	-18.631
Size Adjusted	-9.943	-5.856	-7.772	-13.704	-16.585
Book-to-market Adjusted	-8.694	-4.187	-6.753	-13.941	-10.687

Panel D: Short Lockups					
	1st 6 Months	2nd 6 Months	1 Year	2 Year	3 Year
Market Adjusted	-10.597	-17.358	-11.314	-17.827	-10.984
Size Adjusted	-7.966	-22.906	-13.561	-27.838	-22.244
Book-to-market Adjusted	-8.506	-9.354	-4.342	-15.396	-14.203

Panel E: Typical Lockups					
	1st 6 Months	2nd 6 Months	1 Year	2 Year	3 Year
Market Adjusted	-7.547	-4.969	-8.018	-8.329	-5.945
Size Adjusted	-11.833	-9.188	-17.735	-23.253	-18.827
Book-to-market Adjusted	-6.263	-6.132	-8.121	-11.221	-15.338

(Table 2.10 continued)

Panel F: Long Lockups					
	1st 6 Months	2nd 6 Months	1 Year	2 Year	3 Year
Market Adjusted	-12.659	-13.126	-20.688	-9.587	-13.433
Size Adjusted	-16.079	-9.084	-18.088	-7.084	-24.833
Book-to-market Adjusted	-21.178	-3.561	-19.508	-17.476	-6.297

This table reports market and style adjusted long run returns for periods up to 3 years following IPO. Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds. The CRSP value weighted index is used for the market adjustment. For size matched BHARs, the market value for the non-issuing firms is determined at the end of each month while the market value for the issuing firms is taken on the date of their first appearance in CRSP. On this date, the issuing firm is matched to the next largest firm. If the matched firm is delisted, the issuing firm is then matched to the next largest firm. For book-to-market matching, size deciles are determined based on NYSE firms at the end of each month. Each issuing firm with a positive book-to-market value is then matched to the firm in its size decile that has the closest book-to-market value. Again, should the matched firm be delisted, the match is replaced by the firm in the issuer's size decile with the next nearest book-to-market value. For those issuers with zero or negative book-to-market values, the match is the non-issuing firm closest in size that also has a zero or negative book-to-market ratio. In all cases, matching firms must have at least 5 years of return data, must not have issued equity within the past 5 years, and must have a single class of stock outstanding to be an eligible match.

performance determinant is limited to the dot-com era. Regardless of the form of the long run return, several variables maintain significant explanatory power. Firms choosing to utilize multiple lockups have significantly lower 3 year buy and hold returns. Firms offering more primary shares have poorer performance over all time horizons, perhaps owing to insider sales subsequent to the offering, while those firms with higher volatility prior to lockup expiration significantly underperform over all time periods excluding the second 6 months following the public offering. When year 2000 IPOs are included, underpricing is strongly negatively related to long run performance; however, when excluded, this effect is greatly mitigated for all horizons except the three-year. Analyst coverage is positively related to performance in the first six months, but is

Table 2.11: Buy and Hold Long Run Regressions

Panel A: Market Adjusted					
	(1)	(2)	(3)	(4)	(5)
	6 months	2nd 6 months	1 year	2 year	3 year
Multiple Lockup Indicator	3.255	5.417	6.326	-10.09	-22.66**
	(0.554)	(0.260)	(0.357)	(0.294)	(0.048)
Venture Capital Indicator	-6.512	5.561*	-0.729	-2.230	1.845
	(0.122)	(0.0862)	(0.898)	(0.776)	(0.846)
Lead Underwriter Rank	3.941***	1.213	3.779**	3.345	0.981
	(0.000)	(0.241)	(0.010)	(0.110)	(0.735)
Primary Shares (%)	-16.60***	-18.73***	-36.21***	-49.67***	-58.65***
	(0.002)	(0.000)	(0.000)	(0.000)	(0.001)
Book-to-Market Ratio	6.680**	0.606	2.694	4.457	0.536
	(0.0282)	(0.841)	(0.463)	(0.362)	(0.955)
Volatility	-592.9***	-219.4**	-613.7***	-640.6***	-517.6**
	(0)	(0.0112)	(0.000)	(0.000)	(0.0190)
Total Assets (log)	-1.964	2.056*	1.617	3.246	8.788**
	(0.185)	(0.0747)	(0.470)	(0.280)	(0.040)
Leverage	9.696**	-4.548*	1.221	-0.0788	-2.740
	(0.0144)	(0.0572)	(0.773)	(0.987)	(0.658)
Firm Age	0.0321	-0.0192	-0.0105	0.158	0.0180
	(0.525)	(0.679)	(0.896)	(0.207)	(0.915)
Dual Share Class Indicator	-7.141	-9.038*	-14.38*	-7.053	-38.14*
	(0.116)	(0.073)	(0.069)	(0.538)	(0.092)
Number of Analysts	1.617**	-1.134*	0.178	1.176	1.813
	(0.0142)	(0.0586)	(0.851)	(0.441)	(0.420)
Intangible Assets (%)	-11.02*	-5.242	-14.16	-7.144	-22.13
	(0.0627)	(0.401)	(0.104)	(0.588)	(0.227)
Proceeds (log)	-7.617***	-1.909	-9.038**	-14.19**	-11.24
	(0.00478)	(0.412)	(0.0180)	(0.0122)	(0.170)
High Tech Indicator	-3.819	-0.210	-2.070	-3.891	-7.353
	(0.207)	(0.943)	(0.592)	(0.482)	(0.302)
Shares Locked Up (%)	3.234*	3.015*	6.941*	15.22**	31.36**
	(0.080)	(0.099)	(0.066)	(0.013)	(0.048)

(Table 2.11 continued)

	(1)	(2)	(3)	(4)	(5)
	6 months	2nd 6 months	1 year	2 year	3 year
NYSE Indicator	1.031	3.902	6.126	2.935	5.130
	(0.763)	(0.268)	(0.249)	(0.709)	(0.646)
Underpricing			-	-	-
	-8.657***	-9.199***	11.65***	10.06***	19.77***
	(0.002)	(0.001)	(0.000)	(0.007)	(0.000)
Short Length Indicator	-2.881	-12.81	-7.919	-16.25	-3.299
	(0.704)	(0.111)	(0.465)	(0.228)	(0.871)
Long Length Indicator	-7.646	-9.624*	-15.06*	2.742	3.494
	(0.183)	(0.0975)	(0.0711)	(0.843)	(0.836)
Constant	89.38***	6.416	94.08**	149.8**	119.1
	(0.00293)	(0.802)	(0.0279)	(0.0168)	(0.183)
Annual Effects	Yes	Yes	Yes	Yes	Yes
Observations	1,092	1,092	1,092	958	799
R-squared	0.236	0.217	0.271	0.295	0.254

Panel B: Size Adjusted

	(1)	(2)	(3)	(4)	(5)
	6 months	2nd 6 months	1 year	2 year	3 year
Multiple Lockup Indicator	3.359	5.991	7.097	-9.467	-21.95**
	(0.542)	(0.212)	(0.302)	(0.325)	(0.047)
Venture Capital Indicator	-6.246	5.827*	-0.0901	-1.503	3.541
	(0.139)	(0.072)	(0.987)	(0.848)	(0.696)
Lead Underwriter Rank	3.907***	1.027	3.516**	3.122	1.094
	(0.000240)	(0.319)	(0.0164)	(0.140)	(0.701)
Primary Shares (%)	-16.53***	-18.60***	-35.98***	-49.71***	-57.82***
	(0.00192)	(0.000)	(0.000)	(0.000)	(0.001)
Book-to-Market Ratio	7.098**	1.103	3.932	5.993	7.494
	(0.0197)	(0.709)	(0.255)	(0.223)	(0.320)
Volatility	-586.3***	-213.4**	-596.0***	-619.6***	-406.5**
	(0.000)	(0.0135)	(0.000)	(0.000)	(0.0451)
Total Assets (log)	-1.913	2.244*	1.864	3.480	9.020**
	(0.196)	(0.0517)	(0.406)	(0.249)	(0.024)
Leverage	10.18***	-4.111*	2.153	0.944	0.385
	(0.00974)	(0.0863)	(0.605)	(0.847)	(0.946)
Firm Age	0.0309	-0.0234	-0.0158	0.156	-0.0107
	(0.543)	(0.613)	(0.845)	(0.217)	(0.947)

(Table 2.11 continued)

	(1)	(2)	(3)	(4)	(5)
	6 months	2nd 6 months	1 year	2 year	3 year
Dual Share Class Indicator	-5.994	-7.616	-11.03	-3.021	-16.52
	(0.183)	(0.121)	(0.130)	(0.784)	(0.312)
Number of Analysts	1.662**	-1.093*	0.284	1.309	2.687
	(0.0119)	(0.0691)	(0.765)	(0.395)	(0.223)
Intangible Assets (%)	-11.35*	-5.803	-15.10*	-8.263	-21.56
	(0.055)	(0.351)	(0.082)	(0.531)	(0.223)
Proceeds (log)	-7.626***	-1.978	-9.014**	-14.14**	-11.59
	(0.005)	(0.396)	(0.018)	(0.013)	(0.128)
High Tech Indicator	-3.594	0.0863	-1.444	-3.150	-4.580
	(0.234)	(0.977)	(0.706)	(0.566)	(0.496)
Shares Locked Up (%)	2.238	1.621	3.862	11.56*	12.83
	(0.208)	(0.331)	(0.184)	(0.0519)	(0.232)
NYSE Indicator	1.133	4.035	6.456	3.272	6.210
	(0.740)	(0.252)	(0.225)	(0.679)	(0.570)
Underpricing	-8.619***	-9.065***	-11.42***	-9.668***	-18.69***
	(0.002)	(0.001)	(0.000)	(0.009)	(0.000)
Short Length Indicator	-2.246	-10.58	-4.667	-13.25	3.527
	(0.771)	(0.183)	(0.666)	(0.331)	(0.861)
Long Length Indicator	-7.492	-9.747*	-14.83*	3.480	5.564
	(0.191)	(0.0931)	(0.0737)	(0.801)	(0.725)
Constant	88.75***	7.286	93.18**	148.0**	115.1
	(0.00322)	(0.775)	(0.0289)	(0.0179)	(0.166)
Annual Effects	Yes	Yes	Yes	Yes	Yes
Observations	1,089	1,089	1,089	955	797
R-squared	0.237	0.219	0.274	0.294	0.256

Panel C: Size and Book to Market Adjusted

	(1)	(2)	(3)	(4)	(5)
	6 months	2nd 6 months	1 year	2 year	3 year
Multiple Lockup Indicator	3.547	6.382	7.126	-8.805	-22.82*
	(0.535)	(0.196)	(0.316)	(0.377)	(0.0510)
Venture Capital Indicator	-7.036	5.951*	-0.830	-2.321	1.966
	(0.101)	(0.0672)	(0.887)	(0.774)	(0.837)

(Table 2.11 continued)

	(1)	(2)	(3)	(4)	(5)
	6 months	2nd 6 months	1 year	2 year	3 year
Lead Underwriter Rank	3.926***	1.086	3.637**	3.427	1.315
	(0.000247)	(0.294)	(0.0139)	(0.106)	(0.651)
Primary Shares (%)	-16.30***	-19.58***	-36.65***	-50.54***	-67.10***
	(0.003)	(0.000)	(0.000)	(0.000)	(0.001)
Book-to-Market Ratio	6.586**	0.566	2.607	4.030	-0.532
	(0.0311)	(0.852)	(0.479)	(0.504)	(0.965)
Volatility	-595.5***	-206.8**	-607.4***	-656.8***	-558.3**
	(0.000)	(0.017)	(0.000)	(0.000)	(0.015)
Total Assets (log)	-1.850	2.143*	1.817	3.365	8.515*
	(0.221)	(0.0666)	(0.433)	(0.294)	(0.061)
Leverage	9.882**	-4.315*	1.500	0.553	0.562
	(0.0132)	(0.0746)	(0.727)	(0.919)	(0.935)
Firm Age	0.0260	-0.0222	-0.0209	0.147	0.0224
	(0.609)	(0.632)	(0.797)	(0.252)	(0.898)
Dual Share Class Indicator	-7.509	-8.836*	-14.55*	-7.401	-42.11*
	(0.101)	(0.0802)	(0.0672)	(0.530)	(0.0688)
Number of Analysts	1.656**	-1.089*	0.201	1.379	1.735
	(0.0134)	(0.0713)	(0.833)	(0.382)	(0.462)
Intangible Assets (%)	-11.03*	-4.343	-13.87	-5.735	-21.01
	(0.0650)	(0.489)	(0.115)	(0.668)	(0.257)
Proceeds (log)	-7.898***	-2.380	-9.630**	-15.13**	-10.88
	(0.00444)	(0.318)	(0.0153)	(0.0123)	(0.232)
High Tech Indicator	-3.241	0.105	-1.499	-4.129	-8.530
	(0.288)	(0.972)	(0.702)	(0.460)	(0.239)
Shares Locked Up (%)	3.232*	3.026*	6.896*	15.23**	33.28**
	(0.0817)	(0.0998)	(0.0685)	(0.0139)	(0.0438)
NYSE Indicator	1.128	4.579	6.662	4.063	3.554
	(0.744)	(0.196)	(0.215)	(0.612)	(0.756)
Underpricing	-8.119***	-9.942***	-11.77***	-9.943**	-19.45***
	(0.004)	(0.000)	(0.000)	(0.011)	(0.000)
Short Length Indicator	-2.990	-10.96	-5.722	-15.18	-4.920
	(0.702)	(0.171)	(0.599)	(0.270)	(0.811)
Long Length Indicator	-7.838	-11.54**	-16.25*	1.834	3.027
	(0.187)	(0.0461)	(0.0586)	(0.898)	(0.861)

(Table 2.11 continued)

	(1)	(2)	(3)	(4)	(5)
	6 months	2nd 6 months	1 year	2 year	3 year
Constant	91.69***	11.74	100.7**	160.6**	123.6
	(0.003)	(0.652)	(0.0230)	(0.0149)	(0.204)
Annual Effects	Yes	Yes	Yes	Yes	Yes
Observations	1,076	1,076	1,076	937	776
R-squared	0.235	0.218	0.268	0.293	0.252

This table reports regression results in which the dependent variable is the buy and hold long run returns for IPO firms. Observations are for firms with an IPO between 2000 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds. The CRSP value weighted index is used for the market adjustment. For size matched BHARs, the market value for the non-issuing firms is determined at the end of each month while the market value for the issuing firms is taken on the date of their first appearance in CRSP. On this date, the issuing firm is matched to the next largest firm. If the matched firm is delisted, the issuing firm is then matched to the next largest firm. For book-to-market matching, size deciles are determined based on NYSE firms at the end of each month. Each issuing firm with a positive book-to-market value is then matched to the firm in its size decile, which has the closest book-to-market value. Again, should the matched firm be delisted, the match is replaced by the firm in the issuer's size decile with the next nearest book-to-market value. For those issuers with zero or negative book-to-market values, the match is the non-issuing firm closest in size that also has a zero or negative book-to-market ratio. In all cases, matching firms must have at least 5 years of return data, must not have issued equity within the past 5 years, and must have a single class of stock outstanding to be an eligible match. The variable high tech is an indicator that is set to 1 if the firm is an industry defined as a technology industry as in Cliff and Denis (2004). Number of analysts is from I/B/E/S coverage in the third month following IPO. Firm age, the dual class indicator, which has a value of 1 if the firm has multiple classes of stock outstanding, and the lead underwriter ranking were obtained from Jay Ritter's website. Underpricing is the percent difference between the offering price and the first day's closing price. Volatility is the standard deviation of the market model residual over seventy days prior to lockup expiration excluding the 20 days prior to lockup. Runup is the cumulative return from IPO until day -20. Robust p-value in parentheses. *** p<0.01, ** p<0.05, * p<0.1

negatively related in the following 6 months such that the effect is lost going forward.

Leverage behaves similarly with more highly levered firms initially performing well, but

again this effect is largely reversed in the second six months. The percent of shares

locked up consistently has a positive effect on long-term performance, but this effect is generally only significant during the first six months and over the two year time period.

Table 2.12: Buy and Hold Long Run Regressions, Excluding Year 2000

Panel A: Market Adjusted

	(1)	(2)	(3)	(4)	(5)
	6 months	2nd 6 months	1 year	2 year	3 year
Multiple Lockup Indicator	-1.577	6.481	3.596	-13.10	-27.09**
	(0.733)	(0.234)	(0.634)	(0.239)	(0.0301)
Venture Capital Indicator	-3.277	6.242*	1.874	2.384	8.967
	(0.414)	(0.0989)	(0.792)	(0.809)	(0.452)
Lead Underwriter Rank	1.961*	0.946	2.750	2.788	-0.00762
	(0.0738)	(0.415)	(0.118)	(0.271)	(0.998)
Primary Shares (%)	-19.57***	-17.10***	-37.24***	-52.08***	-58.85***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.003)
Book-to-Market Ratio	7.746***	1.407	4.874	5.692	6.342
	(0.00793)	(0.654)	(0.163)	(0.274)	(0.430)
Volatility	-512.7***	-107.8	-580.3***	-711.8***	-815.9**
	(0.000)	(0.435)	(0.004)	(0.010)	(0.0236)
Total Assets (log)	-1.953	2.425*	1.038	3.386	8.742
	(0.218)	(0.0705)	(0.726)	(0.393)	(0.111)
Leverage	9.911**	-4.901**	1.630	0.782	-2.627
	(0.0124)	(0.0395)	(0.719)	(0.885)	(0.698)
Firm Age	0.0363	-0.0334	-0.00551	0.148	-0.00826
	(0.443)	(0.483)	(0.947)	(0.250)	(0.963)
Dual Share Class Indicator	-9.248*	-7.988	-13.77	-5.274	-17.63
	(0.0574)	(0.135)	(0.101)	(0.687)	(0.357)
Number of Analysts	1.102	-1.307**	-0.117	0.587	2.422
	(0.102)	(0.0453)	(0.914)	(0.740)	(0.376)
Intangible Assets (%)	-11.69**	-5.525	-18.50**	-10.94	-21.86
	(0.0371)	(0.403)	(0.0398)	(0.437)	(0.286)
Proceeds (log)	-5.061*	-0.0545	-5.759	-12.14*	-8.507
	(0.0708)	(0.983)	(0.227)	(0.0797)	(0.405)
High Tech Indicator	-2.237	0.245	-1.135	-0.830	-2.494
	(0.497)	(0.943)	(0.818)	(0.908)	(0.781)

(Table 2.12 continued)

	(1) 6 months	(2) 2nd 6 months	(3) 1 year	(4) 2 year	(5) 3 year
Shares Locked Up (%)	3.510*	0.834	4.526	13.97**	14.82
	(0.0674)	(0.652)	(0.177)	(0.0359)	(0.210)
NYSE Indicator	1.340	2.861	5.345	1.925	3.804
	(0.694)	(0.441)	(0.350)	(0.821)	(0.754)
Underpricing	-8.016	-1.016	-10.67	-13.70	-28.13**
	(0.101)	(0.853)	(0.205)	(0.218)	(0.0217)
Short Length Indicator	-0.559	-12.66	-8.057	-21.15	-3.802
	(0.939)	(0.175)	(0.529)	(0.221)	(0.892)
Long Length Indicator	-7.968	-10.50	-13.76	7.586	11.21
	(0.155)	(0.104)	(0.153)	(0.638)	(0.555)
Constant	56.60*	10.23	67.04	174.7**	149.8
	(0.0649)	(0.747)	(0.204)	(0.0228)	(0.188)
Annual Effects	Yes	Yes	Yes	Yes	Yes
Observations	858	858	858	755	624
R-squared	0.134	0.103	0.124	0.192	0.169

Panel B: Size Adjusted

	(1) 6 months	(2) 2nd 6 months	(3) 1 year	(4) 2 year	(5) 3 year
Multiple Lockup Indicator	-1.529	7.191	4.383	-12.63	-27.06**
	(0.741)	(0.185)	(0.561)	(0.258)	(0.0301)
Venture Capital Indicator	-3.260	6.230*	1.857	2.372	9.072
	(0.416)	(0.0994)	(0.795)	(0.810)	(0.447)
Lead Underwriter Rank	1.976*	0.790	2.595	2.706	0.0783
	(0.0728)	(0.493)	(0.139)	(0.288)	(0.983)
Primary Shares (%)	-19.53***	-17.00***	-37.09***	-52.05***	-59.03***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.002)
Book-to-Market Ratio	7.718***	1.287	4.741	5.622	6.305
	(0.008)	(0.682)	(0.175)	(0.280)	(0.432)
Volatility	-510.7***	-114.1	-585.8***	-716.9***	-812.6**
	(0.000)	(0.409)	(0.004)	(0.009)	(0.0246)
Total Assets (log)	-1.903	2.591*	1.241	3.532	8.871
	(0.230)	(0.0538)	(0.677)	(0.376)	(0.107)

(Table 2.12 continued)

	(1)	(2)	(3)	(4)	(5)
	6 months	2nd 6 months	1 year	2 year	3 year
Leverage	10.22**	-4.751**	1.963	1.064	-1.760
	(0.0101)	(0.0473)	(0.668)	(0.847)	(0.797)
Firm Age	0.0350	-0.0382	-0.0115	0.144	-0.0126
	(0.462)	(0.422)	(0.891)	(0.267)	(0.944)
Dual Share Class Indicator	-9.274*	-8.147	-13.93*	-5.422	-17.84
	(0.0572)	(0.128)	(0.0979)	(0.679)	(0.350)
Number of Analysts	1.110*	-1.326**	-0.137	0.577	2.470
	(0.0992)	(0.0417)	(0.899)	(0.744)	(0.367)
Intangible Assets (%)	-11.94**	-5.890	-19.06**	-11.53	-22.76
	(0.0334)	(0.372)	(0.0344)	(0.414)	(0.267)
Proceeds (log)	-5.171*	-0.223	-5.970	-12.30*	-8.847
	(0.0662)	(0.932)	(0.213)	(0.0768)	(0.389)
High Tech Indicator	-2.198	0.283	-1.066	-0.838	-2.301
	(0.505)	(0.934)	(0.829)	(0.907)	(0.798)
Shares Locked Up (%)	3.515*	0.792	4.477	13.91**	14.89
	(0.0662)	(0.668)	(0.178)	(0.0367)	(0.209)
NYSE Indicator	1.314	2.849	5.323	1.920	3.853
	(0.699)	(0.443)	(0.352)	(0.822)	(0.751)
Underpricing	-8.098*	-0.910	-10.58	-13.61	-28.38**
	(0.0977)	(0.868)	(0.209)	(0.222)	(0.0205)
Short Length Indicator	-0.0859	-10.10	-4.903	-19.03	-4.066
	(0.991)	(0.270)	(0.700)	(0.280)	(0.885)
Long Length Indicator	-7.996	-11.10*	-14.34	7.366	11.17
	(0.153)	(0.0850)	(0.135)	(0.648)	(0.557)
Constant	78.60***	8.363	95.09*	177.2**	152.0
	(0.00743)	(0.759)	(0.0592)	(0.0213)	(0.183)
Annual Effects	Yes	Yes	Yes	Yes	Yes
Observations	856	856	856	753	623
R-squared	0.134	0.102	0.124	0.190	0.168

Panel C: Size and Book to Market Adjusted

	(1)	(2)	(3)	(4)	(5)
	6 months	2nd 6 months	1 year	2 year	3 year
Multiple Lockup Indicator	-1.467	6.979	4.320	-11.56	-27.59**
	(0.760)	(0.215)	(0.581)	(0.318)	(0.0324)

(Table 2.12 continued)

	(1)	(2)	(3)	(4)	(5)
	6 months	2nd 6 months	1 year	2 year	3 year
Venture Capital Indicator	-3.753	6.573*	1.761	2.143	9.225
	(0.362)	(0.0837)	(0.809)	(0.832)	(0.442)
Lead Underwriter Rank	1.969*	0.768	2.572	2.908	0.243
	(0.0761)	(0.507)	(0.144)	(0.256)	(0.948)
Primary Shares (%)	-19.47***	-18.00***	-37.76***	-52.82***	-67.62***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.00107)
Book-to-Market Ratio	7.732***	1.361	4.812	5.698	7.523
	(0.00810)	(0.665)	(0.167)	(0.368)	(0.467)
Volatility	-514.5***	-83.48	-574.3***	-753.9***	-948.2**
	(0.000)	(0.549)	(0.005)	(0.008)	(0.0116)
Total Assets (log)	-1.936	2.613*	1.256	3.263	7.725
	(0.239)	(0.0555)	(0.680)	(0.436)	(0.190)
Leverage	10.05**	-4.631*	1.925	1.191	-0.524
	(0.0118)	(0.0529)	(0.675)	(0.849)	(0.948)
Firm Age	0.0311	-0.0375	-0.0150	0.134	0.00177
	(0.515)	(0.431)	(0.859)	(0.305)	(0.992)
Dual Share Class Indicator	-9.607*	-7.981	-14.00*	-6.133	-21.92
	(0.0503)	(0.135)	(0.0964)	(0.647)	(0.260)
Number of Analysts	1.142*	-1.263*	-0.0648	0.828	2.370
	(0.0952)	(0.0550)	(0.953)	(0.649)	(0.413)
Intangible Assets (%)	-11.83**	-4.832	-18.18**	-9.068	-20.45
	(0.0362)	(0.466)	(0.0444)	(0.523)	(0.321)
Proceeds (log)	-5.402*	-0.499	-6.477	-12.97*	-6.954
	(0.0640)	(0.852)	(0.190)	(0.0811)	(0.544)
High Tech Indicator	-1.789	0.652	-0.460	-1.068	-3.673
	(0.590)	(0.851)	(0.926)	(0.882)	(0.684)
Shares Locked Up (%)	3.529*	0.764	4.462	13.96**	16.02
	(0.0675)	(0.677)	(0.181)	(0.0381)	(0.192)
NYSE Indicator	1.592	3.500	5.954	3.131	1.717
	(0.643)	(0.350)	(0.300)	(0.716)	(0.890)
Underpricing	-8.300*	-0.636	-10.51	-14.82	-30.44**
	(0.0919)	(0.908)	(0.212)	(0.187)	(0.0140)
Short Length Indicator	-0.365	-9.664	-4.958	-19.44	-5.268
	(0.961)	(0.293)	(0.699)	(0.274)	(0.850)

(Table 2.12 continued)

	(1)	(2)	(3)	(4)	(5)
	6 months	2nd 6 months	1 year	2 year	3 year
Long Length Indicator	-8.484	-11.02*	-14.78	6.223	10.94
	(0.137)	(0.0904)	(0.127)	(0.701)	(0.567)
Constant	81.62***	10.23	100.4*	183.4**	170.1
	(0.00718)	(0.713)	(0.0529)	(0.0235)	(0.169)
Annual Effects	Yes	Yes	Yes	Yes	Yes
Observations	846	846	846	738	605
R-squared	0.132	0.102	0.122	0.190	0.169

This table reports regression results in which the dependent variable is the buy and hold long run returns for IPO firms. Observations are for firms with an IPO between 2001 and 2012 inclusive excluding firms whose offering price is less than $5, ADRs, non-common stock offerings, REITs, mutual to stock conversions, equity carveouts, spinoffs, or closed end funds. The CRSP value weighted index is used for the market adjustment. For size matched BHARs, the market value for the non-issuing firms is determined at the end of each month while the market value for the issuing firms is taken on the date of their first appearance in CRSP. On this date, the issuing firm is matched to the next largest firm. If the matched firm is delisted, the issuing firm is then matched to the next largest firm. For book-to-market matching, size deciles are determined based on NYSE firms at the end of each month. Each issuing firm with a positive book-to-market value is then matched to the firm in its size decile that has the closest book-to-market value. Again, should the matched firm be delisted, the match is replaced by the firm in the issuer's size decile with the next nearest book-to-market value. For those issuers with zero or negative book-to-market values, the match is the non-issuing firm closest in size that also has a zero or negative book-to-market ratio. In all cases, matching firms must have at least 5 years of return data, must not have issued equity within the past 5 years, and must have a single class of stock outstanding to be an eligible match. The variable high tech is an indicator that is set to 1 if the firm is an industry defined as a technology industry as in Cliff and Denis (2004). Number of analysts is from I/B/E/S coverage in the third month following IPO. Firm age, the dual class indicator, which has a value of 1 if the firm has multiple classes of stock outstanding, and the lead underwriter ranking were obtained from Jay Ritter's website. Underpricing is the percent difference between the offering price and the first day's closing price. Volatility is the standard deviation of the market model residual over seventy days prior to lockup expiration excluding the 20 days prior to lockup. Runup is the cumulative return from IPO until day -20. Robust p-value in parentheses. *** p<0.01, ** p<0.05, * p<0.1

2.6 Conclusion

In this chapter we explore multiple aspects of firms' IPO lockup decisions. We re-examine previous findings regarding lockup length choice and market reaction upon

lockup expiration using more recent data. More importantly, we extend the lockup literature in several areas that, to our knowledge, are not represented in the extant literature. Firms with higher book-to-market values and those with dual class share structures are more likely to use multiple lockups while those with firms with more primary shares sold are less likely to use a staged lockup arrangement.

In addition to the type of firms using multiple lockups, we explore the market's reaction to these agreements. We find that abnormal trading volume falls monotonically with lockup release order. Perhaps of more practical importance we find that for the third or subsequent lockup, the market does not react reliably negatively as it does for the single lockups that have previously been explored. While we cannot strongly say that the reaction is positive, the evidence tends in that direction. For the long run market response, results indicate that firms with multiple lockups underperform over the three years following IPO, but not in the six month, one year, or two year subperiods. We do find that those firms with more primary shares sold in the initial offering consistently underperform regardless of the subperiod in question.

Chapter 3. Accelerated Share Repurchases

3.1 Introduction

In contrast to those firms undertaking an equity offering, others have a need to disgorge themselves of cash and return the proceeds of their enterprise to stockholders. For much of the twentieth century, dividends were by far the primary means for doing so. However, in the 1980's the prevalence of stock repurchase programs began to grow at a rate far exceeding that of dividends with repurchases exceeding dividends (in dollar terms) by 1999 (Grullon and Michaely, 2002). Although several methods of repurchase have been used including fixed price tender offers and dutch auctions, the open market repurchase (OMR) has historically been the dominant form with Grullon and Ikenberry (2000) finding them to be responsible for 91% of the value of repurchases over the 1980-1999 period. More recently a relatively new form of open market repurchase has gained in popularity, the accelerated share repurchase (ASR).

Bargeron, Kulchania and Thomas (2011) report a total of 13 ASRs between the years 1996-2003. As shown in Table 3.1, we find an equal number in 2004 alone, which rises over the next 3 years before falling in 2008. Beginning in 2010, the number of ASRs begins to recover and becomes increasingly numerous in comparison to OMRs in the post financial crisis era.

Like the OMR, shares under an ASR are purchased in the open market; however, the purchasing firm in an ASR contracts with an investment bank as an intermediary to deliver to the firm a substantial portion of the repurchase program immediately by borrowing those shares. The intermediary then covers its short position over the time frame specified in the contract (typically several months) through open

Table 3.1: Annual Sample Distribution by Repurchase Type

	OMR			ASR		
Year	Mean Program Size (million)	N	%	Mean Program Size (million)	N	%
2004	624.1	565	97.9%	462.7	12	2.1%
2005	639.3	655	95.9%	486.7	28	4.1%
2006	686.7	669	96.1%	314.3	27	3.9%
2007	693.6	840	92.8%	770.9	65	7.2%
2008	360.7	738	97.9%	340.3	16	2.1%
2009	421.9	288	98.3%	756.7	5	1.7%
2010	823.1	460	96.4%	296.7	17	3.6%
2011	507.2	575	95.5%	261.7	27	4.5%
2012	927.1	435	95.4%	870.7	21	4.6%
2013	1,027.6	429	91.5%	673.1	40	8.5%
2014	480.4	530	90.4%	556.2	56	9.6%
2004-2014		6184	95.2%		314	4.8%

Table 3.1 displays the annual distributions of sample ASR and OMR firms along with their respective share of the distribution for the year. Data is from Thomson Reuter's SDC platinum database.

market purchases. Although the purchaser may specify the number of shares to be repurchased, more typically a program value is specified, and the number of shares delivered are based on the closing price. Because the actual prices paid by the intermediary are almost sure to vary as shares are repurchased, the contracts contain provisions for a cash or stock settlement to be made based upon the weighted average purchase price. In exchange for its' role in the ASR the intermediary is paid a commission for each share delivered. As a result of the average price settlement feature, the purchasing firm bears all price risk.

From the above description, the tradeoffs of the ASR versus the more traditional OMR become immediately obvious. In exchange for giving up any flexibility in the actual price paid for the shares, the repurchasing firm receives an immediate,

substantial reduction in the number of shares outstanding. The ASR represents a gain in immediacy at the cost of flexibility and the potential of paying a higher price per share than if the company were to conduct market repurchases at its discretion. An ASR further reduces flexibility as the contract locks in either the dollar value of the program of the number of shares whereas a firm conducting an OMR retains the option to not fulfill the announced program.

A number of possible reasons for employing an ASR rather than an OMR have been proposed in the extant literature including as signals by management to show their willingness to quickly return cash to stockholders or their belief that the stock is undervalued, to defend against takeovers, to adjust the firm's capital structure, or to manage earnings per share (Bargeron et. al, 2011). Chemmanur et. al (2010) also propose that ASRs may be used to combat dilution resulting from employee stock programs. In this paper, we explore one possible explanation for why firms would accept this loss of flexibility in exchange for an immediate reduction in shares outstanding. Specifically, we posit that firms are willing to accept the costs of the ASR to increase earnings per share (EPS) relative to analysts' expectations. Because ASRs deliver shares more immediately than an OMR, they provide a more impactful reduction in the number of shares outstanding for the announcement quarter. Since earnings are divided by a fewer number of shares, this reduction has the potential to inflate reported EPS.

The chapter proceeds as follows. We survey the relevant literature in section 2. We describe our empirical methods in section 3. We present and discuss the results in section 4, and we draw our conclusions in section 5.

3.2 Literature Review and Hypothesis Development

Firms were, until the 1980's, exceedingly hesitant to repurchase shares even though this form carried real world tax benefits for shareholders. This hesitancy is even more puzzling given earlier theoretical work (Miller and Modigliani, 1961) showing that, under perfect market assumptions, the choice to pay out through dividends or repurchases should be irrelevant. Grullon and Michaely (2002) attribute this lack of repurchase activity to corporate concerns that such a program would be seen by the SEC as an attempt to manipulate price. However, in 1982, the SEC adopted the safe harbor rule, Rule 10b-18[3], which provides guidelines under which firms may repurchase shares with the presumption that they were not influencing price.

A number of prior works study the flexibility offered by an OMR. Stephens and Weisbach (1998) find that although the majority of shares announced (74-82%) are actually repurchased in the subsequent three years, nearly 17% of firms purchase fewer than 20% of the shares announced with 10% of firms purchasing fewer than 10% of announced shares and more than 6% of firms purchasing substantially no shares. An OMR also provides substantial flexibility not only in the amount of shares to repurchase but also in the timing of cash disbursements. Both Jagannathan, Stephens and Weisbach (2000) and Guay and Harford (2000) demonstrate this flexibility by linking the choice between dividends and repurchases to the perceived permanence of the cash being paid out. Because of the semi-permanent nature of dividends, firms would rather

[3] Rule 10b-18 limits daily purchases to 25% of daily volume averaged over the previous 4 weeks, requires each day's purchases to be made through a single broker or dealer, forbids purchases in the opening or closing half-hours of trading, and prohibits purchases above either the last market purchase price or highest independent bid price.

not pay out temporary boons to cash by increasing dividends to unsustainable levels. Instead, a repurchase allows for the disbursement of excess cash without committing the firm to maintain these payouts in the future. The dearth of tender offers relative to OMRs in works such as Comment and Jarrell (1991), Ikenberry, Lakonishok and Vermaelen (1995) and Peyer and Vermaelen (2005) speak to the value of the flexibility inherent in the OMR.

In contrast, ASRs sacrifice the flexibility of the OMR for the immediacy of share delivery. Bagnoli, Gordan, and Lipman (1989) present a model in which share repurchases can serve as an effective takeover defense by signaling managements' private information thereby raising the firm's stock price to a level, which prevents a successful takeover. Because of the more immediate and inflexible nature of an ASR, the use of the form should provide a stronger, more credible signal than an OMR. Additionally, an OMR can serve as a takeover deterrent as Billet and Xue (2007) document that OMR authorization is related to a heightened latent takeover probability. Akyol, Kim and Shekhar (2014) find this deterrent effect to be even stronger for those firms choosing an ASR while Bargeron et. al (2011) find that ASR firms are significantly more likely than OMR firms to have been a takeover target within the 6 months prior to the repurchase announcement.

Closely related to the immediacy of an ASR is the credibility provided by the contractually obligated nature of the repurchase. The initiation of a repurchase is often seen as a signal by management of the firm's undervaluation (Dann, 1981; Vermaelen, 1981; Comment and Jarrell, 1991). The latter two works find a more significant market reaction for repurchases in the form of a tender offer than for OMRs. In this sense, we

would expect the ASR to function more like a tender offer than an OMR because it entails a commitment to purchase and not simply the intention to do so. This conjecture is supported by the findings of Chemmanur, Cheng and Zheng (2010); however, Bargeron et. al (2011) fail to detect a significant difference between the market reactions to ASRs and OMRs either in a univariate or multivariate setting. Bonaime (2012) considers the increased credibility of an ASR in the context of poor reputation firms that have previously authorized low completion OMRs and finds that these firms are more likely to announce more credible ASRs in the future to counteract the poor sentiment resulting from the prior OMR.

The quicker impact to earnings per share may also represent another, more relevant to this study, need for the immediacy provided by an ASR. In a survey of CFOs, Brav, Graham, Harvey and Michaely (2005) report that 75% deem increasing earnings per share as either important or very important to repurchase decisions compared to only 9.2% of CFOs who rank increasing EPS as not important or not important at all. Because an ASR lowers the number of shares outstanding more quickly than an OMR, it should be a more effective tool in increasing EPS. Marquardt, Tan and Young (2009) find positive relationships between EPS accretative repurchases and CEO compensation that is explicitly tied to EPS and the choice of an ASR. However, they do not consider analysts expectations in their study. Additionally, they document a link between the use of ASRs and voluntary CEO turnover subsequent to repurchase.

A large body of literature concerns the effects of either meeting or failing to meet these analysts' expectations. Degeorge, Patel and Zeckhauser (1999) examines the

distribution of earnings relative to expectations and document an unusually low number of observations that fall just short of expectations along with an abnormally high volume that just meet them. Burgstahler and Eames (2006) corroborate these findings. Degeorge et. al (1999) also finds an underrepresentation of large positive earnings surprises, which they attribute to "saving for a better tomorrow." Brown and Caylor (2005) find that, beginning in the mid-1990's" the avoidance of negative quarterly earnings surprises becomes the most relevant benchmark compared to avoiding negative earnings or earnings decreases. The market rewards firms that meet these expectations with greater valuations for firms that consistently do so (Kasznik and McNichols, 2002), and even does so when earnings were likely managed to achieve the benchmark albeit to a lesser degree (Bartov, Givoly and Hayn, 2002). Most closely related to our study, Hribnar, Jenkins and Johnson (2006) find a significantly large number of firms, which would have missed earnings expectations by a cent without repurchasing shares through an OMR program.

3.3 Empirical Method

3.3.1 Sample Selection

To construct our sample, we begin by obtaining all repurchase announcements from 2004-2014 by US firms from Thomson Reuter's SDC platinum database. In addition to those observations flagged by SDC as ASRs, we search the deal synopses for "accelerated", and we look through negotiated transactions for which the counterparty is an investment bank. For these alternative methods, we check SEC filings to determine whether the repurchase truly is an ASR. SDC also provides OMRs for comparison. Using these methods we yield an initial sample of 325 ASRs and 6730

OMRs. Because ASRs are often undertaken as part of an ongoing open market program, we match each ASR to a preceding OMR when possible to prevent comparison between an ASR and the OMR for which it is a constituent. We also use Compustat to confirm the nation of the repurchasing firms, which reduces the number of OMRs in the sample to 6184, and the number of ASRs to 314. From SDC we also obtain data regarding attempted takeovers of sample firms and equity issuance by sample firms. Accounting variables are taken from Compustat while CRSP provides pricing, return and trade volume information. We obtain from I/B/E/S analysts expectations, actual EPS, and earnings announcement dates.

3.3.2 Variable Construction

Return Std. Dev is the standard deviation of returns over a period beginning 255 days prior to program announcement and ending 46 days prior as in Bargeron et. al (2011).

Illiquidity is the Amihud (2002) illiquidity factor which measures daily absolute return scaled by dollar trading volume averaged over the same period as *Return Std. Dev*.

Assets is the book value of total assets from Compustat annual data at the end of the fiscal year preceding repurchase initiation.

Cash is cash and equivalents assets from Compustat annual data at the end of the fiscal year preceding repurchase initiation.

Free Cash Flow is free cash flows as in Acharya, Almeida and Campello (2007) measured as gross operating income less depreciation, tax payments, interest expense, and total dividends scaled by total assets.

Free Cash Flow Std. Dev. is the 5 year standard deviation of the above free cash flow measure.

High-hedge and Low-hedge are similarly based on Acharya, Almeida and Campello (2007) and are determined by the three year correlation between free cash flow and 3 digit SIC industry median research and development expenses. Correlations less than -0.2 results in a value of 1 for *Highhedge* while correlations greater than 0.2 results in a value of 1 for *Lowhedge*.

Market-to-book is firm market capitalization scaled by the book value of equity defined as in Fama and French (1993) as stockholders equity plus balance sheet deferred taxes plus investment tax credits, if applicable, less the value of preferred stock where preferred stock is measured, in order of preference, by redemption, liquidation, or par value. Values are Compustat annual values at fiscal year end prior to repurchase.

Takeover is a dummy variable indicated whether the firm has been the target of a takeover attempt, according to SDC, in the 6 months prior to repurchase.

Ratio is based on the quarterly Compustat variable *cshfdq*, which records the number of shares outstanding used to determine fully diluted EPS. *Ratio* is calculated as the current value divided by the lagged value and is used as indicator of the effect of the repurchase on available shares in the quarter of authorization.

As if EPS is the product of *Ratio* and EPS as reported by I/B/E/S, *EPS_actual*, which serves as an estimate of earnings per share absent repurchase.

Prior stock performance is the market model cumulative abnormal returns over days -44 through -4 prior to the repurchase announcement.

Equity offering is an indicator variable that takes a value of 1 if the firm conducts a seasoned equity offering during the repurchase quarter. Offer information is obtained from the SDC New Issues database.

Stock split or Dividend is an indicator variable that takes a value of 1 if the firm undergoes a stock split or issues a stock dividend during the repurchase quarter. Data for the variable comes from CRSP.

Negative Earnings is an indicator variable that takes a value of 1 if the firm has negative earnings for the quarter based on the actual earnings reported by I/B/E/S.

Discretionary Accruals is a measure of discretionary accruals calculated using quarterly data based on the modified Jones (1991) method proposed by Dechow, Sloan and Sweeney (1995).

3.3.3 Descriptive Statistics and Univariate Analysis

Table 3.2 presents summary statistics for the sample split by repurchase type. We test differences in means via t-test and differences in medians using a Wilcoxon rank sum test.

Table 3.2: Descriptive Statistics

		N	OMR	N	ASR	Difference
Assets	[Mean]	6151	12,948	314	18,821	-5,873
	[Median]		1,041		5,301	-4261***
ln(Assets)		6151	7.070	314	8.576	-1.506***
			6.948		0.148	6.800***
Cash/Assets		6151	0.174	314	0.148	0.026**
			0.099		0.095	0.005
ln(Illiquidity)			-		-	
		6019	19.213	314	22.083	2.870***
			-		-	
			19.763		22.183	2.420***
Return Std. Dev.		6019	0.023	314	0.017	0.006***
			0.019		0.015	0.005***
Market Value Equity		5814	6,730	303	10,858	-4128***
			878		4,891	-4014***
Book Value Equity		5801	0.996	303	0.083	0.913
Growth			0.094		0.073	0.021***

(Table 3.2 continued)

		N	OMR	N	ASR	Difference
Beta	[Mean]	5427	1.131	307	1.092	0.040
	[Median		1.004		1.010	-0.006
Free Cash Flow		4659	0.039	275	0.060	-0.021
			0.046		0.052	-0.006***
Free Cash Flow Std. Dev.		4063	0.061	270	0.026	0.035**
			0.026		0.017	0.009***
High-hedge		4667	0.290	278	0.385	-0.095***
			0.000		0.000	0***
Low-hedge		4667	0.624	278	0.514	0.109***
			1.000		1.000	0***
Market to Book		5814	-12.438	303	1.779	-14.217
			1.902		2.211	-0.309***
ln(Market to Book)		5755	0.725	301	0.823	-0.098**
			0.653		0.796	-0.142***
Leverage		4698	0.412	276	0.392	0.020
			0.353		0.403	-0.050***
Return on Assets		5812	0.036	298	0.044	-0.008
			0.032		0.038	-0.006***
Profit Margin		5804	-0.451	298	0.208	-0.659
			0.180		0.167	0.013
Program size (% of shares outstanding)		6080	32.465	309	5.972	26.493
			5.570		4.456	1.114***
Prior Stock Performance		5925	-0.044	313	-0.006	-0.038***
			-0.029		-0.002	-0.028***
Net PPE/assets		6123	0.164	311	0.223	-0.059***
			0.077		0.144	-0.067***
Takeover		6184	0.004	314	0.057	-0.053***
			0.000		0.000	0***

Table 3.2 presents summary statistics for the sample. The sample originates from SDC platinum repurchase data and consists of the identifiable ASR and OMR repurchases over the years 2004-2014. Assets is Compustat total assets at the end of the fiscal year prior to the repurchase announcement. Ln(assets) is the natural log of total assets. Cash/assets is cash and equivalents divided by total assets at the end of the fiscal year prior to repurchase. Ln(Illiquidity) is the natural log of the Amihud (2002) illiquidity measure. Return Std. Dev. is the standard deviation of returns over a period beginning 255 days prior to repurchase announcement and ending 46 days prior. The market value of equity is the product of share price and number of shares outstanding at the end of the fiscal year prior to repurchase. Book value equity growth is the book value of equity at the end of the fiscal year prior to repurchase less the value one year prior scaled by the lagged value. The book value of equity is determined as in Fama and French (1993). Beta is the beta coefficient of a 60-month market model regression ending the month prior to the earnings announcement following the repurchase quarter.

Free cash flow is a measure of free cash flow as in Acharya et al. (2007). Free cash flow std. dev is the 5-year standard deviation of the free cash flow measure. High-hedge is an indicator variable that takes the value of 1 if the 3-year correlation between free cash flow and 3 digit sic industry median research and development expense is less than -0.2. Low-hedge is an indicator variable that takes the value of 1 if the 3 year correlation between free cash flow and 3 digit sic industry median research and development expense is greater than 0.2. All free cash flow measures are at the end of the fiscal year prior to the repurchase announcement. Market to book is the market value of equity divided by the book value of equity. Ln(market to book) is the natural log of the market value of equity divided by the book value of equity. Leverage is the sum of long-term debt and total current liabilities scaled by total assets at the end of the fiscal year prior to the repurchase announcement. Return on assets is operating income before depreciation divided by total assets less cash and equivalents as in Chemmanur et al (2010). Profit margin is operating income before depreciation divided by sales also as in Chemmanur et. al (2010). Return on assets and Profit margin are measured for the quarter in which the repurchase announcement is made. Program size is the number of shares authorized for repurchase divided by the number of shares outstanding and is taken from SDC. Prior stock performance is the market model cumulative abnormal returns over days -44 through -4 prior to the repurchase announcement. Net PPE/assets is the net value of plant, property, and equipment divided by total assets at the end of the fiscal year prior to the repurchase announcement. Takeover is an indicator variable that takes a value of 1 if the repurchasing firm was the target of a takeover attempt in the 6 months preceding the repurchase announcement. Takeover attempts are obtained from the SDC mergers and acquisitions database. Differences in means (medians) are test using a t-test (Wilcoxon rank sum test). *, **, & *** represent significance at the 0.1, 0.05, & 0.01 levels respectively.

Those firms undertaking ASRs are generally larger than firms conducting the more traditional OMR whether measured by book assets or market capitalization though only the differences in medians show significance. However, the size of an ASR tends to be smaller than an OMR. Evidence on cash holdings is mixed with OMR firms having weakly significant mean holdings while the median cash levels are insignificantly greater for ASR firms. Leverage is similarly mixed with ASRs having the higher median but lower mean leverage. Consistent with the need for flexibility, OMR firms have significantly more volatile share prices as reflected by the higher standard deviation of returns. ASR firms exhibit significantly higher and less volatile free cash flows, which

may indicate the use of an ASR as a more credible means for management to signal its intent to return cash to shareholders.

In contrast to Bargeron et. al (2011), we find that ASR firms more frequently exhibit a strong negative correlation between cash flows and investment needs (high hedge) and less frequently show a strong positive correlation in comparison to OMR firms. ASR firms typically have a higher market to book value and median growth in the value of book equity is significantly lower than OMR firms. Prior stock performance is significantly better for ASR firms, which is not consistent with ASR use as a signal of undervaluation. Lastly, the much greater proportion of ASR firms having experienced takeover bids corroborates prior findings concerning the use of an ASR as a takeover defense mechanism.

3.4 Results

3.4.1 Logit Regression of Repurchase Type

To test the effect of earnings expectations on the choice to repurchase using an ASR or OMR, we estimate "as if" earnings that reflect EPS in the absence of a repurchase by scaling the number of shares used to calculate EPS in the repurchase quarter by the prior quarter's shares then multiplying that ratio by actual EPS. For consistency with prior literature and practice, we round these estimates to two decimal places. We then compare these estimated earnings to median analyst expectations and categorize each firm as miss, just miss, just beat, or beat. Firms whose EPS fall short of expectations by a cent are categorized as just miss while those further below expectations are classified as miss. Those firms that meet expectations or exceed by a cent are classified just beat while those that further out perform expectations are a beat.

We then conduct logit regressions where the dependent variable is an indicator taking a value of 1 for firms conducting an ASR and 0 for OMR firms. We create indicators for each EPS categorization and include a number of other variables that have been shown to affect the decision to conduct an ASR. Table 3.3 presents the results of these regressions.

Specifications 1 through 4 include an indicator for each EPS category so that we can estimate the impact of all categories on the repurchase decision. Because the data requirements for the free cash flow related variables greatly limit the number of observations, we exclude these measures in specifications 1 through 4. In specification 1 we find that Miss firms are significantly more likely to elect to repurchase through an ASR, which is consistent with these firms needing the more immediate reduction in shares that an ASR provides to meet expectations. Specification 3 shows that firms that expect to meet or just beat expectations are much less likely to incur the costs of an ASR and instead choose an OMR. Firms that expect to fall just short of expectations or comfortably exceed them do not exhibit a significant preference for either repurchase type. In specifications 5 and 6, we reexamine the miss and just beat firms and include the free cash flow variables; the results remain consistent with specifications 1 and 3.

Results for the variables that have previously been linked to the repurchase decision remain largely consistent with the extant literature. Firm size, illiquidity, and market to book ratio are negatively related to ASR selection as is stock volatility, though not significantly so, while firms with better stock performance and those that have been takeover targets are more likely to choose an ASR.

Table 3.3: Logit Regression of Repurchase Type

	(1) ASR	(2) ASR	(3) ASR	(4) ASR	(5) ASR	(6) ASR	(7) ASR	(8) ASR
Miss	0.457***				0.488***			
	(3.041)				(3.048)			
Just Miss		-0.00261				-0.175		
		(-0.0103)				(-0.642)		
Just Beat			-0.279				-0.225	
			(-1.260)				(-0.965)	
Beat				-0.260*				-0.263*
				(-1.859)				(-1.755)
Return Std. Dev.	-19.66**	-18.85*	-19.18**	-18.75*	-13.59	-12.76	-12.76	-12.66
	(-2.060)	(-1.944)	(-1.974)	(-1.954)	(-1.421)	(-1.327)	(-1.327)	(-1.323)
ln(Illiquidity)	-0.620***	-0.626***	-0.614***	-0.633***	-0.806***	-0.818***	-0.804***	-0.827***
	(-6.705)	(-6.797)	(-6.560)	(-6.852)	(-6.647)	(-6.830)	(-6.605)	(-6.853)
ln(Assets)	-0.289***	-0.306***	-0.297***	-0.306***	-0.535***	-0.559***	-0.547***	-0.561***
	(-2.793)	(-2.957)	(-2.841)	(-2.947)	(-4.009)	(-4.248)	(-4.109)	(-4.244)
Cash/Assets	0.186	0.0483	0.0732	0.117	0.551	0.404	0.431	0.461
	(0.352)	(0.0905)	(0.137)	(0.220)	(0.879)	(0.637)	(0.683)	(0.733)
Program size (% of shares outstanding)	-0.0828***	-0.0795***	-0.0806***	-0.0799***	-0.0877***	-0.0849***	-0.0855***	-0.0855***
	(-4.217)	(-4.068)	(-4.111)	(-4.089)	(-4.256)	(-4.138)	(-4.161)	(-4.158)
Prior Stock Performance	1.932***	1.856***	1.858***	1.878***	1.690***	1.636***	1.613***	1.647***
	(3.628)	(3.501)	(3.490)	(3.548)	(3.014)	(2.954)	(2.899)	(2.971)
ln(Market to Book)	-0.486***	-0.498***	-0.484***	-0.510***	-0.594***	-0.614***	-0.601***	-0.630***
	(-3.266)	(-3.323)	(-3.230)	(-3.396)	(-3.165)	(-3.270)	(-3.164)	(-3.352)
Takeover	2.320***	2.261***	2.244***	2.313***	2.312***	2.240***	2.234***	2.312***
	(5.873)	(5.793)	(5.766)	(5.831)	(5.620)	(5.557)	(5.542)	(5.670)

(Table 3.3 Continued)

	(1) ASR	(2) ASR	(3) ASR	(4) ASR	(5) ASR	(6) ASR	(7) ASR	(8) ASR
Leverage	0.0697	0.0653	0.0597	0.0774	0.309	0.282	0.275	0.313
	(0.634)	(0.570)	(0.504)	(0.719)	(1.570)	(1.441)	(1.403)	(1.582)
Free Cash Flow					0.530	0.578	0.634	0.516
					(0.286)	(0.312)	(0.345)	(0.277)
Free Cash Flow Std. Dev					-8.736**	-9.126**	-9.118**	-8.716**
					(-2.065)	(-2.143)	(-2.144)	(-2.072)
High-hedge					-0.0142	0.00955	0.00724	-0.0178
					(-0.0560)	(0.0377)	(0.0287)	(-0.0704)
Low-Hedge					-0.556**	-0.541**	-0.536**	-0.565**
					(-2.175)	(-2.121)	(-2.104)	(-2.208)
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annual Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-13.74***	-13.63***	-13.38***	-13.68***	-15.77***	-15.67***	-15.45***	-15.75***
	(-10.10)	(-10.14)	(-9.741)	(-10.17)	(-9.561)	(-9.645)	(-9.264)	(-9.635)
Observations	4,556	4,556	4,556	4,556	3,779	3,779	3,779	3,779

Table 3.3 presents results of a logit regression in which the dependent variable is an indicator that takes a value of 1 for repurchases conducted using an ASR and 0 for repurchases conducted under an OMR without an ASR component. Miss, Just Miss, Just Beat, and Beat are indicator variables that take a value of 1 if the as if earnings per share fall within the specified category. As if EPS is calculated as actual earnings multiplied by the number of shares used to calculated EPS divided by the previous quarter's shares and is an estimate of EPS in the absence of repurchase. As if EPS is then compared to median analyst expectations from I/B/E/S. Those firms that are 1 cent shy of meeting expectation are classified as Just Miss. Those that are further below expectations are classified as Miss. Firms that either meet expectations or exceed them by no more than 1 cent are classified as Just Beat. Firms with higher earnings are classified as Beat. Assets is Compustat total assets at the end of the fiscal year prior to the repurchase announcement. Ln(assets) is the natural log of total assets. Cash/assets is cash and equivalents divided by total assets at the end of the fiscal year prior to repurchase. Ln(Illiquidity) is the natural log of the Amihud (2002) illiquidity measure. Return Std. Dev. is the standard deviation of returns over a period beginning 255 days prior to repurchase announcement and ending 46 days prior. The market value of equity is the product of share price and number of shares outstanding at the end of the fiscal

year prior to repurchase. The book value of equity is determined as in Fama and French (1993). Ln(market to book) is the natural log of the market value of equity divided by the book value of equity. Leverage is the sum of long-term debt and total current liabilities scaled by total assets at the end of the fiscal year prior to the repurchase announcement. Free cash flow is a measure of free cash flow as in Acharya et al. (2007). Free cash flow std. dev is the 5-year standard deviation of the free cash flow measure. High-hedge is an indicator variable that takes the value of 1 if the 3-year correlation between free cash flow and 3 digit sic industry median research and development expense is less than -0.2. Low-hedge is an indicator variable that takes the value of 1 if the 3 year correlation between free cash flow and 3 digit sic industry median research and development expense is greater than 0.2. All free cash flow measures are at the end of the fiscal year prior to the repurchase announcement. Takeover is an indicator variable that takes a value of 1 if the repurchasing firm was the target of a takeover attempt in the 6 months preceding the repurchase announcement. Takeover attempts are obtained from the SDC mergers and acquisitions database. Program size is the number of shares authorized for repurchase divided by the number of shares outstanding and is taken from SDC. Prior stock performance is the market model cumulative abnormal returns over days -44 through -4 prior to the repurchase announcement. Industry effects are based on the Fama and French 12 industry classifications.

3.4.2 Change in earnings categorization

We next investigate the impact that the repurchase form has on realized earnings as compared to earnings absent repurchase. As before we assign each firm to miss, just miss, just beat, and beat categories based on their “as if” earnings. We then assign firms to the same categories based on their actual earnings compared to analyst expectations. We assign a value of 1 to miss firms, 2 to just miss firms, 3 to just beat firms, and 4 to beat firms. We then subtract the as if value from the actual value to determine the impact of the repurchase decision on earnings performance. For example, a firm that is a miss based on as if earnings that ultimately meets expectations would have a difference of 2. We regress this difference on variables impacting EPS using ordered logit. We include indicators for seasoned equity offerings and stock splits as these events impact the number of shares outstanding, and we include discretionary

accruals, which affect the EPS numerator. Also included is an indicator for firms that have negative earnings as a reduction in shares outstanding for these firms reduces earnings per share. Industry and annual fixed effects are included. Table 3.4 presents results.

Table 3.4: Ordered Logit of Change in Earnings Categorization

	(1) DIF	(2) DIF	(3) DIF	(4) DIF
ASR	0.856***		0.932***	
	(5.511)		(4.482)	
Equity Offering	-0.254	-0.274	-1.517	-1.540
	(-0.265)	(-0.301)	(-1.607)	(-1.611)
Stock Split or Dividend	-2.427***	-2.396***	-2.249***	-2.153***
	(-8.141)	(-8.202)	(-4.386)	(-4.319)
Negative Earnings	-0.243**	-0.297***	-0.345**	-0.371**
	(-2.400)	(-2.922)	(-2.315)	(-2.467)
ASRxMiss		1.991***		2.086***
		(8.416)		(6.676)
ASRxJust Miss		3.054***		2.944***
		(18.74)		(12.54)
ASRxJust Beat		0.523		0.795
		(0.760)		(1.063)
Discretionary Accruals			-1.376	-1.387
			(-1.630)	(-1.614)
Industry Effects	Yes	Yes	Yes	Yes
Annual Effects	Yes	Yes	Yes	Yes
Observations	5,245	5,245	2,353	2,353

Table 3.4 presents ordered logit regression results where the dependent variable is the difference between the earnings classification for actual EPS and the as if EPS classification. As if EPS is calculated as actual EPS multiplied by the number of shares used to calculated EPS divided by the previous quarter's shares and is an estimate of EPS in the absence of repurchase. As if and actual EPS are then compared to median analyst expectations from I/B/E/S. Those firms that are 1 cent shy of meeting expectation are classified as Just Miss. Those that are further below expectations are classified as Miss. Firms that either meet expectations or exceed them by no more than 1 cent are classified as Just Beat. Firms with higher earnings are classified as Beat. Miss is assigned a value of 1, Just Miss a value of 2, Just Beat a value of 3, and Beat a value of 4. The difference between the actual and as if EPS classification forms the dependent variable. ASR is an indicator that takes a value of 1 for repurchases conducted using an ASR and 0 for repurchases conducted under an OMR without an ASR component. Equity offering is an indicator variable that takes a value of 1 if the firm

had a seasoned equity offering during the repurchase quarter. Seasoned equity offerings are obtained from the SDC New Issues database. Stock Split or Dividend is an indicator variable that takes a value of 1 if the firm had a stock split or stock dividend during the repurchase quarter. Information for this variable comes from CRSP. Negative Earnings is an indicator variable that takes a value of 1 if the firm had negative earnings for the repurchase quarter. ASRxMiss is the product of ASR and an indicator variable that takes a value of 1 if as if EPS is classified as Miss. ASRxJust Miss is the product of ASR and an indicator variable that takes a value of 1 if as if EPS is classified as Just Miss. ASRx Just Beat is the product of ASR and an indicator variable that takes a value of 1 if as if EPS is classified as Just Beat. Discretionary Accruals is a measure of discretionary accruals calculated using the modified Jones method. Industry effects are based on the Fama and French 12 industry classifications.

In specification 1, we examine those variables that affect the number of shares outstanding. We find that firms conducting an ASR have significantly greater upward movement relative to OMR firms. The controls for equity issuance, stock splits, and negative earnings are signed as expected though only the split indicator shows significance. In specification 2, we replace the ASR indicator with interactions between the ASR indicator and the as if earnings category. Those firms that were expected to fall short of expectations that subsequently conduct an ASR are significantly more likely to increase their EPS performance relative to analyst expectations. Specifications 3 and 4 repeat the regressions with the inclusion of discretionary accruals. Results remain consistent.

3.4.3 Subsequent Earnings Performance

Because of the ongoing nature of repurchases in an OMR, firms choosing that repurchase form are likely to have an increased ability to make small changes in EPS through continued repurchases in subsequent quarters. In contrast, ASR firms realize an immediate change in the number of shares outstanding in the announcing quarter. As such, it may be more difficult for ASR firms to meet expectations going forward. However, given the importance of consistently meeting expectations, the management

of ASR firms may choose a repurchase program size that meets their current needs without overly limiting their future options. Alternatively, the finding by Aykol et. al (2014) that voluntary CEO turnover is significantly higher for ASR firms may indicate a willingness to maximize earnings in the present without regard for their successor's ability to meet future expectations. To discriminate between these possibilities we examine earnings performance against expectations in the four quarters subsequent to the repurchase quarter. Our performance measure here is the difference between actual earnings and median analyst expectations scaled by those expectations. Table 3.5 presents the results. We test for differences in means (medians) using a t-test (Wilcoxon rank sum test).

Table 3.5: Unexpected Earnings Subsequent to Repurchase

Quarter		N	OMR	N	ASR	Difference
1	[Mean]	4774	-0.015	293	0.010	-0.026
	[Median]		0.029		0.036	-0.008
2		4613	0.004	277	-0.088	0.091
			0.026		0.024	0.003
3		4450	0.064	262	-0.013	0.077
			0.026		0.022	0.004
4		4247	-0.042	243	-0.163	0.121
			0.028		0.020	0.007

Table 3.5 shows unexpected earnings in the 4 quarters following repurchase. Unexpected earnings is measured as the difference between actual EPS and the median analyst EPS forecast scaled by the median forecast. Differences in means (medians) are test using a t-test (Wilcoxon rank sum test). *, **, & *** represent significance at the 0.1, 0.05, & 0.01 levels respectively.

In general, OMR firms have greater earnings surprises when measured by the means, but in quarters 1-3 following repurchase. ASR firms have better median performance. However, neither repurchase form shows a significant advantage over the other. Overall, the results indicate that the decision to repurchase shares using an ASR does not significantly affect the firm's future ability to meet earnings expectations.

3.4.4 Short-term Market Performance

In Table 3.6, we display regression results for the short-term market reaction to the repurchase announcement. In all specifications, the dependent variable is the 3-day cumulative abnormal returns centered about the announcement day. Of primary interest is whether the market responds differently to an ASR than an OMR, and whether the market is able to determine whether the repurchase is perhaps being done to be able to meet analyst expectations. In specifications 1-4, we include OMR and ASR repurchases while specifications 5 and 6 are restricted solely to ASRs. As evidenced in all four of the specifications that contain both ASRs and OMRs, the market shows a markedly stronger response to the announcement of ASRs with a significance at the 1% level. However, the market does not appear to be able to tell at announcement that the repurchase may be being undertaken in order to manipulate EPS as "Met EPS Through Repurchase" is not significant in any specification in which it is included.

3.4.5 Long Run Market Performance

We next turn to the long run market performance of repurchasing firms. In measuring long run performance, we use the calendar time portfolio method advocated by Fama (1998). Table 3.7 displays long run performance based on repurchase type. In panel A, we look the full sample of OMRs and ASRs combined. In all time frames, we see significant abnormal performance when measured against the 3-factor model. In the 6 months subsequent to the repurchase announcement, there is an average monthly underperformance of 0.56% whereas the announcement month exhibits abnormal returns of nearly 1%. This abnormal performance still manifests itself over the

Table 3.6: Short-term Stock Market Reaction to Repurchase Announcement

	(1) CAR3vw	(2) CAR3vw	(3) CAR3vw	(4) CAR3vw	(5) CAR3vw	(6) CAR3vw
ASR	0.0153***	0.0155***	0.0159***	0.0162***		
	(5.019)	(5.066)	(5.160)	(5.237)		
Met EPS Through Repurchase		-0.00257		-0.00380	0.00672	0.00314
		(-0.685)		(-1.007)	(1.095)	(0.498)
Return Std. Dev.	0.878**	0.878**	0.504**	0.504**	0.490	0.239
	(2.503)	(2.503)	(2.395)	(2.396)	(1.353)	(0.636)
ln(Illiquidity)	0.00410***	0.00408***	0.00508***	0.00504***	0.00443	0.00560
	(3.272)	(3.243)	(3.377)	(3.344)	(0.949)	(1.027)
ln(Assets)	0.00486**	0.00485**	0.00532**	0.00532**	0.00403	0.00336
	(2.545)	(2.544)	(2.564)	(2.566)	(0.826)	(0.545)
Cash/Assets	0.0168	0.0167	0.0117	0.0116	-0.0106	-0.00108
	(1.353)	(1.342)	(1.275)	(1.255)	(-0.460)	(-0.0470)
Program size (% of shares outstanding)	3.43e-07	3.38e-07	3.33e-07	3.26e-07	0.00144	0.00184**
	(0.986)	(0.973)	(0.862)	(0.845)	(1.527)	(2.075)
Prior Stock Performance	-0.00693	-0.00690	-0.0202	-0.0202	0.0270	0.0409
	(-0.381)	(-0.380)	(-1.309)	(-1.309)	(0.919)	(1.410)
ln(Market to Book)	-0.00325	-0.00322	-0.000162	-0.000106	0.0197***	0.0164**
	(-1.377)	(-1.364)	(-0.0713)	(-0.0466)	(2.648)	(2.031)
Takeover	-0.0129	-0.0130	-0.0209	-0.0210	-0.00577	-0.00223
	(-0.804)	(-0.810)	(-1.539)	(-1.547)	(-0.514)	(-0.179)
Leverage	0.00298	0.00296	0.00231	0.00226	-0.0444**	-0.0344
	(0.538)	(0.535)	(0.514)	(0.503)	(-1.984)	(-1.229)
Free Cash Flow			0.00685	0.00700		0.0284
			(0.321)	(0.329)		(0.484)

(Table 3.6 continued)

	(1) CAR3vw	(2) CAR3vw	(3) CAR3vw	(4) CAR3vw	(5) CAR3vw	(6) CAR3vw
Free Cash Flow			-0.000903	-0.000917		0.0525
Std. Dev			(-0.133)	(-0.135)		(1.049)
High-hedge			0.00174	0.00192		0.00422
			(0.397)	(0.439)		(0.519)
Low-Hedge			0.00542	0.00555		0.0120
			(1.290)	(1.322)		(1.389)
Constant	0.0352**	0.0349**	0.0554***	0.0548***	0.0535	0.0710
	(2.190)	(2.171)	(3.147)	(3.100)	(0.756)	(0.881)
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes
Annual Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,556	4,556	3,779	3,779	261	240
R-squared	0.048	0.048	0.043	0.043	0.160	0.215

Table 3.6 presents results of a linear regression in which the dependent variable is the three day cumulative abnormal return, measured against the value weighted market model, centered around the day of repurchase program announcement. Assets is Compustat total assets at the end of the fiscal year prior to the repurchase announcement. Ln(assets) is the natural log of total assets. Cash/assets is cash and equivalents divided by total assets at the end of the fiscal year prior to repurchase. Ln(Illiquidity) is the natural log of the Amihud (2002) illiquidity measure. Return Std. Dev. is the standard deviation of returns over a period beginning 255 days prior to repurchase announcement and ending 46 days prior. The market value of equity is the product of share price and number of shares outstanding at the end of the fiscal year prior to repurchase. The book value of equity is determined as in Fama and French (1993). Ln(market to book) is the natural log of the market value of equity divided by the book value of equity. Leverage is the sum of long-term debt and total current liabilities scaled by total assets at the end of the fiscal year prior to the repurchase announcement. Free cash flow is a measure of free cash flow as in Acharya et al. (2007). Free cash flow std. dev is the 5-year standard deviation of the free cash flow measure. High-hedge is an indicator variable that takes the value of 1 if the 3-year correlation between free cash flow and 3 digit sic industry median research and development expense is less than -0.2. Low-hedge is an indicator variable that takes the value of 1 if the 3 year correlation between free cash flow and 3 digit sic industry median research and development expense is greater than 0.2. All free cash flow measures are at the end of the fiscal year prior to the repurchase announcement. Takeover is an indicator variable that takes a value of 1 if the

repurchasing firm was the target of a takeover attempt in the 6 months preceding the repurchase announcement. Takeover attempts are obtained from the SDC mergers and acquisitions database. Program size is the number of shares authorized for repurchase divided by the number of shares outstanding and is taken from SDC. Prior stock performance is the market model cumulative abnormal returns over days -44 through -4 prior to the repurchase announcement. Industry effects are based on the Fama and French 12 industry classifications. Met EPS through repurchase is an indicator that takes the value of 1 for firms that met earnings expectations, but would have been expected to fail to do so in the absence of repurchase.

subsequent three years although the magnitude falls. Over the first, second, and third years following repurchase announcement, monthly abnormal returns average 0.29%, 0.23%, and 0.21% respectively.

Table 3.7: Long Run Stock Performance By Repurchase Type

	Months Relative to Repurchase Announcement				
	(-6 , -1)	(0,0)	(1 , 12)	(1 , 24)	(1 , 36)
Panel A: Full Sample					
α	-0.56%	0.97%	0.29%	0.23%	0.21%
	(-7.48***)	(3.90***)	(3.03***)	(2.44***)	(2.18**)
β	0.934	1.1239	0.915	0.9285	0.9405
	(46.06***)	(16.89***)	(35.90***)	(37.58***)	(26.56***)
s	0.5243	0.5138	0.5383	0.5489	0.5577
	(14.67***)	4.25***	(11.58***)	(12.18***)	(9.82***)
h	-0.0478	-0.2128	0.0877	0.1985	0.2355
	(-1.40*)	(-1.90*)	(2.04**)	(4.76***)	(4.12***)
R^2	96.66%	78.46%	95.06%	95.65%	95.53%
F	1284.3***	155.39***	815.01***	929.78***	904.62***
N	6489	6493	6459	6463	6466
Panel B: OMR					
α	-0.59%	0.90%	0.29%	0.23%	0.20%
	(-7.77***)	(3.55***)	(3.03***)	(2.43***)	(2.12**)
β	0.931	1.1291	0.9108	0.9274	0.9394
	(45.22***)	(16.69***)	(35.65***)	(37.37***)	(36.63***)
s	0.5343	0.5313	0.5458	0.5561	0.5675
	(14.73***)	(4.32***)	(11.71***)	(12.29***)	(12.13***)
h	-0.0403	-0.1961	0.0887	0.1967	0.2326
	(-1.16)	(-1.72*)	(2.06**)	(4.70***)	(5.38***)
R^2	96.58%	78.25%	95.03%	95.62%	95.51%
F	1250.1***	153.46***	809.10***	923.28***	900.18***
N	6175	6179	6150	6154	6157

(Table 3.7 continued)

	Months Relative to Repurchase Announcement				
	(-6 , -1)	(0,0)	(1 , 12)	(1 , 24)	(1 , 36)
Panel C: ASR					
α	-0.09%	2.49%	0.29%	0.15%	0.22%
	(-0.30)	(5.26***)	(1.30*)	(0.91)	(1.34*)
β	0.9981	0.6895	1.0341	0.9327	0.9545
	(13.11***)	(5.41***)	(17.30***)	(21.53***)	(22.17***)
s	0.3165	0.0502	0.3092	0.3241	0.3012
	(2.36**)	(0.22)	(2.84***)	(4.10***)	(3.84***)
h	-0.1096	-0.3493	0.1065	0.2682	0.3265
	(-0.86)	(-1.42*)	(1.06)	(3.67***)	(4.50***)
R^2	66.69%	27.42%	79.26%	86.66%	87.40%
F	88.75***	11.84***	161.78***	275.06***	293.59***
N	314	314	309	309	309

Table 3.7 presents long-term stock performance for sample firms based upon the calendar time portfolio method using the Fama French 3 factor model. Panel A presents results for the full sample while Panel's B and C represent open market repurchase observations and accelerated share repurchase observations respectively.

Results solely for OMRs are contained in Panel B. Results for OMRs are substantially similar to those of the full sample, likely due to their making up the bulk of the sample. Panel C shows results for ASRs. Unlike the sample as a whole or OMRs specifically, ASRs do not display the same poor performance in the months leading up to the announcement. While still negative, the -0.09% monthly abnormal returns for ASRs are not statistically significant and are less than one-sixth the magnitude of the comparable figure for the sample as a whole. As evidenced in the short-term-results, the abnormal returns for the announcement month are much greater for ASRs. Results for the years following the announcement are only weakly significant for the one and three year time frames and not at all for the two year window. Still, the magnitude of abnormal performance is identical in the year following the repurchase announcement to the OMR firms. Two-year performance is slightly lower while three-year performance is slightly higher.

In Table 3.8, we look at long-term stock performance relative to EPS expectations. Panel A contains results for those firms expected to meet analysts forecasts even if they had not repurchased. Panel B shows results for those firms that we expect would have fallen short of expectations in the absence of a repurchase while Panel C is for those firms that did fail to meet EPS expectations. In the 6 months prior to the repurchase announcement, all firms exhibit significantly negative monthly abnormal performance though the magnitudes differ greatly. For those firms expected to meet earnings, this figure is -0.36%. The magnitude increases to -1.06% for those firms that miss earnings while those needing a repurchase to meet expectations fall in between. For the month of announcement, the abnormal return is only significant (and positive) for those firms expected to meet earnings. For the remaining firms, the result is negative but not significantly so.

Table 3.8: Long Run Stock Performance by Earnings Performance Relative to EPS Expectations

	Months Relative to Repurchase Announcement				
	(-6 , -1)	(0,0)	(1 , 12)	(1 , 24)	(1 , 36)
Panel A: Expected to Meet EPS Without Repurchase					
α	-0.36%	1.58%	0.57%	0.40%	0.34%
	(-4.55***)	(5.36***)	(6.42***)	(4.58***)	(3.63***)
β	0.9288	1.1642	0.9106	0.9141	0.9249
	(43.17***)	(14.76***)	(38.38***)	(38.87***)	(37.01***)
s	0.5055	0.5112	0.4938	0.5171	0.5268
	(13.34***)	(3.57***)	(11.41***)	(12.06***)	(11.56***)
h	-0.0513	-0.223	0.0273	0.1161	0.1762
	(-1.42)	(-1.68*)	(0.68)	(2.93***)	(4.18***)
R^2	96.18%	73.32%	95.46%	95.75%	95.43%
F	1115.7***	117.28***	889.81***	952.96***	883.96***
N	4167	4168	4149	4153	4156
Panel B: Met EPS Through Repurchase					
α	-0.75%	-0.33%	-0.06%	0.04%	0.11%
	(-3.67***)	(-0.62)	(-0.32)	(0.27)	(0.75)

(Table 3.8 continued)

	Months Relative to Repurchase Announcement				
	(-6 , -1)	(0,0)	(1 , 12)	(1 , 24)	(1 , 36)
β	0.8603	1.0903	0.8458	0.9012	0.9565
	(15.71***)	(7.65***)	(18.64***)	(22.23***)	(23.66***)
s	0.4872	0.4862	0.6957	0.5853	0.5662
	(5.05***)	(1.90*)	(8.41***)	(7.92***)	(7.68***)
h	-0.0462	0.1931	0.0537	0.2041	0.191
	(-0.50)	(0.81)	(0.70)	(2.99***)	(2.80***)
R^2	77.17%	45.76%	85.48%	88.85%	89.66%
F	149.83***	32.91***	249.24***	337.47***	367.01***
N	470	470	470	470	470
Panel C: Missed EPS					
α	-1.06%	-0.33%	-0.37%	-0.21%	-0.13%
	(-8.23***)	(-0.81)	(-2.48**)	(-1.61)	(-1.10)
β	0.9374	0.9838	0.9118	0.9555	0.9622
	(27.01***)	(9.02***)	(23.21***)	(27.36***)	(30.14***)
s	0.5721	0.5672	0.6351	0.6252	0.6446
	(9.36***)	(2.86***)	(8.86***)	(9.82***)	(11.07***)
h	-0.0829	-0.3342	0.2412	0.3801	0.3801
	(1.42)	(-1.82*)	(3.64***)	(6.45***)	(7.06***)
R^2	91.05%	52.03%	90.03%	92.79%	94.03%
F	450.79***	46.28***	382.48***	544.98***	666.45***
N	1684	1686	1671	1671	1671

Table 3.8 presents long-term stock performance for sample firms based upon the calendar time portfolio method using the Fama French 3 factor model. Panel A presents results for those firms which met and were expected to meet quarterly earnings expectations without the reduction in shares outstanding due to repurchase. Panel B contains results for those firms that met earnings expectations but would have been expected to miss those expectations without the reduction in shares outstanding caused by repurchase. Panel C firms failed to meet earnings expectations.

Following the repurchase announcement, results vary for each firm type. Those firms that were expected to meet expectations enjoy positive abnormal returns over the following three years. Those firms that required a repurchase to meet expectations exhibit insignificant abnormal performance. Firms that miss analysts' expectations have significantly negative monthly abnormal returns for the year following the repurchase announcement of -0.37%. In summation, firms that use repurchases to meet expectations do not suffer the negative effects in the year following repurchase

associated with missing expectations, but they don't enjoy the positive abnormal returns accrued by those higher quality firms that are able to meet expectations regardless of their repurchase decision.

3.5 Conclusions

In this chapter we analyze ASRs with a particular eye towards their use in influencing the number of shares outstanding in a way that might allow firms to meet EPS expectations that would not have been able to do so without a repurchase. We find that firms that would be expected to fall two or more cents shy of median expectations are very significantly more likely to elect an ASR while those firms that would be expected to exceed earnings by two or more cents are weakly significantly less likely to elect an ASR. We also find that subsequent earnings performance is not significantly different in the four quarters following the repurchase announcement regardless of the form of repurchase undertaken. ASR announcements are greeted by higher three day abnormal returns, but the market does not appear to be able to tell at the time of repurchase announcement that the repurchase is possibly EPS manipulative. However, in the three years following the repurchase announcement, potentially manipulative repurchasers do not receive the positive abnormal returns that accrue to those who would have been expected to meet expectations without repurchase, but they also don't suffer the negative abnormal returns that plague those missing analysts' expectations.

Chapter 4. Conclusions

The two essays that constitute this dissertation explore equity transactions that are in one case designed to raise capital and, in the other, disburse capital back to the firm's shareholders. Chapter 2 concerns the raising of capital through the IPO process and more specifically the lockup protections put in place by the underwriting firm to limit the selling of shares by pre-IPO shareholders. The proportion of primary shares sold in the offering is inversely related with the decision to implement multiple lockups while book-to-market value and a dual class share structure are positively correlated with a staged lockup arrangement. In contrast with the prevailing wisdom regarding single lockups, lockup releases beyond the first do not produce reliably negative abnormal returns. Additionally, firms with multiple lockups underperform single lockup firms over the three years following IPO but not in the one or two year subperiods.

Our second essay addresses accelerated share repurchases, an emerging method of returning cash to stockholders. Unlike the more traditional open market repurchase, an ASR commits the firm to its repurchase and consequently provides a much more immediate reduction in the number of shares outstanding. Our evidence shows that this form of repurchase is associated with firms meeting analyst's earnings expectation that would not have done so in the absence of the repurchase. The change in meeting or not meeting earnings is not explained by other behavior that could possibly impact EPS such as discretionary accruals. Although the market seems indifferent to possibly manipulative behavior at the time the repurchase is announced, manipulative repurchasers suffer poorer long-term stock performance than their non-manipulative peers.

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Appendix. Prospectus Excerpts

The following excerpts come from IPO prospectuses filed with the Security and Exchange Commission (SEC) and made available to the public through the SEC's website, sec.gov.

A.1 Visa

We begin by looking at Visa, an example of the typical 180-day single lockup. We first show the relevant paragraph from the "Shares Eligible for Future Sale" section of the prospectus.

"We and our directors and executive officers are subject to lock-up agreements under which we and they have agreed not to transfer or dispose of, directly or indirectly, any common stock or any securities convertible into or exercisable or exchangeable for common stock for 180 days after the date of this prospectus. J.P. Morgan Securities Inc. and Goldman, Sachs & Co. may, in their sole discretion, at any time and without prior notice or announcement, release all or any portion of shares subject to the lock-up agreements."

This simple phrasing conveys the essence of the lockup agreement: the requirement to retain existing holdings, the length of the lockup, and the fact that the underwriter imposes the lockup agreement. The next quotation comes from the "Underwriting" section of Visa's prospectus and contains more detail about the prohibitions imposed by the underwriter.

"We have agreed that, for a period of 180 days after the date of this prospectus, without the prior written consent of J.P. Morgan Securities Inc. and Goldman, Sachs & Co. and subject to certain exceptions, we will not offer, pledge, announce the intention to sell, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase or otherwise transfer or dispose of, directly or indirectly, any shares of class A common stock or any securities convertible into or exercisable or exchangeable for class A common stock or enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of class A common stock, whether any such transaction is to be settled by delivery of class A common stock or such other securities, in cash or otherwise, other than the class A common stock to be sold in this offering, awards made, and shares of class A common stock issued upon the exercise of options

granted, under our outstanding equity incentive compensation plans, and issuances of shares of class A common stock in an amount up to 5% of the number of shares purchased under the underwriting agreement as consideration or partial consideration for an acquisition or a joint venture (as long as J.P. Morgan Securities Inc. and Goldman, Sachs & Co. receive a signed lockup agreement for the balance of the lockup period from each recipient of such shares). In addition, each of our directors and executive officers has agreed that, for the same 180-day lock-up period, without the prior written consent of J.P. Morgan Securities Inc. and Goldman, Sachs & Co. and subject to certain exceptions, he or she will not offer, pledge, announce the intention to sell, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of class A common stock or any securities convertible into or exercisable or exchangeable for class A common stock (including without limitation, class A common stock which may be deemed to be beneficially owned in accordance with the rules and regulations of the Securities and Exchange Commission and securities which may be issued upon exercise of a stock option or warrant), or enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the class A common stock, whether any such transaction is to be settled by delivery of class A common stock or such other securities, in cash or otherwise. In addition, we have agreed that, for the same 180-day lock-up period, without the prior written consent of J.P. Morgan Securities Inc. and Goldman, Sachs & Co., our board of directors will not waive any of the restrictions on transfer binding the shares of class B and class C common stock, as described under "*Description of Capital Stock—Transfer Restrictions*."

The 180-day lock-up period is subject to extension if during the last 17 days of the 180-day lock-up period, we issue an earnings release or material news or a material event relating to us occurs; or prior to the expiration of the 180-day lock-up period, we announce that we will release earnings results during the 16-day period beginning on the last day of the 180-day lock-up period. In such a case, the lock-up restrictions will continue to apply until the expiration of the 18-day period beginning on the issuance of the earnings release or the occurrence of the material news or material event."

A.2 Global Traffic Network

Next we have the lockup for Global Traffic Network, which is a single lockup firm but with a longer one-year lockup period. We begin with the relevant text from the "Shares Eligible for Future Sale" section of the prospectus. Here the prospectus is more explicit in the text regarding the number of shares subject to the agreement. As with Visa, the basic nature of the lockup is specified, but this section is more detailed with regard to the prohibited activities.

“Our directors, executive officers, certain other officers and all of our current stockholders have agreed not to offer, sell, contract to sell, swap, make any short sale of, pledge, establish an open “put equivalent position” within the meaning of Rule 16a-1(h) under the Securities Exchange Act of 1934, as amended (the “Exchange Act”) with respect to, grant any option to purchase or otherwise dispose of, or publicly announce his, her or its intention to do any of the foregoing with respect to, any shares of common stock, or any securities convertible into, or exercisable or exchangeable for, any shares of common stock for a period of 12 months after the date of this prospectus without the prior written consent of the Underwriter. We have entered into a similar agreement with the Underwriter that we will not issue additional shares (with the exception of shares pursuant to the over-allotment option) of our common stock before the end of the 180 day period following the date of this prospectus, other than with respect to our issuing shares pursuant to employee benefit plans, qualified option plans or other employee compensation plans already in existence, or pursuant to currently outstanding options, warrants or other rights to acquire shares of our common stock. See “Underwriting — Lock Up Agreement.” After the expiration of the 12-month “lock-up” period, our stockholders and option holders will be entitled to dispose of their shares upon compliance with applicable securities laws. After this lock-up period, 3,800,000 shares of our common stock will be eligible for sale without limitation and 8,500,000 shares of our common stock will be eligible for sale subject to the volume, manner of sale and other limitations under Rule 144.”

Next we show the relevant portion of the “Underwriting” section of the

prospectus.

“Except as noted below, our directors, executive officers and current stockholders have agreed with the Underwriter that for a period of 12 months following the date of this prospectus, they will not offer, sell, assign, transfer, pledge, contract to sell or otherwise dispose of or hedge any of our shares of common stock or any securities convertible into or exchangeable for our shares of common stock. We have entered into a similar agreement with the Underwriter that we will not issue additional shares (with the exception of shares pursuant to the over-allotment option) of our common stock before the end of the 180 day period following the date of this prospectus, other than with respect to our issuing shares pursuant to employee benefit plans, qualified option plans or other employee compensation plans already in existence, or pursuant to currently outstanding options, warrants or other rights to acquire shares of our common stock. The Underwriter may, in its sole discretion, at any time without prior notice, release all or any portion of the shares from the restrictions in any such agreements. In determining whether to release shares from the restrictions, the Underwriter may consider, among other factors, the financial circumstances applicable to a director’s, executive officer’s or stockholder’s request to release shares and the number of shares that such director, executive officer or stockholder requests to be released. There are no agreements between the Underwriter and us or any of our directors, executive officers or stockholders releasing us or them from such agreements before the expiration of the applicable period.”

A.3 Cafepress

We next show a case of multiple lockups. Interestingly in this case, the subjects of the extended lockup period are not executives but large block-holders. Those two block-holders are themselves subject to two lockup periods such that they are unable to fully dispose of their shares until the expiration of the second lockup period. We first show the relevant text from the "Shares Eligible for Future Sale".

"Our directors, executive officers and holders of substantially all of our outstanding common stock (on a fully-diluted basis as of December 31, 2011 without giving effect to this offering) have agreed with limited exceptions that they will not sell any shares of common stock owned by them without the prior written consent of J.P. Morgan Securities LLC and Jefferies & Company, Inc., on behalf of the underwriters, for a period of 180 days from the date of this prospectus. In addition, Fred E. Durham III and Maheesh Jain, two of our greater than 5% stockholders, have agreed to the same restrictions described above for a period of 360 days from the date of this prospectus with respect to 1,312,718 and 1,157,508 shares held beneficially by them as of December 31, 2011, respectively, (or 975,218 and 820,008 shares, assuming the underwriters exercise their over-allotment option in full) and for a period of 630 days from the date of this prospectus with respect to 850,336 and 748,794 shares held beneficially by them as of December 31, 2011, respectively. However, subject to certain exceptions, in the event that either:

- during the last 17 days of the restricted period, we issue an earnings release or material news or a material event relating to us occurs, or
- prior to the expiration of the restricted period, we announce that we will release earnings results during the 16-day period beginning on the last day of the restricted period,

then in either case the expiration of the restricted period will be extended until the expiration of the 18-day period beginning on the date of the issuance of an earnings release or the occurrence of the material news or event, as applicable, unless J.P. Morgan Securities LLC and Jefferies & Company, Inc. waive, in writing, such an extension. Subject to certain exceptions, at any time and without public notice, J.P. Morgan Securities LLC and Jefferies & Company, Inc. may in their sole discretion release some or all of the securities from these lock-up agreements. To the extent shares are released before the expiration of the lock-up period and these shares are sold into the market, the market price of our common stock could decline.

See "Underwriting" for a more complete description of the lock-up agreements."

The “Underwriting” section reiterates much of the same information but is much more explicit with regards to the activities prohibited by the lockup provision.

“Our directors and executive officers and holders of substantially all of our outstanding common stock (on a fully-diluted basis as of December 31, 2011 without giving effect to this offering) have also agreed that for a period of 180 days after the date of this prospectus, may not, without the prior written consent of J.P. Morgan Securities LLC and Jefferies & Company, Inc., (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of our common stock or any securities convertible into or exercisable or exchangeable for our common stock (including, without limitation, common stock or such other securities which may be deemed to be beneficially owned by such directors, executive officers, or stockholders in accordance with the rules and regulations of the SEC and securities which may be issued upon exercise of a stock option or warrant) or (2) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of the common stock or such other securities, whether any such transaction described in clause (1) or (2) above is to be settled by delivery of common stock or such other securities, in cash or otherwise, or (3) make any demand for or exercise any right with respect to the registration of any shares of our common stock or any security convertible into or exercisable or exchangeable for our common stock. In addition, Fred E. Durham III and Maheesh Jain, two of our greater than 5% stockholders, have agreed to the same restrictions described above for a period of 360 days from the date of this prospectus with respect to 1,312,718 and 1,157,508 shares held beneficially by them as of December 31, 2011, respectively, (or 975,218 and 820,008 shares, assuming the underwriters exercise their over-allotment option in full) and for a period of 630 days from the date of this prospectus with respect to 850,336 and 748,794 shares held beneficially by them as of December 31, 2011, respectively. Notwithstanding the foregoing, if (1) during the last 17 days of the restricted period, we issue an earnings release or material news or a material event relating to our company occurs; or (2) prior to the expiration of the restricted period, we announce that we will release earnings results during the 16-day period beginning on the last day of the restricted period, the restrictions described above shall in certain cases continue to apply until the expiration of the 18-day period beginning on the issuance of the earnings release or the occurrence of the material news or material event. These restrictions generally shall not apply to: (a) the sale of shares of our common stock in this offering; (b) transfers of shares of our common stock or any security convertible into or exercisable or exchangeable for our common stock as a bona fide gift or gifts; (c) distributions of shares of our common stock or any security convertible into or exercisable or exchangeable for our common stock to members, stockholders, affiliates, subsidiaries, limited partners or general partners of the stockholder; (d) transfers of shares of our common stock or any security convertible into or exercisable or exchangeable for common stock by will or intestate succession to an immediate family member of the officer, director or stockholder or to a trust, the beneficiaries of which are exclusively the officer, director, or stockholder or their

immediate family members; (e) transactions relating to shares of our common stock acquired in open market transactions after the completion of this offering; provided that in the case of any transfer or distribution pursuant to clause (b), (c) or (d), each donee or distributee execute sand delivers to the representatives a lock-up agreement; and provided, further, that in the case of any transfer, distribution or transaction pursuant to clause (b), (c), (d) or (e), no filing by any party under Section 16(a) of the Exchange Act reporting a reduction in beneficial ownership, and no other similar public announcement, will be required or will be made voluntarily in connection with such transfer, distribution or transaction during the restricted period (other than a filing on a Form 5 made after the expiration of the restricted period); (f) the "net" exercise of outstanding options in accordance with their terms and the surrender of shares of stock in lieu of payment in cash of any tax withholding obligation, provided that we, in each case, become the owner of the shares of our common stock surrendered in the net exercise and that such shares will be subject to the lock-up provisions referred to in the immediately preceding paragraph; (g) the exercise for cash, including payment in cash of any tax withholding obligation, of any options to acquire shares of our common stock, provided that any shares of our common stock acquired pursuant to clause (f) or (h) will be subject to these lock-up provisions; provided, further that with respect to clause (f) or (g), no filing under Section 16(a) of the Exchange Act, reporting a reduction in beneficial ownership, and no other similar public announcement, will be required or will be made voluntarily during the restricted period (other than a filing on a Form 5 made after the expiration of the restricted period); or (h) the establishment of a trading plan pursuant to Rule 10b5-1 under the Exchange Act for the transfer or sale of shares of our common stock, provided that such plan does not provide for the sale or transfer of our common stock during the restricted period, and provided further, that no filing by any party under the Exchange Act or other public announcement will be required in connection with the entering into of any such trading plan during the restricted period."

A.4 Avalon Pharmaceuticals

We next show an example of a firm with three lockup periods. The CEO agrees to the longest lockup period of 18 months, other executives are locked up for 12 months, and other pre-IPO shareholders are subject to the standard 180-day lockup. The following quote comes from the "Shares Eligible for Future Sale" section of the prospectus. For this firm, the information in the "Underwriting" section is largely redundant, so we omit it for brevity.

"Our officers and directors, stockholders, and option and warrant holders holding over 99% of our fully diluted equity have signed lock-up agreements under which they agreed not to offer, sell, pledge, contract to sell, sell short, grant any option in or otherwise dispose of, or enter into any hedging transaction with respect to, any shares

of our common stock or any securities convertible into or exercisable or exchangeable for shares of our common stock beneficially owned by them, for specified periods, subject to extensions in certain cases. Our Chief Executive Officer has agreed to a lock-up period of 18 months after the date of this prospectus and our other executive officers have agreed to a lock-up period of one year. All other signatories have agreed to a lock-up period of 180 days. However, shares acquired in this offering or after its conclusion by signatories to the lock-up agreements are subject to a lock-up period expiring 90 days after the date of this prospectus. The foregoing does not prohibit open market purchases of our common stock by such holders after the completion of this offering, and transfers or dispositions by our officers, directors and stockholders can be made sooner:

- with the written consent of WR Hambrecht + Co, LLC; or
- as a *bona fide* gift."

A.5 Facebook

Finally, we show a case where there are numerous lockup expirations. From the "Shares Eligible for Future Sale" section:

"Our officers, directors, employees, and substantially all of our stockholders have agreed with the underwriters or us, not to dispose of any of our common stock or securities convertible into or exchangeable for shares of our common stock for specified periods of time after the date of this prospectus, except with the prior written consent of Morgan Stanley & Co. LLC or us, as applicable. Under the terms of their lock-up agreements with the underwriters, the selling stockholders, other than Mr. Zuckerberg, are eligible to sell up to 271,123,815 shares of our common stock in the aggregate on the date that is 91 days after the date of this prospectus, up to 711,494,326 shares of our common stock in the aggregate on the date that is 181 days after the date of this prospectus, and the remaining shares of our common stock held by them 211 days after the date of this prospectus. Under the terms of their lock-up agreement with the underwriters, our directors, our executive officers, and certain stockholders not selling shares in this offering are eligible to sell shares of our common stock 181 days after the date of this prospectus, subject to certain exceptions as described in "Underwriting." All other holders of our common stock, RSUs and options have previously entered into market standoff agreements with us not to sell or otherwise transfer any of their common stock or securities convertible into or exchangeable for shares of common stock for a period that extends through 180 days after the date of this prospectus. We intend to waive this provision to allow our directors and then current employees to sell shares held by them or shares subject to RSUs or stock options on a date that is between 151 and 180 days after the date of this prospectus. In addition, Mail.ru Group Limited and DST Global Limited and their respective affiliates have entered into an agreement with us to not sell their shares for certain periods of time ranging from 90

days to 365 days following the date of this prospectus. See “Related Party Transactions—Conversion Agreement” for additional information about this agreement.

In addition, we have agreed with our underwriters not to sell any shares of our common stock or securities convertible into or exchangeable for shares of our common stock for a period of 180 days after the date of this prospectus, subject to certain exceptions, including an exception that would permit us to raise capital in an underwritten offering to fund our tax withholding and remittance obligations in connection with the initial settlement of RSUs granted prior to January 1, 2011. Morgan Stanley & Co. LLC may, with our prior written consent, at any time, waive these restrictions.

See “Underwriting” for a more complete description of the lock-up agreements that we and our directors, executive officers, and the selling stockholders have entered into with the underwriters.”

Vita

J. David Kelly, from Easley, South Carolina, attended Clemson University as an undergraduate. After obtaining his bachelor's degree in Mechanical Engineering in 2004, he began working as a design engineer in the major appliance industry. Returning to Clemson University in 2007, he obtained a Master of Business Administration in 2009. He subsequently enrolled in the doctoral program at Louisiana State University's finance department in the fall of 2009. He is currently scheduled to receive his Doctor of Philosophy in May of 2016.