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1 Introduction

The recent financial crisis of 2007-2009 highlights the impact that financial markets can have on firm behaviour. The effect of market states on asset prices is well documented. Until recently, market states have played a less significant role in the corporate finance literature. Recent studies show that the market cycles affect the availability of financing, and employment[1].

Corporate event waves tend to be correlated with the business cycle and the real economy. Harford (2005) finds that merger waves are highly correlated with capital liquidity. Lowry (2003) finds that IPO volume is correlated with macro variables. The corporate event waves can be further separated into financing and investment waves. Both types of waves tend to be pro-cyclical. The literature concerning investment waves mainly focusses on mergers and acquisitions whereas the financing-wave literature concentrates on Initial public offerings (IPOs).

This dissertation aims to give further understanding concerning firms' financing and investments during different market states. In the first essay, I study firm-specific factors behind merger waves. My evidence suggests that acquisition activity of financially constrained firms is an important determinant of the observed waves in the aggregate M&A activity. When capital liquidity increases, financially constrained firms are better able to obtain debt and equity financing to finance their investment opportunities. In contrast, financially unconstrained firms are indifferent to the overall capital liquidity and thereby do not have equally clustered M&A activity. My first essay contributes to the literature in three ways. First, no prior works have made the connection between financially constrained firms and merger waves. Second, I find that financially unconstrained firms vary their means of payment such that they tend to use cash during low states of the market, and prefer equity during high states of the markets. Third, I show that the returns to financially constrained acquirers tend to be lower than those to the unconstrained acquirers.

In the second essay, I study the behaviour of equity issuing firms during cold IPO-markets. I find that firms that go public during cold markets tend to stage their financing while firms that issue during hot markets tend to raise a larger amount financing, which is consistent with the market timing effect (Taggart, 1977). The main contribution of my second essay is that cold market firms initially raise a smaller amount of financing and thereafter they raise additional capital via a seasonal equity offering (SEO). There are two sets of theoretical explanations for why firms stage their financing. First, Stiglitz and Weiss (1981) argue staging may arise from the investor side, as investors are not willing to finance all firm's investment needs at once. Second, Myers and Majluff (1984), Allen and Faulhaber (1989) and Welch (1989) argue that

[1] Ivashina and Scharfstein (2010), Campello, Graham, and Harvey (2010), Mclean and Zhao (2013)

firm may not want to raise capital if their current valuation is lower than the perceived value of the firm. My results support the latter hypothesis.

In the third essay, I study whether the acquisition motive of equity issuance differs between firms going public in hot and cold markets. Celyukurt et al (2010) and Hovakiminan et al (2010) find that firms that go public tend to outpace already public firms in their acquisitions. The main contribution of my study is that the acquisition motive is more plausible for firms that go public during cold markets. My main argument is that if the acquirer is lower-valued during cold markets, the target firm is likely to be lower-valued as well. If firms go public to acquire, they are therefore indifferent to the market state.

2. Corporate event waves

Several types of corporate events occur in waves. Merger waves and IPO waves are the most well-known and studied. Both merger waves and IPO waves tend to be pro-cyclical, i.e. there is a larger merger and IPO activity during times of economic expansions. The corporate event waves can be split into financing waves and investment waves, with IPO and SEO waves representing the former, and merger waves representing the latter. The corporate event waves are also connected to each other. Rao and Stouraitis (2011) find a distinctive pattern in corporate waves, starting with new issue waves (SEOs and IPOs), followed by stock financed merger waves, which in turn are followed by share repurchase waves. In this section, I discuss each of these wave-types in their own sub-sections.

2.1 Merger Waves

A firm can grow either by organic growth through capital expenditure and research and development (R&D) investments, or by acquisitions of other firms or their subsidiaries. The literature concerning capital expenditure and R&D investment waves is limited, while the merger wave literature is considerably larger.

Prior literature provides both neo-classical and behavioural explanations for the existence of merger waves. According to the neoclassical explanations, merger waves are driven by economical shocks that lead to industrial reorganization. Jovanovic and Rousseau (2002) develop a model where technological change and the following dispersion in q ratios lead to high-q firms acquiring low-q firms during merger waves. Harford (2005) conducts extensive empirical tests to find factors explaining merger waves. He shows that the majority of activity in aggregate merger waves is driven by clustering of industry merger waves. However, he concludes that industry shocks alone cannot create merger waves. The industry shocks need to be coupled with sufficient overall capital liquidity. Harford uses the commercial and industrial loan spread (C&I spread) as an empirical proxy for capital liquidity. Maksimovic et al (2013) find similar results for publicly traded firms, but among private firms, they find less clustering in

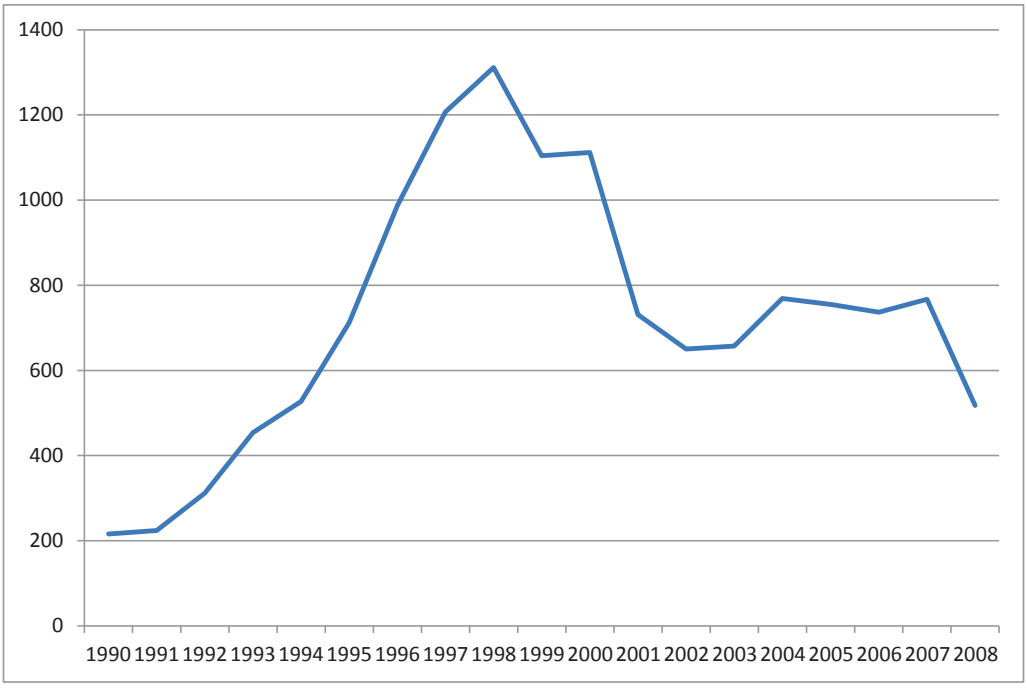
merger activity. Maksimovic and Phillips (2001) use plant level data, and find that ex ante efficiency and firm organization are the main drivers of asset and firm sales. Their findings also support the neo-classical explanation of merger waves. Schlingemann et al (2002) show that industry-wide liquidity is an important effect on the choice of assets to be divested.

Behavioural explanations for merger waves build upon the existence of misvaluations in the equity markets. The misvaluations generate clusters of merger activity. Shleifer and Vishny (2003) argue that the observed clustering in merger activity is driven by stock market valuations. Bull markets lead bidders with overvalued stock to use the stock to make acquisitions of undervalued firms. Rhodes-Kropf and Viswanathan (2004) argue that rational targets without perfect information will accept more bids from overvalued bidders during market valuation peaks, since they overestimate the synergies during peak times. Rhodes-Kropf, Robinson and Viswanathan (2005) empirically test if merger waves occur when market values are high in relation to their true valuations. Their results indicate that merger activity spikes when growth opportunities are high.

Figure 1 below shows the number of M&A transactions with deal value greater than $10 million and the buyer is listed on NYSE, AMEX or NASDAQ, by year. The data is gathered from the SDC platinum database. The figure indicates that substantial variation exists from year to year. The largest amount of transactions occurred in 1997.

Figure 1 Number of M&A transactions

The graph shows the number of M&A transactions over time from U.S. publicly listed acquirers. The data is from SDC and covers the time period 1990-2008. On the Y axis is the number of transactions and on the x axis is time.



2.2 IPO waves

The event when the firm first issue publicly traded equity is called an initial public offering (IPO). During the event the firm usually raises a substantial amount of equity capital by issuing primary shares. The IPO also gives the incumbent shareholders an opportunity to exit the firm through the sale of existing shares called secondary shares. Like M&A activity, the number of firms conducting an IPO also varies over time. IPO waves were first documented by Ibbotson and Jaffe (1975) and Ritter (1984). Hot issue markets are defined in prior literature as periods when a higher than average IPO volume both in terms of number of firms and total proceeds is raised. During hot IPO markets, the first trading day return or first day underpricing tends to be more severe. In contrast, firms going public during cold issue markets experience lower first day underpricing. Previous studies also indicate that hot IPO markets coincide with high valuations in the stock market, and favourable macroeconomic conditions (Loughran, Ritter and Rydqvist (1994), Pagano et al (1998)). Theoretical work by Yung, et al (2008) suggests that time varying investment opportunities lead to time varying adverse selection, which further leads to cyclicality in total IPO volume, and thus we

observe clustering in IPO activity. Lowry (2003) studies the aggregate IPO data, and finds that firms' capital demand and investor sentiment contribute to the wave pattern, as they are related to the aggregate IPO volume.

Previous literature identifies several motives for going public. Pagano et al (1998) report that IPO firms are not financially constrained; they go public to rebalance their capital structure after prior investments. Taggart (1977), Baker and Wurgler (2002) and Alti (2006) find that firms market time their equity issuance in order to raise capital during times of high market valuations. Mikkelson, Partch, and Shah (1997), and Lowry (2003) report that one of the most important reasons for going public is to raise funds for new investments. International evidence by Kim and Weisbach (2008) suggests that acquisitions and capital expenditure are important reasons for raising equity capital in SEOs and IPOs.

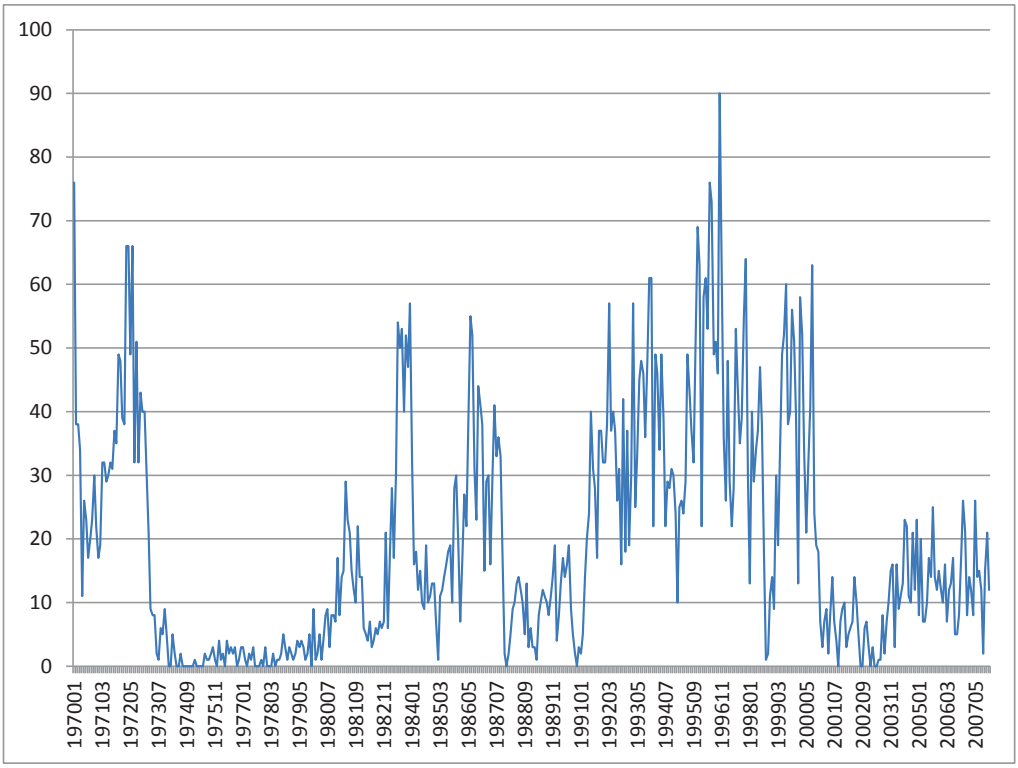
Another motive for IPO firms to go public is to facilitate an acquisition. Hansen (1987), Fishman (1989) and Eckbo, Giammarino and Heinkel (1990) suggest that a private bidder paying with equity wants to go public in order to reduce the asymmetric information problem related to the valuation of the firm's shares. Mikkelson et al (1997) suggest that the proceeds raised in the IPO could be used as means of payment in future cash acquisitions. Hsieh et al (2011) propose a model where payment method is unrelated to the acquisition decision. Going public will reduce valuation uncertainty, and therefore lead to a more effective acquisition strategy. Empirical evidence by Celikyurt, et al (2010) suggests that newly public firms outpace mature firms in conducting acquisitions. Kim et al (2008) find that firms tend to spend a substantial amount of newly raised equity capital on acquisitions and capital expenditures. Hovakimian et al (2010) find that one third of the newly public firms conduct acquisitions within 3 years following the IPO. Finally, Schultz et al (2001) find evidence that hi-tech IPO firms that went public in the late 90s pursued aggressive post-IPO acquisition strategies.

Figure 2 below shows the number of IPOs by month retrieved from Jay Ritter's database[2]. The figure indicates substantial variation in the number of IPOs over time, and three major waves can be identified. The first wave occurs during the early 1970s. It is followed by a period of modest IPO activity. The second wave takes place during the 1980s and the wave with the highest IPO activity coincides with the IT-boom during the 1990s. The largest peak occurs in 1996. If we compare figures 1 and 2 it is noteable that the largest peak in merger activity takes place about one year after the largest peak in IPO volume.

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

Figure 2 Number of monthly IPOs over time 1970-2008

The graph below shows IPO volume over time gathered from Jay Ritter's webpage (*http://bear.warrington.ufl.edu/ritter)*. The Y-axis show number of IPO's per month and the X-axis shows the calendar time.



2.2.1 Differences between firms issuing during hot vs. cold markets

Signalling models by Allen and Faulhaber (1989) and Welch (1989) suggest that market heat is positively related to firm quality, i.e. that high quality firms go public during hot markets. The first day underpricing signals high quality firms, and separates them from low quality firms. By underpricing their initial public offering, high quality firms are thus able to differentiate themselves from low quality firms. For low quality firms, it will be costly to imitate high quality firms. If the firm's valuation is high the firm will issue equity after the IPO in an SEO.

In contrast, theoretical work by Yung et al (2008) suggests that the quality of firms going public is lower during hot markets. Their model predicts that more projects are profitable during hot markets. This is due to lower discount rates and positive shocks to the payoff of the projects. Their results lead to an empirical prediction that capital expenditures will be greater during hot IPO markets.

Helwege and Liang (2004) observe industry clustering of IPOs, and report no particular difference in industry break down between hot and cold markets. The firms going public during periods of high IPO volume tend to be clustered into the same industries as the firms going public during times of low IPO volume. In their sample, it is never the case that one industry is hot when the overall market is cold. This indicates, according to Helwege and Liang (2004), that market wide factors drive IPO waves rather than industry innovations. In the univariate analysis, they find that hot market firms tend to have higher market to book ratios, be smaller, and have lower earnings than cold market firms. However, after controlling for macro economic factors, they fail to find any major differences in firm characteristics between hot and cold market firms.

Alti (2006) finds that cold market issuers are substantially more profitable than their hot market comparables. He also finds differences in issue size. Hot market firms tend to raise more equity during their IPO than cold market firms. This indicates that firms tend to issue more equity when their market price is high.

3. Summary of the Essays

Summary of Essay 1: "The Effects of Financial Constraints on Merger Activity"

Harford (2005) argues that capital liquidity measured by the C&I spread, is the main driver of merger waves. In essay 1, I extend Harford's work by studying firm characteristics behind merger waves. The main hypothesis in this essay is, that financially constrained firms cannot make acquisitions during times of low capital liquidity. This is due to difficulties in obtaining financing during cold markets. The increased cost of external financing may also limit the firm's ability to make profitable acquisitions. It is easier for financially unconstrained firms to obtain funding, and they are more likely to have larger internal cash reserves to use on acquisitions when prices are low.

To test my main hypothesis, I use a sample of 48269 U.S. firm years during the period of 1.1.1989 to 31.12.2008, obtained from COMPUSTAT. I split the firms according to the median KZ index (Kaplan and Zingales, 1997) into five different portfolios. The 20% least constrained firms are sorted into portfolio one and the 20% most constrained in portfolio five.

I find that capital liquidity plays a very important role on financially constrained firms' acquisition intensity, proxied by the C&I spread. A one standard deviation decrease in the spread corresponds to a 24% increase in the firms' probability to acquire during the fiscal year. The corresponding figure for financially unconstrained acquirers is 4%. Moreover, I find that financially constrained firms tend to acquire more with both equity and cash during the times of low spreads. Meanwhile, unconstrained firms

substitute between equity and cash acquisitions, such that during low spreads, they tend to acquire with equity, and during high spreads, they use cash as means of payment. Furthermore, I test the returns to acquisitions among the groups. Financially constrained firms have far lower long calendar time returns than unconstrained firms.

Summary of Essay 2: "Cold Market Equity Issuance and Stage Financing"

In the second essay, I study the firms that issue equity during cold markets. My main hypothesis is that cold market issuers tend to stage their financing. The motivation for stage financing is that raising capital during cold markets is expensive. Therefore, firms raise a small amount of funding on equity offerings during such periods, and raise more capital at a later stage through a follow-up issue.

To test my hypothesis, I utilize Initial public offerings as a natural setting to be able to study whether cold and hot market issuers act differently in the equity capital markets. I find that cold market issuers tend to stage their equity financing to a larger extent than hot market firms. I also make a further analysis to be able to distinguish between the two main hypotheses concerning staged financing.

The first hypothesis suggests that the staged financing arises from the demand side and the second from the supply side of financing. The demand side hypothesis builds upon work from Myers and Majluff (1984) and Allen and Faulhaber (1989) and Welch (1989). Myers and Majluff (1984) argue that during high cost of capital the firm will forego profitable investment opportunities due to transfer of wealth from the existing to the new shareholders of the firm. An intermediate solution of Myers and Majluff (1984) suggests that the firm will only invests in the projects with highest NPV and forego projects that are NPV positive due to the wealth transfer. Thereby firms issuing equity during cold markets raise less capital since the cost of capital is high. Allen and Faulhaber (1989) and Welch (1989) argue that good firms signal to the market by strategically underprice their IPO, when investors learn about firm quality and the firm issuing more equity in a SEO.

The supply side hypothesis suggests that investor stages the financing of firms with opaque investments due to a potential overinvestment problem. The purpose of funding in stages is to limit agency costs associated with excess cash. Gompers (1995) finds that among venture capital investments, firms with high R&D expenses and a large fraction of immaterial assets tends to use staged financing. Hertzel et al (2012) make a similar finding on listed firms.

My evidence supports the demand side staging hypothesis, that firms issuing during cold markets issue less initially and thereafter issue more equity at more favourable terms. The evidence is further strengthened by the difference in firm size. Cold market

firms tend to be larger than hot market firms. Firm size is a standard proxy for financial constraints and small firms are more likely to be subject to financing constraints[3].

Evidence concerning the investor staging hypothesis is weaker. High R&D firms tend to issue more or equally much as low R&D firms initially. Thereafter, I find that high R&D firms issue a first round of financing during the first year after going public. However, use of interaction terms with market heat weakens the effect. This might be due to R&D intensive firms only receiving financing during hot issue markets. This finding suggests that financial constraints are likely to binding among opaque firms during cold issue markets. However, among large firms I do not observe the same effect.

Summary of Essay 3: "Cold Market IPOs and the Acquisition Motive"

Previous studies by Celikyurt et al (2010) and Hovakamian et al (2010) find that the acquisition motive is an important reason for a firm to go public. I extend these studies and explore the effect of the market state when firms go public.

My findings are consistent with the acquisition motive being a plausible reason firms go public during cold issue markets. I use a data set of 4424 U.S. initial public offerings during the time period 1990-2007. My results suggest that cold market firms are five times more probable than hot market firms to make acquisitions during the first year after going public.

I find support for two motivations behind the larger proportion of cold market IPO firms becoming acquirers following their IPO. First, low capital liquidity in the debt markets appears to motivate firms to go public in order to raise equity financing to conduct their acquisitions. I proxy for debt market liquidity by the C&I spread, and I find that the spread is positively related to acquisitions. Second, overall market valuation when conducting acquisitions may be irrelevant for the IPO firms when they conduct acquisitions, as firms sell and buy equity during the same overall market valuations. Hence, only the relative valuation between acquirer and target should be relevant. I find that in comparison to times with high market valuation a larger proportion and a higher number of firms go public to acquire during times of low market valuation, proxied by the P/E ratio of S&P 500.

Furthermore, I find new results regarding the ex post IPO acquisition intensity among firms with a high initial return. Namely, the first day return appears to have an effect on acquisition intensity during hot issue markets but that effect is not present among firms going public during cold markets

[3] For example Hadlock and Pierce (2010) find that financial constraints decreases with firm size.

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THE ESSAYS

The Effect of Financial Constraints on Merger Activity

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Abstract

Using a sample of 48,269 U.S. firm years, I find that financially constrained firms' acquisition intensity is mainly driven by market wide capital liquidity. I proxy capital liquidity by the commercial and industrial loan spread (C&I spread). One standard deviation decrease in the spread corresponds to an increase in the acquisition probability by 24.2% from the average level among financially constrained firms, whereas for financially for financially unconstrained acquirers the increase is only 4%. I find that financially unconstrained acquirers prefer to acquire with cash during times of low capital liquidity and they tend to use during market states of high capital liquidity. Meanwhile, constrained acquirers conduct more both equity and cash acquisitions during times of high capital liquidity.

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I. Introduction

The existence of merger waves is a well documented phenomenon in the financial literature. Prior research forwards two main explanations for why M&A transactions are clustered over time, the neo-classical and the behavioural hypothesis. The neo-classical hypothesis posits that industry shocks cause merger waves (Gort, 1969; Mithchell and Mulherinn, 1996; Jovanovic and Rousseu, 2002), although the shocks need to be coupled with high capital liquidity (Harford, 2005). Behavioural hypothesises mainly explains M&A transactions using equity as currency. Shleifer & Vishny (2003), Rhodes-Kropf, and Viswanathan (2004) and Rhodes-Kropf, Robinson and Viswanathan (2005) argue that overvalued firms are more likely to use their equity to facilitate acquisitions during high states of the market.

A large extent of the prior literature assume that both financially constrained (FC) firms and unconstrained (UC) firms play an equal role in driving merger activity. Harford (2005) considers the average effect of market wide capital liquidity among all firms and shows that industry shocks coupled with sufficient capital liquidity drives merger waves. Maksimovic, et al. (2013) sort firms by credit rating and find that non rated and high rated firms are least sensitive to changes in the C&I spread. They find no monotonic relationship between credit ratings and sensitivity to the C&I spread in their results. This study differs from Maksimovic, et al. (2013) since I use the KZ-index to classify firms into constrained and unconstrained and I find different results. I suggest that the time series variation in acquisition activity among UC firms is less prevalent and that FC firms' activity is an important driver behind the observed wave in the aggregated M&A market. This paper further deviates from prior research since I study the relationship between payment choice, the credit cycle and financial constraints. I argue that the observed clustering of merger activity is mainly driven by financially constrained firms increase in cash acquisitions by financially constrained firms. UC firms tend to substitute to use equity as means of payment during times of high merger activity.

The clustering of FC firms' acquisition activity derives from two different mechanisms. First, the wedge between internally generated funds and external funds is greater during states of low capital liquidity (Mclean and Zhao, (2014)). The high cost of raising external capital makes fewer acquisitions NPV positive investments. Second, FC firms are less likely to obtain debt financing and more likely to be subject to credit rationing during market states of low capital liquidity[1]. Hence, FC firms are more likely to conduct cash acquisitions wither when they hold a substantial amount of internally generated funds or when capital liquidity is high. FC firms could always use equity as means of payment in the transactions[2]. Indeed, empirical evidence suggests that FC acquirers prefer to pay with stock to a larger extent than UC firms (Alshver, et al. (2011)). Rhodes-Kropf, et al. (2005) suggest that equity transactions are clustered and occur during high market states (Rhodes-Kropf, et al. (2005))[3].

My prediction is that UC firms prefer to acquire with cash during times of low capital liquidity due to lower prices and less competition for the target. During states of high capital liquidity, UC firms prefer to pay with stock if the management believes that their own equity is overvalued. Shleifer and Vishny (2003) argue that it is easier to facilitate acquisitions using stock as payment during high states since the target management overvalues the synergies.

This study also contributes to the post-acquisition performance literature. Prior studies indicate that firms conducting in-wave acquisitions tend to have lower returns in the future (e.g. Rau and Vermaelen, 1998; Duchin and Schmitt, 2013; Bouwman, et al, 2009; and Goel and Thakor, 2010)). This study differs from prior studies since it is the first to my knowledge to consider the post-acquisition performance separately for UC and FC firms.

[1] See for example Campello, Graham and Harvey (2010) for survey evidence.
[2] See Gorbenko and Malenko (2014) for a discussion regarding stock payment and the timing of acquisitions.
[3] Also reference point theory (Baker and Wurgler, 2011) offers an explanation for this pattern. Acquirers and sellers are reluctant to sell if they feel that the offer price is lower than a reference price.

Harford (2005) identifies capital liquidity, proxied by the commercial and industrial loan spread (C&I spread) as an important driver of merger waves. This study builds upon Harford's (2005) result by sorting the sample by the level of capital constraints into five portfolios. I use the Kaplan and Zingales (1998) index as in Lamont, et al. (2001), Baker et al (2003), Hong, et al. (2011) and Gao, et al. (2013). My sample consists of 48,659 U.S. firm years between 1989-2009, and I employ data from COMPUSTAT, CRSP and Thomson SDC platinum. I find that acquisition sensitivity to capital liquidity is monotonically increasing with the level of financial constraints. The economic effect is substantial, a one standard deviation decrease in the C&I spread increases financially constrained firms acquisition activity with 24.4%. Among unconstrained firms the corresponding number is 4%. Besides the C&I spread, I utilize two indicators of merger waves. First, I rank the years according to number of transactions and use the rank scaled by the number of sample years. Second, I use the merger indicator as in Maksimovic, et al. (2013). In all specifications I find that financially constrained firms are significantly more likely to conduct acquisitions during wave years compared to unconstrained firms.

The second set of tests concerns the market state effect on payment choice. UC firms do not by definition have a wedge between internal and external funding costs and they can thereby freely choose the payment method. I find that UC firms are more likely to use cash as payment during times of low capital liquidity, and to use equity during times of high capital liquidity. One possible reason for this pattern is that cash acquisitions provide for better opportunities to value creation during low capital liquidity due to lower valuation multiples[4]. FC firms are more likely conduct cash and equity acquisitions during times of high capital liquidity.

[4] Malmendier et al (2012) argue that firms prefer to acquire using cash as means of payment when the target is undervalued.

The most closely related studies consider bond market access and the effect on acquisition activity. Maksimovic, et al. (2013) use a setting that is similar to mine, sorting firms into three credit rating categories (high rating, low rating and no rating) and find that highly rated and firms without rating are less sensitive to changes in the C&I spread, in comparison to firms with a low credit rating. The Maksimovic, et al. (2013) evidence among the three rating categories is not clear when it comes to financial constraints, as it is difficult to distinguish whether if low rated firms are more financially constrained than non-rated firms. The KZ index provides a clear ranking of a firm's level of financial constraints. Harford, et al. (2014) find that firms with credit rating are more likely to conduct acquisitions. However, their analysis does not consider merger waves and time variation in capital liquidity.

The second set of related studies deals with the effect that financial constraints have on the payment method. Theoretical evidence by Gorbenko et al (2014) suggests that since bidders are always able to pay with stock, financial constraints are unrelated to the price a bidder can pay. However, the payment choice affects the split of the gains in the acquisition. High growth and high synergy targets have incentives to initiate a bid quicker if they are financially constrained. Empirical evidence by Alshwer et al (2011) indicates that FC acquirers prefer to acquire with equity and UC acquirers prefer to pay with cash. However, none of the above papers studies the time variation in means of payment among constrained and unconstrained firms.

I conduct various robustness checks. Instead of identifying acquisition events from the SDC platinum database, I test if my results are robust to using a wider measure of acquisitions. I follow Jovanovic and Rosseau (2001), and identify acquisitions from the cash flow statement retrieved from COMPUSTAT. I also split the sample by firm size and calendar time. Finally in order to reduce the potential noise stemming from occasional acquirers, I only consider firms

that conduct more than one acquisition during a fiscal year. The results are robust to all different specifications.

The paper is structured as follows. Section II develops the hypothesis. Section III provides details of sample selection and descriptive statistics. Section IV provides the results. Section IV is split as follows A: sensitivity to capital liquidity, B sensitivity to ex post merger wave measures, C probability of making several acquisitions, D Means of payment E post-acquisition performance, F Robustness tests.

II Hypothesis development

In this section I develop hypotheses regarding financial constraints effect on the timing of M&A conditioning on market wide capital liquidity. Furthermore, I make predictions concerning the payment method choice and the performance of firms under various levels of financial constraints.

Harford (2005) finds that capital liquidity (proxied by the C&I spread) coupled with industry shocks is an important driver of merger activity. Harford (2005) results suggest that a change in the C&I spread has a significant effect on the likelihood of an acquisition. It is plausible that an exogenous shock to capital liquidity affects UC and FC differently. If UC firms are always able to raise the capital amount needed to conduct an acquisition a change in C&I spread should not have an effect on their cash acquisition volume. So, any variation in acquisition volume among UC firms should come from other sources. Harford (2005) argues that the C&I spread is negatively correlated to market valuations. This could motivate UC firms to conduct cash acquisitions during times of high C&I spreads, as prices are lower. Prior research have identifies that firms use cash as means of payment when the target firm's valuation is low (e.g. Malmendier, et al. (2011)

An increase in the C&I spread is likely to have a greater effect on FC firms. The FC firms will experience higher cost of capital and they are more likely to have binding financial constraints. Hence, I expect the acquisition activity of financially constrained firms to be more sensitive to variation in the C&I spread[5]. Empirical Prediction 1 builds upon the results in previous literature (Harford, 2005 and Maksimovic et al., 2013), which find that C&I spread is negatively related to M&A activity.

Empirical prediction 1:

Financially constrained firms are affected to a larger extent by capital liquidity than financially unconstrained firms. Hence, acquisition sensitivity to the C&I spread should be monotonically increasing with financial constraints.

Moreover, I explicitly test for the probability that firms conduct in-wave mergers. If FC firms drive merger waves I expect them to conduct a larger fraction of in-wave acquisitions than UC firms.

Empirical prediction 2:

Financially constrained firms are more likely to conduct in-wave acquisitions. The acquisition sensitivity to merger waves should be monotonically increasing with financial constraints.

[5] Survey evidence by Campello, Graham & Harvey (2011) indicate that firms have to forego investment during low market states.

The firms that do not hold sufficient cash reserves or have limited debt market access are always able to switch to equity as currency (Gorbenko and Malenko (2014)). Alshwer et al (2011) results suggest that FC firms tend to prefer the use of stock rather than using cash as method of payments and UC firms prefer to use cash as means of payment. Their result does not take into account time variation in capital liquidity. By taking into account that FC varies with capital liquidity I will be able to capture the payment choice during different market states. I predict that FC firms are less likely to pay with cash during times of low capital liquidity and are therefore more likely to use equity to facilitate acquisitions. When capital liquidity is high FC firms are able to get debt financing to acquire. The UC firms prefer cash during times of low capital liquidity since asset price correlate negatively with the C&I spread. Their behaviour is likely to vary by market states, so that they prefer to pay with cash during low capital liquidity and use stock during high liquidity since it is easier to facilitate stock acquisitions during good states of the market.

Empirical prediction 3:

Financially unconstrained firms are more likely to make acquisitions with cash when the C&I spread is high and thereby prices low. Financially constrained firms conduct more cash acquisitions during times of high capital liquidity due to credit rationing during low states of the market.

Prediction four concerns the post-acquisition performance for the acquirers. Unconstrained acquirers are able to conduct acquisitions when there is an opportunity to acquire a firm at a low price, i.e. during high spreads. An example is acquisitions of financially distressed firms.

FC firms will find it difficult to raise the funding needed to acquire the firm at a cost of capital that yields a profitable acquisition. Instead they have to acquire during times when there is more competition to acquire the target and prices will thereby be higher.

Empirical prediction 4:

UC firms will have a better post-acquisition performance than the FC firms.

III Data

I use a COMPUSTAT sample from 1989 to 2008. I exclude utilities (SIC 4000-4999) and financial firms (SIC 6000-6999). To be included in the sample, the COMPUSTAT firms need to exist in CRSP. I further exclude firms with negative book value of equity and assets less than $10 million.

I retrieve the acquisition data from Thomson SDC platinum. The sample period is 1990- 2008 I include all transactions undertaken by firms listed on NYSE, AMEX or NASDAQ. I exclude acquisitions of stakes less than 51 per cent of the target firm's shares and deal values less than $10 million. I create a dummy variable if the firm has conducted an acquisition during the year as in Harford (1999, 2005, 2013).

As a robustness check I use the cash flow statement acquisition data from COMPUSTAT (ACQ) as in Jovanovic and Rosseu (2001). This measure is wider than using the SDC dummy and it reflects all acquisitions a firm undertake during the fiscal year. I scale the acquisition variable by lagged total assets.

Tobins Q is measured as in Baker, Stein & Wurgler (2003), Rauh (2006) and Mclean et al (2013), as the natural logarithm of (Market value of Equity – book value of equity + total

assets)/(total assets). I define cash flow as net income plus amortization and depreciation (EBD) as in Kaplan et al (1997) and Mclean et al (2013). Firm size is measured as the natural logarithm of sales. All right hand side variables in the regressions use lagged values. The control variables are described in table II.

I control for unexplained valuation both on industry level and on firm level as in Rhodes-Kropf et al (2005) and Maksimovic et al (2013)[6]. I create the measure on book value, net income and leverage using Fama-French 12 industries.

To proxy for financial constraints I follow Lamont, Polk, and Saa-Requejo (2001) and Baker et al (2003) and use a synthetic Kaplan and Zingales (1997) (KZ) index for all firms. I use the four variable version of the index since q is utilized in the regressions to proxy for investment opportunities[7]. The index constitutes of Cash flow, cash dividends, cash balance and leverage, all defined as in Baker et al (2003). I then use the time-series median value for each firm to sort firms into five portfolios[8], where portfolio one is the portfolio with the lowest KZ index (financially unconstrained firms) and portfolio five contains the most constrained firms. I use the KZ index to proxy for financial constraints as it is the most widely used a priori measure of financial constraints. Furthermore, by using Whited and Wu (2006) or Hadlock and Pierce (2010) would possibly bias my results upward. This is due to the strong effect of firm size on the index outcome. Firm size has proven to be one of the strongest predictor of likelihood to conduct an acquisition (see for example Harford (1999)).

In the second part of the paper, I run calendar time regressions using the Fama French three factors gathered from Kenneth French's webpage[9]. I create equally weighted return portfolios

[6] See Rhodes-Kropf et al (2005) for an in-depth discussion concerning the measure.
[7] The 4 variable and 5 variable index do not differ dramatically, since q is almost orthogonal to the other variables in the index. See discussion in Baker et al (2003) pp 985. However, I use the lagged full index as a robustness check.
[8] Results do not differ if I use contemperous or lagged KZ index.
[9] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

of the acquiring firms as based on the KZ index as above. I use a 36 month holding periods as in Duchin et al (2013).

Figure I visualises the probability of conducting an acquisition during a given year. Figure IV visualises the probability of conducting an acquisition in a given year. I sort the firms with the 20% lowest KZ in one group KZ1 and the 20% with the highest KZ in the KZ5 group based on the median KZ score. Figure I shows that the acquisition activity has a larger variation in the KZ5 group than the KZ1 group. Figure II shows the probability of conducting an all cash acquisition during a given year. The KZ5 group have a more substantial time variation in the likelihood of conducting an acquisition. Figure III shows the likelihood of conducting an equity acquisition. The KZ1 group tend to have larger peaks than the KZ5 group.

Figure IV visualises the probability of conducting an acquisition in a given year. I sort the firms with the 20% lowest KZ in one group KZ1 and the 20% with the highest KZ in the KZ5 group based on the full lagged KZ index. Both groups have variation in the propensity of conducting an acquisition. The acquisition activity varies substantially for the KZ5 (FC) group. The peaks in the activity occur during the years Maksimovic et al (2013) label as wave years (1996, 1998, 1999 and 2000). While the acquisition intensity in the UC group is a bit more stable over time. Previous studies like Harford (2014) and Maksimovic et al (2013) have used an indicator variable taking value 1 if the firm has conducted an acquisition during the year and 0 otherwise. Their results also indicate that the UC firms tend to conduct more acquisitions on average. Figure II visualise cash acquisitions over time and Figure III equity acquisitions. Figure VI indicate that the propensity for an UC firm to acquire with equity is far more variable compared to a FC firm.

IV. Results

A: Capital liquidity and the likelihood of an acquisition

Table III Panel A reports results from regressions using an acquisition indicator variable as the dependent variable. The indicator variable takes the value one if the firm conducts an acquisition during the fiscal year and value zero otherwise. I sort the firms into five different portfolios according to the firms' median KZ index value over the entire sample period as in Baker et al (2003). Portfolio one includes the 20% least constrained firms and portfolio five contains the most constrained firms. The main variable of interest in the regressions is the C&I spread which proxies for capital availability as in Harford (2005) and Maksimovic et al (2013). I control for lagged q, firm size measured by the natural logarithm of lagged sales and unexplained valuation as in Rhodes-Kropf et al (2005). All regressions use firm fixed effects and standard errors clustered by the three-digit SIC-code as in Maksimovic et al (2013).

Following prediction one I expect the C&I spread to be monotonically decreasing in the portfolios, i.e. portfolio one will have the lowest sensitivity to the level of the C&I spread and portfolio five the highest sensitivity. Hence, financially constrained firms are more likely to conduct acquisitions when capital liquidity is high. Unconstrained firms prefer to make acquisitions when capital liquidity is low.

<Insert table III about here>

Columns 1-5 in Table III show results that are consistent with my prediction. Acquisition sensitivity to the C&I spread increases monotonically with financial constraints. The least constrained firms in portfolio 1 are not significantly sensitive to the C&I spread, the coefficient

estimate is -0.015 and the t-value -0.99. The acquisition sensitivity to the C&I spread becomes significant in portfolio 2 (t-value=2.12), and its significance increases over the portfolios. In portfolio 5, the coefficient estimate is -0.100 and has a t-statistic is -5.86. Hence, financially constrained firms tend to do more acquisitions during times of low C&I spread. The difference in the C&I spread coefficient between portfolio 5 and portfolio 1 is 0.085.

I next compute the economic significance for the coefficients. In portfolio 5, a one standard deviation decrease in C&I spread (0.289) amounts to an increase of 0.0289 in the probability of an acquisition. The average propensity to make an acquisition is 0.119 among the firms in portfolio 5 so the propensity to acquire increases by 24.29%. Among the unconstrained firms in portfolio 1 a one standard deviation decrease in the C&I spread corresponds to a 4% increase in acquisitions.

In columns 6-7 I test if the difference between the groups in sensitivity to the C&I spread is statistically significant using interaction variables. I split in the respective columns the sample to 40-20-40 and 20-60-20 where I leave out the middle firms (mid 20% and mid 60%) in the regressions, to test if the difference between the extreme portfolios is significant. I expect the interaction between being unconstrained and C&I spread to be positive. This indicates that UC firms are more likely to conduct acquisitions during times of high spreads in relation to FC firms.

The results on the interaction terms in table III match my expectations. They indicate that financially constrained firms are more likely to conduct acquisitions during years of low spreads compared to financially unconstrained firms. The difference is statistically significant in both specifications (t-values 3.38 and 4.64).

In panel B I conduct the analysis but use the full KZ index including Q. I use lagged values of the KZ index in the sorting to be able to distinguish financially constrained firm years rather than financially constrained firms. The results do not differ from the analysis in panel A.

In sum, the likelihood of making an acquisition increases more among financially constrained firms during times of low spreads than among unconstrained firms. The acquisition sensitivity to the C&I spread is monotonically increasing with financial constraints.

B: Merger Waves and financial constraints

I utilize two different measures of merger waves and merger activity. First, I use the measure of Maksimovic et al (2013), and I classify a year as a wave year if the number of acquisitions exceeds the time-series mean value plus one standard deviation. For the second measure I sum up the acquisitions over the years according to the SDC database, and then rank the years according to the number of acquisitions. The year with the lowest number of acquisitions gets the value of one and the year with the most acquisitions gets value 19. I then scale the rank by the total number of years[10].

<Insert table IV about here>

Table IV panel A shows that the merger wave indicator is positive and statistically significant in all portfolios. The coefficient is the smallest of least magnitude for the portfolio consisting of the UC firms. In this specification, the coefficient is not monotonically increasing with financial constraints. The acquisition activity tends to be of equal magnitude in portfolio four

[10] This procedure is also utilized by Mclean & Zhou (2014) when they rank investor sentiment.

and five. In columns 6 and 7, I use an interaction variable between a firm being unconstrained and the wave indicator (Wave x UC). The results indicate that FC firms tend to conduct more acquisitions than their UC counterparts during the wave years.

In comparison to the non-wave years, the likelihood of conducting an acquisition increases with 0.067 during the wave years in portfolio five. The regression coefficient of 0.067 corresponds to an increase in merger activity by 63.8%.

In panel B, I use the rank of the aggregated merger activity during the year. In this setting the sensitivity to the rank indicator is significant in all specifications. However, the coefficient estimate increases again monotonically with financial constraints. In columns 6 and 7, I repeat the tests using an interaction, with an indicator variable taking value one if the firm is classified to be in portfolio 1 in column 6 or portfolio 1 or 2 in column 7. The results indicate that the difference between the extreme portfolios is statistically significant.

Again, I also compute the economic significance of my estimates. An increase, in merger activity by one standard deviation (0.2958) in portfolio 1, gives an increase in the likelihood of conducting acquisition of 0.024. This corresponds to percentage increase of 22.5% in the coefficient for portfolio 5 corresponds to an increase of 33.3%. Hence, the likelihood of conducting an acquisition during a time of high merger activity increases more for constrained.

C: Several Acquisitions

In the tests above, I study the likelihood of conducting at least one acquisition during a fiscal year. Since the main focus of this paper is to investigate the effect that financially constrained firms have on merger activity, and whether they drive the waves, it is relevant to test whether these firms conduct more than one acquisition during a fiscal year. One obvious way to test this would be to scale the acquisition value by lagged total assets. However, this creates a

problem since usually a firm demands firm specific characteristics[11], e.g. E-bay could not acquire a smaller version of pay pal. Therefore it is more relevant to directly test if the firm conducts two or more acquisitions during the fiscal year.

To study the effect of several takeovers during the fiscal year, I create an indicator variable taking the value one if the firm conducts at least two acquisitions during the fiscal year and zero otherwise. I use the same set of controls as in previous tests and use firm fixed effects and firm level clustering as in previous tests.

<Table V about here>

Columns 1-5 in table V show the regression results regarding the several acquisitions indicator variable. The C&I spread coefficient appears to increase from -0.008 in portfolio 1 to -0.035 in portfolio 3. After portfolio 3, it decreases to -0.027. Portfolio 3, 4 and 5 all have significant sensitivity to the C&I spread at the 1 per cent level. In columns 6 and 7 I test for the significance between the extreme portfolios. The difference is significant both when testing portfolio 1 against portfolio 5, and when testing portfolios 1 and 2 together against portfolios 4 and 5. Hence, FC firms tend to make fewer acquisitions during high spreads compared to UC firms.

D: Means of Payment

A firm is considered using cash as means of payment if cash is the only currency used in the transactions during a given fiscal year. The same definition is used to classify equity acquirers.

[11] I directly test for acquisition value/total assets in the robustness tests section and the results do not yield any difference.

I predict that UC firms prefer to use cash as currency during low states of the economy, i.e. when asset prices are lower as in Rhodes-Kropf, et al. (2005) and Malmendier, et al. (2011)[12]. I predict FC firms to be less likely to raise new financing to make acquisitions during times of low capital liquidity[13]. Therefore, I expect FC firms' cash acquisitions to be more sensitive to the capital liquidity proxy.

During times of economic expansion and low C&I spread, I expect UC firms to use equity as a mean of payment. The UC firms prefer to pay with equity when valuations are high and therefore their equity is more likely to be highly valued. FC firms have to pay with equity even during low valuations in order to conduct acquisitions. However, equity acquisitions are more likely among all when market valuations are high.

<Table VI about here>

The means of payment results are reported in table IV. Regressions on cash acquisitions in panel A show that the firms in portfolios 1 and 2 are more likely to conduct cash acquisitions during states of low capital liquidity i.e. high C&I spread. For portfolios 3 and 4 the difference is not statistically significant. For portfolio 5, we observe that the firms conduct cash financed acquisitions when the C&I spread is low. The difference between the extreme portfolios is 0,062.

Table VI panel B shows results from regressions on using equity as a mean of payment. The C&I spread is significant and positive for all financial constraint portfolios. Hence, all firms tend to conduct more equity acquisitions when capital liquidity is high. There is no clear pattern

[12] Rhodes-Kropf, et al. (2005) find that firms that are undervalued according to their measure tend to acquire with cash and that firms that are overvalued acquire with equity. Malmendier, et al. (2011) find that cash targets are percieved to be undervalued by the market.
[13] See for example Mclean et al (2013)

in the coefficients between the portfolios. Portfolio 2 has the highest equity acquisition sensitivity to C&I spread -0.046. Columns 6 and 7 show tests of differences between the extreme portfolios. The results indicate that there is no heterogeneity in the payment choice over time between the portfolios.

In sum, UC firms tend to conduct cash acquisitions during times of low capital liquidity and switch to equity as means of payment during times of low C&I spread. The FC firms conduct more cash and equity transactions during times of low C&I spread.

E: Post-Acquisition Performance

To distinguish between the post-acquisition performances of financially constrained and unconstrained acquirers, I construct return portfolios for a 36 month holding period after the acquisition. I construct five portfolios as in the above tests, ranging from the least constrained (portfolio one) to the most constrained (portfolio five). I create equally weighted portfolio returns during the calendar time month among acquirers. The first set of tests use the median KZ index as above. The use of future values is likely to produce biased results and it is not a possible trading strategy. This is due to the look ahead bias in the sorting of firms in the Baker et al (2003) manner. However, it provides a clear view of the performance among the acquiring firms. Therefore, for robustness I also use a second sorting based on the lagged KZ index to create a tradable strategy[14].

[14] In this setting I do not explicitly control for q and can therefore use the KZ index proposed by Kaplan and Zingales (1998).

Columns one to five in Table VII panel A shows regressions of the excess returns on acquirers in the different portfolios.

<Table VII about here>

The results in table VII indicate that UC firms perform better after conducting an acquisition than their constrained comparables. The only statistically significant portfolios are portfolio 1 that has positive performance and portfolio 5 that has significantly negative performance. Buying portfolio 1 and shorting portfolio 5 yields a significant alpha of nearly 1 per cent per month. In column 7 we observe a tradable strategy using only lagged values in the sorting of the portfolio. The return difference is positive and significant.

F: Robustness tests

I conduct three different robustness checks. First, instead of relying on SDC Platinum to identify acquisition events, I collect acquisition data from COMPUSTAT, in order to get a wider measure of acquisitions. Second, I test if the results are driven by firm size, and split the sample according to firm size. Third, I split the sample according to the time period.

<Table VIII about Here>

The regressions in Table VIII use the COMPUSTAT acquisition values scaled by lagged total assets. I run the same set of regressions as in table III. Using the COMPUSTAT acquisition data yields results that are very similar to those based on SDC database. The least financially constrained firms acquisitions tend to be less sensitive to changes in the C&I spread. The relationship increases monotonically with financial constraints.

<Table IX about here>

Panel A in Table IX shows identical regressions as in table III columns 6 and 7 (control variables not reported). However, I split the sample according to firm size. I define small firms as firms with total assets below $100 million and large firms have total assets above $100 million. The results are very similar between the sto size sub-samples.

Panel B in Table IX shows regressions with time-specific sub-samples. The regressions have the same variables as in table III (control variables not reported). I split the sample into two periods 1990-1998 and 1999-2008. The results do not differ between the different time periods.

V Conclusions

Using a sample of 48,269 U.S. firm years, I find that financially constrained firms' acquisition intensity is mainly driven by capital liquidity. I proxy capital liquidity with the commercial and industrial loan spread (C&I spread). One standard deviation decrease in the spread corresponds to an acquisition increase the likelihood to acquire by 24.2%. For financially unconstrained acquirers the increase is only 4%. I also test explicitly for the acquisition sensitivity to merger waves. I utilize two different merger wave proxies. First, I rank the years according to number of acquisitions in the SCD platinum database. Second, I use a wave indicator as in Maksimovic et al (2013). Both measures indicate that financially constrained firms are more likely to conduct in-wave mergers using both measures.

I also consider the choice of payment method, and find that UC firms tend to acquire with cash during times of high spreads and with equity during times of low spreads. Financially constrained acquirers tend make more cash and equity acquisitions during times of high spreads.

Furthermore, I find new results regarding the post-acquisition performance among FC and UC firms. UC firms tend to have far better returns following their acquisitions compared to FC firms.

I conduct three different robustness tests. First, I employ an alternative wider measure of acquisitions from the COMPUSTAT database. Second, I test whether the results are robust across firms size categories. Third, I test whether the results very through time. The robustness tests support the main hypothesis in the paper, and the effects seem consistent across size categories and through time.

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Figure I

Propensity to acquire using median KZ score

Figure I shows the propensity for a firm to conduct at least one acquisition during a fiscal year. The KZ1 line shows the average propensity to acquire for a firms in the least constrained firms sorted by the firms median KZ index into five portfolios as in Baker, Stein and Wurgler (2003). The KZ5 portfolio shows the average in the most constrained portfolio.

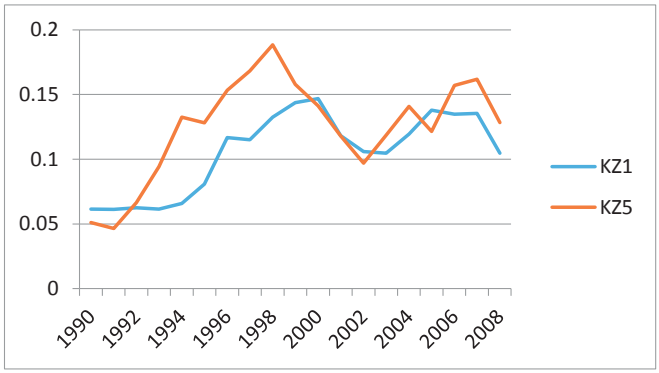

Figure II

Propensity to acquire with cash

Figure II shows the propensity for a firm to conduct at least one all cash acquisition during a fiscal year. The KZ1 line shows the average propensity to acquire for a firms in the least constrained firms sorted by the firms median KZ index into five portfolios as in Baker, Stein and Wurgler (2003). The KZ5 portfolio shows the average in the most constrained portfolio.

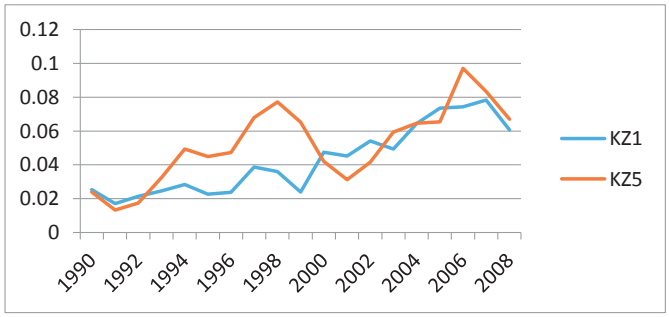

Figure III

Propensity to acquire with Equity

Figure II shows the propensity for a firm to conduct at least one all equity acquisition during a fiscal year. The KZ1 line shows the average propensity to acquire for a firms in the least constrained firms sorted by the firms median KZ index into five portfolios as in Baker, Stein and Wurgler (2003). The KZ5 portfolio shows the average in the most constrained portfolio.

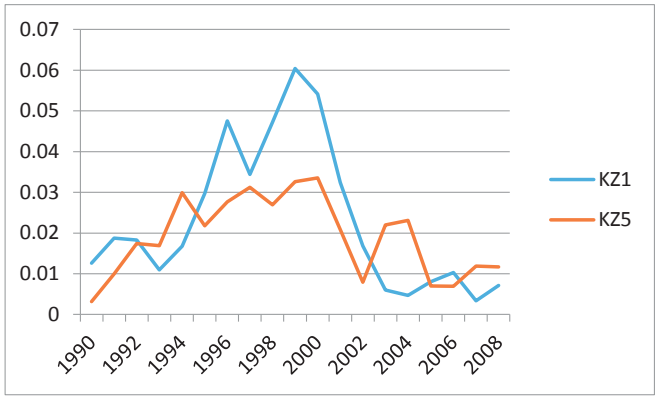

FIGURE IV

Propensity to acquire using lagged KZ sorting

Figure IV shows the propensity for a firm to conduct at least one acquisition during a fiscal year. The KZ1 line shows the average propensity to acquire for a firms in the least constrained firms sorted by the firms by lagged full KZ index into five portfolios as in Lamont et al (2001). The KZ5 portfolio shows the average in the most constrained portfolio.

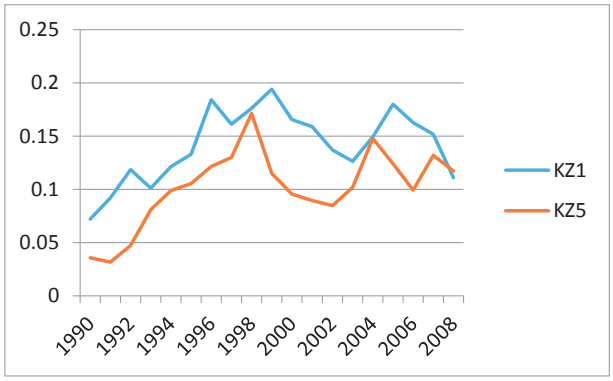

Figure V

Propensity to conduct at least one all cash acquisition a fiscal year

Figure V shows the propensity for a firm to conduct at least one all cash acquisition during a fiscal year. The KZ1 line shows the average propensity to acquire for a firms in the least constrained firms sorted by the firms by lagged full KZ index into five portfolios as in Lamont et al (2001). The KZ5 portfolio shows the average in the most constrained portfolio.

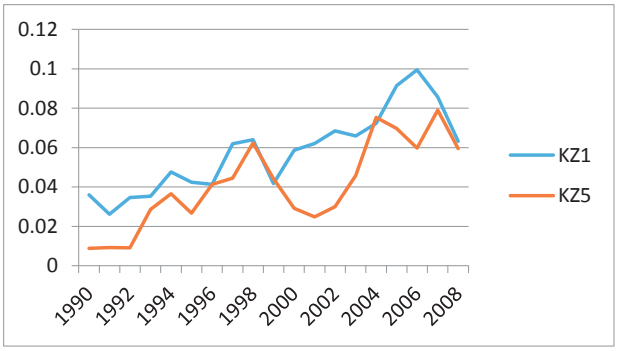

Figure VI

Propensity to conduct at least one all quity acquisition a fiscal year

Figure V shows the propensity for a firm to conduct at least one all cash acquisition during a fiscal year. The KZ1 line shows the average propensity to acquire for a firms in the least constrained firms sorted by the firms by lagged full KZ index into five portfolios as in Lamont et al (2001). The KZ5 portfolio shows the average in the most constrained portfolio.

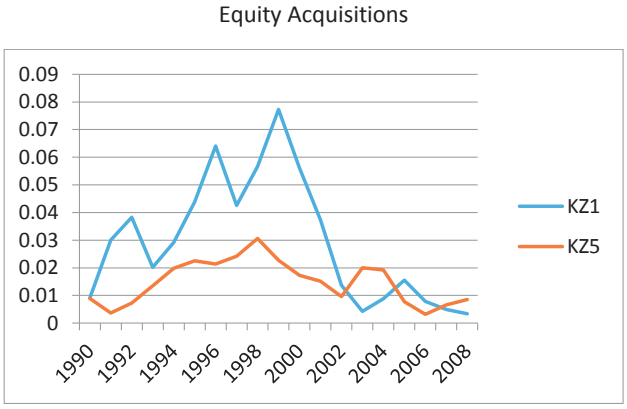

Table 1

Firms conducting at least one acquisition during the year

	KZ1	KZ2	KZ3	KZ4	KZ5
1990	0.07	0.07	0.05	0.06	0.04
1991	0.09	0.08	0.05	0.06	0.03
1992	0.12	0.08	0.09	0.07	0.05
1993	0.10	0.10	0.09	0.11	0.08
1994	0.12	0.11	0.10	0.11	0.10
1995	0.13	0.12	0.11	0.15	0.11
1996	0.18	0.16	0.15	0.15	0.12
1997	0.16	0.16	0.16	0.16	0.13
1998	0.18	0.19	0.15	0.21	0.17
1999	0.19	0.17	0.14	0.16	0.11
2000	0.17	0.17	0.13	0.14	0.10
2001	0.16	0.15	0.13	0.11	0.09
2002	0.14	0.15	0.14	0.13	0.08
2003	0.13	0.17	0.14	0.14	0.10
2004	0.15	0.15	0.17	0.19	0.15
2005	0.18	0.15	0.18	0.17	0.12
2006	0.16	0.16	0.18	0.17	0.10
2007	0.15	0.18	0.16	0.17	0.13
2008	0.11	0.14	0.13	0.14	0.12

TABLE II

DESCRIPTIVE STATISTICS

The variables are the natural logarithm of lagged q, lagged ln(sales) called size, cash flow and unexplained valuation according to Rhodes Kropf et al (2005)

Variable	N	Mean	Stdev
Ln(q(t-1))	58142	0.63	1.60
cf	72110	0.04	0.24
size	69227	5.30	2.14
Firm UV	68454	0.05	1.09
Sector UV	80854	0.04	0.37
C&I Spread	76	2.06	0.29

TABLE III

Propensity to acquire

The table shows regressions on an indicator taking value 1 if the firm conducts at least one acquisition during the fiscal year according to SDC. I run five different regressions on portfolios sorted according to the firms median KZ index value where portfolio 1 consist of the least constrained firms and 5 the most. The variable of interest is the (commercial and industrial loan spread) C&I spread. The regressions also include the natural logarithm of lagged q, lagged ln(sales) called size, cash flow and unexplained valuation according to Rhodes-Kropf et al (2005). Column 6 and 7 includes a dummy variable taking value one if the firm is classified as financially unconstrained according to the KZ index. In column 6 only portfolio 1 is classified as unconstrained both 1 and 2 are unconstrained. The regressions in column 6 and 7 leave out the mid 80% and 20% respectively. The specification in column 6 and 7 also includes an interaction variable between the C&I spread and the UC dummy.Regressions use firm fixed effects, robust standard errors and firm level clustering. Constant term is not reported. Robust t-values are reported in parentheses. ***, **,* indicates significance at 1%, 5% and 10% respectively.

Kz portfolio	1	2	3	4	5	*20-80-20*	40-20-40
C&I spread (t-1)	-0.015	-0.026**	-0.038***	-0.069***	-0.100***	-0.105***	-0.100***
	(-0.99)	(-2.12)	(-2.79)	(-4.21)	(-5.86)	(-5.9)	(-7.59)
Q(t-1)	0.009***	0.018***	0.012***	0.030***	0.019*	0.011***	0.015***
	(-4.04)	(5.43)	(3.39)	(7.25)	(1.94)	(2.65)	(4.86)
Size(t-1)	0.021***	0.030***	0.010*	-0.007***	-0.031***	0.005	0.011***
	(3.64)	(5.24)	(1.71)	(-1.09)	(-3.3)	(1.01)	(3.46)
Cash flow	-0.065**	-0.038***	0.041	0.082***	0.092**	-0.009	0.003
	(-2.54)	(-0.96)	(1.12)	(1.76)	(2.06)	(-0.41)	(0.24)
Unexplained Valuation (t-1)	0.002	0.023***	0.020***	0.025***	0.018***	0.008**	0.016***
	(0.30)	(5.46)	(4.38)	(4.35)	(3.03)	(1.99)	(5.93)
UC						-0.182***	-0.160***
						(-3.09)	(-4.28)
C&I * UC						0.087***	0.075***
						(3.38)	(4.64)
N	10318	11571	11376	10733	7126	17444	39748
R^2	0.0049	0.0119	0.0057	0.0155	0.0207	0.007	0.0087

Panel B using lagged KZ sort including Q

Kz portfolio	**1**	**2**	**3**	**4**	**5**	***20-80-20***	**40-20-40**
C&I(t-1)	0.004	-0.030	-0.033*	-0.024	-0.055***	-0.059***	-0.056***
	(0.29)	(-1.64)	(-1.87)	(-1.33)	(-3.16)	(-3.55)	(-5.19)
Q(t-1)	0.030***	0.088***	0.108***	0.131***	0.133***	0.078***	0.085***
	(2.77)	(6.39)	(7.25)	(8.56)	(9.60)	(9.92)	(15.70)
Size(t-1)	0.008	0.031***	0.028***	-0.011	-0.013*	-0.001	0.006*
	(1.06)	(3.51)	(3.31)	(-1.36)	(-1.91)	(-0.19)	(1.91)
Cash flow	-0.023	-0.012	-0.031	0.061	0.012	-0.022	0.004
	(-0.58)	(-0.29)	(-0.70)	(1.29)	(0.45)	(-1.15)	(0.30)
Unexplained Valuation (t-1)	0.008	0.027***	0.017**	0.023***	0.007	0.005	0.016***
	(1.13)	(3.59)	(2.50)	(3.23)	(1.21)	(1.34)	(5.57)
UC						-0.069	-0.024
						(-1.43)	(-0.75)
C&I(t-1)*UC						0.077***	0.046***
						(3.48)	(3.07)
N	9407	9583	9642	9674	9593	19000	38257
R^2	0.0018	0.0139	0.0143	0.0191	0.0268	0.0135	0.0166
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TABLE IV

Explicit Merger Wave Tests

The table shows regressions on an indicator taking value 1 if the firm conducts an acquisition during the fiscal year according to SDC. I run five different regressions on portfolios sorted according to the firms median KZ index value where portfolio 1 consist of the least constrained firms and 5 the most. Independent variables are a merger wave indicator taking value 1 if the year is a wave year and 0 otherwise as in Maksimovic et al (2013). In Panel B merger activity defined as the total number of acquisitions during the year according to the SDC database. The regressions also include the natural logarithm of lagged q, lagged ln(sales) called size, cash flow and unexplained valuation according to Rhodes Kropf et al (2005). Column 6 and 7 includes a dummy variable taking value one if the firm is classified as financially unconstrained according to the KZ index. In column 6 only portfolio 1 is classified as unconstrained both 1 and 2 are unconstrained. The regressions in column 6 and 7 leave out the mid 80% and 20% respectively. The specification in column 6 and 7 also includes an interaction variable between the C&I spread and the UC dummy.Regressions use firm fixed effects, robust standard errors and firm level clustering. Constant term is not reported. Robust t-values are reported in parentheses. ***, **,* indicates significance at 1%, 5% and 10% respectively.

Panel A: Using Maksimovic et al (2013) wave indicator

Kz portfolio	**1**	**2**	**3**	**4**	**5**	***20-80-20***	**40-20-40**
Wave	0.019**	0.020***	0.030***	0.067***	0.067***	0.070***	0.070***
	(2.18)	(2.39)	(3.68)	(7.20)	(5.88)	(6.10)	(9.69)
Q(t-1)	0.009**	0.018***	0.012***	0.027***	0.018**	0.010***	0.015***
	(2.28)	(4.48)	(2.01)	(6.05)	(2.16)	(2.66)	(4.88)
Size(t-1)	0.021***	0.029***	0.008	-0.008	-0.030***	0.003	0.009***
	(3.57)	(6.16)	(1.41)	(-1.28)	(-3.31)	(0.70)	(2.86)
Cash flow	-0.069**	-0.039	0.041	0.068**	0.082	-0.015	-0.000
	(-2.41)	(-1.62)	(1.56)	(2.07)	(2.40)	(-0.66)	(-0.05)
Unexplained Valuation (t-1)	0.002	0.023***	0.021***	0.026***	0.018***	0.010**	0.019***
	(0.42)	(4.49)	(4.31)	(4.82)	(3.21)	(2.55)	(6.87)
Wave*UC						-0.051***	-0.052***
						(-3.61)	(-5.55)
N	10441	11683	11510	10895	7126	17721	40299
R^2	0.0056	0.0124	0.0064	0.0192	0.0206	0.0339	0.0354
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Using Aggregated merger activity year rank

Kz portfolio	**1**	**2**	**3**	**4**	**5**	***20-80-20***	**40-20-40**
Rank	0.080***	0.073***	0.105***	0.137***	0.134***	0.129***	0.134***
	(6.10)	(5.42)	(7.64)	(9.92)	(7.34)	(7.07)	(12.19)
Q(t-1)	0.008**	0.017***	0.011*	0.026***	0.018**	0.010**	0.0140***
	(2.18)	(4.36)	(1.91)	(5.77)	(2.06)	(2.55)	(4.74)
Size(t-1)	0.018***	0.028***	0.005	-0.014**	-0.035***	0.000	0.006*
	(3.20)	(5.87)	(0.90)	(-2.11)	(-3.84)	(0.05)	(1.81)
Cash flow	-0.073***	-0.043*	0.037	0.066**	0.086**	-0.015	-0.003
	(-2.57)	(-1.82)	(1.43)	(2.04)	(2.58)	(-0.71)	(-0.2)
Unexplained Valuation (t-1)	0.001	0.023***	0.020***	0.026***	0.019***	0.010**	0.018***
	(0.31)	(4.42)	(4.27)	(4.68)	(3.43)	(2.61)	(6.80)
Rank*UC						-0.048***	-0.058***
						(-2.12)	(-4.02)
N	10441	11683	11510	10895	7126	17721	40299
R^2	0.0093	0.0147	0.0116	0.0231	0.0206	0.0339	0.0354
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TABLE V

Probability of Conducting Several Acquisitions

The table shows regressions on an indicator taking value 1 if the firm conducts more than one acquisition during the fiscal year according to SDC. I run five different regressions on portfolios sorted according to the firms median KZ index value where portfolio 1 consist of the least constrained firms and 5 the most. The variable of interest is the (commercial and industrial loan spread) C&I spread. The regressions also include the natural logarithm of lagged q, lagged ln(sales) called size, cash flow and unexplained valuation according to Rhodes-Kropf et al (2005). Column 6 and 7 includes a dummy variable taking value one if the firm is classified as financially unconstrained according to the KZ index. In column 6 only portfolio 1 is classified as unconstrained both 1 and 2 are unconstrained. The regressions in column 6 and 7 leave out the mid 80% and 20% respectively. The specification in column 6 and 7 also includes an interaction variable between the C&I spread and the UC dummy.Regressions use firm fixed effects, robust standard errors and firm level clustering. Constant term is not reported. Robust t-values are reported in parentheses. ***, **,* indicates significance at 1%, 5% and 10% respectively.

Kz portfolio	1	2	3	4	5	*20-80-20*	40-20-40
C&I spread (t-1)	-0.008	-0.009	-0.035***	-0.030***	-0.027***	-0.036***	-0.038***
	(-1.11)	(-1.06)	(-3.58)	(-2.86)	(-2.74)	(-3.8)	(-4.94)
Q(t-1)	0.005***	0.008***	0.006	0.020***	0.018***	0.009***	0.011***
	(2.86)	(3.26)	(1.62)	(3.13)	(2.68)	(6.35)	(9.50)
Size(t-1)	0.008**	0.009***	-0.001	0.001	-0.012**	0.013***	0.015***
	(2.12)	(2.91)	(-0.06)	(0.12)	(-2.31)	(6.09)	(6.58)
Cash flow	-0.014	-0.002	0.066***	0.055	0.013	-0.036**	-0.022
	(-0.97)	(-0.05)	(3.26)	(1.60)	-0.81	(-2.07)	(-1.37)
Unexplained Valuation (t-1)	0.005	-0.003	0.005	0.010***	0.005	0.011***	0.010***
	(1.33)	(-0.79)	(1.23)	(2.51)	(1.65)	(5.78)	(7.59)
UC						-0.060*	-0.052***
						(-1.93)	(-2.7)
C&I * UC						0.028**	0.021**
						(1.99)	(2.46)
N	9838	10444	10375	10486	7126	17444	39748
R^2	0.0053	0.0061	0.0049	0.0064	0.0207	0.0339	0.0354
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table VI

Means of payment regressions

Panel A shows regressions on an indicator taking value 1 if the firm conducts an acquisition using solely cash during the fiscal year according to SDC. Panel B shows regressions on an indicator taking value 1 if the firm conducts an acquisition using solely equity during the fiscal year according to SDC. I run five different regressions on portfolios sorted according to the firms median KZ index value where portfolio 1 consist of the least constrained firms and 5 the most. The variable of interest is the (commercial and industrial loan spread) C&I spread. The regressions also include the natural logarithm of lagged q, lagged ln(sales) called size, cash flow and unexplained valuation according to Rhodes-Kropf et al (2005). Column 6 and 7 includes a dummy variable taking value one if the firm is classified as financially unconstrained according to the KZ index. In column 6 only portfolio 1 is classified as unconstrained both 1 and 2 are unconstrained. The regressions in column 6 and 7 leave out the mid 80% and 20% respectively. The specification in column 6 and 7 also includes an interaction variable between the C&I spread and the UC dummy.Regressions use firm fixed effects, robust standard errors and firm level clustering. Constant term is not reported. Robust t-values are reported in parentheses. ***, **,* indicates significance at 1%, 5% and 10% respectively.

Panel A: Cash

Kz portfolio	1	2	3	4	5	*20-80-20*	40-20-40
C&I spread (t-1)	0.029***	0.029***	0.015	-0.011	-0.033***	-0.037***	-0.023***
	(3.39)	(2.51)	(-1.11)	(-1.15)	(-2.74)	(-3.06)	(-2.76)
Q(t-1)	-0.001***	0	-0.001	0.004*	0.004	0.001	0.002*
	(-3.02)	(-0.19)	(-0.47)	(1.91)	(1.19)	(1.01)	(1.79)
Size(t-1)	0.022***	0.0244***	0.021***	0.020***	0.014***	0.020***	0.021***
	(11.52)	(6.98)	(4.56)	(8.07)	(4.55)	(9.87)	(10.64)
Cash flow	-0.020*	0.007	0.042***	0.067***	0.075***	0.013	0.023**
	(-1.59)	(0.43)	(3.39)	(6.74)	(3.12)	(0.98)	(2.13)
Unexplained Valuation (t-1)	0.016***	0.016***	0.014***	0.015***	0.016***	0.013***	0.014***
	(6.45)	(6.2)	(8.71)	(7.33)	(6.92)	(8.89)	(12.9)
UC						-0.139***	-0.108***
						(5.01)	(-5.35)
UC*C&I(t-1)						0.066***	0.051***
						(4.70)	(4.98)
N	10318	11571	11376	10733	7126	17444	39748
R^2	0.0413	0.042	0.0357	0.0302	0.0294	0.0316	0.0344

Panel B: Equity

Kz portfolio	1	2	3	4	5	*20-80-20*	40-20-40
C&I spread (t-1)	-0.028***	-0.046***	-0.033***	-0.034***	-0.015**	-0.022***	-0.035***
	(-3.56)	(-3.47)	(-4.14)	(-4.05)	(-2.14)	(-3.21)	(-6.24)
Q(t-1)	0.009***	0.010***	0.006***	0.011***	0.009***	0.011***	0.012***
	(3.98)	(10.25)	(3.63)	(4.67)	(3.11)	(5.73)	(10.13)
Size(t-1)	-0.014**	-0.011**	-0.015***	-0.013***	-0.010***	0.004***	0.005***
	(-2.08)	(-2.38)	(-2.54)	(-3.93)	(-2.62)	(4.10)	(4.11)
Cash flow	-0.077***	-0.038	-0.040***	-0.034	-0.045*	-0.073***	-0.065***
	(-3.78)	(-1.51)	(-2.86)	(-1.07)	(-1.86)	(-3.25)	(-3.93)
Unexplained Valuation (t-1)	0.010***	0.024***	0.015***	0.015***	0.014***	0.008***	0.011***
	(2.86)	(3.14)	(3.27)	(4.24)	(4.22)	(4.79)	(4.70)
UC						0.058	0.039

						(1.41)	(1.41)
UC*C&I(t-1)						-0.026	-0.016
						(-1.45)	(-1.29)
N	10318	11571	11376	10733	7126	17444	39748
R^2	0.0356	0.0286	0.0165	0.021	0.0172	0.037	0.0329

TABLE VII

Post Acquisition Performance Regressions

This table show calendar time regressions using 36 month holding period. KZ1 is the least constrained portfolio and KZ5 is the most constrained.

	36 months						Lagged KZ
	KZ1	KZ2	KZ3	KZ4	KZ5	1-5	1-5
Alpha	0.354***	-0.043	0.065	-0.202	-0.589***	0.942***	0.244*
	(2.68)	(-0.29)	(0.44)	(-1.08)	(-2.64)	(4.81)	(1.77)
Rm-rf	1.108***	1.264***	1.194***	1.209***	1.295***	-0.186***	-0.313***
	(33.09)	(28.62)	(29.78)	(22.7)	(17.78)	(-2.91)	(-8.75)
SMB	0.464***	0.698***	0.621***	0.739***	0.739***	-0.275***	-0.068
	(8.70)	(10.16)	(7.92)	(6.47)	(5.64)	(-2.72)	(-1.14)
HML	-0.354***	-0.156***	-0.065	0.356***	0.363***	-0.717***	0.039
	(-6.84)	(-2.58)	(-1.07)	(4.08)	(3.00)	(-7.26)	(0.72)
N	264	264	264	264	264	264	240
R^2	0.89	0.89	0.88	0.82	0.78	0.34	0.32

Table VIII

Regressions on Acquisitions

This table shows regressions on Acquisitions (t)/Total assets (t-1) gathered from COMPUSTAT. I run five different regressions on portfolios sorted according to the firms median KZ index value where portfolio 1 consist of the least constrained firms and 5 the most. The variable of interest is the (commercial and industrial loan spread) C&I spread. The regressions also include the natural logarithm of lagged q, lagged ln(sales) called size, cash flow and unexplained valuation according to Rhodes-Kropf et al (2005). Column 6 and 7 includes a dummy variable taking value one if the firm is classified as financially unconstrained according to the KZ index. In column 6 only portfolio 1 is classified as unconstrained both 1 and 2 are unconstrained. The regressions in column 6 and 7 leave out the mid 80% and 20% respectively. The specification in column 6 and 7 also includes an interaction variable between the C&I spread and the UC dummy. Regressions use firm fixed effects, robust standard errors and firm level clustering. Constant term is not reported. Robust t-values are reported in parentheses. ***, **,* indicates significance at 1%, 5% and 10% respectively.

Kz portfolio	1	2	3	4	5	*20-80-20*	*40-20-40*
C&I spread (t-1)	-0.001	-0.014***	-0.021***	-0.042***	-0.049***	-0.058***	-0.051***
	(-0.19)	(-2.76)	(-3.97)	(-5.04)	(-5.75)	(-6.16)	(-6.96)
Q(t-1)	0.001	0.003**	0.002	0.007	0.009*	0.003**	0.003*
	(1.09)	(2.04)	(1.10)	(1.26)	(1.74)	(2.22)	(1.83)
Size(t-1)	0.002	0.002	-0.008**	-0.019***	-0.036***	0	0
	(0.61)	(0.68)	(-2.04)	(-4.97)	(-5.58)	(-0.09)	(-0.46)
Cash flow	0.029	0.023*	0.067***	0.110***	0.08	0.046***	0.060***
	(1.46)	(1.73)	(3.54)	(3.55)	(3.77)	(3.37)	(4.90)
Unexplained Valuation (t-1)	0.001	0.014***	0.005	0.011***	0.001	0.002**	0.004***
	(0.18)	(3.14)	(1.49)	(3.35)	(0.49)	(2.13)	(3.60)
UC						-0.155***	-0.130***
						(-6.45)	(-8.1)
C&I * UC						0.067***	0.053***
						(6.27)	(7.47)
N	10318	11571	11376	10733	7126	17444	39748
R^2	0.0015	0.0087	0.0081	0.0228	0.0346	0.011	0.0128

Table IX

Robustness checks

The table shows regressions on an indicator taking value 1 if the firm conducts at least one acquisition during the fiscal year according to SDC. In the regression I use the extreme portfolios according to a 5 portfolio sorting of the firms median KZ index . The specification using 20-80-20 indicate that I leave out the 3 middle portfolios and only include the two extreme portfolios. In the 40-20-40 I leave out the middle portfolio and aggregate the two financially uncconstrained and the financially constrained portfolios. Independent variables are the commercial and industrial loan spread from the Federal Reserve C&I spread (t-1). NFC is a dummy variable taking value 1 if the firm are either in the lowest 20% financially constrained or if the firm is in the lowest 40% of the KZ index depending on the regression specification. C&I*NFC is an interaction variable of lagged C&I spread and the NFC dummy variable. The regressions also include the natural logarithm of lagged q, lagged ln(sales) called size, cash flow and unexplained valuation according to Rhodes Kropf et al (2005) which is not reported. The regressions use 3-digit industry fixed effects, robust standard errors and industry clustering. Robust t-values are reported in parentheses. ***,**,* indicates significance at 1%, 5% and 10% respectively.

Panel A:	*Total assets >100*		*Total assets < 100*	
Sorting	*20-80-20*	40-20-40	*20-80-20*	40-20-40
C&I * UC	0.074***	0.059***	0.025*	0.029***
	(5.44)	(6.71)	(1.86)	(3.34)
C&I spread (t-1)	-0.062***	-0.057***	-0.030**	-0.034***
	(-5.46)	(-6.17)	(-2.22)	(-4.25)
UC	-0.177***	-0.151***	-0.058***	-0.068***
	(-5.98)	(-7.59)	(-2.00)	(-3.61)
N	11561	26202	5883	13545
R^2	0.017	0.0194	0.0045	0.0091

Panel B:	*<1999*		*>1998*	
Sorting	*20-80-20*	40-20-40	*20-80-20*	40-20-40
C&I * UC	0.074***	0.064***	0.026**	0.016***
	(4.24)	(5.03)	(2.41)	(2.33)
C&I spread (t-1)	-0.087***	-0.080***	-0.025***	-0.014***
	(-5.37)	(-6.56)	(-3.18)	-2.73
UC	-0.179***	-0.151***	-0.061***	-0.047***
	(-4.75)	(-5.4)	(-2.53)	(-3.17)
N	6041	10302	11403	26408
R^2	0.0225	0.024	0.0064	0.0089

Essay 2:

Cold Market Equity Issuance and Stage Financing

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Abstract

This paper examines the effect of aggregate issue activity and stock market valuation on firm level equity issuance. I find that firms that issue shares during cold issue markets tend to make subsequent equity issues to a larger extent compared to hot market firms. I isolate the effect of issuance in a single event, the Initial Public Offering (IPO), to get a common reference point. Previous literature has found evidence of market timing during "hot" issue markets. However, not much work has been done to examine "cold" market issuers' behavior. Using a sample of 2,609 U.S. IPO transactions, I find that cold market issuers issue 16.7 per cent less equity capital during the IPO than their hot market counterparts and they are 31.8 per cent more likely to return to the equity market within two years following the IPO.

1. Introduction

Market timing of equity issuance is an important topic within the capital structure literature[1]. Firms tend to raise more equity capital during high market valuation when the cost of equity is low. A major part of the literature is focused on hot market issuers. Consequently we know little about what firms with profitable projects do during times of low market valuations. Alti (2006) finds that cold market issuers tend to issue less equity during the IPO than their hot market comparables. He further reports that two years after the IPO, hot and cold market issuers tend to have similar capital structures. One explanation to this pattern is offered by Myers and Majluf (1984). They propose that firms might forego valuable investment projects during times of low market valuations due to a wealth transfer from existing shareholders to new shareholders when issuing equity. In an intermediate solution, Myers and Majluf (1984) find that firms might mitigate the wealth transfer by only investing in projects that yield the highest return and postpone other profitable projects. In other words they stage their financing.

Previous studies find that firms issuing equity during cold markets raise less capital than hot market firms. This paper differs from prior literature since; I argue that instead of issuing a large portion of equity at the IPO, cold market issuers issue a second round of equity when terms are more favourable[2]. This can be seen as staged financing in the public equity markets. About 20 per cent of IPO firms return to the primary equity market to raise additional equity financing within two years after going public. In contrast to previous literature, I argue that staging is an answer to low market valuations. Firms hesitate to raise excess capital during cold markets when capital is more costly and existing shareholders face more severe dilution. I report that cold market firms are 16.7% more likely to issue equity following the IPO than hot

[1] See for example Taggart (1977), Baker and Wurgler (2002) and Alti (2006) for a discussion concerning equity market timing.

[2] This argument is related to the discussion in Baker and Wurgler (2012). Where they use prospect theory by Tversky and kahneman (1974) to argue: investors are not willing to sell equity at low valuations due to behavioural biases.

market firms. I further argue that the result is more consistent with the firm-driven staging hypothesis (demand side) than the market staging hypothesis (supply side). My results suggest that firms that go public during cold markets are larger and that the interaction between firm size and IPO volume plays a significant role in determining the post IPO share issuance behaviour.

There are two strands of literature concerning staged financing, public market staging and firm staging. The public market staging literature argues that staging arises from the supply side, while firm staging arises from the demand side. The firm does not want to raise excess financing during times of high cost of equity due to dilution of existing shareholders. Seminal papers by Allen and Faulhaber (1989) and Welch (1989) propose signalling models to explain staged financing. Strong firms strategically underprice their IPOs to provide the market with a credible signal of high quality, and when firm quality is revealed, they conduct SEOs at a higher price. However, the signalling explanation has received mixed support in empirical studies[3]. Hertzel, Huson and Parrino (2012) argue that staging arises from the supply side. They suggest that the proportion of immaterial assets in the firm, coupled with its R&D expenditures, creates a credit rationing problem due to agency costs of cash, and thereby financing is staged. They propose that firms engaging in more opaque investment activity are more subject to an overinvestment problem, and thereby subject to credit rationing.

None of the above studies suggest that the timing of the IPO plays a role in determining whether the firms stage their financing or not. The main hypothesis I pursue is, that firms with capital needs during times of low valuations will, instead of raising a substantial amount of equity during the IPO, stage their financing by conducting a smaller first round and then raising

[3] Jegadeesh, Weinstein and Welch (1993) find stronger support for the market feedback hypothesis, Welch (1997) finds weak support for the underpricing hypothesis and Spiess and Pettway (1997) find no evidence of the signalling hypothesis.

additional capital in a subsequent seasonal equity offering. There are two potential reasons for this pattern. First, firms only raise capital to finance their best projects during times of low valuations, and they forego other NPV positive projects (Myers and Majluff, (1984)). Second, Gompers and Lerner (2000) argue that low capital supply on the venture capital market forces firms to stage their financing, and to suppress their capital demand.

This study is also related to market timing and target capital structure studies by Alti (2006) and Baker and Wurgler (2002). Alti (2006) studies leverage decisions in IPO firms and finds that hot market issuers tend to return to pre-IPO leverage level after two years following the IPO. He attributes the effect to market timing, and finds that net equity issuance is greater the year following the IPO among cold market firms and that net debt issuance is higher among hot market firms the second year following the IPO. This study differs from Alti (2006), in four different ways. First, I focus on the likelihood of a firm to return to the equity market following the IPO rather than changes in the leverage ratio and firms returning to a pre-IPO target leverage ratio. By studying SEO data I am able to capture actual share issuance and thereby study stage financing in the public equity markets. Second, I attribute the increased issuance by cold market firms to staged financing rather than returning to pre-IPO leverage. It is likely that firms have a different leverage targets after going public than prior to the IPO. Going public provides the firm with improved capital market access both in the debt and equity markets. Since, firms are likely to easier obtain equity financing following the IPO due to improved stock market access. Schenone (2010) finds that firms increase their borrowing terms after going public. Therefore, it is difficult to make inferences concerning target leverage. Third, behavioural biases create difficulties for management to sell equity at low valuations (Baker and Wurgler, 2012). If management have expectations of improved market conditions it is likely that the management have incentives to raise more capital in the future and only finance the most profitable projects at the moment and forego other important projects. Fourth,

I argue that firm quality is the main driver of cold market firm to return to the equity market following the IPO as in the signalling models proposed by Allen and Faulhaber (1989) and Welch (1989). Since low quality firms have difficulties to go public during cold issue markets.

After studying whether staged financing is more likely during times of low IPO activity, I test if staging arises from the supply side or demand side. Previous literature offers some predictions. First, cold market firms have higher long run returns and lower return variance than hot market IPO firms, which suggests that these firms are of higher quality (Yung, et al. 2008). Second, there is likely to be unobservable firm quality characteristics associated with going public during cold markets since it is more difficult to attract financing. These characteristics might include management quality and product market competition. Third, cold market IPO firms are substantially larger than hot market firms (Helwege and Liang (2004)). Larger are less likely to be financially constrained and can thereby chose the amount of equity to raise in the IPO. Hence, I use firm size to determine if the staging arises from the demand or supply side. Hadlock and Pierce (2010) argue that larger firms have easier to obtain financing and that firm size is negatively related to financing constraints. Smaller firms will to a larger extent be subject to staging that arise from the supply side.

To be able to distinguish between hot and cold market issuers, I utilize two main measures of market valuation and market heat. The first measure is the three month centered moving average of IPO volume during the month the firm is listed, as in Alti (2006). Ritter (1991) argues that the low long run returns of hot market IPO firms are due to market timing, i.e. that issuing firms get a higher payoff from issuing during these periods. My second measure is the lagged stock market return on the CRSP index. I use lagged returns to capture stock market cycles. If the market experienced low returns during the last 12 months we would expect the market to have high cost of equity capital. Alti and Sulaeman (2012) find that past stock market returns trigger equity issuance in response to higher valuations. For robustness, I also include

Baker and Wurgler (2006) sentiment index, and the University of Michigan's consumer sentiment index.

I follow Hertzel, Huson and Parrino (2012), Baker and Wurgler (2002) and Alti (2006) and focus on newly public firms. There are several reasons for this. The IPO decision is one of the firm's most important financing decisions during its life span. Therefore, the choice between market timing the issue with a substantial equity issue and staging the financing makes a huge impact on the firm. Secondly, firms going public are more opaque than already public firms. Therefore, the risk of misvaluation is larger. If the management of the firm is unsecure of the correct valuation of its shares, it will conduct a smaller IPO and issue equity at a later stage through a seasoned equity offering. On the contrary, if management acknowledges that the firm is overvalued they will issue more equity to time the market. Third, focusing on IPOs creates a natural laboratory and provides a common starting point. Using later rounds of financing would create methodological difficulties due to the lack of a common reference point across firms.

I use a sample of 2609 U.S. firms completing an IPO during 1.1.1970-31.12.2007. I find that almost 20% of the firms return to the public equity markets within two years following their IPO. The explanation for this is twofold; the strongest effect on the probability of future share issuance comes from market heat during the month of the IPO, measured by IPO volume. Second, I find evidence suggesting that during hot markets, the staging is driven by agency costs related to excess cash, i.e. investors force the firm to stage their financing in order not to overinvest. Cold market firms are larger and thereby less likely to be subject to financial constraints. I find a negative effect between subsequent equity issuance and the interaction between IPO volume and firm size, the relation suggest that staging during cold markets arise from the demand side.

The reminder of the paper is organized as follows: Section 2 provides a short literature review of stage financing, first from the firm side then from the investor side. Section three describes the data. Section 4 considers the amount raised in the IPO and the differences between firms. Section 5 shows the main results of the paper, which factors that affect the probability of subsequent equity offerings following the IPO. Section 6 concludes the paper.

2. Staged financing

A large part of the literature on staged financing mainly focuses on the milestone and round financing by venture capitalists during their investments in start-up firms. Milestone financing is an ex ante decision to provide the firm with capital when some contractually predetermined milestones are reached. In contrast, round staging arises from an ex post decision where the venture capital firm and the start-up negotiate every new round independently. Round staging provides the venture capital firm with more control rights over the start-up since they are able to control the amount of cash available to the start-up and also decide to discontinue their investment and thereby to liquidate the start-up.

This study differs from the venture capital studies as I focus on listed firms. There is a substantial difference between the firms going public and the start-ups financed by venture capital firms. In comparison to venture capital financed firms, the IPO firms are far more mature. IPO firms are also substantially larger and have built up capital market relationships over time. Since IPO firms are more mature and substantially larger than start-up firms it is likely that different mechanisms drive the staged financing choice among listed firms than venture capital firms.

A: Firm driven stage financing

Firm driven staging arises from the demand side. The firms judge whether the cost of capital is sufficiently low to raise more funds than needed to fund the most profitable among their positive NPV projects. A project that is profitable during hot times might not be profitable during cold times due to the varying cost of capital. Two different theories indicate reasons for a firm to stage their financing. The first theory by Myers and Majluf (1984) is more general, while the signalling theory by Allen and Faulhaber (1989) and Welch (1989) is specific to the initial public offering.

If the manager of the firm is better informed than outside investors, the firm will not issue equity to fund all new positive NPV investments (Myers and Majluf, 1984). In an intermediate solution of Myers and Majluf (1984), firms will forego some projects due to the value transfer from existing to new shareholders if the firm's shares are undervalued at the moment of issuance and thereby assets in place are valued higher than the issue. There is a possibility for an intermediate solution. If the firm has more than one valuable project, it may finance the most profitable one, and postpone the execution of the other projects. This is most likely to be the case during cold issue markets, when the equity prices are depressed. The firm chooses to pursue only the most profitable projects, while during hot markets they might elect to finance all positive NPV projects, due to the lower cost of equity capital.

The other set of models is directly related to the IPO. Signalling models by Allen and Faulhaber (1989) and Welch (1989) suggest that first day underpricing is a signal that high quality firms utilize to separate them from low quality firms. By underpricing their initial public offering, high quality firms will be able to differentiate themselves from low quality firms. For low quality firms it will be costly to imitate high quality firms. Cash flows will be revealed after the IPO and thereby high quality firms receive a more favourable valuation for their subsequent SEO offerings.

Empirical evidence concerning the signalling models is mixed. Jegadeesh et al. (1993) report a positive relation between underpricing and the probability of a follow up SEO. However, their evidence suggests that the returns following the first day of trading are a stronger predictor for subsequent offerings than the first day return. This would indicate presence of a market feedback.

Welch (1996) extends previous theoretical work by making the timing between the IPO and subsequent SEO endogenous. The longer a firm waits between the IPO and the SEO the larger the possibility that firm quality will be revealed. His empirical results reveal that unexplained IPO underpricing has a significant positive relationship with the elapsed time between IPO and SEO.

Spiess and Pettway (1997) employ two measures of the impact of hypothesized underpricing signal net of the cost of employing the signal. They find no support for the signalling model, i.e. it is not profitable for firms to underprice their IPO.

Francis et al. (2010) provide some support for the signalling model in the sample of foreign IPOs conducted in the U.S. They find that firms underprice their initial public offering to get a more favourably priced SEO. Their results are stronger for firms domiciled in countries characterized by higher information asymmetry and lack of access to external capital markets.

B: Public Market Staging

The other form of staging arises from the supply side of capital. The capital market is not willing to supply firms with more capital than needed to finance the most valuable projects, since the funds might be used inefficiently. According to Gompers and Lerner (2000), times of high IPO activity are periods when investors have a substantial amount of funds to invest. This creates a deal chasing behaviour and subsequently firms are able to raise a larger amount of

proceeds in their IPO. In contrast, during periods of low IPO activity, investors are less willing to provide the IPO firms with capital. Thus, staging arises from the investor side, as firms are not able to meet their capital needs during low IPO activity periods.

Another mechanism leading to public market staging is proposed by Stiglitz and Weiss (1981). Capital suppliers observe potential agency problems associated with agency problems if the firm is provided with excess cash. Credit rationing occurs since investors put a ceiling to how much risk in one issue they are willing to bear, which in turn limits the capital they will invest in the company.

Hertzel et al. (2012) suggest that firms are not given excess capital from investors due to the possibility of the overinvestment problem. They find that firms with higher R&D expenditures and a larger proportion of immaterial assets tend to get less financing initially and thereby get their financing in stages from the market. They also find that the time elapsed between IPO and second round of external financing decreases with R&D expenditures and immaterial assets. Gompers (1995) finds on venture capital investment data that the round size and duration between rounds is declining with R&D expenditure and intangible assets. Hence, firms with more opaque investment activity get less financing per capital infusion.

Since firms generate higher cash flow's during hot markets it is likely that the agency cost of excess cash is more prevalent during these times. Firms hold more cash and profits are larger during hot markets, therefore firms hold more cash after debt service[4]. It is also easier to obtain financing from other sources during hot markets. Therefore, I expect equity investors to be more careful with their investments in R&D heavy firms during hot markets. Opaque R&D heavy firms might have difficulties to obtain any financing during cold markets.

[4] Cotter and Peck (2001) discuss the possibility that agency costs increase with cash holdings.

3. Data

My sample consists of IPOs from 1970 to 2007, and it is collected from Thomson SDC Platinum. I exclude spin offs, unit offers, and issues by financial firms with the primary SIC code between 6000 - 6999. I also exclude firms with total assets below $10 million in 2007 dollars. I require the firms to have COMPUSTAT data available for the year preceding the IPO and the firm needs to be listed in the CRSP database. I exclude firms with an offer price less than $1/share. My variables and their definitions are similar to those in Baker and Wurgler (2002), and Alti (2006). Book value of debt is defined as total liabilities and preferred stock (replaced by redemption value of preferred stock when missing) minus deferred taxes and convertible debt. Book Leverage, is thus defined as book value of debt divided by total assets[5]. Market to book is defined as book value of debt + market value of equity divided by total assets[6].

I use Earnings before interest, taxes, depreciation, and amortization scaled by year-end assets (EBITDA/A) as profitability measure. SIZE is the logarithm of net sales, and property, plant and equipment divided by total assets proxies for asset tangibility (PPE/A). I scale research and development expenses by total assets (R&D/A), and I follow Alti (2006) to replace missing values with zeros. I also specify a dummy variable RDD if R&D expenditures are missing. CX/A denotes capital expenditure scaled by total assets[7].

I gather the SEO data from the SDC to match with the IPO sample. I consider all SEOs that occur during the four years following the IPO. Hertzel et al. (2012) argue that the capital infusions that occur more than two years after the IPO are less likely to be due to stage financing. They motivate the time horizon by that 576 out of 4054 IPO firms express in the

[5] Firm-year observations when book leverage exceeds 100% are dropped.
[6] I follow Alti (2006) and Baker and Wurgler (2003) to drop observations with a M/B ratio that exceeds 10.0.
[7] I drop firm year observations for which PPE/A, EBITDA/A, CX/A exceeds 100% in absolute value.

prospectus their intent to return to the capital markets, 95% are said to do so within two years. Therefore, I also utilize a variable SEO2y that aggregates share issuance after the IPO up to two years following the IPO.

I use four different measures to separate between hot and cold issue markets. First, I follow Alti (2006), Yung et al. (2009) and Helwege et al. (2004) and use the monthly IPO volume as a measure of IPO market heat. The number of IPOs is gathered from Jay Ritter's web page[8,9]. To smooth seasonal differences, I use a 3 month centred moving average. In the univariate analysis, I utilize a dummy variable that takes the value of one for months with IPO volume above the median, and zero otherwise. Out of the total sample of 3863 IPOs, 3226 are categorized as hot market IPOs and 637 are categorized as cold market issues.

Secondly, I capture stock market cycles by using the 12 month and 6 month lagged returns on the CRSP index. This variable is set to indicate the level of market valuation at the time of the IPO. Lagged returns on the CRSP index are correlated (0.54) with the monthly IPO volume.

For robustness tests, I utilize the sentiment index retrieved from Jeffrey Wurgler's web page[10] as in Baker et al. (2006). The index is created from the first principal component of six variables that proxy investor sentiment. The proxies have been orthogonalized to the business cycle prior to the index creation. The index constitutes of number of IPOs, first day return in IPOs, closed-end fund discount, NYSE share turnover, the equity share in new issues and the dividend premium. Furthermore, I also follow Mclean, et al. (2013) and use the University of Michigan consumer sentiment index. The Index is based on telephone interviews with consumers regarding their view on the future economic outlook.

[8] *http://bear.warrington.ufl.edu/ritter*

[9] I use the adjusted series from 1975 and onwards. 1970 – 1975, I use gross amount of IPOs. Volume is corrected for the industrial production index gathered from Federal Reserve to correct for economic expansion.

[10] *http://*www.stern.nyu.edu/~jwurgler/

Table I provides summary statistics for the firm characteristics of my sample. The Pre IPO row represents the fiscal year preceding the initial public offering. IPO is the first annual financial statement subsequent to the IPO, +1 is the first year after the IPO year, etc. The means and standard deviations are consistent with the findings in previous studies. Profitability decreases after the IPO, consistent with Alti (2006), Jain and Kini (1994) and Mikkelson, Partch and Shah (1997). Capital expenditures and R&D are larger before going public, which is consistent with Pagano, Panetta and Zingales (1998). The firm size is slightly larger than in Alti (2006) sample, which is at least partially due to the correction to 2007 dollars instead of Alti (2006) 1999 dollar value.

4. Difference between the hot market issuers and the cold market issuers

A. Difference in issue size

The amount the firms issue in their first round of equity financing is interesting for a number of reasons. I begin by studying the amount issued under hot versus cold market conditions. I expect the hot market firms to issue larger amounts of equity in their first round. This is the market timing effect as in Alti (2006). Market timing indicates that firms going public during low valuations and cold issue markets issue less equity during their first stage (IPO), and more at a later date through an SEO.

I follow Alti (2006) and use the total proceeds scaled by year end assets (Total Proceeds/A_t). The use of end of IPO year assets mitigates the effect of higher priced equity during hot markets and high valuations. My second measure is the primary proceeds scaled by total assets (Primary proceeds/A_t). The main difference between the measures is that total proceeds capture the sale of secondary shares by insiders.

Panel A in table II reports regressions of my two main measures of market on Total proceeds/A_t and Primary proceeds/A_t. The results indicate that the amount issued in the IPO increases with both the number of IPOs during the month of going public, and first day return. This is in line with Alti (2006). The results in panel A indicate that firms going public during hot issue markets tend to issue more equity than firms going public in cold markets. According to the signalling theory, first day return should be negatively related to issue size. However, the univariate results indicate that firms with higher first day return tends to issue more equity in the IPO.

In Panel B, I add a number of control variables to rule out the possibility that firm characteristics determine the relative size of the issue. The choice of control variables follows Titman and Wessels (1988), Rajan and Zingales (1995) and Alti (2006). The regressions utilize pre IPO values for EBITDA/Assets, R&D/Assets, DEBT/Assets, the logarithm of sales (SIZE), Property plant and equipment scaled by total assets (PPE/A), and the market to book ratio (M/B) at the IPO. Furthermore, I use a dummy variable (RDD) that takes the value of one if R&D expenditures are missing from COMPUSTAT.

The results of the multivariate tests further confirm that hot market firms tend to issue more equity during the IPO than cold market firms. The magnitude of the coefficients indicate that a one standard deviation increase in IPO volume (41.99) corresponds to a 0.017 increase in total proceeds scaled by total assets and a 0.012 increase in primary shares sold in the IPO. For the median firm (total proceeds/ total assets =0.41 and primary proceeds/ total assets =0.32) the numbers corresponds to a 4.22% of total proceeds and a 3.7% increase in primary proceeds. Again, the finding that cold market firms raise less capital is in line with Alti (2006). According to Hertzel, et al. (2012), staging arises from the investor side, i.e. that firm would raise less capital in the IPO and subsequently issue more equity. They argue that R&D expenses should be related to the relative issue size. In contrast, Panel B of table II suggests that research and

development expenses (R&D expenses) are unrelated or positively related to proceeds raised in the initial public offering. This might be due to two reasons. First, R&D intensive firms may have larger capital needs. Second, Hertzel, et al. (2012) scale R&D expenses with sales, not total assets. Firms with a higher fraction of R&D expenses might be firms with lower sales than comparable firms.

B. Differences between hot and cold market issuers

From the previous section, we observe that cold market firms tend to issue less equity in their IPO than hot market firms. In this section I study if the difference is driven by firm characteristics so that certain types of firms tend to go public during cold markets, and if the firm effect is driving the probability for subsequent offerings. Furthermore, signalling theory (Welch (1989), Allen and Faulhauber (1989)) proposes that firms issuing equity through subsequent SEOs are firms of higher quality, so that underpricing the IPO reveals firm quality. Yung, et al. (2008) argue that firms that go public during cold issue markets must have more profitable projects on the margin than hot market firms. Empirical work by Helwege and Liang (2004) fails to identify any significant differences between hot and cold market firms.

Alti (2006) notes three reasons for why issuance amount varies between hot and cold market issuers. First, firms issuing during hot markets may be overleveraged prior to going public, and thereby they issue more equity in order to revert back to their target leverage. The first column of Table III suggests that this is not the case. IPO volume is unrelated to pre-IPO leverage.

Secondly, hot market firms may have better growth prospects and they therefore need to raise more funding to be able to finance the growth. Yung, et al. (2008) argue in the same vein that more investments are profitable during hot markets due to lower cost of capital, and therefore the expected cash flows are higher. The results in columns 2-4 of table III indicate that IPO

volume is unrelated to capital expenditure during the years following the IPO. However, during year three, hot market firms tend to have larger capital expenditures. This effect might be due to the investments that the cold market firms made with their proceeds. Since hot market firms tend to raise more capital in their IPO than cold market firms, this result might indicate that cold market firms spend a larger fraction of their equity proceeds on capital expenditures. This is in line with Myers and Majluf (1984), as firms raise less capital during the high cost of capital under cold market conditions. Stiglitz and Weiss (1981) and Hertzel, et al. (2012) argue that staging occurs on the investor side and that firm characteristics will determine whether a firm will be forced to stage its investments or not. However, no major differences seem to exist in firm characteristics between the two groups.

Thirdly, it is easier to go public during hot markets, and thereby the average firm should have lower profitability (Alti, 2006). However, the results in columns 5-7 in Table III provide no evidence of a relation between profitability and market heat. In contrast, the larger asset base during the end of the first year tends to downward bias hot market profitability.

To test the signalling theory, firms' post IPO performances are used as a proxy of firm quality. Columns 5-7 of Table III fail to support this, as post IPO profitability is unrelated to IPO volume. Furthermore, if cold market firms would generate a larger fraction of internally generated cash flows, we would expect them to have smaller capital needs than hot market firms, and thereby issue less equity. The EBITDA/A results in table III do not support that notion.

Besides the leverage, growth, and profitability measures, I also use a fourth measure to capture differences in pre IPO investments, which is the dollar cash burn rate. Hertzel, et al. (2012) argue that the dollar burn rate (EBITDA-R&D-CAPEX) captures the amount of capital needed in the IPO. If dollar burn rate is positively related to market heat, it indicates that hot market

firms have larger capital needs. A positive correlation between market heat and dollar burn rate would then explain why hot market firms raise more capital. Another motivation for using this measure is that hot market firms may have a higher spending rate before going public than cold market firms, and therefore they go public to rebalance their capital structure from past investments (Pagano et al. 1998). This would partly explain why hot market firms raise more proceeds in their IPO. Therefore, I control for the dollar cash burn rate defined as (EBITDA-R&D-CAPEX) following Hertzel, et al. (2012). I find no evidence of difference in dollar burn rate between hot and cold market forms pre IPO.[11]

I further consider differences in firm size between hot and cold market listing firms. I measure firm size as the natural logarithm of sales. The final column of Table III indicates that cold market firms tend to be larger than their hot market counterparties. Firm size is a standard measure of financial constraints. For example Hadlock and Pierce (2010), Whited and Wu (2006) and Baker et al. (2003) argue that firm size proxies for financial constraints. Hence, it might be the case that the cold market firms managing to go public are less constrained, and thereby less affected by the increased credit rationing during the cold markets.

Table IV reports firm characteristics of hot and cold market issuers. The classification into hot and cold months is done by classifying the months with above median IPO activity as hot and the months with below median IPO activity as cold months. The cold market firms are larger both according to total assets and Sales. The cold market firms have higher profitability as reported in Alti (2006). Furthermore, cold market firms also tend to have higher asset tangibility.

[11] All the results are robust to using lagged CRSP index returns instead of IPO volume as an indicator of market heat.

To summarize, market heat is related to of how much equity proceeds a firm will raise in their IPO, IPO volume tends to be positively related to proceeds raised in the IPO. Thus, cold market firms raise less capital than hot market firms. This result is of importance for the rest of this paper. My multivariate tests indicate that the firm characteristics are very similar between hot and cold market firms, with the exception of firm size. Both groups exhibit similar pre IPO debt/equity ratio, profitability, capital expenditures, and dollar cash burn rate before the IPO in the multivariate tests. In the univariate tests cold market firms are more profitable, are larger and more tangible. Since firm size is a commonly used proxy for financial constraints, I will pursue the role of financial constraints further in the reminder of this paper.

5. Staged Financing

In this section, I explore the likelihood of subsequent equity issuance. If firms tend to stage their financing to a larger extent in cold markets, we would expect the probability of a follow up SEO to be negatively related to the market heat measures.

A: Univariate Results

If the firm staging hypothesis holds i.e. that staging is chosen by the firm, then market heat measured by the IPO Volume should be related to subsequent equity offerings. If the staging is driven by investors due to the monitoring of prospective overinvestment, I would expect a positive relation or no relation. Results in Table V show that firms are more likely to issue equity following the IPO, if the firm went public during cold markets. The only year in which no difference exists in the probability of issuance between hot market and cold market issuers is the first year following the IPO. There are two potential reasons for why we observe no difference between hot and cold market firms exists during the first year. First, underpricing tends to be related to market heat, as hot market firms tend to experience a higher first day return than cold market firms. Therefore, firms with high first day returns might re-issue equity

quickly to capitalize on the high valuation[12]. This is consistent with the signalling literature that predicts that high quality firms with high underpricing tend to issue equity. However, it does not indicate a connection between, underpricing and security issuance. Second, for cold market issuers, the market may remain cold during the first year, and therefore valuations might not improve during this horizon.

B: Multivariate Results

The univariate analysis in the previous section suggests that cold market firms are more likely to issue equity following their initial public offering. This is consistent with the firm staging hypothesis. On the contrary, the public market staging hypothesis suggests that proxies for firm opaqueness should explain stage financing. Hertzel, et al. (2012) find that the investors force R&D intensive firms to stage their financing since those firms are more likely to incur agency costs.

Table VI shows results of probit regressions where the dependent variable is a binary variable that takes the value of one if the firm conducts an SEO during the given year[13]. The control variables are chosen as in the previous regressions, with an addition of first day return to test the viability of signalling theories. I control for proceeds raised in the IPO to test if firms are more likely to do the stage financing decision prior to the IPO, or if the choice of staging is made subsequent to the IPO. If the firm decides on staging prior to going public, it is plausible that the firm raises less capital at the IPO. All explanatory variables use lagged values. The regressions also employ SIC 3-digit industry random effects.

[12] Purnanandam & Swaminathan (2004) find that the most underpriced firms are the most overvalued firms.

[13] Results using fixed effects logit regressions do not differ from using random effects probit. However, using fixed effects logit drops observations due to only positive or negative outcomes in the industry classification groups. The logit fixed effects results can be provided if asked for.

Regression results in Table VI indicate that IPO volume has a significant negative relation to the probability of conducting a subsequent SEO. Firms issuing during hot markets do not return to the equity market with the same probability as cold market firms. The multivariate results are different from the univariate in that after controlling for firm characteristics, even the first year IPO volume is significantly negatively related to the probability of a subsequent seasonal equity offering. To calculate the economic significance year I use the marginal effects from the regression and multiply with a one standard deviation increase in IPO Volume. During the first year following the IPO a one standard deviation increase in IPO volume (41.23) from the median month corresponds to a decrease in probability for the median firm to conduct an SEO during the year by -16.3%. During the second year following the IPO the corresponding number equals -8.2%. During the third year the probability of issuance increases to -10.3%. During the fourth year following the IPO the likelihood of conducting an SEO decreases with -26.2% by increasing IPO volume with one standard deviation.

Signalling theory suggests that first day return is related to subsequent equity issuance. The results reported in Table VI fail to provide support for the signalling theory. Welch (1996) argues that high quality firms can postpone equity issuance for a longer time frame than low quality firms. The result contradicts the earlier signalling models such as Allen, et al. (1989) and Welch (1989).

Hertzel, et al. (2012) argue that R&D/A is an important variable to explain public market staging. They find that R&D intensive firms tend to return to the capital markets faster than low R&D firms. The results in table VII indicate that R&D/A is significant during the first year. After the first, year R&D expenses do not significantly affect the probability of conducting an SEO. These results give support for public market staging due to agency problems as in Hertzel, et al. (2012).

There is no evidence that the level of internally generated funds have an effect on subsequent issuance. This is due to the non significant relationship between EBITDA/A and subsequent issuance activity.

Proceeds/Assets is of interest in the analysis since it shows how long the obvious staging effect lasts. Hertzel et al. (2012) study the prospectuses and find that it is most common that firms mention that they will stage their financing for 24 months. The results in Table VII support their findings, since proceeds are negatively related to the probability of an SEO.

C: Further analysis

To further be able to distinguish between firm staging and public market staging, I complete two different tests. First, I test the interaction between firm pre-IPO firm size and IPO volume is related to subsequent SEO issuance. Both firm size and the ability to go public during cold markets can be viewed as proxies of firm quality. Hence, I expect a negative sign on the interaction term. Second, I test if the agency problem associated with excess cash is more prevalent during hot markets when it is less demanding to raise excess cash. Hence, I expect the interaction term between R&D/Assets to be positive.

Column 1 in table VII reports a base case probit regression without interaction terms[14]. The results indicate that IPO volume is negatively related to subsequent share issuance. Column 2 reports the regression including an interaction term between firm size measured as the natural logarithm of sales multiplied with IPO volume. The results indicate that larger firms stage their financing to a larger extent if they go public during cold markets. This provides evidence in favour for the firm staging hypothesis among large cold market issuers. The economic effect of increasing IPO volume by one standard deviation (30.9) from the median (29) and holding

[14] Using the random effects probit model do not drop out observations due to that industries have all positive or negative outcomes.

size constant at the median provides a decrease in the likelihood of conducting an SEO by 11.75%.

Column 3 in Table VII reports the regression including an interaction between R&D scaled by total assets and IPO volume. The interaction term between R&D and IPO volume is significant and positive. The economic effect by keeping IPO volume constant at the median (29.2) and increasing R&D expenditure by one standard deviation (0.135) give an increase in the likelihood of issuance by 21.08%. This suggests that R&D intensive firms that go public during hot markets tend to stage their financing to a larger extent. The positive relationship between subsequent SEO issuance and the interaction between R&D expenditures and IPO volume might be due to three reasons. First, The R&D intensive firms are less likely to be able to go public during cold issue markets and are therefore not able to confirm an IPO during these times. Second, The R&D intensive firms are able to raise debt financing during cold markets and do not have to raise equity capital from the public markets. Three, the R&D intensive firms are subject to credit rationing in the public equity markets i.e. public market staging.

I also consider that firms are perceived by Myers and Majluf (1984) pecking order theory to be more reluctant to choose internally generated funds and debt rather than equity as financing source. In table IV we observed that the lagged firm profitability was unrelated to subsequent equity issuance by the firm. However, debt financing was not analysed in detail.

Table VIII reports the effect share issuance and IPO volume have on changes in book debt[15]. If high quality firms rather issue debt than equity following the IPO, debt issuance are expected to be negatively related to IPO volume and positively related to firm size. Column 1 reports the change in book debt the year following the IPO. IPO volume and firm size is unrelated to changes in book debt. However, firms that raised less equity in the IPO and firms with lower

[15] Debt issuance is measured as in Alti (2006)

debt/assets ratio prior to the IPO tend to increase their debt the year following the IPO. That some firms go public to increase their leverage is in line with prior research by Rajan (1992) and Schenone (2010). Column 2 reports the debt issuance activity between year one and two following the IPO. IPO volume is not significantly related to debt issuance in the specification. Firm size and asset tangibility (PPE/A) is negatively related to debt issuance, this further supports the hypothesis that firms go public to be able to raise debt capital. Contemporary SEO issuance is positively related to debt issuance two years following the IPO. However, this effect do not appear to be robust over time. Columns 3 and 4 report debt issuance 3 and 4 years following the IPO. The relationship between IPO volume and debt issuance is negative four years following the IPO but unrelated in specification 3. In all specifications lagged debt-asset ratio has a negative relationship with debt issuance. However, none of the firm quality proxies tend to have a robust relation with debt issuance.

D: Robustness tests

In table IX I re-estimate logit regressions with 3-digit SIC code industry effects. I use a wide range of proxies for market heat, namely a dummy defined as in Alti (2006)[16], 6 and 12 month lagged return on the CRSP index to be able to catch stock market cycles, Baker et al. (2006) sentiment index, and the University of Michigan's consumer confidence survey. The dependent variable is a binary variable taking the value one if the firm conducts a seasoned equity offering during the two first years following the initial public offering, zero otherwise.

The results are robust across all measures. Firms going public during cold markets tend to issue subsequent equity with a larger probability than hot market firms. In my main tests in this this paper, I use two measures of market heat, namely a 3 month centered moving average of

[16] Alti (2006) use an indicator variable taking value one if the IPO volume during the month is larger than the median month.

monthly IPO volume as a measure of market heat, and the 12 month lagged return. However, the alternative measures of market heat provide very similar inferences.

Table X reports robustness tests using different time periods. Column 1 reports a time split from 1970-1989 and column 2 reports the years 1990-2008. The main results are robust to the different time splits. Column 3 reports the results excluding the dot.com bubble following Loughran and Ritter's (2004) definition, i.e. excluding the years 1999 and 2000. I exclude the dot.com bubble due to the large amount of IPO firms delisting following the bubble. However, excluding the dot.com bubble from the sample does not change the inference of the main results.

6. Conclusion

I utilize initial public offerings as a natural setting to be able to study how cold and hot market issuers behave in the equity capital markets. By using initial public offerings, I am able to compare firms going public during hot issue markets and firms that go public during cold markets. I find that cold market issuers tend to stage their equity financing to a larger extent than hot market firms. I also make a further analysis to be able to distinguish between the two main hypothesis concerning staged financing. If staged financing arises from the firm's side, then firms issuing equity during cold markets raise less capital since the cost of capital is high. If it arises from the supply side, it aims to limit agency costs associated with excess cash. My evidence supports the firm staging hypothesis, that firms issuing during cold markets issue less initially on their own discretion and thereafter stage their financing by conducting an SEO when terms are more favourable. Comparison of issuer size between hot and cold market issuers provides further support for firm staging. Cold market firms tend to be larger than hot market firms. Firm size is a standard proxy for financial constraints and large firms should be less subject to financing constraints. Evidence concerning the investor staging hypothesis is

weaker. High R&D firms tend to issue at least as much as low R&D firms initially. Thereafter, high R&D firms often issue a first round of financing during the first year after going public. However, after using interaction terms with market heat, the effect gets weaker. This is likely to be due to R&D intensive firms have difficulties raising financing during cold issue markets. I also find some evidence in support of the signalling hypothesis. First day return is weakly positive and significant during the first year after going public. However, firms with high first day return tend to raise more proceeds than comparable firms. The results are robust to using five different measures of market heat and time splits.

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Table I

Descriptive Statistics

The table reports the means and standard deviations of firm characteristics. Pre IPO is the year preceding the Initial public offering. IPO is the first yearly financial statement subsequent to the IPO, +1 is 1 year after the IPO year etc. D/A is book debt scaled by total assets. Assets are total assets in 2008 dollar value. I use EBITDA divided by total assets as profitability measure. PPE/A is a measure of asset tangibility defines as Property, Plant & Equipment scaled by total Assets. CAPEX/A is Capital expenditure scaled by Total Assets. Sales are net sales in 2008 dollar value. SIZE is the logarithm of net sales in 2008 dollar value. R&D is research & development scaled by total assets not including firms not reporting R&D expenditure in COMPUSTAT. R&D2 is R&D setting firms not reporting R&D expenditures value equal to zero. The sample consists of IPOs from 1970.1.1 to 2007.12.31. The last year of COMPUSTAT data is 2011. The sample exclude financial firms, spinoffs, unit offers, and firms with less than $10 million in assets corrected to 2008 dollar value.

	N	*D/A*	*ASSETS $M*	*EBITDA/A*	*PPE/A*	*CAPEX/A*	*SALES $M*	*SIZE*	*R&D/A*	*R&D2/A*
Pre IPO	3863	0.637	537.4	0.148	0.297	0.101	80.8	4.52	0.158	0.064
		(0.231)	(3722)	(0.226)	(0.242)	(0.119)	(2034)	(1.65)	(0.169)	(0.175)
IPO	3863	0.394	652.6	0.125	0.262	0.095	110.9	4.84	0.089	0.037
		(0.217)	(3884)	(0.158)	(0.234)	(0.114)	(2090)	(1.53)	(0.138)	(0.097)
IPO+1	3566	0.422	762.0	0.098	0.283	0.099	144.6	5.09	0.110	0.047
		(0.221)	(3762)	(0.177)	(0.239)	(0.110)	(2326)	(1.51)	(0.077)	(0.126)
IPO+2	3215	0.440	895.3	0.086	0.293	0.082	176.8	5.24	0.118	0.051
		(0.225)	(4253)	(0.176)	(0.241)	(0.085)	(2492)	(1.57)	(0.099)	(0.144)
IPO+3	2896	0.452	1014.2	0.085	0.292	0.072	206.2	5.37	0.116	0.050
		(0.223)	(4831)	(0.169)	(0.241)	(0.077)	(2545)	(1.53)	(0.111)	(0.141)

TABLE II

Differences in Issuance Activity

Panel A reports univariate regressions of the variable of interest on Total Proceeds/At defined as Total Proceeds in the IPO scaled by year end total assets and Primary proceeds scaled by year end total assets. IPO volume is the 3 month centered moving average of monthly IPO volume corrected for industrial expansion divided by 100. First day return is the return during the first trading day after going public. M/B (IPO) is the market to book value at first day open. EBITDA/A is EBITDA scaled by assets, Size is the natural logarithm of net sales in 2008 dollar value, PPE/A is property plant equipment scaled by assets, R&D/A is R&D expenditures scaled by total assets. RDD is a dummy variable taking value 1 if the firm has not reported R&D expenses in COMPUSTAT. D/A is book debt scaled by assets. All regressions are estimated with SIC 3 digit industry effects. ***,**,* reports significance on the 1%, 5% and 10% level, respectively. Constant term is not reported

	Total Proceeds/At	Primary Proceeds /At	Total Proceeds/At	Primary Proceeds /At
Panel A: Univariate Results				
IPO Volume	0.084***	0.063***		
	(5.22)	(4.19)		
Firstday Return			0.039**	0.040**
			(2.02)	(2.55)
Panel B: Multivariate Results				
IPO Volume	0.041**	0.028*		
	(2.44)	(1.96)		
Firstday return			-0.025	-0.009
			(-1.32)	(-0.73)
M/B (IPO)	0.015***	0.010***	0.016***	0.010***
	(13.08)	(8.39)	(11.48)	(8.76)
EBITDA/At-1	0.000*	0.000*	0.000	0.000
	(1.63)	(1.68)	(0.98)	(1.62)
SIZE t-1	-0.036***	-0.051***	-0.034***	-0.051***
	(-8.43)	(-11.3)	(-7.19)	(-11.47)
PPE/At-1	-0.109***	-0.083***	-0.105***	-0.082***
	(-3.88)	(-3.28)	(-3.47)	(-3.32)
R&D/At-1	0.031	0.202**	0.088	0.196**
	(0.4)	(2.38)	(1)	(2.31)
RDD/At-1	-0.02	-0.011	-0.009	-0.011
	(-0.82)	(-0.43)	(-0.33)	(-0.45)
D/At-1	-0.371***	-0.168***	-0.404***	-0.171***
	(-10.06)	(-4.65)	(-9.2)	(-4.79)
R^2 (within)	0.219	0.226	0.2146	0.2255
N	2578	1987	2070	1987

TABLE III

Differences between Firms

The table reports regressions on debt scaled by Assets, capital expenditure scaled by assets, EBITDA scaled by assets and the burn rate defined as EBITDA-R&D-CAPEX. IPO volume is the 3 month centered moving average of monthly IPO volume corrected for industrial expansion. M/B (IPO) is the market to book value at first day open. EBITDA/A is EBITDA scaled by assets, Size is the natural logarithm of net sales in 2008 dollar value, PPE/A is property plant equipment scaled by assets, R&D/A is R&D expenditures scaled by total assets. RDD is a dummy variable taking value 1 if the firm has not reported R&D expenses in COMPUSTAT. D/A is book debt scaled by assets. All regressions are estimated with SIC 3 digit industry effects. ***, **,* reports significance on the 1%, 5% and 10% level respectively. Constant term is not reported.

	D/A		CAPEX/At			EBITDA/At		Burnrate	Firm size
	Pre IPO	IPO	IPO + 1	IPO + 2	IPO	IPO + 1	IPO + 2	Pre-IPO	Pre-IPO
IPO Volume	0.000	-0.000	-0.000	0.000***	0.000	0.000	0.000	-0.034	-2.59**
	(0.71)	(-0.61)	(-0.23)	(3.02)	(0.33)	(-0.46)	(0.49)	(-0.2)	(-2.28)
M/B (IPO)		0.002***	0.002***	0.001***	0.004***	0.002**	0.001		
		(4.02)	(4.01)	(2.75)	(5.31)	(2.35)	(1.59)		
EBITDA/At-1	-0.000	0.000	0.055***	-0.000				0.264**	1.588
	(-0.42)	(0.02)	(3.9)	(-1.59)				(2.26)	(1.54)
SIZE t-1	0.013***	-0.001***	-0.011***	-0.002	0.027***	0.034***	0.036***	37.82***	
	(4.72)	(-6.35)	(-6.56)	(-1.47)	(9.87)	(9.81)	(13.09)	(3.53)	
PPE/At-1	-0.000	0.217***	0.208***	0.120***	0.069***	0.127***	0.145***	5.85	583.3*
	(0.00)	(15.71)	(13.74)	(15.42)	(4.29)	(7.35)	(8.47)	(0.14)	(1.82)
R&D/At-1	-0.15***	-0.068***	-0.0501**	-0.025*	-0.402***	-0.700	-0.679***	10.816	-476.6***
	(4.4)	(-3.77)	(-2.11)	(-1.76)	(-6.38)	(-7.17)	(-6.09)	(-0.69)	(-3.69)
RDD/At-1	0.054***	0.017***	0.000	0.008*	0.020*	0.011***	-0.004	35.29	-682.67***
	(-3.39)	2.04	(0.08)	(1.92)	(1.9)	(1.02)	(-0.34)	(0.76)	(-4.97)
D/At-1		-0.020*	-0.028**	-0.039***	-0.057***	-0.078***	-0.096***	-16.63	60.23
		(-1.79)	(-2.25)	(-3.89)	(-3.04)	(-4.53)	(-5.91)	(-0.58)	(0.41)
R^2 (within)	0.0267	0.1663	0.1481	0.1747	0.1351	0.1609	0.2386	0.0629	0.013
N	3584	2542	2473	2224	2570	2367	2258	2541	3623

TABLE IV

Differences between firms going public during hot and cold markets

The table reports the mean and standard deviation (in parantheses in the first two columns) of different firm characteristics between firms going public during hot and cold markets. The sample split is done according to the median monthly IPO issuance. D/A is book debt scaled by total assets. EBITDA/A is EBITDA scaled by assets, Size is the natural logarithm of net sales in 2008 dollar value, PPE/A is property plant equipment scaled by assets, R&D/A is R&D expenditures scaled by total assets. Size is defined as sales in million dollars. Total proceeds/A is total proceeds scaled by the firms total assets. Total proceeds are Total proceeds given in million dollars. Percentage secondary shares are the secondary shares in offered in the issue scaled by total shares issued. T-values of the differences between hot and cold market issuares are reported in parentheses in the last column. ***,**,* reports significance on the 1%, 5% and 10% level.

	HOT	*COLD*	*Hot-Cold*
D/A pre IPO	0.64	0.62	0.02
	(0.23)	(0.24)	(2.04)**
Assets pre IPO	442	914	-472
	(3752)	(3619)	(-2.98)***
EBITDA/A pre IPO	2.3	12.2	-9.89
	(33.7)	(159)	(-3.11)***
PPE/A pre IPO	0.29	0.33	-0.04
	(0.23)	(0.28)	(-4.19)***
CAPEX/A pre IPO	0.10	0.10	0.00
	(0.12)	(0.13)	(-0.47)
SALES pre IPO	379	709	-331
	(2010)	(2111)	(-3.81)***
R&D/A pre IPO	0.07	0.06	0.01
	(0.14)	(0.13)	(1.56)
Total Proceeds/A	0.91	0.78	0.13
	(1.08)	(1.08)	(2.53)**
Total Proceed $m	59	164	-105
	(156)	(382)	(-11.6)***
Percentage Secondary shares	0.14	0.13	0.01
	(0.20)	(0.20)	(0.93)
N	3012	680	

Table V

Univariate tests of the probability of subsequent issuance

Panel A shows the number of surviving cold and hot market firms following the IPO. Panel B shows the number of IPO firms conducting an SEO the years following the IPO according to the SDC database. Panel C shows the proportion of firms that conduct an SEO the years following the IPO. The split between months is done at the median. Hence, 50% of the months are categorized as hot and 50% as cold.

	IPO year	IPO +1	IPO +2	IPO +3	IPO +4
Panel A: Number of Hot & Cold Firms					
COLD	637	585	537	488	432
HOT	3226	2981	2678	2408	2162
Total	3863	3566	3215	2896	2594
Panel B: Number of firms conducting a SEO					
COLD	31	118	72	55	53
HOT	154	420	246	159	131
Total	185	538	318	214	184
Panel C: proportion of firms conducting a SEO					
COLD	0.049	0.206	0.138	0.116	0.121
HOT	0.048	0.141	0.092	0.066	0.061
Z value	0.12	3.87***	3.15***	3.74***	4.46***

TABLE VI

Likelihood of Subsequent Share Issuance

The table reports logit industry fixed effects regression with the Y variable takes value one if the firm issue equity during the given year and zero otherwise. IPO volume is the 3 month centered moving average of monthly IPO volume corrected for industrial expansion. First day return is the return during the first trading day after going public. M/B (IPO) is the market to book value at first day open. EBITDA/A is EBITDA scaled by assets, Size is the natural logarithm of net sales in 2008 dollar value, PPE/A is property plant equipment scaled by assets, R&D/A is R&D expenditures scaled by total assets. RDD is a dummy variable taking value one if the firm has not reported R&D expenses in COMPUSTAT. D/A is book debt scaled by assets. All regressions are estimated with SIC 3 digit industry effects. ***, **,* reports significance on the 1%, 5% and 10% level respectively. The constant term is not reported in the table.

	SEO IPO+0	SEO IPO+1	SEO IPO+2	SEO IPO+3
IPO Volume	-0.004*	-0.002*	-0.003*	-0.006***
	(-1.94)	(-1.70)	(-1.88)	(-3.36)
Firstday Return	0.200	0.082	0.253**	-0.233
	(1.58)	(0.60)	(2.17)	(-0.88)
M/B (IPO)	0.025**	0.018**	0.002	0.008
	(2.07)	(2.48)	(0.30)	(0.84)
EBITDA/A (t-1)	-0.000	0.060	-0.001	0.205
	(-0.36)	(0.22)	(-0.25)	(0.48)
SIZE (t-1)	0.037	0.102***	0.046	0.083**
	(0.94)	(3.50)	(1.46)	(2.07)
PPE/A (t-1)	-0.024	0.285*	0.071	0.772***
	(-0.10)	(1.79)	(0.40)	(3.50)
R&D/A (t-1)	1.289**	0.917	1.141**	0.881
	(2.32)	(1.37)	(2.15)	(1.23)
RDD/A (t-1)	0.065	0.134	0.084	-0.009
	(0.47)	(1.44)	(0.81)	(-0.07)
D/A (t-1)	0.098	-0.022	0.350	-0.023
	(0.34)	(-0.10)	(1.60)	(-0.08)
Total Proceeds/A (IPO)	-0.774**	-0.160	-0.142	-0.153
	(-2.56)	(-0.94)	(-0.74)	(-0.66)
N	2610	2014	1806	1613
Log likelihood	-406.24	-905.63	-696.3	-502.6
Wald	29	36.1	23.47	36.96

TABLE VII

Regressions with interactions between size, R&D expenses and IPO volume

The table shows random effects probit regressions on a binary variable taking value one if the firm conducted an SEO during the first 2 years following the IPO and zero otherwise. IPO volume is the 3 month centered moving average of monthly IPO volume corrected for industrial expansion. M/B (IPO) is the market to book value at first day open. EBITDA/A is EBITDA scaled by assets, Size is the natural logarithm of net sales in 2008 dollar value, PPE/A is property plant equipment scaled by assets, R&D/A is R&D expenditures scaled by total assets. RDD is a dummy variable taking value 1 if the firm has not reported R&D expenses in COMPUSTAT. D/A is book debt scaled by assets. Size*IPO Volume is an interaction term between ln sales before the IPO and IPO Volume. R&D*IPO volume is an interaction term between IPO Volume and R&D/A before the IPO. All regressions are estimated with three digit SIC code industry effects. ***, **,* reports significance on the 1%, 5% and 10% level respectively. The constant term is not reported.

	SEO 2 years	SEO 2 years	SEO 2 years
IPO Volume	-0.003***	0.005	-0.004***
	(-2.90)	(1.50)	(-3.79)
M/B (IPO)	0.026***	0.027***	0.026***
	(3.84)	(3.94)	(3.81)
EBITDA/A pre ipo	0.000	0.000	0.000
	(0.26)	(0.18)	(0.25)
SIZE pre ipo	0.023	0.084**	0.021
	(1.08)	(2.55)	(0.94)
PPE/A pre ipo	0.100	0.102	0.096
	(0.79)	(0.80)	(0.76)
R&D/A pre ipo	0.593	0.631*	-0.423
	(1.62)	(1.72)	(-0.83)
RDD/A pre ipo	0.152**	0.161**	0.165**
	(1.96)	(2.08)	(2.11)
D/A pre ipo	0.137	0.141	0.169
	(0.84)	(0.87)	(1.04)
Proceeds/A	-0.289**	-0.293***	-0.286**
	(-2.11)	(-2.13)	(-2.08)
Size*IPO volume		-0.002**	
		(-2.42)	
R&D*IPO volume			0.031***
			(2.91)
N	2610	2610	2610
Log likelihood	-1270.6	-1269.6	-1273.7
Wald	43	45.8	37.97

TABLE VIII
SUBSEQUENT DEBT ISSUANCE FOLLOWING THE IPO

The table reports fixed effect OLS regressions on debt issuance. Debt issuance is defined as percentage change in book debt. IPO volume is the 3 month centered moving average of monthly IPO volume corrected for industrial expansion. M/B (IPO) is the market to book value at first day open. EBITDA/A is EBITDA scaled by assets, Size is the natural logarithm of net sales in 2008 dollar value, PPE/A is property plant equipment scaled by assets, R&D/A is R&D expenditures scaled by total assets. RDD is a dummy variable taking value 1 if the firm has not reported R&D expenses in COMPUSTAT. D/A is book debt scaled by assets. Size*IPO Volume is an interaction term between ln sales before the IPO and IPO Volume. R&D*IPO volume is an interaction term between IPO Volume and R&D/A before the IPO. All regressions are estimated with three digit SIC code industry effects and clustering. ***, **,* reports significance on the 1%, 5% and 10% level respectively. The constant term is not reported.

	dDebt from t-1 to t	dDebt from t to t+1	dDebt from t+1 to t+2	dDebt from t+2 to t+3
IPO Volume	-0.001	-0.001	0.002	-0.001*
	(-0.67)	(-1.08)	(1.60)	(-1.94)
M/B (IPO)	0.098**	0.015	0.009	0.010**
	(2.59)	(1.37)	(1.01)	(2.61)
EBITDA/A (t-1)	0.000	-0.191	-0.000***	0.423
	(0.49)	(-0.54)	(-6.84)	(1.40)
SIZE (t-1)	-0.081	-0.111**	-0.020	0.008
	(-1.42)	(-2.45)	(-0.69)	(0.52)
PPE/A (t-1)	0.079	-0.853**	-0.673**	-0.221
	(0.24)	(-2.53)	(-1.98)	(-1.29)
R&D/A (t-1)	-0.782	-2.172**	-0.175	-0.205
	(-1.13)	(-2.53)	(-0.59)	(-0.41)
RDD/A (t-1)	0.120	0.254*	0.094	0.028
	(1.25)	(1.78)	(0.61)	(0.29)
D/A (t-1)	-3.80***	-2.465***	-2.089***	-1.052***
	(-4.44)	(-4.35)	(-4.64)	(-6.12)
Total Proceeds/A (IPO)	-1.470***	-0.246	0.252	-0.010
	(-4.03)	(-1.01)	(1.40)	(-0.14)
SEO (IPO year)	-0.076	0.023	-0.108	0.226
	(-0.66)	(0.07)	(-0.90)	(0.74)
SEO (IPO+1)		0.245*	0.294*	-0.005
		(1.91)	(1.80)	(-0.08)
SEO (IPO+2)			0.263	0.212***
			(1.64)	(2.55)
SEO (IPO+3)				-0.020
				(0.24)
N	2610	2541	2291	2046
R^2 (within)	0.095	0.061	0.062	0.065

TABLE IX

Robustness tests with different proxies of market heat

The table shows logit regressions on a binary variable taking value 1 if the firm conducted an SEO during the first 2 years of being publicly listed and zero otherwise. IPO volume is the 3 month centered moving average of monthly IPO volume corrected for industrial expansion. The market heat indicator is a binary variable taking value one if the firm goes public during a month with above median IPO activity. Return 12 is the lagged return 12 month prior to going public and return 6 is the return 6 month prior to going public. Sentiment is a 3 month centered moving average of the Baker & Wurgler (2006) investor sentiment index. Consumer sentiment is the Michigan consumer sentiment index. M/B (IPO) is the market to book value at first day open. EBITDA/A is EBITDA scaled by assets, Size is the natural logarithm of net sales in 2008 dollar value, PPE/A is property plant equipment scaled by assets, R&D/A is R&D expenditures scaled by total assets. RDD is a dummy variable taking value 1 if the firm has not reported R&D expenses in COMPUSTAT. D/A is book debt scaled by assets. All regressions are estimated with SIC 3 digit industry effects. ***, **,* reports significance on the 1%, 5% and 10% level respectively.

	SEO 2 years	SEO 2 years	SEO 2 years	SEO 2 years	SEO 2 years	SEO 2 years
IPO volume	-0.008***					
	(-3.39)					
Market Heat Indicator		-0.430***				
		(-2.66)				
Return12			-0.021***			
			(-4.25)			
Return 6				-0.016**		
				(-2.35)		
Sentiment					-0.316***	
					(-2.71)	
Consumer sentiment						-0.020***
						(-3.27)
M/B (IPO)	0.039**	0.040***	0.039***	0.039*	0.037**	0.037**
	(2.58)	(2.64)	(2.63)	(2.58)	(2.47)	(2.47)
EBITDA/A pre ipo	0.001	0.000	0.001	0.001	0.00	0.001
	(0.68)	(0.71)	(0.6)	(0.63)	(0.81)	(0.79)
SIZE pre ipo	0.040	0.034	0.042	0.051	0.024	0.056
	(0.74)	(0.64)	(0.79)	(0.95)	(0.45)	(1.08)
PPE/A pre ipo	0.090	0.032	0.154	0.024	0.014	-0.030
	(0.24)	(0.09)	(0.41)	(0.06)	(0.04)	(-0.08)
R&D/A pre ipo	1.70**	1.71**	1.52*	1.65**	1.60**	1.791**
	(2.25)	(2.27)	(1.99)	(2.19)	(2.1)	(2.37)
RDD/A pre ipo	0.502**	0.492**	0.449**	0.467**	0.488**	0.484**
	(2.24)	(2.21)	(2.00)	(2.09)	(2.19)	(2.2)
D/A pre ipo	0.647*	0.661*	0.558	0.588	0.665*	0.448
	(1.78)	(1.82)	(1.54)	(1.61)	(1.83)	(1.24)
Proceeds/A	-1.506***	-1.53***	-1.509***	-1.541***	-1.699***	-1.60***
	(-3.61)	(-3.68)	(-3.63)	(-3.7)	(-4.06)	(-3.83)
Log Likelihood	-673.728	-676.179	-670.492	-676.853	-675.863	-681.897
Lr Ch^2	52.67	47.77	59.15	46.42	48.4	49.35
N	1676	1676	1676	1676	1676	1680

TABLE X

Robustness tests using different time periods

The table shows logit regressions on a binary variable taking value one if the firm conducted an SEO during the first 2 years following the IPO and zero otherwise. The first regression shows firms listed prior to 1990 and the second column shows firms listed after 1989. IPO volume is the 3 month centered moving average of monthly IPO volume corrected for industrial expansion. M/B (IPO) is the market to book value at first day open. EBITDA/A is EBITDA scaled by assets, Size is the natural logarithm of net sales in 2008 dollar value, PPE/A is property plant equipment scaled by assets, R&D/A is R&D expenditures scaled by total assets. RDD is a dummy variable taking value 1 if the firm has not reported R&D expenses in COMPUSTAT. D/A is book debt scaled by assets.. All regressions are estimated with three digit SIC code industry effects. ***, **,* reports significance on the 1%, 5% and 10% level respectively.

	Year<1990	Year>1989	Excl. dot.com
IPO Volume	-0.016***	-0.005*	-0.007***
	(-3.09)	(-1.74)	(-3.11)
M/B (IPO)	0.028	0.041**	0.047***
	(0.78)	(2.44)	(3.26)
EBITDA/A pre ipo	-0.000	0.000	0.000
	(-0.03)	(0.53)	(0.42)
SIZE pre ipo	-0.207	0.074	0.079*
	(-1.52)	(1.37)	(1.62)
PPE/A pre ipo	1.626*	-0.091	-0.067
	(1.76)	(-0.22)	(-0.19)
R&D/A pre ipo	3.020	1.235	1.514**
	(1.60)	(1.53)	(2.07)
RDD/A pre ipo	0.037	0.572**	0.413**
	(0.07)	(2.44)	(1.98)
D/A pre ipo	0.294	0.890**	0.671*
	(0.33)	(2.26)	(1.86)
Total Proceeds/A	0.034	-0.480	-0.478
	(0.04)	(-1.34)	(-1.51)
Log Likelihood	-129.93	-546.16	-748.64
Lr Chi^2	20.58	33.9	42.96
N	396	1388	1965

Essay 3:

Cold Market IPOs and the Acquisition motive

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Abstract

Using a data set of 4,201 U.S. Initial public offerings during the time period 1990-2007, I find that firms that list during cold markets are 4 times more likely to conduct acquisitions following the IPO, compared to hot market listing firms. I find support for two different explanations to this pattern. First, during times of low debt market liquidity, firms go public to raise equity financing to conduct their acquisitions. Second, the overall market valuation matters less when raising equity capital to conduct acquisitions, as firms both sells and buy equity at the same overall market valuations. Hence, only the relative valuation between acquirer and target matters. Firms with a high initial return during their first day of trading are more likely to conduct acquisitions following the IPO. Furthermore, I find that firms going public during hot issue markets prefer to use equity as currency to settle the transaction.

1. Introduction

Going public is one of the most important events in a firm's life cycle. The initial public offering (IPO) makes the firm exchange listed and the firm often raises a substantial amount of equity financing in the transaction. It is well documented that IPOs tend to be cyclical (Ibottson and Jaffe (1975); Ritter (1984)), and that IPO waves coincide with high market valuations (Loughran, et al. (1994); Pagano, et al. (1998)). Why some firms still decide to go public during cold markets and low market valuations is much less studied. In this paper, I find that one plausible reason for cold market IPOs is to facilitate acquisitions.

Previous literature identifies two main motives why firms go public. First, Mikkelson, et al. (1997), Lowry (2003), Lowry and Schwert (2004), Brau and Fawcett (2006), Kim and Weisbach (2008), Celikyurt, et al. (2010) and Hovakimian and Sutton (2010) report that one of the most important reasons for going public is to raise funds for new investments. Second, Taggart (1977), Baker, et al. (2002), and Alti (2006) argue that firms tend to time their equity issuance, in order to raise capital during times of high market valuations.

IPO firms are able to invest their proceeds on capital expenditure or by conducting acquisitions. Schultz and Zamann (2001), Brau and Fawcett (2006), Celikyurt, et al. (2010) and Hovakimian and Sutton (2010) support the role of IPOs in facilitating acquisitions, as they find that firms going public tend to outpace mature firms in their acquisition intensity. This study contributes to the literature by considering the role of market heat and market valuations have on firm acquisition intensity following the IPO. The differences between hot and cold market IPOs and why firms go public during cold markets are not well understood. Helwege and Liang (2004) find that firm characteristics do not differ dramatically between hot and cold market IPOs. Yung, et al. (2008) report that cold market issuers tend to be of a higher quality than hot market issuers. Even if observable firm characteristics do not differ substantially between hot and cold markets the motive to go public might differ. To be able to distinguish between the motives for

going public I perform tests to rule out the effect of market timing and capital expenditure as motives for cold market to go public. First, Baker et al. (2002) and Alti (2006) argue that market timing is more likely during hot issue markets. Therefore, I use market heat as a proxy for market timing attempts. Second, I report that hot market IPO firms have greater capital expenditure spending than their cold market comparables. I further report that the effect IPO market heat has on subsequent acquisitions weakens over time, to rule out that hot and cold market have different acquisition demand. Hence, it is likely that the acquisition motive is one of the few motives why a firm go public during cold markets.

I develop two hypotheses for why firms go public during cold markets to facilitate acquisitions, and a third hypothesis that is based on the price run up at exchange listing. First, when average valuations are low, IPO firms with an acquisition motive would be both selling and buying equity at a low valuation, provided that prices of both their own equity and that of their acquisition target are correlated with the overall market valuation. In that vein, Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) argue that only the relative valuation of firms is of importance when making the acquisition decision. This would indicate that the number of firms going public to acquire would not vary substantially by market conditions. Assuming that other IPO motives follow market cycles more strongly, this further suggests that a larger proportion of firms going public during cold markets tend to make acquisitions. My second hypothesis builds upon Myers and Majluffs (1984) pecking order theory. If cold IPO markets coincide with low debt market liquidity, then private firms might be forced to go public and raise equity capital to finance the acquisition. Thirdly, a firm observes the stock price run up during its first trading day; thereafter management makes their inference on whether the firm's shares are overvalued. If management believes that the shares are overvalued, they want to use them as currency in acquisitions. I use first day underpricing as proxy for overvaluation, as motivated by Purnanandam and Swaminathan (2004) who show

that the most overvalued firms have the greatest IPO underpricing. I find that firms going public during cold markets are four times more likely to follow their IPOs with acquisitions, compared hot market IPO firms. An increase by one standard deviation in IPO volume increases the probability of conducting an acquisition four years following the IPO by 26%. I find empirical support for both the market valuation irrelevance hypothesis and the pecking order hypothesis.

I also explore the means of payment used by recent IPO firms in their acquisitions. Hsieh, et al. (2011) find that valuation uncertainty, measured by offer price revision and first day underpricing, increases the likelihood of conducting an acquisition. Celikyurt, et al. (2010) find that underpricing is positively related to the use of equity in the transaction. However, previous literature does not consider whether preference for equity over debt varies between hot and cold markets.

I find that firms going public during hot markets tend to settle their transactions partly with equity. Furthermore, I find that underpricing plays a role in determining the means of payment in the transaction as in Celikyurt et al (2010). I find that first day underpricing plays an important role in determining the means of payment in the hot market transactions but that it is of lesser importance during cold markets.

In summary, this paper contributes to the literature in three ways. 1) It is one of the first papers to give a motivation for why firms go public during cold markets, i.e. the acquisition motive. 2) There are two ex ante motives for newly listed firms to raise financing during cold markets to facilitate acquisitions. First, capital market liquidity is low and therefore the firm needs to raise equity capital to finance the acquisition, i.e. the pecking order theory. Second, valuations follow business cycles so only the relative valuation between target and acquirer is of importance, not the market state. In addition there is one ex post IPO motive for IPO firms to conduct M&A, the firm observes ex post a stock price run up after listing and wants to acquire

with equity. I find support for the former two during cold markets and the latter one during hot markets. 3) Firms going public during hot markets tend to settle their transactions using equity as means of payment. The use of equity during hot markets is positively related to first day return.

The study is structured as follows. In chapter II, I review the literature and develop hypotheses. Chapter III describes the data sample. Chapter IV describes the results, and Chapter V concludes.

2. Literature review and hypothesis development

A: IPOs and M&A

Three strands of literature offer alternative explanations for the connection between IPOs and subsequent acquisitions. First, Hansen (1987), Fishman (1989) and Eckbo, et al. (1990) suggest that a private bidder paying with equity wants to go public to reduce the asymmetric information problem concerning valuation of the firm's shares. Second, Mikkelson, et al. (1997) suggest that the proceeds raised in the IPO could be used as means of payment in future cash acquisitions. Third, Hsieh, et al. (2011) propose a model where payment method is unrelated to the acquisition decision. Going public will reduce the valuation uncertainty and therefore lead to a more effective acquisition strategy.

Empirical evidence by Celikyurt, et al. (2010) suggests that newly public firms outpace mature firms in conducting acquisitions. Kim, et al. (2008) find that firms tend to spend a substantial amount of newly raised equity capital on acquisitions and capital expenditures. Hovakimian, et al. (2010) find that one third of IPO firms conduct acquisitions within 3 years following the IPO. Schultz, et al. (2001) find evidence that hi-tech IPO firms that went public in the late 90s pursued aggressive post-IPO acquisition strategies.

Evidence suggests that firm value is correlated with the overall market valuation[1]. A firm listing during cold issue markets or during times of low market valuation has to raise proceeds at a lower valuation than hot market firms. If the funds are to be invested in something that is correlated with the overall market valuation, the state of the economy does not matter. Consequently, firms raising proceeds from the equity market to facilitate an acquisition should be indifferent of the overall market valuation. Shleifer and Vishny (2003) argue that only the relative valuation of firms is of importance when making the acquisition decision. If the acquirer is lower valued during cold markets, the target probably carries a lower valuation as well. Hence, holding investment opportunities constant over time, the number of firms going public to acquire should not differ between hot and cold markets. However, the proportion of listing firms conducting acquisitions during cold markets should be substantially larger than during hot markets. During hot markets other motives for going public seems more plausible. Taggart (1977), Baker, et al. (2002) and Alti (2006) suggest that firms time their equity issuance to occur during high market valuations. Investment projects involving fixed priced investments such as capital expenditures become more favourable during times of high market valuations (Yung et al (2008).

Empirical prediction 1:

A larger proportion of firms engage in acquisitions during cold markets. Hence, acquisitions and aggregated monthly IPO volume at listing should be negatively related.

[1] Sharpe (1964) and Lintner (1965) argue in the capital asset pricing model that firms have beta larger than zero. Hence, firm's returns are positively correlated with market returns and thereby are the valuation positively correlated as well.

Loughran, et al. (1994), and Pagano, et al. (1998) find that hot IPO markets coincide with high market valuations. Lowry (2003) also finds a link between market valuation and IPO volume and Baker, et al. (2003) argue that firms tend to market time their equity issuance. In this paper, I use the de-trended P/E ratio on S&P 500 to distinguish between times of high and low market valuations. This measure has previously been used by Bouwman, et al. (2009), and Goel and Thakor (2011).

Empirical prediction 2:

Overall market valuation at the time of listing is negatively related to the proportion of firms conducting an acquisition following the IPO.

Secondly, I explore motives for why a larger proportion of cold market listing IPO firms tends to conduct acquisitions. My first explanation builds upon the pecking order theory by Myers and Majluf (1984). Cold markets are more likely to occur at times of low capital liquidity, when it is more difficult to get financing for M&A transactions. Mclean, et al. (2013) show that financial constraints are time varying. Therefore, it is likely that firms have to issue equity to get financing during cold markets. To proxy for capital liquidity, I follow Harford (2005) and use the commercial and industrial loan spread.

One of the motives for going public is to easier facilitate debt financing. Rajan (1992) argues that going public will reduce information asymmetries and mitigate the the hold-up problem between the firm and the lender, and thereby facilitate debt financing. Schenone (2010) finds that the cost of debt decreases after the IPO, but finds no difference between hot and cold market issuers. Thereby, the borrowing motive to go public should not affect the results and

the pecking order theory and going public to raise funds should be the main motives during times of low spreads.

Empirical prediction 3:

C&I spread as a proxy of capital liquidity at the listing time should be positively related to newly listed firm's probability to acquire.

The discussion above focus on ex-ante motives to conduct acquisitions. There might be ex-post IPO motives to conduct acquisitions. The firm may experience a high initial return and be tempted to make an acquisition by paying with their overvalued equity (e.g. Shleifer and Vishny, (2003)). The firm will then first raise proceeds from the IPO, and then use the window of opportunity by using its overvalued shares as means of payment in the transaction. Celykurt (2010) and Shultz, et al. (2001) find evidence that underpricing is positively related to equity financed acquisition activity.

However, if the firm value is correlated with the overall market valuation and cold IPO markets coincide with low valuations, the relationship between underpricing and acquisition activity may not be linear (i.e. the proportion of firms making their acquisition decisions ex post going public should be different between hot and cold markets). If the market valuation is low and the firm knows that their valuation is likely to be higher in the future, they will not be triggered to acquire using equity. In essence the firm would be in such case raising equity two times instead of one. Golubov, et al. (2012) argue that conducting an acquisition by using equity as currency is equal to conducting an SEO in addition to the acquisition. Raising capital twice during times of low valuations might not be seen as beneficial from the management. During high market valuations the firms that experience a large run up might be triggered to make an

acquisition due to a valuation higher than their own reference point of a high valuation. I use first day underpricing as measure for overvaluation as motivated by Purnanandam and Swaminathan (2004), who show that the most overvalued firms exhibit the greatest IPO underpricing. From previous research, it is evident that first day return affects the choice of acquisition currency, Celikyurt, et al. (2010) finds that first day return tends to be positively related to the use of equity as means of payment. Using the same logic as in previous hypothesis among hot and cold market issuers I believe that:

Empirical prediction 4:

The use of equity as means of payment should be positively related to going public during hot markets. First day return is likely to have a stronger effect during hot issue markets on the use of equity in the transaction.

3. Sample selection and data

My major data sources are Capital IQ, CRSP, SDC, Federal Reserve and COMPUSTAT. Transaction data is obtained from Capital IQ, the stock market data is from CRSP and the accounting data is collected from COMPUSTAT. The IPO data is collected from Thomson SDC platinum.

A: Sample selection

The IPO data is taken from Thomson SDC and consist of 7,251 IPOs during the time period 1990-2007. The sample ends in 2007 which allows me to track the transactions five years after. Financial firms according to the Fama-French 48 industry classifications are removed from the sample along with REITs, closed end funds, MLPs and ADRs. I only include initial public offerings with total proceeds equal to or greater than $20 million in 2011 dollars. The firms

need to have available issue/filing date in SDC and have first their first trading day according to CRSP within three days following the IPO. Celykurt, et al. (2010) have their cut off at $100 million and Hovakimian, et al. (2010) do not have any restrictions on proceeds. Since, smaller firms tend to use their stock as currency in M&A transactions in larger proportion. The sample size becomes 4,201 IPOs. To be included in the sample over time, the firms need to have available accounting data in COMPUSTAT. The inflation data are gathered from Federal Reserve's webpage. I follow Bradley and Jordan (2002), and don't adjust the offer price to inflation and include IPOs with offer price over $1, to not include penny stocks.

The M&A data are retrieved from Capital IQ. It includes transactions from 1990 to 2012. I include the transactions where the buyer is listed on NYSE, AMEX or NASDAQ. The acquiring firms need to be available in CRSP and COMPUSTAT. The market value of the target must exceed $10 million (in 2011 dollars) and the bids needs to be majority bids. I exclude subsidiaries and LBOs. The $10 million cut off is standard in the M&A literature and has been used in recent studies by Bouwman, et al. (2009) and Goel and Thakor (2010). Including smaller transactions in the sample might not measure the effect of raising capital from initial public offerings on the acquisitions, due to the small relative size of targets in relation to acquirers. The restrictions give a total number of 5691 possible acquisitions during the period. I use the CPI gathered from Federal Reserve to adjust deal value of the acquisitions for inflation.

B: Classification of hot and cold markets

I follow Loughran and Ritter (1995), Helwege and Liang (2004) and Yung, et al. (2008) and use monthly IPO volume as the primary measure of market heat. The sorting is done into three groups that compromise of 1/3 of the months in each category, where the top tercile is labeled

hot market months and the bottom tercile is labeled as cold market months. The measure is constructed from all IPOs with offer price and total proceeds available in Thomson SDC platinum excluding ADRs, REITs, MLPs and closed end funds. This makes the number of total IPOs used in the month sorting equal to 7251. In addition to IPO volume, I also sort by the commercial and industrial loans spread to measure the impact from the liquidity in the debt capital markets. This measure has been used extensively in the literature to proxy for capital liquidity[2]

For a third measure, I follow Bouwman, et al. (2009) and Goel, et al. (2010) and use the monthly de-trended P/E ratio of the S&P 500. The P/E ratio is de-trended since the P/E ratio has an upward moving trend.

The correlation between the C&I spread and IPO volume is -0.55. This correlation is higher than the correlation between CPI adjusted monthly proceeds and IPO volume which is 0.51. The high negative correlation between C&I spread and IPO volume indicates that firms in general go public during times of low spreads. The correlation between the de-trended P/E ratio and IPO volume is 0.08 and between C&I spread and de-trended P/E ratio it is 0.24

C: Control variables

I use two sets of control variables. The first set is from the acquisition probability models (e.g. Harford (1999) and Tolmunen and Torstila (2005)) and include the natural logarithm of total assets, leverage, market-to-book and return on assets. Asquith, et al. (1983), and Roll (1986) predict that larger firms are more likely to become acquirers. The M/B ratio is constructed from the firm's market capitalization in CRSP and total assets from COMPUSTAT. I control for

[2] For example Harford (2005) use this measure.

Return on Assets as EBITDA scaled by total assets. Leverage is defined as book value of long term and short term interest bearing debt scaled by total assets.

The second set of control variables is motivated by the IPO literature. Offer price, total proceeds and offer price revision is gathered from Thomson SDC Platinum. Offer price revision is measured as the original midrange file price and the amended file price. I follow Bradley and Jordan (2002) and Hanley and Hoberg (2012) and use two variables, one for upward revision and one for downward revision. This is due to data availability and the non-linearity in the effect of the offer price revision. Offer price revision is only available for 2,431 companies out of the total sample of 4,201 IPOs. Data on the first day returns of the initial public offering are obtained from CRSP. The first trading day in CRSP must be closer than three trading days within the date given in the SDC database.

In this paper, I utilize two types of regressions. The first type is standard annual cross sectional regressions. The buyer is acquiring a firm for the first time during year 0, 1, 2 or 3. These regressions allow me to use yearly accounting data and yearly market data without causing endogeneity problems. The second type of regressions ranges from year 0 to 1, 2, and 3 to observe when the firm becomes acquirer for the first time after listing. Therefore, I only include information from the time of the listing event in these regressions.

4. Descriptive Statistics

Table I shows the number of firms that engage in at least one acquisition within four years after the IPO. 2.2% of the firms in the sample engage in an acquisition larger than $10 million during the first year after going public. Until the end of year three the number has increased to 8.2%. This is far smaller than the numbers reported in Celykurt, et al. (2010) and Hovakimian and Sutton (2010). The difference is likely due to differences in sample selection criteria. Celykurt,

et al. (2010) use a sample with a size restriction of proceeds greater than $100 million and any acquisition value. Hovakimian and Sutton (2010) do not have any restrictions on proceeds raised and no restrictions on sample size. I use $10 million as minimum acquisition size and proceeds greater than $20 million. The $10 million acquisition size is somewhat of a norm in the M&A literature. For example, recent papers by Bouwman, et al. (2009) and Goel, et al. (2010) use $10 million. As the proceeds cut-off increases, a larger proportion of the firms engage in acquisitions. Using Celykurt, et al. (2010) IPO size of $100 million, 13.2% of the firms engage in acquisitions larger than $10 million by the end of year three, in comparison to 8.2% in my sample. While panel A reports cumulative M&A frequencies, in panel B, we observe M&A activity each year by the firms that conducted an IPO. The percentage decreases over the years.

Table II shows descriptive statistics for the firm characteristics and IPO characteristics that are used in the regressions. Consumer price index adjusted proceeds (2011 dollars) has an average of $140 million in the sample. This is lower than $180 million found by Celykurt, et al. (2010). Mainly due to their cut off using firms with proceeds greater than $100 million. Average proceeds are substantially larger than Hovakimian and Sutton (2010), who do not have any IPO size restrictions.

Proceeds/assets measures total proceeds raised in the offering normalized by assets t+1 (first fiscal year end following the IPO). Offer price revision is the IPO offer price relative to the midpoint of the original filing range. We observe a slight upward revision of 2.3% on average. Hsieh, et al. (2011) observe an upward revision of 1.9%.

The average first day return in the sample is 22.5%. Ritter reports an average underpricing of 17.9% between 1980-2012 on his webpage. Bradley et al (2002) reports an underpricing of 22.6% in their sample. Debt ratio is long term debt divided by assets, and it has an average of

12.8%. In panel B of Table II, we observe a debt rating indicator variable used in the regressions. The debt rating variable equals one for about six percent of the sample firms.

Table III shows the descriptive statistics sorted by market heat. I utilize three different measures of market heat: IPO volume, C&I spread and de-trended P/E ratio. The sorting classifies the different months into hot, neutral and cold months. Hot represents the top tercile and cold the bottom tercile. Cold market firms tend to raise more funds than hot market firms according to all three measures used. Helwege and Liang (2004) find the opposite results. However, their sample period differs substantially from the time period utilized in this sample. Larger issues by cold market firms might be due to cold market firms being larger than hot market firms.

Offer price revision does not differ between the market states. However, first day return is higher during hot markets. This result is in line with prior studies, e.g. Helwege and Liang (2004).

The financial characteristics differ markedly between the firms listing during hot and cold markets. Firms going public during cold markets have more debt compared to hot market firms. The difference is significant for all market heat measures. As already mentioned, cold market firms are significantly larger than hot market firms.

Return on assets tends to be slightly larger among cold market IPO firms. Helwege and Liang (2004) and Alti (2006) also find that cold market listing firms have higher operating income to assets. There is not a substantial difference in the market to book among the listing firms across market states. Helwege and Liang (2004) did not find a significant difference in using the same market categorization as in this study their market categorization. However, sorting by de-trended P/E ratio yields a difference. The proportion of firms that have S&P rated debt is larger during cold markets. Both the higher ROA and the more common rated debt support Yung, et al. (2008) that firms of higher quality go public during cold markets.

5. Results

A: Univariate Results

Table IV shows the results of univariate tests where the number of firms conducting acquisitions following the IPO is compared between hot and cold markets. The market states are sorted based on monthly IPO volume, C&I spread and de-trended P/E ratio of the S&P 500, so that the bottom third consist of cold market months and the top third consist of hot market months. Panel A of Table IV shows that in comparison to hot market issuers, cold market IPO issuers are almost five times more likely to conduct an acquisition within the first year after IPO. The difference gets smaller over time and after four years, the proportion of cold market listing firms that have conducted acquisitions is less than four times that of hot market listing firms. Since the difference between hot and cold market firms declines over time it is likely that cold and hot market firms do not have different demand for conducting acquisitions.

Panel A section 2 shows that a larger proportion of cold market IPO firms tend to be acquirers, the following years after going public, compared to hot market firms. The effect is strongest during the first year after the IPO but while it is weaker for years 1 and 2, the effect is statistically significant for all the years tested.

Panel B shows the results based on a similar sorting by C&I spread. High C&I spread months indicate low debt market capital liquidity. The results indicate that a larger proportion of firms going public during high spreads are likely to be acquirers than firms listing during low spreads. The effect is strongest during the first year, and it weakens over time. Acquirers listing during low spreads tend buy more firms than high spread IPO firms. This result is in contrast with previous literature, e.g. Harford (2005) shows that low C&I spreads tend to be followed by aggregate merger waves. Nevertheless, the amount of acquisitions seems to be similar over credit cycles. The results give some support for Myers and Majluf (1984) pecking order theory.

The firms listing during high spreads may not be able to fund acquisitions internally or from the debt markets and thus they conduct an IPO to raise funding.

In panel C, the de-trended price earnings ratio of the S&P 500 is used to segregate hot and cold market periods. A larger proportion of the firms listing during low P/E ratios tend to acquire. The proportion of cold market IPO firms that acquire during their first year of being public is twice as large as that for hot market IPO firms. The relation between the proportion of hot and cold market acquirers is slowly decreasing, although the relation seems fairly steady over time. Results in Panel C section 2 shows the amount of IPO firms becoming first time acquirers after listing per year. The results indicate that there are significantly more firms becoming acquirers among the cold market firms than among hot market issuers during the first and second years.

The results in Table IV are robust to different market categorizations, such as splitting months into 25% cold, 50% normal and 25% hot markets. Furthermore, the results are robust to different sample size cut-offs e.g. using $50 million and $100 million as minimum proceeds raised by the listing firms. The results are also robust to using either a three-month or a six-month moving average of IPO volume as sorting variable.

In table IV panel A we observe that the number of acquisitions per acquiring firm is higher among hot market firms than cold market firms. This is due to outliers in the data. Hot market firms during the IT bubble have conducted serial acquisitions following the IPO. Furthermore, I report the deal values. I do not make any conclusions from the deal values since they are likely to be endogenous to the market state. Asset prices are higher during times of high valuations and might thereby make the relation between deal values and listing state biased.

To summarize, a larger proportion of cold market firms tend to become acquirers following their IPO. The result is also present when using a proxy for debt market liquidity and overall stock market valuation as sorting variables. Firms listing during months of low IPO activity

are almost five times more likely to conduct an acquisition following the IPO. Sorting by debt market liquidity I find that firms listing during high spreads make three times the amount of acquisitions and the proportion of firms making acquisitions is eight times larger.

B: Multivariate results

In table V, the M&A measure is a binary variable, taking the value of one if the firm has made an acquisition from year zero to year t, zero otherwise. For this set of regressions I only include information from the time of the listing. According to prediction one, the main variable of interest in these regressions is the aggregated IPO volume during the month of going public. I also consider the C&I spread, and expect a positive relationship between the C&I spread and acquisitions. Regressions 1-4 in table V indicate that monthly IPO volume has a significant negative effect on acquisition intensity. This is consistent with the empirical prediction one, made in section II. A one standard deviation increase in IPO volume (22.16) corresponds to a decrease in the likelihood of conducting an acquisition by 33% during year one. After four years the corresponding number is 26.7%. Hence, the effect weakens over time.

Regressions 5-8 in table V indicate that firms that go public during times of high spreads are more likely to become acquirers than firms going public during times of low spreads. The effect is present during year zero, one and two. During the third year the effect disappears. There are two potential explanations for this pattern. First, firms face difficulties in raising debt financing during times of high spreads, and thereby they raise funds from the equity market to conduct acquisitions. Second, private firms aiming to conduct acquisitions during low spreads have easier to obtain debt financing and are less likely to go public. This lowers the number of firms going public to acquire during low spreads.

First day return has a positive effect on acquisition activity among the IPO firms during the first year after going public. Previous literature finds two explanations for this. First, it is easier for the firm to facilitate an acquisition after going public. Hsieh, et al. (2011) claim that firms go public to resolve valuation uncertainty, and that the firm can credibly communicate its valuation to the target firm once it is publicly traded. Second, IPO firms observe the share price run-up and might be overvalued[3]. If the firm is overvalued, there are incentives to pay with equity in an acquisition[4]. Celykurt, et al. (2010) find that underpricing plays an important role in explaining stock financed acquisitions by IPO firms and that the effect diminishes over time.

Offer price revision is split into two variables offer price revision up and offer price revision down[5]. Hsieh, et al. (2011) argues that offer price revision is related to valuation uncertainty and that firms go public to resolve valuation uncertainty and thereby easier facilitate acquisitions. I find weak evidence of firms with offer price revision closer to zero making more acquisitions, which provides support for Hsieh, et al. (2011).

In table VI, the M&A measure is a binary variable, taking the value of one if the firm has made an acquisition during the fiscal year, zero otherwise. The results in table VI indicate that IPO volume is inversely related to acquisitions, i.e. firms listing during months of low listing activity have a larger likelihood of becoming acquirers. However, the effect weakens over time. A one standard deviation increase in IPO volume results in a 13.3% increase in the likelihood of conducting an acquisition during year 4. During year 3 the difference is not statistically different from zero. The C&I spread is positively related to M&A activity in all regressions except for year four.

[3] . Purnanandam and Swaminathan (2004) show that the most overvalued firms have the greatest IPO underpricing.
[4] According to Shleifer, et al. (2003) firms want to make acquisitions with equity as currency if it is overvalued.
[5] I follow Bradley and Jordan (2002) and split Offer price revision up is Max (offerprice/mid range filing price -1, 0), Offer price revision down is Min (offerprice/mid range filingprice -1, 0).

To test robustness of these results, I also run regressions with de-trended P/E ratio on acquisitions. I conduct identical tests as in Table V and VI. The P/E ratio enters with a negative and significant coefficient in regressions 1 and 2, but the coefficient becomes indistinguishable from zero after year 2. In regressions 5-7, the effect is present and statistically significant throughout the entire time period.

C: Means of payment

The probit results in table VIII show the preferred means of payment among acquisitions conducted by IPO firms. Since I only include actual acquisitions conducted by IPO firms, the sample size is reduced to 533 M&A transactions. As predicted by the hypothesis firms listing during cold issue markets prefer to use cash as means of payment. Using equity as means of payment is equivalent to issue equity (Galubov et al., (2012)). Therefore, firms going public during cold markets are not likely to raise equity at low valuations a second time and are therefore likely to prefer cash as payment mechanism. Firms that experience a higher first day return tend to partly use equity in their acquisition offer. This result is not new to the literature, Celikyurt, et al. (2010) and Hsieh, et al. (2011) document the same result. However, to be able to investigate the difference in the effect of underpricing between hot and cold market acquirers I use interaction terms in table IX.

Table IX shows probit regressions on a binary variable taking value 1 if the offer consists of 100% cash and 0 if the offer consists of any equity. Prediction four above states that the use of equity in the offer should be positively related to the interaction between market heat and first day return. The variable of interest in the regression is the interaction term between first day return and the indicator variable hot that takes value one if the firm goes public during the top tercile of months measured by number of IPOs.

The interaction effect between hot market and firstday return is strongest in magnitude during the first year following the IPO. The price run up following the IPO have a tendency to be reversed after a few months (Ritter, 1991 and Brav and Gompers, 1997). The fast reversion of the firstday return give firms incentives to use equity as means of payment during the first year following the IPO to exploit the higher pricing of their stock. In the regressions I add to additional control variables, de-trended S&P 500 at the time of the acquisition and the relative size of the acquisition. Firms tend to use 100% cash in the acquisition when the target is small in relation to the acquirer. The firm also prefer to use equity during times of high market valuations.

D: Acquisitions as a motive to go public during cold markets

Section 5B shows that cold market firms are more likely conduct acquisitions following the IPO compared to firms that go public during hot issue markets. It is also evident that the effect of the listing month weakens over time. However, to be able to distinguish if acquisitions are one of the plausible motives for going public during cold markets I do further tests. Previous research highlights two major reasons why firms go public.

First, if the cost of capital is low firms are willing to issue equity to take advantage of their high valuation. Alti (2006) argue that hot market firms are market timers and raise more equity than needed to cover their capital needs. Hence, it is less likely that cold market firms go public due to the low cost of capital. I explicitly test for this in table V where I show that the acquisition motive is more likely to be relevant among cold market firms.

The second main argument to go public is to finance investments. There is two ways for a firm to grow, organic growth via capital expenditures or by acquiring a firm. It is likely that the price of capital expenditure investments is relatively fixed over time. Hence, the price of capital expenditure investments does not correlate with the overall market valuation. However, the

price of a firm tends to move with the overall market valuations. Since the target firm value varies with the overall market valuation the acquirer is able sell equity and buy equity at the same overall market valuation. Hence, the market state should not be of large importance for a firm aiming to conduct an acquisition with the proceeds raised in the IPO. To be able to rule out the organic growth motive I test if higher capital expenditure is positively related to IPO volume at the listing month.

Table X shows the relation between IPO volume at the firms IPO month and capital expenditure during the following years. IPO volume is statistically significant and positive in all regressions. Hence, firms that go public during hot markets tend to invest more in capital expenditure. During the first year the effect is weakest and from year two and onwards the effect IPO volume has on capital expenditure weakens.

In conclusion there are three different mechanisms that is likely to affect the timing of going public and conducting acquisitions following the IPO other than the motives proposed in the hypothesis one and two. First, cold and hot market firms are potentially different. By studying the effect of the listing on the acquisition likelihood following the IPO I observe that the difference between hot and cold market firms acquisition intensity weakens over time. Furthermore, other motives might be more plausible during hot markets than the acquisition motive. By ruling out market timing and showing that capital expenditure investments are higher among hot market firms it is likely that the acquisition motive is one of the most relevant during cold markets.

6. Conclusions

Previous studies by Celikyurt, et al. (2010) and Hovakimian and Sutton (2010) find that the acquisition motive is an important reason for a firm to go public. I argue that the acquisition motive is one of few reasons for firms to go public during cold issue markets. I find that firms

are four times more likely to conduct acquisitions during the first year of being exchange traded if they go public during cold markets, in comparison to firms with an IPO during hot markets.

I find support for two explanations for why a larger proportion of cold market IPO firms become acquirers. The first reason builds on the pecking order theory. Due to low capital liquidity in the debt markets, firms go public and raise equity financing to conduct their acquisitions. I proxy for debt market liquidity by the C&I spread and find that the spread is positively related to acquisitions, i.e. firms that go public during times of higher spreads tend to engage in more acquisitions. This supports the pecking order theory; firms go public to raise equity when they cannot obtain debt financing.

The second explanation is related to the irrelevance of overall market valuation when conducting acquisitions. Firms that issue an IPO and conduct an acquisition sell and buy equity at the same overall market valuations. Hence, market state should not matter but rather only the relative valuation between acquirer and target. I find that a larger proportion and number of firms go public to acquire during times of low market valuation proxied by the P/E ratio of S&P 500 in comparison to firms issuing at times of high market valuations.

Furthermore, I find results regarding the ex post IPO acquisition intensity among firms with a high initial return. Namely, that first day return only has an effect on acquisition intensity during hot issue markets.

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TABLE I

ACQUISITION INTENSITY OVER TIME

Panel A shows the number of acquisitions made by IPO firms over time. The acquisition data is retrieved from Capital IQ and the IPO data from Thomson SDC Platinum. Panel B shows the amount of firms conducting an acquisition a given year following the IPO. The sample period ranges from 1990-2012.

Years	**0-1**	**0-2**	**0-3**	**0-4**
Panel A:				
Number of Acquisitions by IPO firms	173	354	470	572
Number of IPO firms engaging in acquisitions for the first time	99	178	238	284
Total number of IPO firms	4424	4146	3691	3216
Percentage of acquiring firms	0.022	0.043	0.064	0.088
Acquisitions per acquiring firm	1.75	1.99	1.97	2.01
Deal value ($m)/total number of IPO firms	7.8	16.2	18.8	25.6
Deal value ($m)/ acquiring firms	537.61	452.01	399.34	442.23
Panel B:	**1**	**2**	**3**	**4**
Number of Acquisitions by IPO firms	173	181	116	102
Number of IPO firms engaging in acquisitions for the first time	99	79	60	46
Total number of IPO firms	4424	4146	3691	3216
Percentage of firms undergoing acquisitions	0.022	0.019	0.016	0.014
Acquisitions per acquiring firm	1.75	2.29	1.93	2.22
Deal value ($m)/total number of IPO firm	7.8	8.4	2.6	6.8
Deal value ($m)/ acquiring firms	537.61	381.17	231.68	629.27

TABLE II

FIRM CHARACTERISTICS

Proceeds measure the total proceeds raised in the IPO adjusted to 2011 dollars. Offer price is the offer price/share in the IPO. Offer price revision is offerprice/mid range filing price -1. Market/book is measured at the day of the listing. Assets is total book value of assets. Leverage is defined as (long term + short term debt)/total assets. Return on assets (ROA) is defined as EBITDA/total assets. Debt rating is an indicator variable taking value one if the firm have debt rated by Standard & Poors at the beginning of the period. The sample period ranges from 1990-2007.

	Mean	st dev	max	min
Proceeds $M	140	311	9581	20
Offer price	14	6	253	2
Offer price revision	0.023	0.231	3.333	-0.997
First day return	0.225	0.467	6.056	-0.891
leverage	0.128	0.206	2.339	0
Total assets $M	794	5187	113294	4
ROA	0.039	0.237	1.712	-2.392
Market/Book	3.836	13.288	191.943	-670.076
Indicator variables in percentage	1			
Debt Rating	0.064			

TABLE III

FIRM CHARACTERISTICS

Proceeds measure the total proceeds raised in the IPO adjusted to 2011 dollars. Offer price is the offer price/share in the IPO. Offer price revision is offer price/mid range filing price -1. Leverage is defined as (long term + short term debt)/total assets. Return on assets (ROA) is defined as EBITDA/total assets. Market/book is measured at the day of the listing as Market value scaled by Book value of equity. Debt rating is an indicator variable taking value one if the firm have debt rated by Standard & Poor's at the beginning of the period. The sample period ranges from 1990-2007.

	IPO VOLUME			***C&I spread***			***De-trended P/E***		
Panel A: control variables	Hot 1/3	Cold 1/3	T -stat	Hot 1/3	Cold 1/3	T -stat	Hot 1/3	Cold 1/3	T-stat
Proceeds $M	107	279	-10.16***	103.07	180.97	-7.89***	133	161	-2.59***
Offer price revision	0.03	0.04	-0.61	0.02	0	-0.98	0.04	0.02	1.17
First day return	0.24	0.17	2.84***	0.17	0.12	-4.09***	0.37	0.16	10.54***
Leverage	0.12	0.16	-3.67***	0.13	0.15	-2.48**	0.11	0.14	-3.77***
Total assets $M	653	1982	-4.41***	546.18	1074.6	-2.74***	918	693	1.16
ROA	0.03	0.05	-1.23	0.06	0.07	-1.14	-0.01	0.06	-6.8***
Market/Book	3.97	3.67	0.39	3.43	2.99	0.68	4.63	3.59	1.93*
Indicator variables in percentage									
S&P rated debt	0.05	0.11	-4.91***	0.06	0.09	-3.55***	0.06	0.07	0.27
Number of firms	2629	431		2018	814		1612	1324	

TABLE IV

UNIVARIATE TESTS

Panel A in table IV below shows the number and proportion of firms conducting an acquisition during hot and cold markets sorted by number of IPOs. One third of the months are classified as hot months and one third as cold months. Panel B shows the numbers from a sorting based on the C&I spread. Panel C shows the same sorting according to the detrended P/E ratio from S&P 500.

	Hot Markets				Cold Markets			
	Year 0	**Years 0-1**	**Years 0-2**	**Years 0-3**	**Year 0**	**Years 0-1**	**Years 0-2**	**Years 0-3**
PANEL A: Heat measure IPO VOLUME (1/3 and 1/3)								
Number of IPO firms	2847	2656	2335	2033	363	349	311	256
Number of IPO firms making acquisitions	35	61	88	108	18	28	36	48
Acquisition per acquiring IPO firm	2.03	2.23	2.14	2.21	1.17	1.46	1.61	1.65
Deal value per acquiring IPO firm	25.94	99.58	105.62	97.17	191.49	601.35	515.05	474.01
Percentage of IPO firms making acquisitions	0.012	0.023	0.038	0.053	0.05	0.08	0.116	0.188
Hot - cold, Z-value (number of acquiring firms)	-5.25***	-6.08***	-6.36***	-7.86***				

	Year 0	**Year 1**	**Year 2**	**Year 3**	**Year 0**	**Year 1**	**Year 2**	**Year 3**
Number of IPO firms	2847	2656	2335	2033	363	349	311	256
Number of IPO firms making acquisitions	35	26	27	20	18	10	8	12
Acquisition per acquiring IPO firm	2.03	1.07	0.59	0.47	1.17	0.71	0.47	0.44
Deal value per acquiring IPO firm	25.94	14.43	27.01	20.63	191.49	81.63	3.85	18.15
Percentage of IPO firms making acquisitions	0.012	0.01	0.012	0.01	0.05	0.029	0.026	0.047
Z-value (Hot - cold) (number of acquiring firms)	-5.25***	-3.14**	-2.17**	-4.7***				

	Low C&I Spread				High C&I Spread			

	Year 0	Years 0-1	Years 0-2	Years 0-3	Year 0	Years 0-1	Years 0-2	Years 0-3
PANEL B: Heat measure C&I spread (1/3 and 1/3)								
Number of IPO firms	2142	2005	1770	1519	703	680	633	544
Number of IPO firms making acquisitions	10	29	47	71	30	58	76	81
Percentage of IPO firms making acquisitions	0.005	0.014	0.027	0.047	0.043	0.085	0.12	0.149
Z-value (Hot - cold) (number of acquiring firms)	-7.43***	-9.22***	-9.75***	-8.72***				

	Year 0	Year 1	Year 2	Year 3	Year 0	Year 1	Year 2	Year 3
Number of IPO firms	2142	2005	1770	1519	703	680	633	544
Number of IPO firms making acquisitions	10	19	18	24	30	28	18	5
Percentage of IPO firms making acquisitions	0.005	0.009	0.01	0.016	0.043	0.041	0.028	0.009
Z-value (Hot - cold) (number of acquiring firms)	-7.43***	-5.59***	-3.54***	0.34				

			High P/E ratio				**Low P/E ratio**	
	Year 0	**Years 0-1**	**Years 0-2**	**Years 0-3**	**Year 0**	**Years 0-1**	**Years 0-2**	**Years 0-3**
PANEL C: Heat measure detrended P/E of S&P500 (1/3 and 1/3)								
Number of IPO firms	1612	1481	1297	1157	1324	1253	1133	981
Number of IPO firms making acquisitions	36	59	78	91	57	94	119	136
Percentage of IPO firms making acquisitions	0.022	0.04	0.06	0.079	0.043	0.075	0.105	0.139
Z-value (Hot - cold) (number of acquiring firms)	-3.19***	-4.18***	-4.48***	-4.69***				

	Year 0	Year 1	Year 2	Year 3	Year 0	Year 1	Year 2	Year 3
Number of IPO firms	1612	1481	1297	1157	1324	1253	1133	981
Number of IPO firms making acquisitions	36	23	19	13	57	37	25	17
Percentage of IPO firms making acquisitions	0.022	0.016	0.015	0.011	0.043	0.03	0.022	0.017
Z-value (Hot - cold) (number of acquiring firms)	-3.19***	-2.60***	-1.57	-1.28				

TABLE V

REGRESSIONS OF IPO VOLUME AND C&I SPREAD ON M&A ACTIVITY

The table shows probit regressions of IPO volume and C&I spread on M&A activity. The dependent variable is a binary variable taking value 1 if the firm conducted an acquisition during the given time span and 0 otherwise, e.g. if a firm conducts an acquisition year one the variable will take value 1 in regressions 0-2, 0-3 and 0-4 as well . IPO volume measures the total amount of firms going public during the same month as the firm listed. The C&I spread is the commercial and industrial loan spread (over the fed funds rate) gathered by the Federal Reserve and proxies for capital liquidity. Firm size is measured as the natural logarithm of total assets measured in $million First day return is the closing price/offer price -1. Proceeds measure total proceeds raised in the IPO scaled by year end total assets. Offer price revision up is Max (offer price/mid range filing price -1, 0), Offer price revision down is Min (offer price/mid range filing price -1, 0). Market to book is market value of equity divided by book value of equity. Rating is an indicator variable taking value one if the firm have debt rated by Standard & Poors at the beginning of the period. The sample period ranges from 1990-2012. Z-values are in reported in parentheses. ***,**,* reports significance on the 1%, 5% and 10% level, respectively. Regressions are estimated with Fama-French 48 industry classification fixed effects. Constant term is not reported.

Years	0-1	0-2	0-3	0-4	0-1	0-2	0-3	0-4
IPO Volume	-0.015***	-0.016***	-0.011***	-0.012***				
	(-5.68)	(-7.47)	(-6.73)	(-7.29)				
C&I spread					1.19***	1.15***	1.08***	0.895***
					(6.04)	(7.27)	(7.72)	(6.92)
Firm size	0.205***	0.168***	0.158***	0.147***	0.211***	0.172***	0.154***	0.152***
	(5.17)	(4.75)	(5.01)	(4.88)	(5.30)	(4.90)	(4.85)	(5.03)
First day return	0.229***	0.196***	0.190***	0.157***	0.197***	0.157**	0.162***	0.127**
	(3.16)	(3.06)	(3.18)	(2.68)	(2.69)	(2.41)	(2.68)	(2.16)
Proceeds	0.351***	0.202*	0.157	0.127	0.343***	0.184*	0.135	0.113
	(2.89)	(1.86)	(1.57)	(1.32)	(2.83)	(1.68)	(1.32)	(1.17)
Rating	-0.008	-0.140	-0.076	-0.002	0.017	-0.095	-0.038	0.027
	(-0.05)	(-0.91)	(-0.56)	(-0.02)	(0.10)	(-0.62)	(-0.28)	(0.22)
M/B	0.006	0.001	0.001	0.000	0.005	0.001	0.000	0.00
	(1.21)	(0.39)	(0.23)	(0.17)	(1.18)	(0.22)	(0.00)	(0.02)
Revision down	0.449	1.12*	0.805*	0.536	0.363	1.067*	0.735	0.503
	(0.67)	(1.85)	(1.63)	(1.23)	(0.55)	(1.79)	(1.50)	(1.17)
Revision up	0.074	-0.217	-0.370	-0.216	-0.017	-0.329	-0.446	-0.294
	(0.22)	(-0.64)	(-1.12)	(-0.76)	(-0.05)	(-0.93)	(-1.32)	(-1.02)
Log Likelihood	-378.8	-608.7	-791.3	-915.6	-378.4	-613.2	-785.1	-919.8
Wald	82.38	108.75	106.54	114.64	85.82	107.06	119.55	110.29
N	4201	4201	4201	4201	4201	4201	4201	4201

TABLE VI

REGRESSIONS OF IPO VOLUME AND C&I SPREAD ON M&A ACTIVITY

The table shows probit regressions of IPO volume and C&I spread on M&A activity. The dependent variable is a binary variable taking value 1 if the firm conducted an acquisition during the given time span and 0 otherwise, e.g. if a firm conducts an acquisition year one the variable will take value 1 in regressions 0-2, 0-3 and 0-4 as well . IPO volume measures the total amount of firms going public during the same month as the firm listed. The C&I spread is the commercial and industrial loan spread (over the fed funds rate) gathered by the federal reserve and proxies for capital liquidity First day return is the closing price/offer price -1. Firm size is measured as the natural logarithm of total assets measured in $million. Proceeds measure total proceeds raised in the IPO scaled by year end total assets. Offer price revision up is Max (offer price/mid range filing price -1, 0), Offer price revision down is Min (offer price/mid range filing price -1, 0). Market to book is market value of equity divided by book value of equity. Rating is an indicator variable taking value one if the firm have debt rated by Standard & Poors at the beginning of the period. Leverage is defined as (long term + short term debt)/total assets. Return on assets (ROA) is defined as EBITDA/total assets. The sample period ranges from 1990-2012. Z-values are in reported in parentheses. ***,**,* reports significance on the 1%, 5% and 10% level, respectively. Regressions are estimated with Fama-French 48 industry classification fixed effects. The constant term is not reported.

Years	2	3	4	2	3	4
IPO Volume	-0.013***	-0.001	-0.006**			
	(-4.74)	(-0.29)	(-1.98)			
C&I spread				0.811***	0.484**	-0.155
				(4.05)	(2.29)	(-0.62)
Firm size	0.062	0.093*	0.120**	0.071	0.128***	0.141***
	(1.29)	(1.91)	(2.41)	(1.49)	(2.62)	(2.90)
Firstday	0.100	0.065	0.026	0.069	0.039	0.017
	(0.97)	(0.61)	(0.18)	(0.67)	(0.36)	(0.11)
Proceeds	-0.130	-0.033	0.048	-0.138	0.029	0.044
	(-0.73)	(-0.17)	(0.36)	(-0.78)	(0.18)	(0.34)
Debt rating Pre-IPO	-0.055	0.286	0.158	-0.011	0.269	0.163
	(-0.22)	(1.31)	(0.69)	(-0.05)	(1.24)	(0.71)
M/B (t-1)	-0.003	0.000	0.001	-0.003	-0.041	0.001
	(-0.97)	(0.00)	(0.31)	(-1.00)	(-0.63)	(0.33)
Revision down	2.01*	-0.025	-0.618	2.037*	-0.142	-0.470
	(1.92)	(-0.04)	(-0.88)	(1.96)	(-0.22)	(-0.66)
Revision up	-1.03	-0.769	0.229	-1.24*	-0.700	0.134
	(-1.44)	(-1.21)	(0.57)	(-1.70)	(-1.10)	(0.29)
ROA (t-1)	0.494*	0.203	1.018**	0.549*	0.039	1.02**
	(1.69)	(0.94)	(2.26)	(1.87)	(0.16)	(2.26)
Leverage (t-1)	-1.15***	-1.05***	-0.062	-1.168***	-0.792**	-0.069
	(-2.8)	(-3.07)	(-0.18)	(-2.85)	(-2.24)	(-0.20)
Log Likelihood	-331.8	-391.6	-214.35	-336.15	-285.3	-613.2
Wald	48.81	18.95	21.99	42.94	27.91	107.06
N	4201	3749	2854	4201	3749	2854

TABLE VII

REGRESSIONS OF P/E RATIO OF THE S&P500 ON M&A ACTIVITY

The table shows Probit regressions. The dependent variable in regression 1-4 is a binary variable taking value 1 if the firm conducted an acquisition during the given year and 0 otherwise, if the firm haven't conducted an acquisition previously after listing. The dependent variable in regression 5-8 is a binary variable taking value 1 if the firm conducted an acquisition during the given time span and 0 otherwise, e.g. if a firm conducts an acquisition year one the variable will take value 1 in regressions 0-2, 0-3 and 0-4 as well. De-trended P/E ratio is the de-trended P/E ratio of the S&P 500. First day return is the closing price/offer price -1 also termed as first day underpricing. Proceeds measure total proceeds raised in the IPO scaled by year end total assets. Offer price revision up is Max (offer price/mid range filing price -1, 0), Offer price revision down is Min (offer price/mid range filing price -1, 0). Market to book is book value of equity divided by market value of equity. Leverage is defined as (long term + short term debt)/total assets. Return on assets (ROA) is defined as EBITDA/total assets. Credit rating is an indicator variable taking value one if the firm have debt rated by Standard & Poors at the beginning of the period. The sample period ranges from 1990-2012. Z-values are in parentheses, *** indicates significance at 1% level, ** indicates significance at 5% level and * indicates significance at 10% level. Regressions are estimated with Fama-French 48 industry classification fixed effects.

Years	0-1	0-2	0-3	0-4	2	3	4
Detrended P/E	-0.035***	-0.035***	-0.028***	-0.023***	-0.029***	-0.002	0.008
	(-4.74)	(-5.78)	(-5.12)	(-4.59)	(-3.46)	(-0.28)	(0.82)
Firm size	0.238***	0.203***	0.187***	0.182***	0.097**	0.153***	0.102**
	(6.16)	(5.97)	(6.08)	(6.23)	(2.07)	(3.17)	(1.98)
Firstday	0.300***	0.267***	0.250***	0.206***	0.153	0.015	-0.038
	(3.97)	(4.02)	(4.05)	(3.42)	(1.49)	(0.13)	(-0.25)
Proceeds	0.340***	0.204*	0.160	0.137	-0.133	0.022	0.035
	(2.77)	(1.89)	(1.60)	(1.44)	(-0.76)	(0.12)	(0.19)
Debt rating pre-IPO	0.033	-0.095	-0.034	0.020	0.001	0.288	0.168
	(0.20)	(-0.63)	(-0.26)	(0.16)	(0.00)	(1.34)	(0.75)
M/B (t-1)	0.005	0.001	0.001	0.001	-0.004	0.001	0.005
	(1.21)	(0.47)	(0.29)	(0.26)	(-1.03)	(0.17)	(0.81)
Revision down	0.597	1.264**	0.878*	0.628	2.13**	-0.072	-0.454
	(0.88)	(2.07)	(1.77)	(1.43)	(2.04)	(-0.11)	(-0.65)
Revision up	0.041	-0.343	-0.493	-0.361	-1.33*	-0.823	0.190
	(0.12)	(-0.94)	(-1.43)	(-1.19)	(-1.81)	(-1.28)	(0.46)
ROA (t-1)					0.392	0.036	1.25***
					(1.34)	(0.16)	(2.91)
Leverage (t-1)					-1.26***	-0.849**	-0.151
					(-3.06)	(-2.40)	(-0.46)
Log Likelihood	-385.9	-623.4	-802.39	-933.4	-338.3	-287.9	-226.8
Wald	77.76	92.2	90.86	86.42	39.19	23.55	17.46
N	4201	4201	4201	4201	4201	3749	3305

Table VIII

LOGIT REGRESSIONS OF HOT AND COLD MARKETS ON CASH

The table shows probit regressions of all IPO companies' 100% cash acquisitions 0-4 years after going public. The dependent variable is an indicator variable and takes value 1 if 100% cash is used as currency in the acquisition and 0 otherwise. First day return is the return on the first trading day for the firm. Relative size gives the size relation between acquirer and target. It is given by acquirers' total assets divided by the total deal value. Firm size is the natural logarithm of total assets The sample period ranges from 1990-2012. Z-values are in parentheses, *** indicates significance at 1% level, ** indicates significance at 5% level and * indicates significance at 10% level. Pseudo R^2 and number of observations are also reported in the table. Regressions are estimated with robust standard errors.

Years	1	2	3	4
IPO Volume	-0.023**	-0.063***	-0.010	-0.028***
	(-2.01)	-4.52)	(-1.29)	(-4.19)
Firm size	0.270*	0.135	-0.016	0.004
	(1.65)	(0.88)	(-0.11)	(0.03)
Firstday	-1.57*	-0.756***	-1.286***	-0.636
	(-1.81)	(-2.21)	(-2.95)	(-1.47)
Proceeds	0.595	-1.563*	0.222	-0.181
	(0.43)	(-1.71)	(0.38)	(-0.29)
Debt rating pre-IPO	0.0685	2.183***	-0.068	0.212
	(0.12)	(2.66)	(-0.15)	(0.44)
M/B (t-1)	0.060	0.003	0.017**	0.044
	(0.80)	(0.09)	(2.07)	(1.44)
Revision down	-2.01	-0.794	-1.824	1.369
	(-1.19)	(-0.23)	(-1.05)	(0.66)
Revision up	1.15	-1.304	-8.125	0.889
	(0.67)	(-1.21)	(-1.36)	(0.55)
ROA (t-1)		0.539	2.536***	2.38***
		(0.74)	(2.83)	(2.82)
Leverage (t-1)		-2.993***	0.356	0.838
		(-2.96)	(0.43)	(1.10)
Pseudo R^2	0.22	0.46	0.3	0.28
N	72	158	128	120

TABLE IX

REGRESSIONS OF HOT AND COLD MARKETS ON CASH

The table shows probit regressions of all IPO companies' 100% cash acquisitions 0-4 years after going public. The dependent variable is an indicator variable and takes value 1 if 100% cash is used as currency in the acquisition and 0 otherwise. The categorization into hot and cold markets is based on sorting the months by IPO number of IPO's and then split the sample into trecils. Hot market issuer is a dummy variable taking value 1 if the firm went public during a hot issue month and zero otherwise. Hot state x Firstday return is an interaction variable between firstday return and the hot indicator variable. First day return is the return on the first trading day for the firm. Relative size gives the size relation between acquirer and target. It is given by acquirers' total assets divided by the total deal value. Firm size is the natural logarithm of total assets. S&P 500 P/E is the value of de-trended S&P 500 removing the best line fit and then deducts a 5 year moving average to measure the overall market valuation. The sample period ranges from 1990-2012. Z-values are in parentheses, *** indicates significance at 1% level, ** indicates significance at 5% level and * indicates significance at 10% level. Pseudo R^2 and number of observations are also reported in the table. Regressions are estimated with robust standard errors and constant term is not reported.

Years	1	2	3	4
Hot state x Firstday return	-9.20**	0.014	-4.89**	-0.08
	(-2.14)	(0.01)	(-2.15)	(-0.10)
Hot State	-9.20	-0.52	0.066	0.56
	(0.38)	(-0.89)	(0.10)	(1.02)
Firstday	6.01	-1.23	2.92	-0.66
	(1.44)	-0.62	(1.29)	(-0.88)
Firm size	0.16	0.35**	-0.05	0.07
	(0.84)	(2.18)	(-0.29)	(0.52)
Proceeds	0.055	-2.15**	0.64	0.07
	(0.06)	(-2.36)	(0.80)	(0.10)
Debt rating pre-IPO	-0.21	1.98***	-0.44	0.06
	(-0.30)	(2.84)	(-0.91)	(0.14)
M/B (t-1)	0.106	0.051	-0.00	0.05
	(1.05)	(1.39)	(-0.2)	(1.54)
Revision down	-1.19	-1.21	-0.99	1.23
	(-0.65)	(-0.61)	(-0.64)	(0.52)
Revision up	3.95*	0.240	-9.71	0.24
	(1.72)	(0.20)	(-1.07)	(0.13)
S&P 500 P/E	-0.002	-0.003**	-0.00	-0.002**
	(-1.05)	(-2.21)	(-0.20)	(-2.14)
Relative Size	-0.113	-0.41**	-1.36**	-0.80**
	(-1.11)	(-2.14)	(-2.34)	(-2.07)
ROA (t-1)		0.26	2.54***	2.25**
		(0.33)	(2.68)	(2.10)
Leverage (t-1)		-4.71***	1.36	0.97
		(-3.93)	(1.55)	(1.24)
Pseudo R^2	0.398	0.543	0.478	0.272
N	72	158	128	120

TABLE X

REGRESSIONS OF HOT AND COLD MARKETS ON CAPITAL EXPENDITURE

The table shows regressions of all IPO companies' capital expenditure the four years following the IPO. The dependent variable is defined as Capital Expenditure/Total Assets multiplied by 100. IPO volume measures the total amount of firms going public during the same month as the firm listed. The C&I spread is the commercial and industrial loan spread (over the fed funds rate) gathered by the Federal Reserve and proxies for capital liquidity. Firm size is measured as the natural logarithm of total assets measured in $million First day return is the closing price/offer price -1. Proceeds measure total proceeds raised in the IPO scaled by year end total assets. Offer price revision up is Max (offer price/mid range filing price -1, 0), Offer price revision down is Min (offer price/mid range filing price -1, 0). Market to book is market value of equity divided by book value of equity. Rating is an indicator variable taking value one if the firm have debt rated by Standard & Poors at the beginning of the period. The sample period ranges from 1990-2012. Z-values are in reported in parentheses. ***,**,* reports significance on the 1%, 5% and 10% level, respectively Regressions are estimated with robust standard errors,FF48 fixed effects and clustering. Constant term is not reported.

Years	1	2	3	4
IPO Volume	0.016*	0.031***	0.024***	0.014***
	(1.98)	(4.67)	(4.12)	(2.88)
Firm size	0.062	-0.478**	-0.388**	-0.250*
	(0.26)	(-2.35)	(-2.61)	(-1.84)
Firstday	-0.080	0.083	0.164	-0.250
	(-0.24)	(0.26)	(0.88)	(-1.49)
Proceeds	0.993	0.508	-0.305	-0.074
	(1.57)	(1.09)	(-0.88)	(-0.23)
Debt rating pre-IPO	-2.15**	-0.936	-0.855	-0.983**
	(-2.50)	(-1.43)	(-1.42)	(-2.03)
M/B (t-1)	-0.020	0.010	0.005	0.005
	(-1.55)	(1.00)	(0.54)	(0.97)
Revision down	-0.472	-1.928	1.245	0.339
	(-0.23)	(-1.25)	(1.02)	(0.24)
Revision up	-0.697	0.496	0.356	1.09*
	(-1.25)	(0.87)	(0.48)	(1.71)
ROA (t-1)		0.244	1.63***	1.75***
		(0.37)	(3.95)	(3.51)
Leverage (t-1)		1.564	1.72	1.26
		(0.99)	(1.39)	(1.41)
R^2 (within)	0.009	0.016	0.016	0.016
N	4201	3934	3434	3014

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The recent financial crisis of 2007–2009 highlights the impact that financial markets can have on firm behavior. The effect of market states on asset prices is well documented. Until recently, market states have played a less significant role in the corporate finance literature.

This dissertation aims to give further understanding concerning firms' financing and investments during different market states. In the first essay, I study firm-specific factors behind merger waves. My evidence suggests that acquisition activity of financially constrained firms is an important determinant of the observed waves in the aggregate M&A activity. When capital liquidity increases, financially constrained firms are better able to obtain debt and equity financing to finance their investment opportunities. In contrast, financially unconstrained firms are indifferent to the overall capital liquidity and thereby do not have equally clustered M&A activity.

In the second essay, I study the behavior of equity issuing firms during cold IPO-markets. I find that firms that go public during cold markets tend to stage their financing while firms that issue during hot markets tend to raise a larger amount financing, which is consistent with the market timing effect.

In the third essay, I study whether the acquisition motive of equity issuance differs between firms going public in hot and cold markets.

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