Operating Lease and Credit Rating*

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Abstract

This paper documents how firms' concern about credit rating downgrading and their attempts to get credit rating upgrading affect their choice between the use of debt and lease. Firms near a credit rating change tend to use less debt relative to operating lease to finance their new projects. This effect becomes more evident when firms' rating concern becomes stronger. This effect is also more significant when firms' cost of equity finance is higher. The finding is consistent with the empirical evidence that the use of operating lease has much less impact on firm's credit rating compared to the use of debt. The result is surprising because rating agencies are fully aware of firms' use of off-balance-sheet finance and would adjust it when they assess firms' creditworthiness. There are two possible reasons for the result. First, the operating lease obligations are usually underestimated. Second, auditors tolerate more misstatement in disclosed off-balance-sheet items than they do in recognized balance sheet items.

JEL classification: G30, G31

Keywords: lease, off-balance-sheet finance, credit rating, capital structure

1. Introduction

The importance of credit rating has been elaborated over and over. It directly impacts firms' cost of debt through its influence on bond marketability and bond liquidity. Stock price and equity returns are also associated with credit rating level and credit rating prospect. In addition, credit rating affects firms' access to alternative financial market and firms' bargaining power against many counterparties. The evidence provided by the survey paper of Graham and Harvey (2001) indicate that CFOs consider credit ratings second only to financial flexibility as a determinant of financing choice. Other than credit rating level, Kisgen (2006) proposes a method to proxy for firms' concern about credit rating change and he finds that the rating change concern also affects firm's capital structure decision. Loss associated with a credit downgrading and benefits associated with a credit upgrading are large enough to affect corporate behavior. There are several follow up papers showing that credit rating change concern also affects firms' earning management, capital investment, cash holdings and dividend payout decisions.

In addition to debt and equity, lease is also an importance source of finance. The role of lease in capital structure has been ignored from time to time since it can be incorporated as a special form of debt obligations. On one hand, lease payment is obligations to make interest and principal payment which is comparable to secured debt. On the other hand, lease contract is associated with more financial and operating flexibility, and is more secure and has higher priority than normal debt. In the pecking order perspective, firms use lease because it is less information sensitive than normal debt. In the tradeoff perspective, firms choose to use debt and lease to obtain lowest financing and tax cost. Specific to the problem of credit rating change, moving to lease contract is apparently one way to undertake leverage-reducing activity. My focus is on the use of operating lease for three reasons. First, capital lease is immediately included in debt obligations. Second, the amount of capital lease used is negligible compared to the use of debt and operating lease. Third, restructuring capital lease to operating lease leads to the absence of capital lease. The motivation of restructuring is to move debt off balance sheet. However, rating agencies such as Standard & Poor's or Moody's would take into account the use of operating lease when they assess the credit quality of the firms. They treat operating lease indifferently as debt obligations. Thus, the relative use of debt and operating lease should not be affected by the concern about credit rating change (H1). Alternatively, former studies indeed demonstrate that operating lease has much less significant effect on firms' credit rating compared to normal debt. Accordingly, firms would reduce their use of debt relative to operating lease when their concerns about credit rating change are strong (H2).

By employing the method developed by Kisgen (2006), I find empirical evidences supporting the second hypothesis. This is consistent with the empirical findings that credit rating is less sensitive to the use of operating lease. This is not due to ignorance since rating agencies already adjust the operating lease obligations when they are assessing the firms, but is mainly caused by the insufficient disclosure and information location of operating lease. Sometimes, firms' concern about credit rating change would be even stronger, such as firms on the borderline of investment and non-investment grade and firms that have just been downgraded. Under such circumstances, firms would replace debt by operating lease more aggressively to maintain their current rating level, to get upgraded to a more favorable rating level or to regain their original rating level. I also introduce two new proxies to measure firms' concern about their current credit rating: whether

the firm is placed on the CreditWatch or assigned a credit Outlook by the rating agencies. The rating change concern for these two kinds of firms are quite material. Accordingly, the results associated with these firms are also stronger. Nevertheless, the results are not totally driven by the firms on CreditWatch or with credit Outlook. Firms in the lower tier of the broad group are also careful about their use of operating lease and debt obligations even without CreditWatch or Outlook.

As a response to the increasing criticism about the abusive use of operating lease, SEC and FASB issued interpretation letters reiterating existing GAAP and clarifying the regulators' view on some controversial lease accounting issues in 2005. At the meantime, Standard & Poor's introduced a more sophisticated method to estimate operating lease obligations. I find that the effect of rating change concern on firms' relative use of lease and debt alleviates afterwards. It can be inferred that firms are taking advantage of the special nature of operating lease to embellish their balance sheet, and employ a more sophisticated method to estimate operating lease obligations can reduce this problem.

The results are concentrated on firms with no financing deficit, and pecking order theory fails to explain the use of operating lease. The finding is not too surprising. First of all, the use of lease contract is mostly constrained by the supply side. Moreover, lease contract generally applies to fixed asset only and a large amount of spending causing financing deficit is difficult to be funded by lease. Kisgen (2006) assumes firms' effort of reducing the use of debt to maintain their credit rating is only relevant when they need to raise new fund to finance their new project. In fact, firms usually issue equities to reduce their debt obligations when they feel it essential to improve their credit quality. Or in the framework of lease, they sell the assets to use the proceed to pay down debt and then lease the assets back. In this case, firms with no financing deficit may have more discretion to do so. The results are also much stronger when the equity market is cold or when firm's stock is undervalued. Replacing debt by operating lease often becomes an appealing strategy when using equity is not feasible or very costly.

This paper contributes to the literature in several aspects. First, it provides further evidence that rating change concern impacts firm's behavior, especially how they choose between different forms of finance. Firm's inclination of using more operating lease than debt indicates room for the manipulation of off-balance-sheet finance at the critical point of credit assessment. To measure firm's concern about credit rating change, I further introduce two new proxies which indicate whether firms are on the CreditWatch or assigned a credit Outlook. CreditWatch and Outlook are set up by the rating agencies to reflect their opinion about the firm's likelihood of rating change. Hence, CreditWatch and Outlook are more closely related to firm's rating change concern. Second, this paper also belongs to the leasing and buying decision literature. Given the fact that the disclosure of operating lease is not sufficient and not as reliable as recognized items, it is reasonable to argue that the cost of using operating lease is lower than using debt obligations when firms are associated with higher risk of downgrading or higher likelihood of upgrading. Based on this assumption, the credit rating change concern can be reconciled with the theory of leasing and buying decision. Although it is hard to argue that this is a first-order determinant, it would be an important driving factor that sometime can distort firm's behavior. Third, the results and findings support the proposed new accounting rule associated with the disclosure of operating lease (FASB 2012). The new rules almost eliminate the distinction between capital

lease and operating lease, requiring all lease with a maximum term longer than 12 months capitalized on the balance sheet. Voices opposed to this regulation change, such as American Bankers Association, state that the current disclosure is sufficient and they do not believe the new rule will make any improvement. In addition to stock market and bond market participants as well as the commercial banks, the results of this paper show that the rating agencies who are among the most sophisticated financial experts also cannot fully adjust firms' use of operating lease. Therefore, recognizing and disclosing all leasing is reasonable and necessary.

2. Literature review

2.1 Why credit rating is important

Bond ratings receive wide publicity and appear to be influential in determining risk premiums and even the marketability of bonds (West (1970)). First of all, credit rating affects firm's cost of debt. For example, West (1973) finds that bond rating systematically affects the yields of bonds even after controlling for firm-specific factors. One channel is through the private information a credit rating conveys. Regulation FD excludes rating agencies, such that they continue to be allowed to receive non-public information. Hence, credit ratings contain information which is not public and can speed up the dissemination of information about the firm (Millon and Thakor (1985); Boot, Milbourne, and Schmeits (2004)). Another channel is directly through their impact on the marketability of bonds affected by many rating-based regulations and rules in credit market. For example, saving and loans were prohibited from investing in junk bonds. Insurance companies and commercial banks are also restricted in investing non-investment-grade bond. Many institutional investors, such as mutual fund and pension fund, are restricted to invest in bond with credit rating above a particular level (Partnoy (2002); Boot, Milbourn, and Schmeits (2003); Kisgen and Strahan (2010)). Credit rating also affects firm's access to alternative financial markets. For example, commercial paper is only assigned to firms above AA-.

Besides, credit rating has great influence on bond liquidity. Lower rating is associated with lower liquidity. Since credit rationing is very common. So, those firms with lower rating might not be able to raise enough debt capital when they need (Patel, Evans, and Burnett (1998); Stiglitz and Weiss (1981)). And, credit downgrading may trigger a covenant violation which will limit firm's ability to issue more debt in the future.

Moreover, credit ratings can also affect stock price. Schwendiman and Pinches (1975) find that there is monotonic relationship between a firm's bond rating and its common stock beta. In addition, lower ratings affect firm's relationship with suppliers, employees and customers. Lower rating implies higher probability of bankruptcy. This reduces the firm's bargaining power against many counterparties.

Overall, rating change would impact on firm's cost of external finance and thus could be a great concern when firms are making decisions, especially for the firms which are on the borderline of the rating class. Therefore, firms would have great incentives to avoid being downgraded and to attempt being upgraded. And concerns about rating change might distort firm's behavior. Former studies have shown that rating change concern affects firm's behavior: The survey paper

of Graham and Harvey (2001) demonstrate that CFOs consider about the credit rating when making decision about firm's capital structure. Kisgen (2006) provides the evidence that firms near a rating change issue less debt relative to equity compared to other firms which are not near the borderline. Jung, Soderstrom and Yang (2013) show that firms near a rating change would have a higher absolute value of accruals, and Shah (2008) shows that firm will reduce capital investment in order to avoid falling into a lower rating level.

2.2 Leasing and buying decision

In the point of view of literatures, lease is an alternative form of finance. Lease contract utilizes a firm's debt capacity because it reduces firm's ability to borrow through other channels. Lease shares a lot in common with debt. In this sense, lease is considered to displace debt. Lease agreements are contractual obligations, with a commitment on cash flow through fixed rental payments over the life of the lease. It could include some stringent covenants which constrain the lessee's financial flexibility. If lessees fail to comply with the lease agreement, it will constitute default and might trigger the default or acceleration of other debt obligations. There are also penalties associated with termination of lease agreement prior to maturity. According to Myers, Dill, and Bautista (1976) and many other following papers, the lease payment is hardly distinguishable from obligations to make interest and principal payment on the firm's debt, and should be compared with secured debt. Under this framework, the value created from a lease contract is mainly due to the tax shield transfer from the lessee to the lessor as well as the reduced premium on external fund by leasing for firms facing high financial contracting cost.

Lease also possesses unique characteristics. Lease has much more financial and operating flexibility which can guard against the business cycle and demand fluctuates compared to both debt and equity finance. Although lease is essentially considered as secured debt, it has greater debt capacity than secured lending (Sharpe, and Nguyen (1995); Eisfeldt, and Rampini (2009)). There are many remedies to protect the lessor after the firm's file of bankruptcy. If the leased asset is really critical, the firm might choose to assume the lease contract, and the lessor will continue to receive the rental payment. Even if the firm rejects the lease obligation, it is much easier for the lessor to repossess the asset than the case for a secured debt. The lease contract has the same priority as administrative expenses, which is higher than the normal debt. Besides, lessors are more willing to renegotiate outstanding obligations or grant additional obligations, whereas banks are more likely to liquidate borrowers upon default. Under this framework, financial market imperfection also is a key factor which causes firms to switch from debt to lease.

The major idea behind the leasing vs. buying decision is that firms try to minimize taxes and financial cost. There is a long controversial about whether leasing is a substitute (e.g. Myers, Dill, and Bautista (1976); Marston, and Harris (1988); Beattie, Goodacre, and Thomson (2000); Deloof, Lagaert, and Verschueren (2007)) or a complement (e.g. Ang, and Peterson (1984); Branson (1995); Mehran, Taggart, and Yermack (1999); Lewis, and Schallheim (1992); Lasfer, and Levis (1998)) to debt finance. The empirical results are mixed. One hypothesis is that they are sometimes substituting and sometimes complementary, depending on whether firms are large or small and whether firms are financially constrained or not. Yan (2006) develops a concise

model that can explain the relative use of lease and debt which do not solely rely on the requirement of tax status difference between lessor and lessee or financial market imperfection. Most of the theory or empirical evidence about the choice between lease and debt do not distinguish capital lease and operating lease. Sharpe, and Nguyen (1995) and Graham, Lemmon and Schallheim (1998) focus on the use of operating lease and they find similar results as capital lease.

2.3 Capital lease, operating lease and the accounting standard change

So far, the differential accounting for lease in the US is based on the four "bright-line" criteria proposed by SFAS No.13 (FASB (1976)). Under SFAS No.13, the differentiation between capital lease and operating lease is based on ownership risk. Operating lease bears insufficient risk to treat the leasehold as an asset and the associated obligation as a liability. However, some lease contracts contain guaranteed residual value clauses which explicitly transfer residual value risk to the lessee. These RV clauses contribute to design the lease contracts which aim to obtain operating lease accounting treatment. Operating lease expenses are treated as part of the operating expense and only the expenses used to create current period revenue are included. The lessor possesses the ownership of the asset in an operating lease, so the lessee bears little or no risk of the obsolete asset. On the other hand, capital lease imposes substantial risk on the lessee. If a firm purchases the asset, the depreciation and interest expenses are tax deductible. Tax treatment of capital lease is similar to acquired asset. For operating lease, the lease payments are operating expense and tax deductible. Compared to operating lease, capital lease leads to greater deductions earlier and less later on. Another important difference is that the operating lease (or all lease other than capital lease) is off-balance-sheet. Hence, one of the important incentives of the use of operating lease might be to mask the true leverage. Firms would prefer operating lease because it can hide potential liabilities and lower the financial leverage.

SFAS No.13 tightened the conditions under which a lease contract can be classified as an "operating lease". The regulation change aimed to specify the use of various types of lease but incurred unintended consequences. SFAS No. 13 increased the cost of using capital lease and therefore resulted in the reduction of the proportion of assets financed by capital lease. Much of the unexpected decline in capital lease is offset by the increase in operating lease, suggesting that many capital lease were restructured during the transition period to qualify as operating lease. Actually, the four "bright-line" criteria provide the exact guidance to companies on how to structure lease contracts to get a favor financial reporting treatment (Imhoff and Thomas (1988)). And the existences of lease contract items such as RV clauses ensure that the lessees are fully capable of restructuring capital lease as operating lease. Cornaggia, Franzen and Simin (2013) show that the use of operating lease as a fraction of total debt has increased over seven times from 1980 to 2007. At the same time, the use of capital lease fell by half. And according to my sample which includes more recent time period, the use of capital lease is only about one tenth of the operating lease. This fact is consistent with the proposition by the regulators and many financial presses that firms structure lease to quantify for off-balance-sheet accounting treatment in order to hide non-cancellable commitment. Benefits of off-balance-sheet accounting treatment of operating lease contribute a lot in distorting the use of operating lease. Firms are

criticized to structure lease in order to remain off-balance-sheet, and the disproportional use of operating lease reflects an attempt to distort firm financial statement (Miller and Bahnson (2008)).

As a response to this concern, FASB (and IASB) proposed a significant change in accounting rule which requires all lease to be included in balance sheet in May 16, 2013. Under the new rule, all lease with a maximum term longer than 12 months will be capitalized on the balance sheet. Although the new rule is not expected to take effect until January 2018, firms and the CFOs have already started to worry about the overwhelming use of lease that are currently off-balance-sheet. Based on Franzen, and Simin (2013)'s finding, this new accounting rule will alter both the cardinal measures and the ordinal ranks of the firms by several common metrics. And the use of off-balance-sheet lease causes the underestimate of the firm's risk and overstatement of the firm's performance. It is shown that firms are making effort to develop a strategy to minimize the negative impact of the accounting rule change.

The planned revision of the standard intends to abolish the distinction between capital and operating lease. There exist a lot of controversies and objections against this new standard change. For example, the American Bankers Association commented to FASB/IASB that most banking credit officers are satisfied with current accounting rule and do not think the new rule will lead to any improvement in capital decision.

There are still loopholes in the new accounting standards allowing firms to avoid balance-sheet recognition of lease if they really have the incentive to do so (Hales, Venkataraman and Wilks (2012)). Under the new rule, all lease with a maximum term longer than 12 months will be capitalized on balance sheet. But as long as the distinction between Type A and Type B exists, there is still room to structure the lease contract off-balance-sheet. The new classification criteria also focus on the renewal or termination options, option to purchase the asset and fair market value of the leased asset. They do not seem to substantially different from the criteria before.

The international use of lease is quite different from the one in US. European countries rely even more heavily on lease to finance their fixed investment. The differential accounting for lease is also different. For example, all lease are treated as operating lease in France and Japan. This is based on the idea that it is more efficient to disclosure and differentiates the lease by their true economics, instead of simply based on some stereotype criteria.

2.4 Operating lease and credit rating analysis

As mentioned in the previous section, one of the most important incentives to use operating lease is that operating lease is off-balance-sheet. Debt covenants often restrict the payment of dividends and the issuance of additional debt. To deal with a tightened covenant, firms usually choose to issue equity capital and redemption of outstanding debt. Otherwise, managers can mitigate debt covenant constraints by leasing assets (El-Gazzar (1993)). Cornaggia, Franzen and Simin (2013) find that operating leasing allows firms to better manage debt covenants limiting debt or capital expenditures. This finding is supported by the fact that excess operating leasing is diminished by scrutiny of institutional investors, and firms investigated by the SEC or DOJ for financial misrepresentation usually are associated with high levels of excess operating lease.

There are also empirical evidences that firms use costly and complex off-balance-sheet financing arrangements through special purpose entities (SPE) to obscure debt levels (Mills and Newberry (2005); Altamuro (2006)). Compared to SPE, operating lease activity is more transparent.

The motivation behind the more intensive use of operating lease could be scrutinized. It might be just for financial flexibility or an effort to mask true leverage. Moreover, the use of operating lease can distort many other aspects of firms' performance. Stock market participants do not appropriately impound the effects of operating lease into stock price (Imhoff and Wright (1993)), and investors do not adequately estimate the effect of operating lease on future earnings (Ge (2008)). Ge, Larson and Sloan (2011) find that firms with overstatements to earnings have more operating lease in the year of overstatement. Ge, Imhoff and Lee (2008) conclude that market participants are inefficient in their information processing, and the market measures of risk and return do not seem to reflect the economic substance of operating lease.

Although firms might try to fool the shareholder or even the market by using off-balance-sheet lease, it does not necessarily mean that they can successfully do so to the experts such as analyst, financial institutions and rating agencies. However, the early studies in this area find that operating lease had little effect on credit risk (Abdel-khalik, Thompson and Taylor (1978); El-Gazzar (1993)). But at that time, the use of operating lease was not as popular as today. After Enron scandal and the passage of the Sarbanes-Oxley Act of 2002, investors and regulators have treated off-balance-sheet items, including operating lease, with a lot more scrutiny and skepticism. As shown in Dhaliwal, Lee and Neamtiu (2011), at least to certain extent, investors view the risk of ownership associated with the operating leased assets as staying with the lessees. Chu and Zhang (2007) find that banks set the spread as an increasing function of operating lease. However, the level of the impact is lower than the one predicted under perfect information.

The off-balance-sheet operating lease includes the non-cancellable, long-term lease contract with fixed cost claims and bankruptcy priority. It is fundamentally equivalent to conventional debt obligations. Hence, both Standard & Poor's and Moody's incorporate the use of operating lease into their credit assessment procedure. They capitalize the operating lease and adjust the financial ratios by this capitalized lease. There are eleven financial ratios S&P analyze in assessing a firm's creditworthiness. Three of them are associated with interest coverage; the other three of them measure profitability and five of them are related to the use of debt (S&P (2008)). Bond raters rely heavily on numbers produced by the firm's accounting system rather than from the stock and bond markets (Kaplan and Urwitz (1979)). Credit rating agencies collect public information from firm's financial statement and annual reports and they also gather nonpublic information through private conversation with the firm's managers. Bond raters care about the probability of default as well as the loss given default. Default on a promised lease or debt payment both can force a firm into bankruptcy. Capitalizing off-balance-sheet lease increases the probability of technical default. "True" lease is not likely to affect the loss given default. Rather, operating lease cannot be simply considered as "true" lease and it is very likely that it also affects the loss given default. S&P focuses more on probability of default and it capitalizes operating lease when assigning credit rating to evaluate probability of default (S&P (2008)). However, the work of Lim, Mann and Mihove (2003) implies that there is still room for firms to manipulate the off-balance-sheet finance. According to their findings, the effect of the on-balance-sheet debt is much stronger than the off-balance-sheet lease obligations on both firms' borrowing cost and credit

rating. This result is similar for existing and new issued bank loan and credit rating. That's to say, one dollar amount of operating lease obligation is much less important than one dollar amount of the balance sheet debt for firm's credit rating.

Leasing standard requires sufficient disclosures for users to interpret a disclosed amount as if it had been recognized. Current GAAP requires recognition of liabilities arising from capital lease arrangements, but only disclosure of current and future payments associated with operating lease arrangements. The empirical evidence shows that the disclosure is not sufficient. In Chu and Zhang (2007), the authors explain their findings by arguing that the estimated operating lease obligations are lower than the true operating obligations. They put forward three reasons for why banks would underestimate the operating lease obligations. First, only the minimum lease payments are disclosed. Second, the minimum lease payments are disclosed for only next five years and the amount beyond five years is aggregated. Third, according to the argument in the 2005 AICPA report, some lease are simply not disclosed in the notes. It is costly and complex to consider every lease contract and obtain all necessary information. Therefore, even if the lender recalculates the firm's liabilities by referring to the financial statement notes, it is likely that it will only have an estimate of the total lease obligation that understates the true liability. According to Oak (1999), the present value method is very likely to understate the debt equivalence of the lease contract since the future minimum lease payment tends to be lower than actual because certain lease terms contain payment escalators in line with inflation or revenue generated from the leased property.

Evaluating the effective amount of off-balance-sheet debt is very complicated due to the limited disclosure. Moreover, the capitalization of operating lease incorporates some measurement errors, because of the estimation of implicit discount rate and the amount and time of future payments. The most reliable discount rate to use should be the rate implicit in the lease contract which is not publicly available. S&P uses the average rate on firms' secured debt or uses a rate imputed from firms' total interest expense and average debt. The bond raters used to use even more naïve method of estimating discount rate in early years. Thus, market participants would find it too difficult or too costly to perfectly adjust the on-balance-sheet information for the effect of off-balance-sheet lease transaction (Imhoff and Thomas (1988)).

The items used to capitalize operating lease are not recognized in the financial statement, but disclosed in the footnotes. Accounting information disclosed in the footnotes is not treated equally as the information recognized in the body of the financial statements (Libby, Nelson and Hunton (2006)). One rationale for relegating amounts to the footnotes is that the information is less reliable due to significant uncertainty associated with measurement of the amount (Johnson and Storey (1982)). Anyway, determining lease asset and liability amounts involves little subjectivity. Therefore, there should be little uncertainty. Besides, the information of operating lease is specified in the lease contract and hence there should not be very much uncertain. Actually, the specifics of a leasing contract determine its information location and the information location is the real reason that influences its reliability. As Libby, Nelson and Hunton (2006) argues, audit partners require greater correction of misstatements in recognized amounts than in the equivalent disclosed amounts. They view recognized amounts as more material and also spend more time on correction decisions for recognized information.

Accordingly, auditors may be more willing to allow errors in disclosed items compared to recognized items.

Therefore, capital market reacts differently to items included in financial statement and those only disclosed in the footnote. In other words, market participants do not fully incorporate footnote information (Aboody (1996); Davis-Friday, Folami, Liu and Mittelstaedt (1999)). The same logic can be applied to those bond raters. They take the capitalized operating lease less into account comparing to debt obligations due to the relative unreliable, imprecise and insufficient information associated with estimated operating lease obligations. Although their underlying economics are equivalent, using operating lease enables firms to ease the pressure of credit rating change. According to Altamuro, Jhonson, Pandit, and Zhang (2014), when banks assess the credit risk of the firm, they indeed take the use of operating lease into account. The predict power of the financial ratios improved a lot when they are adjusted by the capitalized lease. But for those firms with a credit rating, banks think the credit rating already contains all the information about the use of operating lease, and the adjustment no longer improves the explanation power. Based on their findings, using operating lease to replace debt, in order to maintain existing credit rating level, would be even more worthwhile.

3. Data and Methodology

3.1 Sample construction

The sample period is from 1985 to 2014. The sample starts form 1985 because it is the first year credit rating data available in Compustat. Credit rating is monthly reported so I merge S&P rating with the firm's fiscal year end month. Then I exclude firms with total asset as missing value or smaller than 1 million. I further exclude the utilities and financial firms (SIC 4900-4999, 6000-6999). All accounting data are winsorized by 1%.

I focus on a subsample containing only the firms with available credit rating. I exclude firms with credit rating lower than CCC-, since these firms might have totally different financial policies. D is used for a bond that is in default and C is a special rating applied only to income bonds on which no interest is currently being paid. These firms are also excluded. However, defaulted firms (with rating D) actually use extremely high operating lease.

I also exclude the firms with negative value of common equity and the observations with extremely large debt offer in a single year. As indicated by Kisgen (2006), extremely large debt offer matters for firms both near and far from a rating change, so any firm would expect a downgrading after that. Besides, large debt offers are usually associated with merger and acquisitions. These will compromise the result about rating change concerns. The extremely large debt offer is defined as a debt offer larger than 10% of the firm's total asset. I also try different cutoffs (5%, 10% or 20%) and the main results do not change. In the resulted sample, I have 24,370 firm-year observations with 3300 unique firms.

3.2 Dependent variable

To obtain the debt equivalent value of operating lease, we need to capitalize it by estimating its present value:

$$\text{Capitalized operating lease} = \text{Rental expense} + \sum_{t=1}^{5} \frac{\text{MLP}_t}{(1+d)^t} \quad (1)$$

Here, rental expense (item 47) is from the current year and MLP_t (t=1, 2….5) represent the minimum rental expense due in the first (or second, third, fourth, or fifth) year from the Balance Sheet date under all existing non-cancelable lease (item 96, 164, 165, 166, 167). Accounting rules in the US require that the operating lease commitments for the next five years to be reported as part of the footnotes. Following Graham, Lemmon and Schllheim (1998), I use 10% as the discount rate. In fact, S&P no longer uses 10% as discount rate since 2005. Instead, it calculates the average interest rate from a company's most recent annual statements as a proxy for its cost of funds. Former empirical studies show that using very complicated method would give us an estimated discount rate which is very close to 10%.

The key dependent variable of interest is the relative use of operating lease to the use of debt: $\text{Net lease to debt} = \frac{\Delta\text{Operating lease} - \Delta D_{it}}{\text{Total asset}_{t-1}}$

Assuming firms already exhaust their internal fund and need to raise capital to fund their new project, there are three sources of finance: debt, lease and equity. To see how firms fund their new projects, focusing on the incremental financing choice is more suitable. ΔD_{it} equals to the debt issuance minus debt reduction plus the change in current debt. One important thing is that this item already includes the change of capital lease which is also considered as obligations. $\Delta\text{Operating lease}$ is just the change of capitalized operating lease from last year. Thus, this variable measures the relative choice between the debt finance and operating lease to fund the new project for the current year. This item is scaled by the book value of firm asset from the last period.

3.3 Proxy for rating change concern

In this paper, I focus on firm's concern about their Domestic Long Term Issuer Credit Rating issued by Standard & Poor's. This corporate credit rating variable contains a broad group creditworthiness indicator ranging from AAA to CC, representing firm's capacity to meet financial obligations from strong to vulnerable. The three letter broad rating groups contain most of the information regarding firm's ability to make debt obligations repayment (S&P (2006)). As S&P (2006) states, Long-term rating from 'AA' to 'CCC' could be modified by the additional plus or minus sign to show the relative standing within the major rating categories. Standard & Poor's assigns a plus or minus to the rating to indicate that the bond is at the upper or lower end of the rating category.

Following the methodology of Kisgen (2006), I use dummy variables indicating whether there is a "+" or "-" in firm's S&P rating to proxy its concern about rating change. Dummy variable "Plus" equals to one when firm's S&P rating contain a "+". A "+" additional to major rating indicator implies that the firm is on the top tier of the broad rating group. Thus it is more likely

to be upgraded. Meanwhile, a "-" additional to a major rating indicator implies that the firm is on the bottom tier of the broad rating group which is more likely to be downgraded. Hence, dummy variable "Minus" equals to one when there is a "-" in firm's S&P rating and is a proxy for the firm's concern about being downgraded. "POM" is a dummy variable equals to one if the firm's credit rating contains either a "+" or a "-", which represent firms' overall concern about their corporate credit rating. People would expect that the downgrading concern is much pronounced than upgrading attempts, but sometime the attempt to be upgraded could also be very strong.

In this framework, basically only firms' concerns about the change among broad rating groups are considered. This is reasonable since most investors and regulations focus more on difference among firms belonging to different broad rating groups and do not treat firms in the same broad rating group very differently. In Kisgen (2006), he also uses the credit score model to rank firms among each minor rating group and uses the top tier and bottom tier in each group to proxy firms' rating change concern. As a complementary test, I also adopt this approach and find results supporting my hypothesis. But when I check the validity of this minor rating change proxy, I find that firms belonging to the top tier of each minor rating group are not necessarily more likely to be upgraded and firms belonging to the bottom tier of each minor rating group are not necessarily more likely to be downgraded. In fact, the probabilities of being downgraded or upgraded are both much higher for firms in the middle layer. Rating agencies use very complicated procedure to evaluate firms' creditworthiness. Corporate credit rating not only contains public information based on accounting data but also includes non-public information gathered through the discussion with firms' manager. Therefore, using the credit score model to proxy firm's adjacency to a rating change might not be very effective.

Firms' credit ratings are usually criticized to be rather stable over time. If firms have been associated with AA- for ten years, it is hard to say how much they concern about their current rating level. In the robust test, I try to identify several cases when firms concern about credit rating change would be stronger. Most of the rating-based market regulations and rules are targeting on the non-investment grade firms. Thus, a BBB- firm would be even more reluctant to be downgraded to a lower level and a BB+ firm would find it even more attractive to be upgraded to a higher level. Likewise, a firm has just been downgraded would put extra effort and try to be upgraded back to its prior rating level and a firm has just been upgraded would be afraid of being drawn back to the former lower rating level. Therefore, these firms would concern more about their credit rating compared to ordinary firms.

The rating agencies such as S&P will review their ratings at least in annual basis even without any suspicious events. And they might find it necessary to reassess the rating or outlook. They will place the ratings on CreditWatch, if they believe the likelihood of a rating change is sufficiently high (S&P (2008)). The ratings placed on CreditWatch list are usually associated with a significant chance of rating change, roughly 50% or more. To confirm the potential rating change, the raters will gather more information including both public and private information which usually involves meeting with the firm's management team. Rating agencies place firms on CreditWatch to attract the market's attention and force the firm to take actions to improve credit quality (Boot, Milbourn and Schmeits (2006)).This special surveillance would be a warning sign to the firm's management and this would significantly raise their concerns about the firm's current credit rating. Sometimes, a rating outlook would be assigned to the long-term debt

issuers to assess the potential for rating change (S&P (2008)). Although being placed on the outlook does not always lead to an actual rating change, firms with a positive outlook are more likely to receive upgrading and firms with a negative outlook are more likely to receive downgrading. Being placed on the CreditWatch also raises the difficulties of equity finance which would make the use of operating lease even more appealing. Hence, I also use whether firm is on the list of CreditWatch or Outlook as a proxy for their rating change concern.

3.4 Other determinants of buying or leasing decision

Based on the former literature, there are several other factors which would also affect the use of lease relative to debt and I should control them when investigating the effect of rating change concern. Yan (2006) develops a conclusive model to incorporate different theories predicting the substitute or complementary use of debt and lease. This model reconciles the tradeoff theory and tax arbitrage theory, and shows that the use of lease relative to debt is based on firm's financial cost function. Generally, the determinants of the use of debt can be separated as due to tax incentives or non-tax incentives, and there is no difference in determining the use of operating lease or capital lease. I mainly follow the framework in Graham, Lemmon, & Schallheim (1998) and Sharp & Nguyen (1995) because these two papers focus more on investigating the use of operating lease.

Firm size is proved to be an important determinant of the use of lease. On one hand, smaller firms should use more lease due to their higher asymmetric information. This is also true from the supply side since lease contracts can be helpful to reduce the uncertainty around the firms. Larger firms are usually more diversified, thus are with more stable cash flow. Larger firms are more likely to have economies of scale in issuing securities. Therefore, larger firms bear lower cost to raise external fund. Meanwhile, it is much harder for the smaller firms to predict the future need for the assets, so they usually use more lease. On the other hand, lease and firm size could be positively correlated. Large firms are facing greater political cost and have more incentive to adopt income decreasing method and hence tend to use fewer lease. (Holthausen and Leftwich (1983), Watts and Zimmerman (1978)) The empirical results for the relation between firm size and firm's use of lease are mixed. Some find evidence support the first prediction; others find evidence consistent with the latter. There are also some works find that the effect of firm size on lease is not significant or is changing over time. (Ang and Peterson (1984)) These papers measure firm size using book value of total assets, market capitalization, total sales, or total number of employees. In this paper, firm size is measured by the natural log value of the book value of total asset. I also use total sales as an alternative measurement, and main results do not change.

Firms from certain *industries*, such as transport and retailing, use more lease compared to others. Service and utility companies also use more lease while construction companies tend to lease less. The "industry" determinants are related to the industry wide differences in investment tax credit, nature of asset and collateral and the characteristics of secondary markets. Moreover, the supply side is also a very important factor of the industry differences in the use of lease. In early studies when the use of lease was generally not very popular, the probability of using lease contract or

not was also proved to be significantly different among industries. To capture the differences in the use of lease contracts in different industries, I include the industry fixed effects in the regressions.

Companies use more lease when its assets are less *specific*. These kinds of assets are easily transferable and usually are already available in the leasing market. General fixed asset is the most unspecific asset. Redeployable assets are suitable both for lease and for use as collateral in debt structure. On the other hand, higher collateral also increases firm's debt capacity, which would allow them to use more debt. This determinant is measured by the net Property, Plant and Equipment scaled by total asset.

Firms with higher *leverage* use more lease. Firms that already have a high level of leverage tend to have lower debt capacity, more constraint by the debt covenants and are more likely to bankrupt. Lease, especially operating lease, has been found an important alternative mean to avoid debt financing. Thus, firms with high leverage would choose to use more lease in order to avoid large capital outlays, violation of covenants and to get more favorable financing terms (from lessor rather than creditors). Here, leverage is measured by the sum of long-term debt and short-term debt divided by total asset.

Firms facing greater *financial constraint* would use more operating lease. Again, firms with greater financial constraint are usually more information asymmetry. Lease contracts provide creditors with more security, higher priority in bankruptcy and an effective way of reducing adverse selection and moral hazard problems that arise from information asymmetries (Eisfeldt and Rampini (2008) and Sharpe and Nguyen (1995)). These firms also would face higher cost of external finance and would prefer to lease assets to reduce investment cost. In this paper, financial constraint is proxied by a "no dividend" dummy. However, the firms with available credit rating are considered to be less financial constrained compared to other firms.

Taxes are a very important factor in leasing-buying decision. Operating lease is a tool that can shift tax shield from lessee to lessor. Tax arbitrage theory suggests that lessee can sell its tax shields to lessor through lease, and more lease reduce the potential redundancy of tax shield. As mentioned in Yan (2006), for firms with higher tax rate, the cost of tax shield redundancy would be higher. Thus, firms with lower effective tax rate would prefer leasing to buying.

Firms with more *growth option* in their investment opportunity set should retain the ability to fund future investment with higher priority claims. These firms should have a lower proportion of secured debt and lease in their capital structure. On the contrary, such firms would allocate more fixed-claim obligations to operating lease rather than debt since lease are more flexible and can mitigate debt overhang problem for firms with a lot of investment opportunities. Here, we use market-to-book ratio adjusted by operating lease to proxy the investment opportunity. Yan (2006) suggests that cost of debt financing increases in lease financing more for high growth firms than for low growth firms.

In robustness check, I further include a lot more control variables. Lease contracts have higher priority than debt in bankruptcy, thus firms with a higher probability of *financial distress* would arrange more leasing. If so, there should be a positive relation between leasing and ex ante measure of financial distress. Financial distress is measured by a modified version of Altman's

(1986) *Z-score*. Alternatively, I use *ECOST* as the measure of financial distress. Unlike Z-score, ECOST measures the ex-ante expected cost of financial distress. I also include *firm age* as a proxy for information asymmetry. *Liquidity* and *profitability* might also have important impact on firm's choice between lease and debt.

4. Empirical Results

4.1 Some stylized facts

In this paper, I focus on the firms with available Standard & Poor's credit rating. These firms are expected to be larger, older, more mature and less financially constrained. As we can see form panel A of table 1, compared to ordinary firms in Compustat, rating firms usually are larger, more mature and with less growth opportunities. They also use higher leverage and with more fixed assets. On average, these rating firms are more profitable than ordinary Compustat firms.

I further separate the rating firms into three groups according to their S&P rating. Minus group consists of all firms having a "-" in their S&P ratings. Plus group consists of all firms having a "+" in their S&P ratings. Neutral group consists of firms in the middle tier which contain neither "-" nor "+". According to panel B in table1, the firm characteristics among these three groups of firms are very similar. The neutral group seems to be slightly larger and perform better than firms in other two groups, which can be mainly attributed to the AAA firms contained in this group.

[Table 1]

Rating firms are certainly not identical to unrated firms. But they make up a large fraction of the debt user and market asset universe of public non-financial firms. As pointed out by Rauh and Sufi (2010), almost 95% of the total debt and 90% of the total assets is from firms rated for at least one year. According to former literature, firms with credit ratings generally have higher leverage and increase their use of debt finance (Faulkender and Peterson (2006), Sufi (2007)). In table 2, I compare firms' use of debt, capital lease and operating lease. In the full sample, over 99% of the firms use debt and about 85% use operating lease. On the contrary, only 33% of the firms report use of capital lease. In early studies of leasing finance, people see much higher use of capital lease. For example, Barclay and Smith (1995a, b) find that 46% of their firm-year observations have capital lease and back to early 70s, the percentage goes up to around 70%. There exists huge substitution of capital lease by operating lease since the regulation change of FASB (1976).

[Table 2]

The percentages of debt and lease user are both slightly higher among rating firms. Moreover, rating firms use debt more intensively and use less operating lease compared to ordinary Compustat firms. Rating firms usually face much more favored terms in issuing debt and have more access to alternative finance market. These hence boost their use of debt and reduce their use of operating lease. Although there are evidences that lease supply is more generous to rating firms, it seems that the effect from demand side overrides the effect from supply side on average.

[Figure 1]

Operating lease can be considered as an important source of finance. As we can see from figure 1, the amount of operating lease is almost as much as a half of the amount of total debt in the full sample. Figure 2 plots the use of operating lease as a proportion of total debt for all firms and rating firm respectively. Mean and median statistics show a similar pattern that operating lease is much more important source of finance for unrated firms. In the full sample, the mean is much higher than the median operating lease to total debt ratio. Thus, there exist some firms intensively using operating lease. These outlier firms are very likely to be highly financial constrained and even financial distressed. These kinds of firms choose to lease assets instead of buying them to avoid further use of debt. On the other hand, the operating lease to total debt ratio is also positive skewed for the rating firms, but the skewness is not that large as in full sample. Besides, the ratio of operating lease to total debt is around 30% on average for rating firms. Therefore, the use of operating lease is quite comparable to the use of debt even for the rating firms. According to Leaseurope, lease is even more popular in Europe where on average 28% of the investment is financed by lease contract, excluding real estate.

[Figure 2]

Cornaggia, Franzen and Simin (2013) show that operating lease as a fraction of total debt has increased over seven times from 1980 to 2007. And they find this trend to be significant after controlling several determinants of the use of lease and this trend is not due to any decreasing trend in total debt. From figure 2, we can see that the trend is very likely to be dominated by unrated firms and not so pronounced for rating firms. Moreover, the trend seems to revert in recent years, especially after the rumor of potential regulation change in capitalizing all lease use. Recent decade sees more and more harsh attentions on off-balance-sheet finance, especially on the use of operating lease. As illustrated in the upper panel of figure 2, firms' use of operating lease experiences a rather flat period right after the financial scandals in early 2000s and decrease sharply after year 2010. Cornaggia, Franzen and Simin (2013) find evidence that the lessors also grow during 1980s to 2000s. The boom of supply side could facilitate the increasing trend but it is unlikely to cause the reversion even if the lessors stopped to growth. Since the new accounting regulation is expected to be effective in 2018, it is more likely that firms are trying to "smooth" the effect of this regulation on their use of operating lease.

[Figure 3]

Some industries generally use more lease, as we can see from figure 3. Firms in retail, transport, meals and personal services industries use more lease. This is determined by their business model. Again, the figure shows firms' ability to structure capital lease as operating lease since the amount of capital lease is negligible compared to the use of operating lease even in the lease intensive industries.

[Figure 4]

The use of operating lease decreases all the way as the credit rating level enhances. The literature has shown that more financial constrained firms use more lease. Anyway, rating firms are generally considered to be less financial constrained. But the effect is still shaping the use of

operating lease even within the rating firms group. Firms with higher level of credit rating are also more profitable and face less cost of debt. These all lead them to use fewer lease. The trend is not that significant in the use of capital lease, which is probably because of the negligible amount of the use of capital lease.

[Table 3]

Kisgen (2006) constructs the proxy for rating change concern by implicitly assuming that firms are more sensitive to the broad rating change and less sensitive to the rating change within each broad group. Also, he assumes that firms with a "-" in their credit rating are more likely to be downgraded to a lower broad rating group and firms with a "+" in their credit rating are more likely to be upgraded to an upper rating group. This argument is natural and intuitive in the eye of the market and is consistent with the construction of a credit rating according to the rating agencies. Table 3 is organized based on a rating change transformation matrix as shown in appendix 1. If a firm belongs to the minus group, its probability of being downgraded to a lower broad rating group is 6.3% higher than the unconditional probability. Moreover, this probability is about 8.5% higher than firms belonging to neutral group and 9.8% higher than firms belonging to plus group. On the other hand, if a firm belongs to the plus group, its probability of being upgraded to an upper broad rating group is 5.4% higher than the unconditional probability. Moreover, this probability is about 6.9% higher than firms belonging to neutral group and 9.3% higher than firms belonging to minus group

[Figure 5]

Firms with a "-" in their credit rating are more likely to be downgraded and firms with a "+" in their credit rating are more likely to be upgraded. Hence these firms are considered to be more concerning about credit rating change. The left panel of figure 5 shows that firms near a credit rating change would choose to issue less debt relative to firms far from the credit rating change. This is consistent with the finding of Kisgen (2006). On the other hand, the firms near a credit rating change would choose to use more operating lease as illustrated in the right panel of figure 5. In figure 6, the firms are further separated into three major rating groups. A major group includes all firms with S&P credit rating belonging to "AAA", "AA" or "A" broad categories. B major group includes all firms with S&P credit rating belonging to "BBB", "BB" or "B" broad categories. C major group only includes firms with S&P credit rating belonging to "CCC" broad categories because we exclude the firms with credit rating lower than CCC-. As we can see, the effect of credit rating concern on the use of operating lease is uniform across all major rating groups. These naïve facts roughly support my hypothesis that firms near a rating change would try to use more operating lease relative to debt.

[Figure 6]

4.2 Baseline regressions

Table 4 demonstrates the results of the baseline regression. All control variables are from the previous fiscal year, as well as the rating concern proximities. The regressions are all adjusted by

clustering at firm level. There are only a few clusters in the time dimension and clustering by both time and firm yields very similar results. Industry fixed effect is based on Fama and French 48 classification. Firms that are smaller, riskier, more constrained and with lower tangible assets would prefer to use more operating lease relative to debt. The results also show that firms with more growth options should use less fixed payment obligations.

The effect of rating change concern is statistically significant. Its economic significance is also evident. On average, firms near a credit rating change would use 0.0023 more operating lease relative to debt compared to firms far away from the rating change. Given that the sample mean (median) of the use of operating lease relative to debt is 0.0125909 (0.0071418), firms concern about rating change would increase their use of operating lease relative to debt by approximately 18.3%. The effect of rating change concern for the minus group and plus group are quite different. This is probably because the loss from downgrading would be much greater than the benefits from upgrading. In equity market, there exist negative significant responses to credit downgrading, but no statistically significant reaction for upgrading (Holthausen and Leftwich (1986), Hand, Holthausen and Leftwich (1992), Dichev and Piotroski(2001)). Only downgrading will lead to covenant violations which cannot be resolved by upgrading. And, institutional investors are forced to sell the bond after the firm received a downgrading, but they don't necessarily increase the holding of the bond of the firm is upgraded. Besides, the gap between the probabilities of broad upgrading among plus group with the other two groups is not as large as the gap between the probabilities of broad downgrading among minus group with the other two groups.

[Table 4]

Several other factors have also been found to be associated with firms' choice between lease and debt. I also try to include these factors in the regression. As shown in table 5, the main results remain unchanged after controlling firms' profitability, liquidity, ex post financial distress measured by Z-score and ex ante financial distress measured by E-cost. I also replace the log value of total asset by log value of firm age and the results are still the same.

[Table 5]

Table 6 illustrates the results of the subsample tests. Smaller firms and younger firms approaching a credit rating change are more likely to substitute debt by operating lease. Not surprisingly, firms with a higher HP index are also more likely to do so since HP index is constructed by firm size and firm age. Besides, financial constraints also would lead firms to use more lease. This effect is stronger for firms with higher cash flow volatility, higher Tobin's Q or lower analyst coverage as well. These findings are consistent with the traditional theory and empirical evidence that riskier firms, growth firms and firms with higher information asymmetry would relatively use more lease. Firms with higher payout ratio may feel reluctant to cut dividend since it would be really bad signal. Thus, using operating lease would be a reasonable approach to achieve the goal of both maintaining their payout ratio as well as polishing their balance sheet liabilities. The results are similar for firms with high or low leverage, although we would expect higher levered firms to use more lease in general cases. Another interesting finding is that firms in the grey region of financial distress are most active in reducing debt by using more operating

lease when they are approximate to a credit rating change. "Safe" firms also do it but to a lesser extent. Firm might not be able to or even give up enhancing its situation when it is really "distressed".

[Table 6]

As alternative measure of financial constraint, KZ index and WW index give opposite results compared to HP index. The effect is stronger for firms with lower KZ index or WW index which are considered to be less financial constrained. As indicated by former literature, KZ index and WW index might not be as reliable measurement for financial constraints as HP index. Besides, KZ index can also be considered as a proxy for firms' equity dependence rather than financial constraint. Equity-dependent firms tend to be young, and with higher leverage, lower cash flows, higher cash flow volatility and greater investment opportunities. These features are mostly captured by KZ index (Baker, Stein and Wurgler (2003)). If a firm generally depends more on equity finance, it is less likely to rely on operating lease to replace debt finance. A related but not equivalent test is separating firms based on their external finance dependence. The substitution of debt by operating lease is concentrated on firms with low external finance dependence. External finance dependence measures the amount of desired investment that cannot be funded by internal cash flow generated from the firm's everyday operation. That's to say, if the firm indeed exhausts all its internal cash flow and needs external finance to fund its new project, it is unlikely to use the operating lease. The further investigation associated with firms' external finance dependence will be presented in the later section.

Some results of the subsample tests are contradictory to the traditional theory or empirical evidence about the relative use of lease and debt. The contradiction itself somehow can be considered as a support for my hypothesis. For example, the results are stronger for firms in the industries which are not traditionally predicted to have a high propensity to lease assets. One possible explanation is that the operating lease resembles the rental agreement and true lease, rather than asset purchase and financing for the heavy user of operating lease such as retailers and transporters. These industries have some characteristics that might lead to economic differences in lease accounting (Dhaliwal, Lee and Neamtiu (2011)). Likewise, firms with high R&D expenditure show more inclination in replacing debt by operating lease while theoretically only liquid fixed assets of general usage are appropriate for lease financing. Lessor would find it less valuable to lease less liquid and firm-specific assets (Smith and Wakeman (1985)) which would cause a strong constraint form supply side in leasing this kind of assets. Thus, research and development expenditure are unlikely to be structured as operating lease unless the motivation is to keep debt off the balance sheet. Besides, the effect is stronger for firms voluntarily issuing earning guidance and firms with better or more reliable financial quality. Nevertheless, voluntary disclosure and better accounting quality should reduce information asymmetry and hence reduces financial constraint. Moreover, Bharath, Sunder and Sunder (2008) find that different source of finance affects the importance of accounting quality and firms with relatively higher accounting quality are rewarded with lower cost of debt. These will make firms with low quality financial reporting tend to use more lease. Just as the situation for high R&D firms and firms in operating lease less intensive industries, the reason for these firms' increased use of operating lease relative to debt near a rating change is beyond the underlying economic value of lease relative to debt.

4.3 Stronger concern about credit rating change

If the concern about credit rating is a driving factor impacting firms' relative use of operating lease and debt, we would expect that the effect should be more pronounced when this rating change concern becomes stronger. Corporate bond can generally be separated into two classes. Bonds rated in the top four categories ("AAA", "AA", "A" and "BBB") are commonly known as investment grade ratings. On the other hand, bonds rated in the lower categories are known as speculative bonds or junk bonds. The junk bonds generally are regarded as not eligible for institutional investment. Firms with a speculative grade rating would also be constricted from alternative financial market. Thus, firms' concern about credit rating downgrading and also their efforts in attempting credit rating upgrading should be stronger around the investment-grade boundary.

Likewise, firms just being downgraded should have more incentive to get back their former level of credit rating while firms just being upgraded would be rather indifferent. This unsymmetrical relation between the actual rating change and the use of operating lease relative to debt would be amplified for fallen angels and rising stars. Here, actual rating change includes not only the change among broad rating groups but also the change among minor rating groups. Fallen angel refers to firms being downgraded form an investment bond to a speculative bond. Rising star refers to firms being upgraded form a speculative bond to an investment bond. Fallen angel and rising star usually involve rating changes of more than one minor layer.

[Table 7]

Firms with credit rating of "BBB-" and "BB+" take up about 8.27% and 6.02% of the firm-year observations respectively. Credit quality of the US firms has declined since 1978 to 1995 due to the use of more stringent rating standards in assigning ratings (Blume, Lim and MacKinlay (1998)). As we can see from appendix 2, the percentage of downgrading is always higher than the percentage of upgrading in each year. The tests for stronger rating change concerns are demonstrated in table 7. As we expect, the impact of the rating change concern on firms' use of operating lease relative to debt is larger for firms around the investment-grade boundary, where regulations based on ratings are most prevalent and significant. The impact is further amplified for downgrading firms and especially fallen angels. Rising stars actually decrease their use of operating lease relative to debt, although the effect is not significant. Unlike fallen angels who are downgraded given unexpected business condition shocks, rising stars often come out due to actively reduce their leverage ratios by paying down debt before the upgrade (Nini, Smith and Sufi (2012)). Thus it is very likely that rising stars will try to recover the strategic debt issuance reduction afterwards.

One criticism about the firm's credit rating is that it is rather stable over time. Thus, it is hard to argue that a firm associated with AA- rating for over ten years would have very material concern about its own credit rating. Rating agencies' assessment of firm's creditworthiness is an ongoing process and they have mechanisms like CreditWatch and Outlook that focus on the scenarios when the potential for future rating change is higher than usual. Here, I use whether firms are placed on the CreditWatch or assigned the Outlook as indicators about their concern about rating change. These proxies are more direct and relevant than just using the indicators about the

additional signs to firm's broad rating. The portion of firms placed on the CreditWatch is not very high, generally around 10% on average. The probability of being assigned a valid Outlook is even lower. I only focus on the CreditWatch and Outlook to issuer of long-term debt in domestic currency. S&P would release a "developing" CreditWatch or "developing" Outlook to firms in unusual situations when future events are unclear. This kind of CreditWatch or Outlook is also excluded because the assessments of these firms are expected to be pending and they often are going through great transition.

[Table 8]

As shown in table 8, firms under CreditWatch or Outlooks are reducing their use of debt relative to operating lease. This confirms our main results. The results for Outlook resemble the results of the baseline regression with larger magnitudes. The results for CreditWatch are more significant. Outlooks have a longer time frame than CreditWatch, typically two years for investment-graded firms and one year for noninvestment-graded firms in the future. Thus, the concerns about being placed on the CreditWatch could be more urgent. Another interesting finding is that the effect of positive CreditWatch is much stronger than the effect of negative CreditWatch, for both significance level and magnitude. Kisgen (2006) mentions that firms in really bad circumstances may find it beyond their capacity to maintain their current credit rating, and have no other choices but to live with it. This also explains the reason why the baseline results for "distressed" firms are insignificant.

Although whether firms are on the borderline of the broad rating group do not seem to be associated with whether it will be placed on the CreditWatch or Outlook, it is also possible that the results of the baseline regression are driven only by the firms with material rating change concern. Hence, it is meaningful to see how the firms on the borderline of broad rating group but not on the CreditWatch list behave. The tests are reported in table 9.

[Table 9]

For CreditWatch, the upgrading attempts are concentrated on firms with CreditWatch but the concern of being downgraded is also significant even for firms without CreditWatch which drive them to replace debt by operating lease. Besides, firms without any Outlook also exhibit rating change concern in spite of less significance level and magnitude. For firms on the downgrading borderline, no Outlook pressure even gives them more freedom to do so. These evidences ensure that the effects of CreditWatch and Outlook do not dominate the effect of rating change concern. In fact, the results for rating change concern measured by additional sign to the broad rating groups are still significant after excluding all firm-year observations with CreditWatch.

There are flaws in capitalizing the operating lease. In table 10, I try to estimate the operating lease obligations more precisely by including the thereafter proportion. Thereafter aggregates the cumulative total of all future rental commitments after year five excluding the capitalized lease obligations. The rest life of the operating lease contract is estimated as the thereafter portion of lease divided by the fifth year's lease payment. The average lease payment for the rest of the life of the operating lease contract is estimated as the thereafter portion of lease divided by the number of year in the rest life. Then the future lease payments are discounted from each future year to present. The new capitalized operating lease revises the old one by adding a term

containing the lease obligation beyond the five year horizon. The item "thereafter" is required to be disclosed only after year 1995. So in this table, our sample period is from 1996 to 2014.

[Table 10]

As we can see, the main results do not change after further including the thereafter term. Moreover, the magnitudes of the coefficients associated with the rating change concern even increase. I also get similar results by capitalizing the operating lease using the perpetuity method. Thus, the results are robust to alternative methods in estimating the capitalized operating lease.

Since using lease can lower firm's observed tax rate, effective tax rate would be endogenously related to the use of lease (Graham, Lemmon and Schallheim (1998)). To solve this problem, Graham et al. use a simulation method to estimate the firm's marginal tax rate before financing. The data of before financing marginal tax rate is obtained from Graham's website. In table 11, I control the estimated marginal tax rate instead of the effective tax rate. Again, the main results do not change and are even enhanced in magnitude. Besides, the negative effect of the marginal tax rate is consistent with the former literatures. This also confirms the endogeneity of corporate tax status associated with the use of lease since the effect of effective tax rate is positive in the baseline regression.

[Table 11]

Using capitalized operating lease including the thereafter term or controlling for the estimated marginal tax rate compromises the sample size by reducing the regression observations by almost a half. Since these two concerns do not really affect our main results, I will keep using the specification in the baseline regression in the following tests.

In early 2000s, a lot of financial scandals and frauds raised the public attention about the abusive use of operating lease. In 2005, SEC and FASB issued interpretation letters reiterating existing GAAP and clarifying the regulators' view on some controversial lease accounting issues. In the same year, Standard & Poor's introduced a more sophisticated method to estimate operating lease obligations. Prior to the March 2005 revision, S&P used a 10 percent rate to discount lease obligations. S&P believed the 10 percent rate likely resulted in lower capitalization of lease in the current lower interest rate environment. Commencing in March 2005, the discount rate is based on an estimate of an issuer's actual borrowing costs and will naturally respond to changes in borrowing cost with each year of analysis. Occasionally, better information on interest factors inherent in actual lease may be available, or the average cost of funds is judged unrepresentatively and an alternative discount rate is chosen (Berman and Jones (2007)). If the incentives of using operating lease to replace debt rely mostly on markets' and bond raters' "casual" response to operating lease obligations, this inclination would become weaker during the period when extensive attentions are paid on the use of operating lease and the bond raters can more precisely evaluate the amount of operating lease obligations.

[Table 12]

In table 12, I assume the effects of the rating change concern on the use of operating lease relative to debt are heterogeneous in the before-period and after-period. The results show that

this effect is more pronounced in the before-period, which is consistent with our expectation. If the sample period is restricted to only the after-period when more market attention and more sophisticated estimation on operating lease obligations are introduced to the market, the effect would still be significant although the significant level and magnitude are both reduced.

4.4 Financing deficit

The subsample test in section 4.2 shows that external fund dependent firms do not seem to induce more operating lease to replace debt in order to maintain their existing credit rating level. Since the measure of external fund dependence only captures the capital need of capital expenditure, it generally ignores many important aspects of firms' spending. Hence, I introduce the measure of financing deficit which evaluates firms' needs of external finance more comprehensively. In this measurement, current portion of the long-term debt is not included since Frank and Goyal (2003) find that empirically this part should not belong to financing deficit. Cash is correlated with debt and equity issuance due to the lumpy debt and equity issuance when firms hold excess cash from the proceeds. Thus, changes in cash and equivalents are included in financing deficit. If financing deficit is larger than zero, then firm has already exhausted all its internal capital and needed to raise external fund. Otherwise, firm's internal cash flow would be enough to support its operations.

[Figure 7]

As plotted in figure 8, the percentage of firms with a positive financing deficit seems to decline after 1995. On average, 57.59% of firms near credit rating change are with no financing deficit while 58.74% of the firms far away from the credit rating change are with no financing deficit. The percentage is similar if we separate the rating change concern to downgrading concern and upgrading concern. By assuming rating change concerns have different impacts on firms with or without financing deficit, we can find that the effects are significant for both types of firms but with opposite signs. As shown in table 13, firms with financing deficit increase the use of debt relative to operating lease while firms with no financing deficit decrease the use of debt relative to operating lease when their concern about rating change are relatively higher. The magnitudes of the two opposite effects are almost comparable. Financing deficit has a great influence on firm's use of different source of finance. According to the pecking order theory, firms should not only prefer internal fund to external fund, but also would prefer safe securities to the risky securities. Here safe securities refer to securities with lower information cost, or in other words, information insensitive. Hence, different sources of finance can be ranked based on their sensitivities to the revealed inside information in a descending order: lease, secured debt, convertible bonds as well as preferred stocks, and equity (Myers and Majluf (1984)). Based on this argument, firms should first consume all their resources from lease contract before they issue debt and equity, especially when this can also facilitate the maintaining of credit rating level. But the results show the opposite. In real cases, the use of lease contract is largely constrained by the supply side. Moreover, lease contract usually can only be used to finance fixed assets such as capital investment. Even the R&D expenditure is scarcely funded using lease contract. Through the construction of the firm's financing deficit, we can see that a large portion of the financing

deficit capture the needs for funding cash dividends, working capitals and non-cash items which are not easily financed by lease contract.

[Table 13]

One of Frank and Goyal (2003)'s original findings is that net equity issues track the financing deficit more closely than net debt issues. Our results are contradictory to their findings, but more consistent with the recent work of Chang and Song (2013). Chang and Song (2013) aim to explain the puzzle found by Frank and Goyal (2003) by showing that pecking order provide good prediction on firms' financing behavior after controlling the financial constraint condition. They use KZ index, WW index and HP index as measures of financial constraint and find that less constrained firms track the financing deficit more by debt rather than equity. My sample is restricted to rating firms which are generally considered as less financially constrained. As show in figure 9, the debt issuance is almost perfectly tracing the financing deficit. The level of equity issuance is quite stable. The use of operating lease captures the tendency of financing deficit better in recent years but there is an abnormal peak around year 2000 which is contradictory to the financing deficit and debt issuance and is very likely to be associated with the abusive use of off-balance-sheet finance in early 2000s. Firm's financial constraint has a great impact on its use of lease, and usually unconstrained firms use much less lease than constrained firms. Moreover, financial constraint also affects the choice between buying and leasing. As internal funds fall, constrained firms tend to increase leasing and decrease borrowing while less constrained firms tend to decrease leasing and increase borrowing. And a debt change will lead to a greater change in leasing for more constrained firms than less constrained firms (Lin, Wang, Chou and Chueh (2013)). Thus, less constrained rated firms are very likely to choose to use debt rather than lease when the financing need is urgent.

[Figure 8]

Kisgen (2006) assumes that if there is adequate amount of retained earnings, firms will just use their internal fund to finance all the investment opportunities. However, this argument is not necessarily true. When it is necessary to maintain their current credit rating level, firms may find it beneficial to reduce existing debt obligations. They can choose to issue equities or sell and lease back to pay down debt and this has nothing to do with their need for external fund. Moreover, firms without financing deficit probably possess more freedom to do so. This also explains the reason why firms with positive CreditWatch are more aggressive in replacing debt by operating lease to pursue being upgraded. In my sample, most of the firms are without financing deficit and the debt issuance is negative on average.

4.5 Cold equity market and stock undervaluation

Firms may feel it feasible to issue equity in order to pay down debt so that they can maintain a good credit rating. Higher level of the use of debt may induce the concern about default probability while the impact of the use of equity is faintly discernable. Under this circumstance, firms would consider it more efficient to use equity to replace debt rather than use lease.

Therefore, the results should be more evident when equity financing is not a feasible choice or is very costly.

Firms would prefer equity finance when the cost of equity capital is temporarily low. The issue conditions might vary based on macroeconomic criteria (Choe, Masulis and Nanda (1993); Moore (1980)). Thus, the hot market during which equity issues are clustering can be considered as the period when equity can be raised at favorable terms. Bayless and Chaplinsky (1996) find that information cost for all firms are reduced in hot market by showing that firms experience lower prediction errors on average in hot markets. Information asymmetry could be a great deterrent of equity issuance, and hence managers will confront great disadvantage of issuing equity in cold market. In former literature, volume of issuance, e.g. number of new offerings, is used to identify hot versus cold market. The data associated with IPOs and SEOs are obtained from the SDC and I use the number of IPOs or the total number of IPOs and SEOs to measure equity issues condition respectively. Spinoffs and unit offers are excluded, and equity issuances by financial and utility firms are also excluded. My results are comparable to Ritter's data of IPO and SEO. I do not directly use Ritter's data because I need results for very recent sample period which is not covered by him. I calculate the centred three month moving average of the number of offers for each month to remove the effect of seasonality. The month is defined as cold if the number of offers is below the median across all month in the sample. The year is defined as cold if it contains more than six cold months. I also aggregate the offers for each year. And I simply consider a year as cold if the total number of offers in this year is below the sample median. Therefore, I get four measurement of cold market based on monthly or yearly method, and IPOs or IPOs plus SEOs.

[Table 14]

Higher level of IPOs and SEOs imply hotter equity market. The partition of hot and cold equity market seems to be highly correlated with the macroeconomic condition and the whole situation of the economy. The monthly measure and the yearly measure are highly correlated. The correlations between the measure based on IPOs only and the measure based on the total number of IPOs and SEOs tend to decrease but are still very high. Assuming the effect of the rating change concern on firms' use of operating lease to debt to be different in hot equity market and cold equity market, the tests are reported in table 15 using four alternative measure of the cold equity market. As we expect, the effect is more pronounced when equity finance is with less advantage.

[Table 15]

Equity misvaluation is also very important for firms' financing decisions. Firms would have greater incentive to use equity finance when their stocks are overvalued. CFOs report that stock market valuations are an important consideration in their firms' decision to issue common stock (Graham and Harvey (2001)). Overvaluation is associated with greater capital expenditures and R&D expenditures (Gilchrist, Himmelberg and Huberman (2005); Polk and Sapienza (2009); Titman, Wei and Xie (2004)), and predicts greater total and equity issuance (Dong, Hirshleifer and Teoh (2012)). The sensitivity of equity issuance to overvaluation is greater than that of debt issuance, and overvalued firms substitute debt by equity issuance. The measure of misevaluation

is following Rhodes-Kropf, Robinson and Viswanathan (2005) as described in table 16. In my sample, about 33% of the firm-year observations are undervalued and this percentage is consistent for firms near or far from the credit rating change.

[Table 16]

If we assume the rating change concern has heterogeneous effects on firms' relative use of lease or debt for firms with undervalued stock or overvalued stock, we would expect that the effect should be stronger for undervalued firms. The results shown in table 16 confirm this expectation. If firm stock is overvalued, firms would find it more efficient to fund project using equities and also more efficient to reduce debt obligations using equities. On the other hand, if firm stock is undervalued, firms would feel reluctant to issue equities. Meanwhile, if they need to reduce the level of debt obligations to maintain credit rating, firms would choose to lease new fixed assets instead of buying or may sell some fixed assets to pay down debt and then lease it back.

5. Discussion and Conclusion

In this paper, I find that firms near a credit rating change would use more operating lease relative to debt compared to firms far away from the credit rating change. Firms' concern about their current credit rating is not only perceived by whether they are on the borderline of the broad rating group, but also detected by whether they have been placed on the rating agencies' CreditWatch or assigned a credit Outlook. The effect is mostly driven by the downside concern. However, if the firm is placed on the CreditWatch and the prospect is "positive", the firm will see a promising chance of being upgraded and the attempts to pursue it will give rise to even stronger significant results.

This behaviour is not solely to move debt off the balance sheet since rating agencies treat operating lease just as debt obligations and adjust financial ratios by incorporating the capitalized operating lease. However, former empirical works provide evidence that credit rating is indeed less sensitive to operating lease obligations than to debt obligations. Bond raters treat operating lease less serious probably because the information associated with operating lease is with poor quality. Data items used to estimate operating lease obligations are disclosed in the footnotes, rather than recognized in the body of the financial statement. Items are allocated to the footnotes for the reason that the measurement may not be very reliable. Another possibility is that auditors would allow more errors associated with disclosed items rather than recognized items, and this in turn leads to the unsoundness of disclosed items. Inevitably, the capitalization of operating lease incorporates some measurement errors including the estimation of implicit interest rate and the amount and length of future payments. Therefore, rating agencies view operating lease obligations less material. In addition, firms can manage to hide part of their operating lease due to the insufficient disclosure. Only the minimum lease payments are disclosed and some lease is simply not included. The future minimum lease payment is very likely to be lower than the actual payment because some lease contracts contain payment escalators in line with inflation or revenue generated from the leased property. Besides, the disclosure is only for following five years. Firms start to disclose the amount beyond five years in an aggregated

manner only after 1995. The preference to use operating lease facing the prospect of credit rating change does not root in the nature of leasing but in the nature of off-balance-sheet finance.

The reasons stated above explain why the cost of using lease instead of debt would be lower for firms concerning about potential rating change. Thus, the rating change concern can be incorporated into the theory of leasing vs. buying decision and reconciled with the trade-off model developed by Yan (2006). Accounting standard setters are proposing a new accounting concept, right of use, whereby most lease should be capitalized as obligations (FASB 2012). The proposal faced immediate opposition. For example, the American Bankers Association commented to FASB/IASB that most banking credit officers are satisfied with current accounting rule and do not think the new rule will lead to any improvement in capital decision. They were right under the condition that people are both fully aware of the possibility of structured operating lease and fully capable of adjusting it. The former could be true for experts such as institutional investors, analysts or rating agencies, but is not necessarily true for the whole market, especially retail investors. Some market participants, even including the experts like commercial banks, rely on firm's credit rating to coordinate the information associated with the use of off-balance-sheet finance. The finding of this paper suggests that this is not sufficient at all. The latter condition is even more unrealistic given the results illustrated in preceding sections. Rating agencies such as S&P are very strict with the use of operating lease. They ignore the true nature of the leasing contract and uniformly take them as fixed obligations. They employ sophisticated method to estimate the operating lease obligations and consider adjusting operating lease as the inevitable to assess firm's creditworthiness. Their failure of doing so implied by the findings of this paper is largely due to insufficient disclosure of the operating lease data. As a footnote item, the disclosure is not only insufficient but also less reliable. Therefore, we would expect the proposed change of accounting rules which reallocate the operating lease to the balance sheet to significantly improve the ability to estimate the obligation equivalency of operating lease and evaluate firm's creditworthiness.

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Appendix 1: Rating change transformation matrix

The column titles indicate the firms' credit rating level for the last year and the row titles indicate the firms' credit rating level in current year. Each number in this matrix represents the total number of firm-year observations with S&P credit rating as indicated by the column title in last year and S&P credit rating as indicated by the row title in current year. For example, the number "17" in the first column and second row means that during the sample period from 1985 to 2014, there are altogether 17 firm-year observations when firms are just downgraded from "AAA" in last year to "AA+" in current year.

	AAA	**AA+**	**AA**	**AA-**	**A+**	**A**	**A-**	**BBB+**	**BBB**	**BBB-**	**BB+**	**BB**	**BB-**	**B+**	**B**	**B-**	**CCC+**	**CCC**	**CCC-**
AAA	522	10	5	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
AA+	17	122	12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AA	11	24	642	31	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0
AA-	4	6	58	648	51	5	2	0	0	0	0	0	0	0	0	0	0	0	0
A+	3	0	25	80	1135	85	5	5	1	0	0	0	0	0	0	0	0	0	0
A	1	1	13	26	125	1759	130	16	4	0	0	0	0	0	0	0	0	0	0
A-	1	0	2	5	32	167	1307	156	26	6	2	0	1	1	0	0	0	0	0
BBB+	0	0	8	1	14	66	168	1705	204	23	7	2	1	1	0	1	0	0	0
BBB	0	0	1	0	4	23	70	226	2180	239	30	11	4	3	1	1	0	0	0
BBB-	0	0	0	0	1	10	13	54	224	1724	204	55	10	6	0	2	0	0	0
BB+	0	0	1	0	2	7	4	10	57	141	1191	265	60	8	0	0	0	0	0
BB	1	0	0	0	1	4	1	11	23	84	141	1753	349	79	5	0	1	0	0
BB-	1	0	0	0	0	4	0	6	15	27	66	251	2298	382	43	12	5	1	2
B+	0	0	0	0	3	5	2	2	11	11	20	75	286	2870	284	43	12	4	4
B	0	0	0	1	3	0	0	4	2	11	5	18	112	340	1538	154	23	6	2
B-	0	0	0	0	0	0	0	2	2	4	5	9	32	111	201	658	61	20	4
CCC+	0	0	0	0	0	0	0	1	1	2	2	3	13	48	75	81	208	16	6
CCC	0	0	0	0	0	0	0	0	0	0	1	4	7	18	30	33	26	106	8
CCC-	0	0	0	0	0	0	0	0	0	0	1	1	5	8	12	12	13	7	37

Appendix 2: Downgrading and upgrading over years

Year	#Firms	#Rating	#Downgrade	Downgrade%	#Upgrade	Upgrade%
1985-1986	5697	930	117	12.58%	43	4.62%
1986-1987	5697	973	112	11.51%	71	7.30%
1987-1988	5562	931	113	12.14%	81	8.70%
1988-1989	5468	912	85	9.32%	97	10.64%
1989-1990	5477	846	118	13.95%	54	6.38%
1990-1991	5611	820	117	14.27%	73	8.90%
1991-1992	6008	861	93	10.80%	99	11.50%
1992-1993	6388	930	78	8.39%	109	11.72%
1993-1994	6750	984	73	7.42%	72	7.32%
1994-1995	7540	1040	89	8.56%	119	11.44%
1995-1996	7803	1149	93	8.09%	95	8.27%
1996-1997	7669	1263	102	8.08%	133	10.53%
1997-1998	7893	1379	139	10.08%	135	9.79%
1998-1999	7794	1437	172	11.97%	76	5.29%
1999-2000	7340	1448	216	14.92%	95	6.56%
2000-2001	6730	1409	271	19.23%	76	5.39%
2001-2002	6352	1395	275	19.71%	73	5.23%
2002-2003	6116	1398	212	15.17%	121	8.66%
2003-2004	5982	1394	156	11.19%	143	10.26%
2004-2005	5855	1328	186	14.01%	142	10.69%
2005-2006	5626	1279	191	14.93%	138	10.79%
2006-2007	5410	1222	166	13.58%	159	13.01%
2007-2008	5194	1183	239	20.20%	130	10.99%
2008-2009	5030	1148	225	19.60%	88	7.67%
2009-2010	4933	1148	91	7.93%	223	19.43%
2010-2011	4892	1155	94	8.14%	186	16.10%
2011-2012	5026	1176	111	9.44%	137	11.65%
2012-2013	5010	1188	87	7.32%	160	13.47%
2013-2014	4654	1212	92	7.59%	174	14.36%

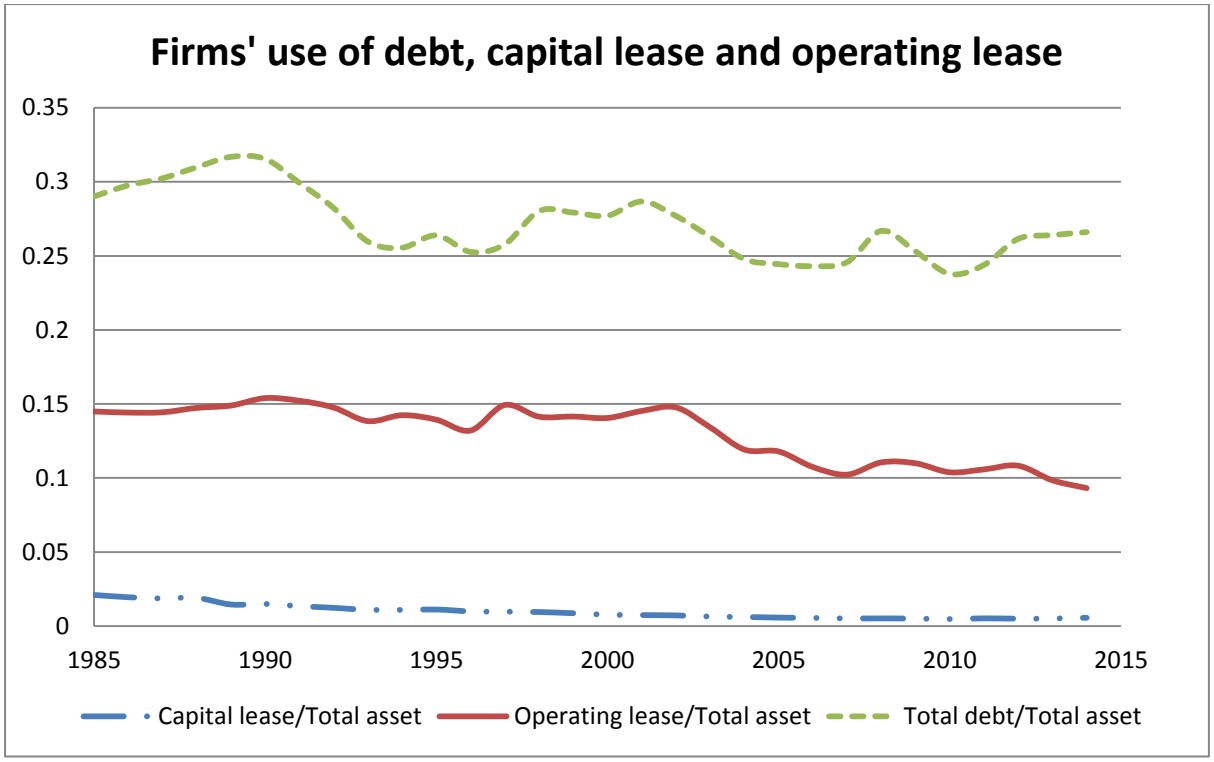

Figure 1: Firms' use of debt, capital lease and operating lease

This figure compares firms' use of debt, capital lease and operating lease. Debt refers to the total debt including both long-term and short-term debt. Capital lease is the capitalized lease obligation directly recognized in firms' financial reports. Operating lease is the capitalized operating lease calculated based on equation (1). All three items are scaled by total assets. The use of debt already contains the use of capital lease but do not contain the use of operating lease.

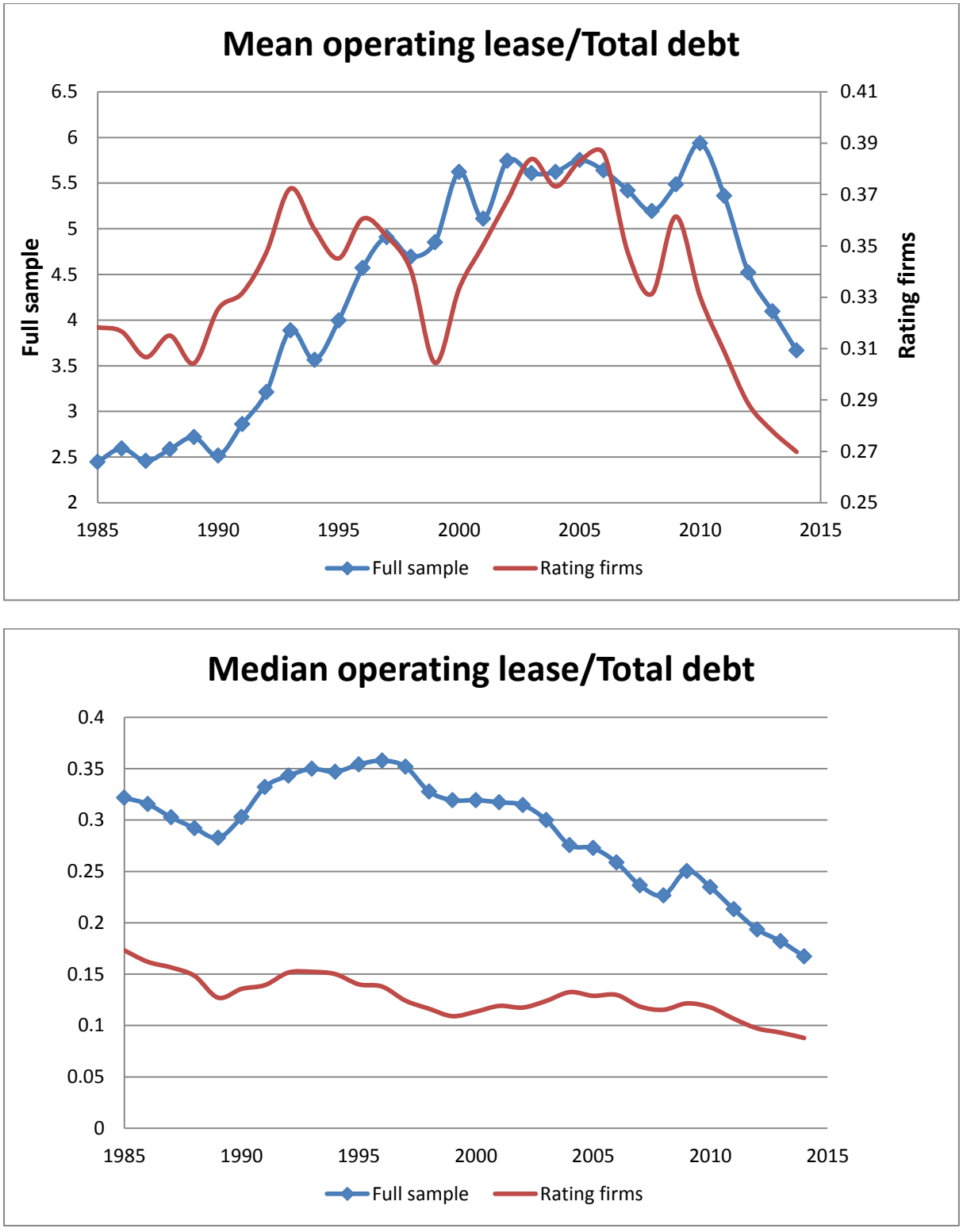

Figure 2: The use of operating lease relative to total debt

This figure illustrates the use of operating lease as a proportion of total debt for full sample and rating firms respectively. The upper panel plots the sample mean and the lower panel plots the sample median.

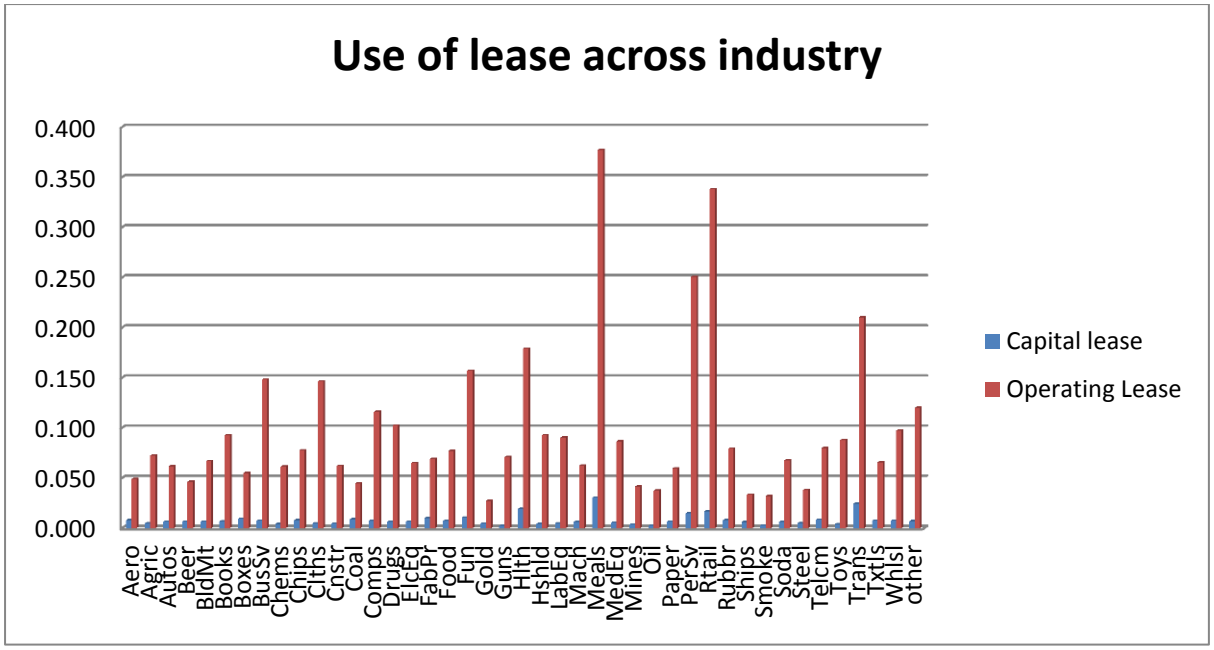

Figure 3: The use of lease across different industries

Capital lease and operating lease are both scaled by total asset. Firms in financial and utility industries are excluded.

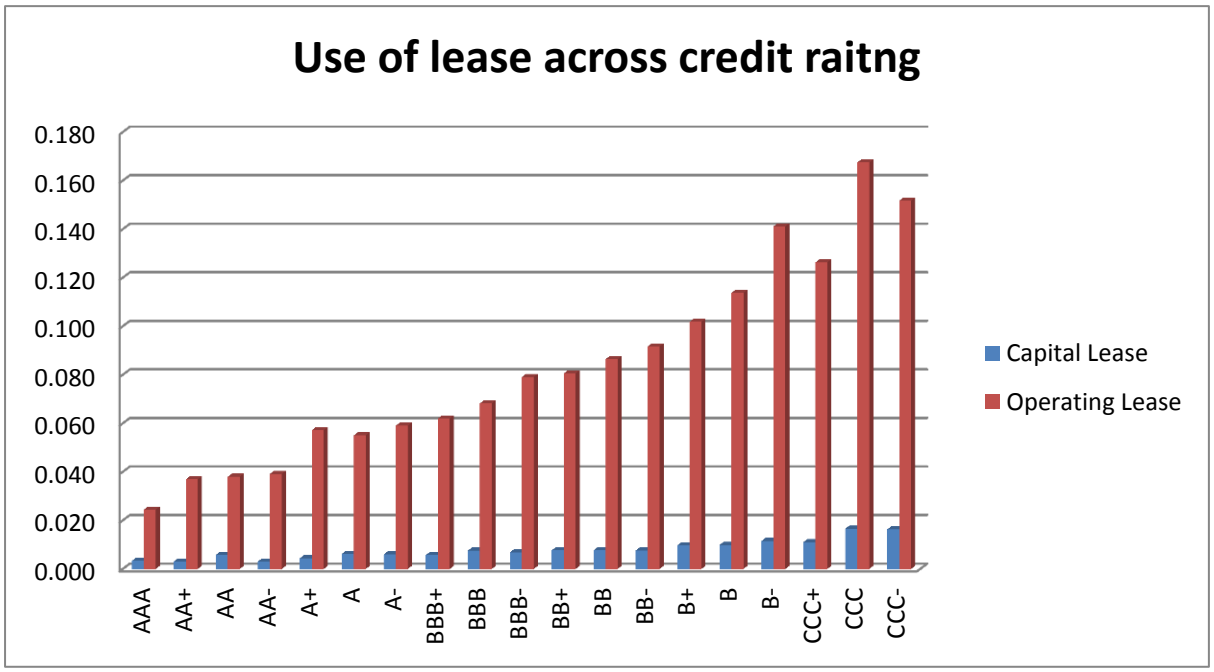

Figure 4: The use of lease across credit rating categories

Capital lease and operating lease are both scaled by total asset. Firms with credit rating lower than CCC- are excluded.

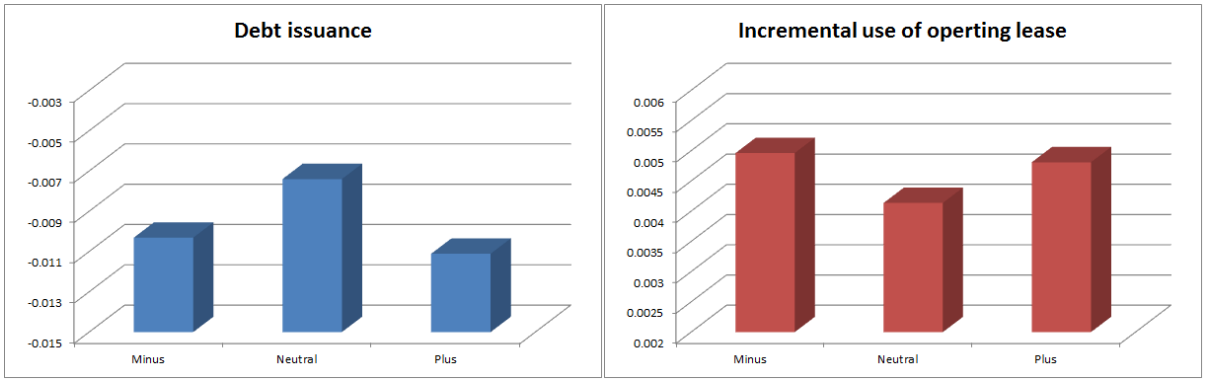

Figure 5: Debt issuance and incremental use of operating lease for different groups of firms

Debt issuance equals to the long-term debt issuance minus the long-term debt reduction plus the change in current debt. Incremental use of operating lease equals to the change of capitalized operating lease from last year. Debt issuance and change in capitalized operating lease are scaled by total assets. Minus group consists of all firms having a "-" in their S&P ratings. Plus group consists of all firms having a "+" in their S&P ratings. Neutral group consists of firms in the middle tier which contain neither "-" nor "+". Firms in the minus group are considered to have more downgrading concern. Firms belong to the plus group are more likely to make upgrading attempts.

Figure 6: Incremental use of operating lease among different groups of firms

Incremental use of operating lease equals to the change of capitalized operating lease from last year. Change in capitalized operating lease is scaled by total assets. A major group includes all firms with S&P credit rating belong to "AAA", "AA" or "A" broad categories. B major group includes all firms with S&P credit rating belong to "BBB", "BB" or "B" broad categories. C major group only includes firms with S&P credit rating belong to "CCC" broad categories because we exclude the firms with credit rating lower than CCC-. Then for each major group, the firms are further separated into minus, plus and neutral groups. Minus group consists of all firms having a "-" in their S&P ratings. Plus group consists of all firms having a "+" in their S&P ratings. Neutral group consists of firms in the middle tier which contain neither "-" nor "+". Firms in the minus group are considered to have more downgrading concern. Firms belong to the plus group are more likely to make upgrading attempts.

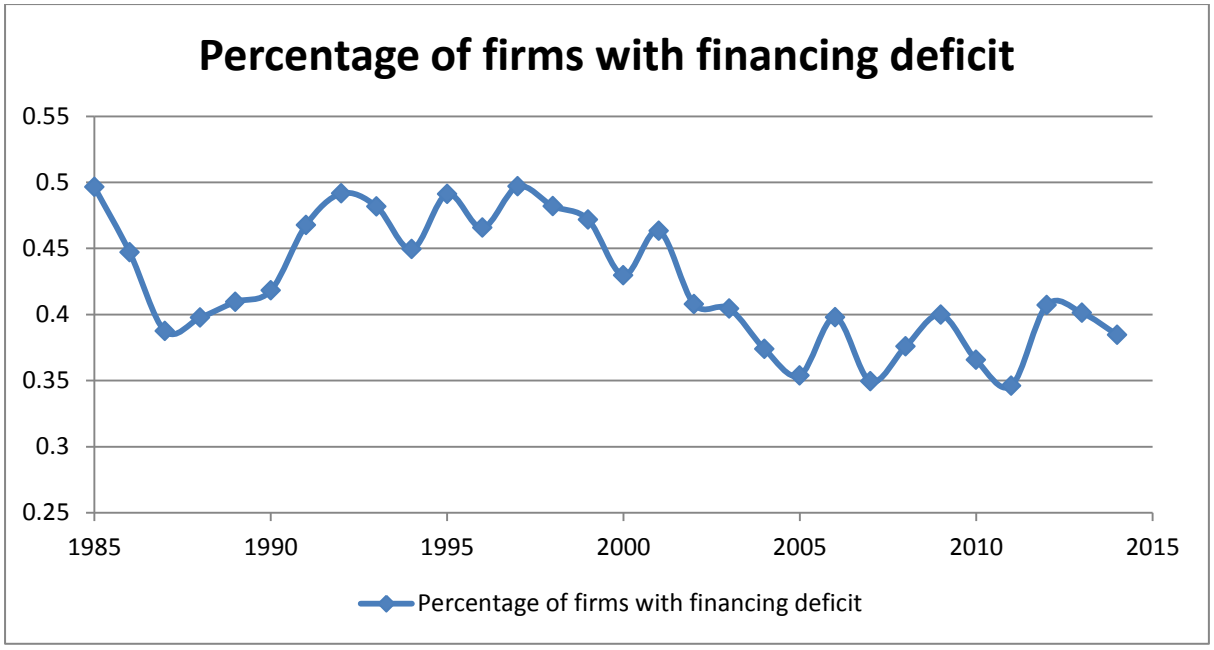

Figure 7: Percentage of rating firms with financing deficit

The sample is restricted to rating firms. A firm is considered to have financing deficit if its calculated financing deficit is positive.

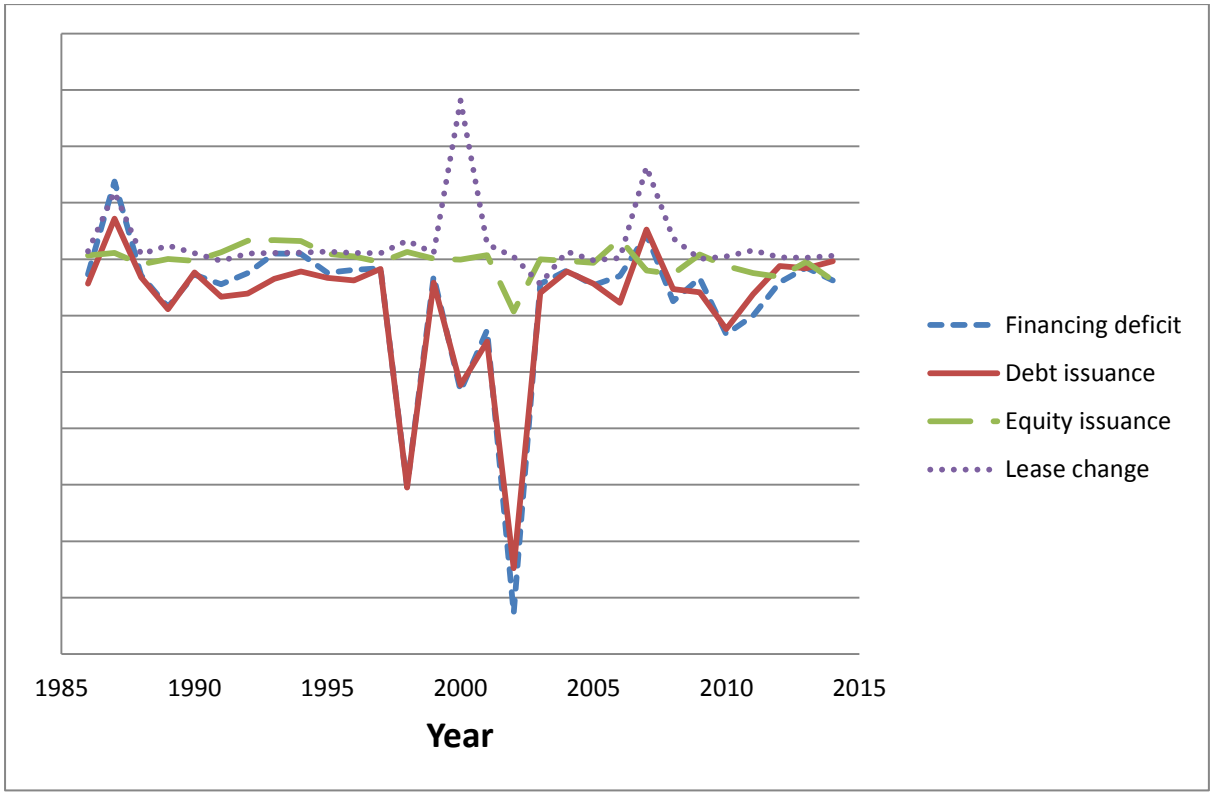

Figure 8: Pecking order of different source of finance

The sample is restricted to rating firms. This figure shows how firm's use of debt, equity and lease track the firm's financing deficit.

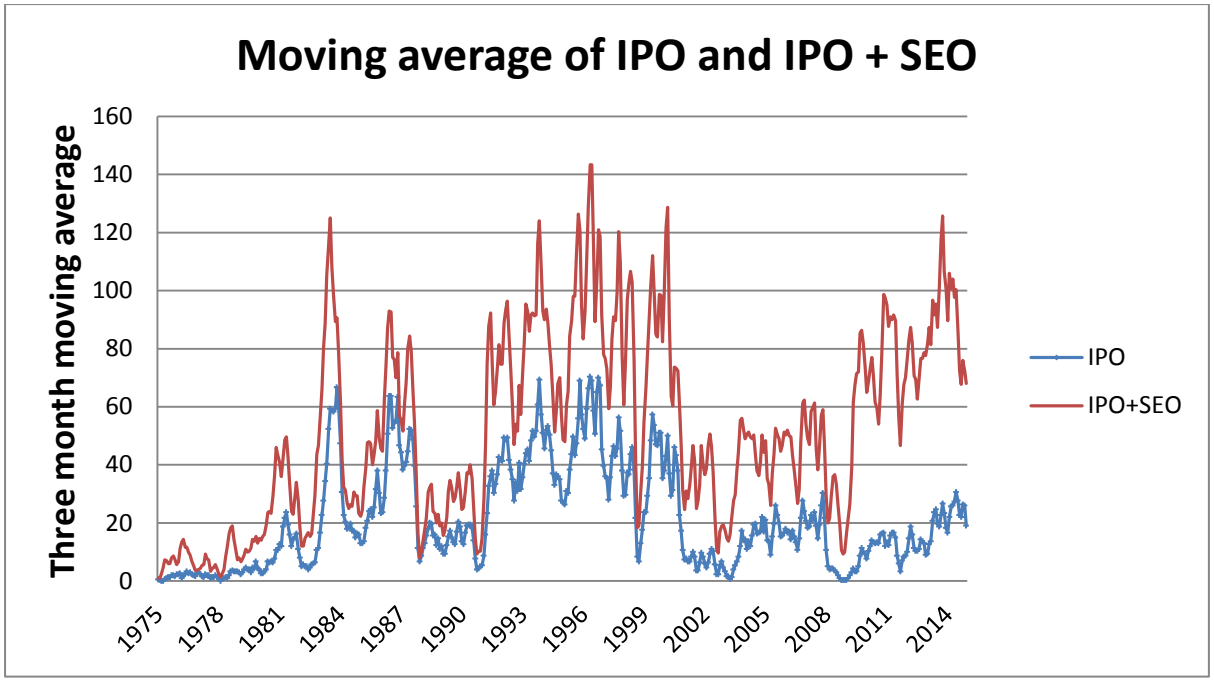

Figure 9: Issuance volume change over time

This figure plots the three month moving average of the number of IPOs or the total number of IPOs and SEOs. This data is used to identify the cold equity market.

Table 1: Summary statistics

This table illustrates the basic summary statistics for different groups of firms. Panel A compares the subsample including the rating firms only to the full sample of all firms in the Compustat universe. Panel B compares the firms within the rating sample. Minus group consists of all firms having a "-" in their S&P ratings. Plus group consists of all firms having a "+" in their S&P ratings. Neutral group consists of firms in the middle tier which contain neither "-" nor "+". Sample period is from 1985 to 2014. Size is the natural log value of total book assets. Collateral is the net property, plant and equipment scaled by total assets. Leverage is the market leverage which equals to the total debt divided by the sum of total debt and market value of equity. Profitability is the EBITDA scaled by total sales. Tax rate is the effective tax rate which equals to the total income taxes divided by pretax income. MB ratio is the market-to-book ratio.

Panel A: Full sample and rating firms

	#Obs		Size	Collateral	Leverage	Profitability	Tax rate	MB ratio
Full sample	180956	Mean	4.789	0.281	0.232	-0.694	0.184	2.105
		Median	4.661	0.208	0.147	0.0875	0.227	1.466
Rating firms	34183	Mean	7.753	0.363	0.35	0.141	0.26	1.6
		Median	7.667	0.314	0.301	0.143	0.33	1.358

Panel B: Minus, Neutral and Plus group

	#Obs		Size	Collateral	Leverage	Profitability	Tax rate	MB ratio
Minus	10395	Mean	7.751	0.354	0.355	0.125	0.253	1.560
		Median	7.672	0.302	0.312	0.138	0.327	1.327
Neutral	12633	Mean	7.923	0.374	0.336	0.152	0.269	1.614
		Median	7.829	0.325	0.281	0.148	0.334	1.385
Plus	11155	Mean	7.562	0.359	0.363	0.145	0.256	1.563
		Median	7.464	0.313	0.314	0.144	0.329	1.362

Table 2: The use of debt, capital lease and operating lease

This table compares firms' use of debt, capital lease and operating lease. Panel A includes all firms in the Compustat universe while panel B contains the rating firms only. The first two columns show the number and the percentage of firm-year observations reporting positive use of debt, capital lease or operating lease respectively. Debt refers to the total debt including both long-term and short-term debt. Capital lease is the capitalized lease obligation directly recognized in firms' financial reports. Operating lease is the capitalized operating lease calculated based on equation (1). All three items are scaled by total assets. The use of debt already contains the use of capital lease but do not contain the use of operating lease.

Panel A: Full sample

	#Obs	%	Mean	Median	Sd	Min	Max
Capital lease	60279	33.31%	0.00843	0	0.0258	0	0.173
Operating lease	152404	84.22%	0.125	0.0635	0.171	0.00225	0.992
Debt	153966	99.60%	0.271	0.207	0.291	0	1.593
Total	180956						

Panel B: Rating firms

	#Obs	%	Mean	Median	Sd	Min	Max
Capital lease	14146	41.38%	0.00771	0	0.0221	0	0.173
Operating lease	30497	89.22%	0.084	0.0396	0.13	0.00225	0.992
Debt	33891	99.15%	0.392	0.34	0.246	0.00659	1.379
Total	34183						

Table 3: Likelihood of broad rating change

#Rating is the total number of firm-year observations belongs to each group. Firms are separated into three groups based on their last year credit rating. #Events represents the total number of broad rating downgrade in panel A and the total number of broad rating upgrade in panel B. %Events is the percentage of broad rating change for minus, plus and neutral groups respectively. It can be considered as the probability of broad rating change conditional on the fact that the firm belongs to the specific group. Expected probability is the unconditional probability of broad rating change which equals to total number of events divided by total number of observations. Difference equals to the conditional probability minus the unconditional probability.

	Previous year firm group			
Panel A: Broad rating downgrade				
	Total	Minus	Neutral	Plus
#Rating	34183	10395	12633	11155
#Events	1327	1060	217	50
%Events		10.197%	1.717%	0.448%
Expected probability		3.882%	3.882%	3.882%
Difference		6.315%	-2.165%	-3.434%
Panel B: Broad rating upgrade				
	Total	Minus	Neutral	Plus
#Rating	34183	10395	12633	11155
#Events	1941	182	524	1235
%Events		1.751%	4.148%	11.071%
Expected probability		5.678%	5.678%	5.678%
Difference		-3.927%	-1.53%	5.393%

Table 4: The effect of rating change concern on the use of operating lease relative to debt

Dependent variable is the use of operating lease relative to debt scaled by lagged total asset. Size is the natural log value of total book assets. Collateral is the net property, plant and equipment scaled by total assets. Leverage is the market leverage which equals to the total debt divided by the sum of total debt and market value of equity. No dividend is a dummy variable equals to one if the firm do not pay dividend this year. Tax rate is the effective tax rate which equals to the total income taxes divided by pretax income. MB ratio is the market-to-book ratio. POM is a dummy variable equals to one if there is a "+" or "-" in the S&P rating of the firm. Minus is a dummy variable equals to one if there is a "-" in the S&P rating of the firm. Plus is a dummy variable equals to one if there is a "+" in the S&P rating of the firm. The table reports the regression coefficient and the standard error clustered by firm level.

Variables	(1)	(2)	(3)	(4)
Size	-0.0037***	-0.0035***	-0.0037***	-0.0035***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Collateral	-0.0209***	-0.0212***	-0.0209***	-0.0211***
	(0.0039)	(0.0040)	(0.0039)	(0.0040)
Leverage	0.0431***	0.0411***	0.0432***	0.0412***
	(0.0040)	(0.0041)	(0.0040)	(0.0041)
No dividend	0.0067***	0.0060***	0.0067***	0.0059***
	(0.0015)	(0.0015)	(0.0015)	(0.0015)
Tax rate	0.0045***	0.0040**	0.0045***	0.0040**
	(0.0017)	(0.0017)	(0.0017)	(0.0017)
MB ratio	0.0022***	0.0023***	0.0022***	0.0023***
	(0.0008)	(0.0008)	(0.0008)	(0.0008)
POM	**0.0023****	**0.0023****		
	(0.0011)	**(0.0011)**		
Minus			**0.0030****	**0.0028****
			(0.0013)	**(0.0013)**
Plus			**0.0016**	**0.0017**
			(0.0014)	**(0.0013)**
Constant	0.0163***	0.0258***	0.0161***	0.0256***
	(0.0059)	(0.0073)	(0.0059)	(0.0073)
Observations	13,148	13,148	13,148	13,148
R-squared	0.0541	0.0701	0.0542	0.0702
Industry FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes

Table 5: The effect of rating change concern on the use of operating lease relative to debt: more control variables

Dependent variable is the use of operating lease relative to debt scaled by lagged total asset. In additional to Size, Collateral, Leverage, No dividend dummy, Tax rate and MB ratio, I further include profitability, liquidity and two measure of financial distress Z-score and E-cost as control variable. I also use firm age to replace total asset as a proxy for firm size. Profitability equals to EBITDA scaled by total sales. Liquidity is the current asset divided by current liability. Z-score=1.2×Working capital/Total asset +1.4 × Retained earnings/Total asset +3.3 × BEIT/Total asset +0.6 × Market capitalization/Total liabilities+ 0.999 × Sales/Total asset. E-cost equals to firms earnings variation multiplies by its level of assets intangibility. Firm's earning variation is a proxy for likelihood of financial distress and is measured by the standard deviation of the first difference in firms historical EBIT. This item is scaled by firm's average book asset. Firm's level of assets intangibility is a proxy for loss given default and is measured by the sum of R&D expense and advertising expense divided by book assets. Z-cost measures the ex post financial distress while E-cost measures the ex-ante financial distress. Firm age is the number of years since the firm first appeared in CRSP dataset. The key variables of interest are POM dummy, Minus dummy and Plus dummy. Their definitions are still the same as in table 4. The table reports the regression coefficient and the standard error clustered by firm level.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Size	-0.0032***	-0.0034***	-0.0030***	-0.0032***		-0.0032***	-0.0034***	-0.0030***	-0.0032***	
	(0.0006)	(0.0006)	(0.0006)	(0.0006)		(0.0006)	(0.0006)	(0.0006)	(0.0006)	
Collateral	-0.0278***	-0.0273***	-0.0282***	-0.0275***	-0.0284***	-0.0278***	-0.0273***	-0.0282***	-0.0275***	-0.0284***
	(0.0042)	(0.0043)	(0.0044)	(0.0044)	(0.0044)	(0.0042)	(0.0043)	(0.0044)	(0.0044)	(0.0044)
Leverage	0.0437***	0.0414***	0.0448***	0.0432***	0.0468***	0.0437***	0.0414***	0.0448***	0.0432***	0.0468***
	(0.0041)	(0.0044)	(0.0043)	(0.0045)	(0.0045)	(0.0041)	(0.0044)	(0.0043)	(0.0045)	(0.0045)
No dividend	0.0065***	0.0057***	0.0059***	0.0053***	0.0071***	0.0065***	0.0057***	0.0059***	0.0053***	0.0071***
	(0.0016)	(0.0016)	(0.0017)	(0.0017)	(0.0017)	(0.0016)	(0.0016)	(0.0017)	(0.0017)	(0.0017)
Tax rate	0.0039**	0.0034*	0.0036*	0.0032	0.0028	0.0039**	0.0034*	0.0036*	0.0032	0.0028
	(0.0019)	(0.0019)	(0.0020)	(0.0020)	(0.0020)	(0.0019)	(0.0019)	(0.0020)	(0.0020)	(0.0020)
MB ratio	0.0020**	0.0035***	0.0018**	0.0029**	0.0027*	0.0020**	0.0035***	0.0018**	0.0029**	0.0027*
	(0.0008)	(0.0013)	(0.0009)	(0.0014)	(0.0014)	(0.0008)	(0.0013)	(0.0009)	(0.0014)	(0.0014)
Profitability	0.0002	0.0002	-0.0002	-0.0003	0.0002	0.0002	0.0002	-0.0002	-0.0002	0.0003
	(0.0006)	(0.0006)	(0.0007)	(0.0008)	(0.0009)	(0.0006)	(0.0006)	(0.0007)	(0.0008)	(0.0009)
Liquidity	-0.0007	-0.0006	-0.0008	-0.0007	0.0002	-0.0007	-0.0006	-0.0008	-0.0007	0.0002
	(0.0006)	(0.0006)	(0.0006)	(0.0007)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0007)	(0.0006)
Z-score		-0.0009		-0.0006	-0.0005		-0.0009		-0.0006	-0.0005

		(0.0007)		(0.0007)	(0.0007)		(0.0007)		(0.0007)	(0.0007)
E-cost			-0.0317	-0.0321	-0.0198			-0.0321	-0.0324	-0.0201
			(0.0267)	(0.0266)	(0.0257)			(0.0266)	(0.0266)	(0.0257)
Firm age					-0.0001**					-0.0001**
					(0.0000)					(0.0000)
POM	**0.0023****	**0.0025****	**0.0020***	**0.0022***	**0.0025****					
	(0.0011)	**(0.0011)**	**(0.0011)**	**(0.0011)**	**(0.0011)**					
Minus						**0.0026****	**0.0027****	**0.0027****	**0.0028****	**0.0032****
						(0.0013)	**(0.0013)**	**(0.0013)**	**(0.0013)**	**(0.0013)**
Plus						**0.0020**	**0.0022***	**0.0013**	**0.0015**	**0.0017**
						(0.0014)	**(0.0014)**	**(0.0014)**	**(0.0014)**	**(0.0014)**
Constant	0.0152*	0.0175**	0.0223***	0.0117	-0.0125*	0.0151*	0.0174*	0.0221***	0.0115	-0.0127*
	(0.0088)	(0.0089)	(0.0083)	(0.0089)	(0.0074)	(0.0088)	(0.0089)	(0.0083)	(0.0089)	(0.0074)
Observations	11,845	11,722	11,076	10,965	10,965	11,845	11,722	11,076	10,965	10,965
R-squared	0.0761	0.0768	0.0754	0.0754	0.0721	0.0762	0.0768	0.0755	0.0754	0.0722
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: Subsample tests

Dependent variable is the use of operating lease relative to debt scaled by lagged total asset. Control variables include Size, Collateral, Leverage, No dividend dummy, Tax rate and MB ratio. Their definitions are the same as in table 4. This table reports the regression coefficient and the t-statistics clustered by firm level for the three key variables of interest for each subsample. Size is measured by log value of total assets. Firm age is the number of years since the firm first appears in the CRSP dataset. Payout ratio equals to the total dividend payment divided by operating income before depreciation. KZ index = -1.001909 × Cash flow/K + 0.2826389 × Tobin's Q+ 3.139193× Debt/Total capital -39.3678× Dividends/K - 1.314759 × Cash/K. Cash flow/K equals to the sum of income before extraordinary items plus depreciation and amortization divided by property, plant and equipment. Tobin's Q equals to the value of total asset minus common equity minus deferred tax plus the product of fiscal year close price and common shares outstanding divided by total asset. Debt/Total capital equals to the sum of long-term debt and short term debt divided by the sum of long-term debt and short term debt and total stockholders' equity. Dividends/K equals to the sum of common dividends and preferred dividends divided by property, plant and equipment. Cash/K equals to cash and short-term investments divided by property, plant and equipment. Property, plant and equipment is from the previous year. WW index = -0.091 × CF - 0.062 × DIVPOS +0.021× TLTD -0.044 × LNTA+0.102 × ISG-0.035 × SG. CF equals to the sum of income before extraordinary items and depreciation and amortization divided by total assets. DIVPOS is a dummy variable equals to one if cash dividends is larger than zero. TLTD equals to the sum of long-term debt and short-term debt divided by total assets. LNTA is the log value of total asset adjusted by GDP deflator. ISG is the change of 3-digit industry sales from year t-1 to year t scaled by 3-digit industry sales in year t-1. SG is the change of GDP deflator adjusted sales from year t-1 to year t scaled by GDP deflator adjusted sales in year t-1. HP index = -0.737 × size +0.043 ×size^2 - 0.040 × Age. Here, Size equals to the log value of inflation adjusted total assets. Age is the log value of number of years the firm has been on CRSP with a non-missing stock price. Size and Age have ceiling of $4.5 billion and 37 years, respectively. Here I convert the total assets to 2014 dollars. Firms with a higher KZ index, higher WW index and higher HP index are more financially constrained. Leverage is the market leverage which equals to the total debt divided by the sum of total debt and market value of equity. Z-score larger than 2.99 is considered to be "safe", z-score smaller than 2.99 and larger than 1.8 is considered to be "grey" while z-score less than 1.8 is considered to be "distressed". Industries intensively using operating lease includes Transport, Retail, Personal Services, Meals, Cloths, Health and Entertainment industries. Cash flow volatility is the standard deviation of cash flow where cash flow is measured by operating income before depreciation minus interest expense, tax expense, common dividend and preferred dividend scaled by total assets. R&D expense is scaled by total assets. Analyst coverage is measured by the number of analyst follow the firm. This is a proxy for information asymmetry. Following Beatty and Liao (2010), the account quality proxy is calculated as the combination of four different measures. AQ1 captures the extent to which accruals map into cash flow. It is the quintile ranking of the adjusted R-squared from estimating a regression of total current accruals on cash flow from operations measured concurrently, with one-period lead and one period lag following the model by Dechow and Dichev (2002). AQ2 measures the earnings persistence. It is the quintile ranking of the coefficient on current earnings from estimating a regression of one

period ahead earning on current earnings. AQ3 is the proxy for the earnings predictability. It is the quintile ranking of adjusted R-squared from the regression specified in AQ2. AQ4 captures cash flow predictability. It is the quintile ranking of adjusted R-squared from a regression of one period ahead cash flow on current earnings. Then these four measures are combined by taking the average of the ranks of each individual measure. Higher AQ score refers to better financial report quality. Financial report reliability is measured by FOG Index based on the idea that managers can obscure their financial reports by making them harder to read (Li (2008)). A larger FOG index indicates lower financial report quality. The FOG index is obtained from Li's website. Voluntary disclosure is a dummy variable equals to one if the firm issues earning guidance this year. External finance dependence is defined as capital expenditures minus cash flow from operations divided by capital expenditures.

		#Obs		POM	Minus	Plus
Size	Large	6,992	Coefficient	0.0011	0.002	0.0001
			t-statistics	0.78	1.2623	0.0867
	Small	6,145	Coefficient	0.0039**	0.0036*	0.0042*
			t-statistics	2.1599	1.813	1.8495
Firm age	Old	6,838	Coefficient	0.0026	0.0017	0.0037
			t-statistics	1.3974	0.778	1.5987
	Young	5,155	Coefficient	0.002	0.0034**	0.0006
			t-statistics	1.4553	2.0892	0.3609
Payout ratio	High	6,931	Coefficient	0.0021	0.0029*	0.0013
			t-statistics	1.53	1.7836	0.8067
	Low	6,206	Coefficient	0.0023	0.0025	0.002
			t-statistics	1.2909	1.2689	0.9328
KZ index	High	6,953	Coefficient	0.0016	0.0026	0.0004
			t-statistics	0.9823	1.4457	0.2222
	Low	6,179	Coefficient	0.0032**	0.0033*	0.0030*
			t-statistics	2.1712	1.9387	1.7208
WW index	High	6,129	Coefficient	0.0021	0.0021	0.0022
			t-statistics	1.1845	1.0497	0.9696
	Low	7,009	Coefficient	0.0021	0.0033**	0.001
			t-statistics	1.5527	2.0454	0.6052
HP index	High	6,481	Coefficient	0.0032*	0.0029	0.0034*
			t-statistics	1.8728	1.51	1.6704
	Low	6,600	Coefficient	0.0011	0.0024	-0.0001
			t-statistics	0.7985	1.4442	-0.0729
Leverage	High	6,229	Coefficient	0.0027	0.0033*	0.0021
			t-statistics	1.5334	1.672	0.9783
	Low	6,907	Coefficient	0.0027**	0.0029*	0.0025
			t-statistics	1.9942	1.8134	1.4984
Tobin's Q	High	7,110	Coefficient	0.0022	0.0036**	0.0008
			t-statistics	1.5517	2.108	0.4743
	Low	6,031	Coefficient	0.0023	0.0018	0.0029
			t-statistics	1.426	0.9972	1.4637
Financial distress	Safe	5,431	Coefficient	0.0030*	0.0024	0.0035*

			t-statistics	1.8003	1.2431	1.7227
	Grey	4,159	Coefficient	0.0049***	0.0052***	0.0045**
			t-statistics	2.7764	2.5912	2.1253
	Distressed	2,810	Coefficient	-0.0028	-0.002	-0.0036
			t-statistics	-1.1448	-0.7264	-1.1904
Industry intensity	High	2,984	Coefficient	0.0000	0.0003	-0.0002
			t-statistics	0.0119	0.0806	-0.0566
	Low	10,164	Coefficient	0.0028**	0.0034**	0.0022
			t-statistics	2.3797	2.5434	1.5089
Cash flow volatility	High	7,476	Coefficient	0.0026*	0.0032*	0.0019
			t-statistics	1.7367	1.8221	1.0853
	Low	5,244	Coefficient	0.0012	0.002	0.0003
			t-statistics	0.7423	1.1078	0.1514
R&D	High	6,329	Coefficient	0.0042***	0.0048***	0.0036**
			t-statistics	3.1751	3.0687	2.179
	Low	6,819	Coefficient	0.0005	0.0007	0.0003
			t-statistics	0.2881	0.3689	0.1246
Analyst coverage	High	4,923	Coefficient	0.0020	0.0032	0.0009
			t-statistics	1.1937	1.5230	0.4434
	Low	3,911	Coefficient	0.0032	0.0044**	0.0018
			t-statistics	1.5900	1.9829	0.7157
Financial report quality	High	3,869	Coefficient	0.0043**	0.0047**	0.0039
			t-statistics	2.1195	2.0116	1.5733
	Low	3,434	Coefficient	0.0019	0.0026	0.0011
			t-statistics	1.3513	1.6164	0.6494
Financial report reliability	High	5,544	Coefficient	0.0043**	0.0058***	0.0026
			t-statistics	2.5583	2.9242	1.2882
	Low	5,180	Coefficient	0.0023	0.0015	0.0031
			t-statistics	1.3733	0.7635	1.4819
Voluntary disclosure	Yes	6,592	Coefficient	0.0030**	0.0040**	0.0012
			t-statistics	2.1101	2.4207	0.648
	No	6,556	Coefficient	0.0013	0.0019	0.0014
			t-statistics	0.8002	1.0895	0.7033
External fund dependence	High	6,202	Coefficient	0.0005	0.0015	-0.0005
			t-statistics	0.3174	0.7805	-0.2683
	Low	6,837	Coefficient	0.0038***	0.0042**	0.0034**
			t-statistics	2.6865	2.5249	1.9731

Table 7: Stronger rating change concern

Dependent variable is the use of operating lease relative to debt scaled by lagged total asset. Control variables include Size, Collateral, Leverage, No dividend dummy, Tax rate and MB ratio. Their definitions are the same as in table 4. BBB- is a dummy variable equals to one if the firm's credit rating is BBB- last year. BB+ is a dummy variable equals to one if the firm's credit rating is BB+ last year. Downgrading is a dummy variable equals to one if the firm was just downgraded last year. Upgrading is a dummy variable equals to one if the firm was just upgraded last year. Fallen angel is a dummy variable equals to one if the firm was just downgraded form an investment bond to a speculative bond. Rising star is a dummy variable equals to one if the firm was just upgraded form a speculative bond to an investment bond. The table reports the regression coefficient and the standard error clustered by firm level.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Size	-0.0037***	-0.0036***	-0.0038***	-0.0036***	-0.0038***	-0.0036***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Collateral	-0.0212***	-0.0216***	-0.0211***	-0.0213***	-0.0211***	-0.0213***
	(0.0039)	(0.0040)	(0.0039)	(0.0040)	(0.0039)	(0.0040)
Leverage	0.0438***	0.0418***	0.0409***	0.0398***	0.0426***	0.0409***
	(0.0040)	(0.0041)	(0.0040)	(0.0041)	(0.0040)	(0.0040)
No dividend	0.0067***	0.0060***	0.0069***	0.0061***	0.0069***	0.0061***
	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0015)
Tax rate	0.0043**	0.0038**	0.0047***	0.0041**	0.0045***	0.0040**
	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)
MB ratio	0.0024***	0.0025***	0.0023***	0.0023***	0.0022***	0.0023***
	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0008)
BBB-	**0.0035***	**0.0035***				
	(0.0019)	**(0.0019)**				
BB+	**0.0065****	**0.0065****				
	(0.0027)	**(0.0026)**				
Downgrading			**0.0069*****	**0.0051*****		
			(0.0017)	**(0.0017)**		
Upgrading			**0.0001**	**0.0015**		
			(0.0017)	**(0.0017)**		
Fallen angel					**0.0123*****	**0.0094****
					(0.0045)	**(0.0045)**
Rising star					**-0.0030**	**-0.0015**
					(0.0042)	**(0.0041)**
Constant	0.0173***	0.0268***	0.0185***	0.0275***	0.0183***	0.0277***
	(0.0060)	(0.0073)	(0.0059)	(0.0073)	(0.0060)	(0.0073)
Observations	13,148	13,148	13,148	13,148	13,148	13,148
R-squared	0.0548	0.0708	0.0551	0.0705	0.0545	0.0702
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes

Table 8: CreditWatch and rating Outlooks

Dependent variable is the use of operating lease relative to debt scaled by lagged total asset. Control variables include Size, Collateral, Leverage, No dividend dummy, Tax rate and MB ratio. Their definitions are the same as in table 4. CreditWatch is a dummy variable equals to one if the firm's long-term issuer rating appeared on the CreditWatch last year. Negative CreditWatch is a dummy variable equals to one if the CreditWatch is negative. Positive CreditWatch is a dummy variable equals to one if the CreditWatch is positive. Outlook is a dummy variable equals to one if the firm's long-term issuer rating was assigned a rating outlook last year. Negative Outlook is a dummy variable equals to one if the Outlook is negative. Positive Outlook is a dummy variable equals to one if the Outlook is positive. The table reports the regression coefficient and the standard error clustered by firm level.

Variables	(1)	(2)	(3)	(4)
Size	-0.0037***	-0.0036***	-0.0036***	-0.0036***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Collateral	-0.0212***	-0.0211***	-0.0213***	-0.0213***
	(0.0040)	(0.0040)	(0.0040)	(0.0040)
Leverage	0.0406***	0.0409***	0.0408***	0.0408***
	(0.0041)	(0.0041)	(0.0041)	(0.0041)
No dividend	0.0061***	0.0060***	0.0061***	0.0061***
	(0.0015)	(0.0015)	(0.0015)	(0.0015)
Tax rate	0.0041**	0.0041**	0.0041**	0.0041**
	(0.0017)	(0.0017)	(0.0017)	(0.0017)
MB ratio	0.0024***	0.0024***	0.0024***	0.0024***
	(0.0008)	(0.0008)	(0.0008)	(0.0008)
CreditWatch	**0.0049*** **			
	(0.0016)			
Negative CreditWatch		**0.0037*** **		
		(0.0020)		
Positive CreditWatch		**0.0079*** **		
		(0.0030)		
Outlook			**0.0054** **	
			(0.0024)	
Negative Outlook				**0.0053** **
				(0.0025)
Positive Outlook				**0.0061**
				(0.0057)
Constant	0.0277***	0.0276***	0.0280***	0.0280***
	(0.0073)	(0.0073)	(0.0074)	(0.0074)
Observations	13,148	13,148	13,148	13,148
R-squared	0.0706	0.0707	0.0702	0.0702
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 9: Firms on the borderline and also under surveillance of the rating agencies

Dependent variable is the use of operating lease relative to debt scaled by lagged total asset. Control variables include Size, Collateral, Leverage, No dividend dummy, Tax rate and MB ratio. Their definitions are the same as in table 4. The POM, Minus and Plus dummies indicate whether firms are on the borderline of the rating change. The CreditWatch or No CreditWatch as well as the Outlook or No Outlook dummies reveal whether firms are under surveillance of the rating agencies. The table reports the regression coefficient and the standard error clustered by firm level.

Variables	(1)	(2)	(3)	(4)
Size	-0.0036***	-0.0036***	-0.0035***	-0.0035***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Collateral	-0.0211***	-0.0211***	-0.0212***	-0.0211***
	(0.0040)	(0.0040)	(0.0040)	(0.0040)
Leverage	0.0405***	0.0406***	0.0409***	0.0409***
	(0.0041)	(0.0041)	(0.0041)	(0.0041)
No dividend	0.0060***	0.0060***	0.0060***	0.0060***
	(0.0015)	(0.0015)	(0.0015)	(0.0015)
Tax rate	0.0041**	0.0041**	0.0041**	0.0041**
	(0.0017)	(0.0017)	(0.0017)	(0.0017)
MB ratio	0.0024***	0.0024***	0.0023***	0.0023***
	(0.0008)	(0.0008)	(0.0008)	(0.0008)
POM × CreditWatch	**0.0070*** **			
	(0.0021)			
POM × No CreditWatch	**0.0016**			
	(0.0011)			
Minus× CreditWatch		**0.0062** **		
		(0.0027)		
Minus × No CreditWatch		**0.0023***		
		(0.0013)		
Plus × CreditWatch		**0.0080*** **		
		(0.0030)		
Plus × No CreditWatch		**0.0008**		
		(0.0014)		
POM × Outlook			**0.0070** **	
			(0.0032)	
POM × No Outlook			**0.0020***	
			(0.0011)	
Minus × Outlook				**0.0071***
				(0.0041)
Minus × No Outlook				**0.0025** **
				(0.0013)
Plus × Outlook				**0.0021**
				(0.0042)
Plus × No Outlook				**0.0017**
				(0.0014)
Constant	0.0266***	0.0265***	0.0261***	0.0260***
	(0.0073)	(0.0073)	(0.0073)	(0.0073)
Observations	13,148	13,148	13,148	13,148

R-squared	0.0708	0.0709	0.0702	0.0703
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 10: Capitalized operating lease including the thereafter item

Dependent variable is the use of operating lease relative to debt scaled by lagged total asset. In this table we further include the thereafter item in calculating the capitalized operating lease following the formula below:

$$\text{Capitalized operating lease} = \text{Rental expense} + \sum_{t=1}^{5} \frac{\text{MLP}_t}{(1+d)^t} + \sum_{t=6}^{6+\text{Addyrs}} \frac{\text{EMLP}_t}{(1+d)^t}$$

Here, Addyrs =Thereafter Portion of Leases (item 389)/ MLP_5 and EMLP_t= Thereafter Portion of Leases (item 389)/ Addyrs. The item "thereafter" is required to be disclosed only after year 1995. So in this table, our sample period is from 1996 to 2014.Control variables include Size, Collateral, Leverage, No dividend dummy, Tax rate and MB ratio. Their definitions are the same as in table 4. POM dummy, CreditWatch dummy and Outlook dummy are used to proxy for credit rating change concern. Minus dummy, Negative CreditWatch dummy and Negative Outlook dummy are used to proxy for negative rating change concern. Plus dummy, Positive CreditWatch dummy and Positive Outlook dummy are used to proxy for positive rating concern. The table reports the regression coefficient and the standard error clustered by firm level.

	POM		CreditWatch		Outlook	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Size	-0.0046***	-0.0046***	-0.0049***	-0.0048***	-0.0048***	-0.0048***
	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Collateral	-0.0234***	-0.0233***	-0.0232***	-0.0229***	-0.0233***	-0.0233***
	(0.0050)	(0.0050)	(0.0051)	(0.0051)	(0.0051)	(0.0051)
Leverage	0.0324***	0.0325***	0.0321***	0.0327***	0.0326***	0.0328***
	(0.0049)	(0.0049)	(0.0051)	(0.0051)	(0.0051)	(0.0051)
No dividend	0.0045**	0.0045**	0.0048**	0.0047**	0.0048**	0.0047**
	(0.0018)	(0.0018)	(0.0019)	(0.0019)	(0.0019)	(0.0019)
Tax rate	0.0034*	0.0033*	0.0037*	0.0036*	0.0037*	0.0037*
	(0.0019)	(0.0019)	(0.0020)	(0.0020)	(0.0020)	(0.0020)
MB ratio	0.0026***	0.0026***	0.0029***	0.0028***	0.0028***	0.0028***
	(0.0009)	(0.0009)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
Rating concern	**0.0030****		**0.0068*****		**0.0066****	
	(0.0013)		**(0.0020)**		**(0.0028)**	
Negative concern		**0.0040*****		**0.0048****		**0.0052***
		(0.0015)		**(0.0024)**		**(0.0029)**
Positive concern		**0.0019**		**0.0117*****		**0.0148***
		(0.0017)		**(0.0036)**		**(0.0078)**
Constant	-0.0785***	-0.0798***	-0.0740***	-0.0744***	-0.0742***	-0.0743***
	(0.0091)	(0.0091)	(0.0093)	(0.0093)	(0.0094)	(0.0094)
Observations	8,576	8,576	8,576	7,293	8,576	8,576
R-squared	0.0859	0.0862	0.0836	0.0815	0.0826	0.0828
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 11: Using estimated marginal tax rate

Dependent variable is the use of operating lease relative to debt scaled by lagged total asset. In this table, I control the estimated marginal tax rate obtained from Graham and Mills (2008) to eliminate the concern about the endogeneity of corporate tax status in the setting of buy and lease decision. Other control variables include Size, Collateral, Leverage, No dividend dummy and MB ratio. Their definitions are the same as in table 4. POM dummy, CreditWatch dummy and Outlook dummy are used to proxy for credit rating change concern. Minus dummy, Negative CreditWatch dummy and Negative Outlook dummy are used to proxy for negative rating change concern. Plus dummy, Positive CreditWatch dummy and Positive Outlook dummy are used to proxy for positive rating concern. The table reports the regression coefficient and the standard error clustered by firm level.

	POM		CreditWatch		Outlook	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Size	-0.0035***	-0.0035***	-0.0040***	-0.0040***	-0.0040***	-0.0040***
	(0.0007)	(0.0007)	(0.0008)	(0.0008)	(0.0008)	(0.0008)
Collateral	-0.0225***	-0.0225***	-0.0242***	-0.0241***	-0.0244***	-0.0244***
	(0.0053)	(0.0053)	(0.0057)	(0.0057)	(0.0057)	(0.0057)
Leverage	0.0426***	0.0427***	0.0476***	0.0478***	0.0477***	0.0474***
	(0.0054)	(0.0054)	(0.0059)	(0.0059)	(0.0059)	(0.0059)
No dividend	0.0061***	0.0061***	0.0053**	0.0052**	0.0053**	0.0053**
	(0.0020)	(0.0020)	(0.0021)	(0.0021)	(0.0021)	(0.0021)
Marginal tax rate	-0.0122**	-0.0121**	-0.0045	-0.0045	-0.0047	-0.0047
	(0.0048)	(0.0048)	(0.0097)	(0.0097)	(0.0097)	(0.0097)
MB ratio	0.0026***	0.0026***	0.0030***	0.0030***	0.0030***	0.0030***
	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
Rating concern	**0.0032****		**0.0061*****		**0.0073****	
	(0.0014)		**(0.0021)**		**(0.0029)**	
Negative concern		**0.0036****		**0.0053****		**0.0084*****
		(0.0017)		**(0.0026)**		**(0.0032)**
Positive concern		**0.0027**		**0.0079****		**0.0020**
		(0.0017)		**(0.0040)**		**(0.0074)**
Constant	0.0166	0.0165	0.0179	0.0178	0.0183	0.0183
	(0.0103)	(0.0103)	(0.0115)	(0.0115)	(0.0115)	(0.0115)
Observations	7,293	7,293	7,293	7,293	7,293	7,293
R-squared	0.0795	0.0795	0.0814	0.0815	0.0810	0.0811
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 12: SEC and FASB's interpretation letters and Standard &Poor's introduction of more comprehensive method to capitalize operating lease

Dependent variable is the use of operating lease relative to debt scaled by lagged total asset. Control variables include Size, Collateral, Leverage, No dividend dummy, Tax rate and MB ratio. Their definitions are the same as in table 4. POM dummy, CreditWatch dummy and Outlook dummy are used to proxy for credit rating change concern. Minus dummy, Negative CreditWatch dummy and Negative Outlook dummy are used to proxy for negative rating change concern. Plus dummy, Positive CreditWatch dummy and Positive Outlook dummy are used to proxy for positive rating concern. The table reports the regression coefficient and the standard error clustered by firm level. In 2005, SEC and FASB have issued interpretation letters reiterating existing GAAP and clarifying the regulators' view on some controversial lease accounting issues. And the rating agencies, S&P and Moody have started improve their estimation of capitalized operating lease using more comprehensive methodology. The key variable proxies for the concern about credit rating change are interacted with two dummy variables: Before-and After- to incorporate the heterogeneous effect during these two sample period. The before-period includes the observations in year 2005 and the after-period starts from year 2006.

	POM		CreditWatch		Outlook	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Size	-0.0034***	-0.0034***	-0.0038***	-0.0038***	-0.0038***	-0.0038***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Collateral	-0.0099***	-0.0099***	-0.0092***	-0.0092***	-0.0093***	-0.0092***
	(0.0030)	(0.0030)	(0.0029)	(0.0029)	(0.0029)	(0.0029)
Leverage	0.0383***	0.0383***	0.0378***	0.0379***	0.0380***	0.0379***
	(0.0038)	(0.0038)	(0.0039)	(0.0039)	(0.0039)	(0.0039)
No dividend	0.0084***	0.0084***	0.0081***	0.0081***	0.0082***	0.0082***
	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0015)
Tax rate	0.0040**	0.0040**	0.0044**	0.0044**	0.0044**	0.0044**
	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)
MB ratio	0.0022***	0.0022***	0.0023***	0.0023***	0.0023***	0.0023***
	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0008)
Rating concern× Before	**0.0042*** **		**0.0073*** **		**0.0088*** **	
	(0.0013)		**(0.0023)**		**(0.0033)**	
Rating concern× After	**-0.0003**		**0.0046** **		**0.0050**	
	(0.0014)		**(0.0022)**		**(0.0032)**	
Negative concern× Before		**0.0047*** **		**0.0066** **		**0.0098*** **

		(0.0016)		**(0.0026)**		**(0.0034)**
Negative concern× After		**0.0009**		**0.0051***		**0.0056**
		(0.0016)		**(0.0029)**		**(0.0034)**
Positive concern× Before		**0.0038****		**0.0093****		**0.0041**
		(0.0017)		**(0.0047)**		**(0.0078)**
Positive concern× After		**-0.0017**		**0.0034**		**0.0017**
		(0.0018)		**(0.0037)**		**(0.0077)**
Constant	0.0192***	0.0191***	0.0234***	0.0234***	0.0234***	0.0235***
	(0.0048)	(0.0048)	(0.0048)	(0.0048)	(0.0048)	(0.0048)
Observations	13,148	13,148	13,148	13,148	13,148	13,148
R-squared	0.0426	0.0427	0.0427	0.0427	0.0422	0.0422
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 13: How financing deficit impacts the effect of rating change concern

Dependent variable is the use of operating lease relative to debt scaled by lagged total asset. Control variables include Size, Collateral, Leverage, No dividend dummy, Tax rate and MB ratio. Their definitions are the same as in table 4. POM dummy, CreditWatch dummy and Outlook dummy are used to proxy for credit rating change concern. Minus dummy, Negative CreditWatch dummy and Negative Outlook dummy are used to proxy for negative rating change concern. Plus dummy, Positive CreditWatch dummy and Positive Outlook dummy are used to proxy for positive rating concern. This table reports the regression coefficient and the standard error clustered by firm level. Financing deficit equals to the sum of cash dividends, net investment, and change in working capital minus the cash flow after interest and taxes. The three latter terms are calculated respectively. Net investment equals to the sum of capital expenditures, increase in investment, acquisitions, and minus sale of PPE, sale of investment, change in short-term investment and other investment activities. Change in working capital equals to change in cash and cash equivalents minus the sum of decrease in receivable, decrease in inventories, increase in payable, increase in tax and accrued, other change in asset and liabilities, other financing activities and change in current debt. Cash flow after interest and taxes equals to the sum of income before extraordinary items, extraordinary items and discontinued operations, depreciation and amortization, deferred taxes, net equity change, sale of property, plant and equipment and investments and other funds from operations and exchange rate effect. This method is following Frank and Goyal (2003) but I recode the missing value of the variables in Table 8 of Frank and Goyal (2003) with zero. No deficit is a dummy variable equals to one if firm's financial deficit is negative. Deficit is a dummy variable equals to one if firm's financial deficit is positive.

	POM		CreditWatch		Outlook	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Size	-0.0041***	-0.0041***	-0.0035***	-0.0035***	-0.0036***	-0.0036***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Collateral	-0.0162***	-0.0162***	-0.0202***	-0.0201***	-0.0213***	-0.0213***
	(0.0038)	(0.0038)	(0.0040)	(0.0040)	(0.0040)	(0.0040)
Leverage	0.0376***	0.0376***	0.0393***	0.0396***	0.0402***	0.0403***
	(0.0038)	(0.0038)	(0.0040)	(0.0041)	(0.0041)	(0.0041)
No dividend	0.0065***	0.0065***	0.0065***	0.0065***	0.0061***	0.0060***
	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0015)
Tax rate	0.0028*	0.0028*	0.0033*	0.0033*	0.0038**	0.0038**
	(0.0016)	(0.0016)	(0.0017)	(0.0017)	(0.0018)	(0.0018)
MB ratio	0.0021**	0.0021**	0.0023***	0.0023***	0.0023***	0.0023***
	(0.0009)	(0.0009)	(0.0008)	(0.0008)	(0.0008)	(0.0008)

Rating concern× No deficit	**0.0228*** **		**0.0270*** **		**0.0224*** **	
	(0.0012)		**(0.0020)**		**(0.0025)**	
Rating concern× Deficit	**-0.0292*** **		**-0.0251*** **		**-0.0189*** **	
	(0.0014)		**(0.0024)**		**(0.0041)**	
Negative concern× No deficit		**0.0229*** **		**0.0252*** **		**0.0213*** **
		(0.0014)		**(0.0023)**		**(0.0028)**
Negative concern× Deficit		**-0.0296*** **		**-0.0252*** **		**-0.0193*** **
		(0.0017)		**(0.0029)**		**(0.0040)**
Positive concern× No deficit		**0.0227*** **		**0.0311*** **		**0.0284*** **
		(0.0015)		**(0.0036)**		**(0.0053)**
Positive concern× Deficit		**-0.0288*** **		**-0.0252*** **		**-0.0171* **
		(0.0018)		**(0.0041)**		**(0.0098)**
Constant	0.0165**	0.0165**	0.0139*	0.0138	0.0154*	0.0154*
	(0.0075)	(0.0075)	(0.0084)	(0.0084)	(0.0084)	(0.0084)
Observations	12,994	12,994	12,994	12,994	12,994	12,994
R-squared	0.1876	0.1876	0.0944	0.0945	0.0759	0.0759
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 14: Four alternative measurements of the cold equity market

This table reports the pairwise correlation between four alternative measurements of the cold equity market. Volume of issuance is used to identify hot versus cold market. Here I use the number of IPOs and the total number of IPOs and SEOs respectively. Following former literature, I calculate the centred three month moving average of the number of offers for each month to remove the effect of seasonality. The month is defined as cold if the number of offers is below the median across all month in the sample. The year is defined as cold if it contains more than six cold months. I also aggregate the offers for each year. And simply consider a year as cold if the total number of offers in this year is below the sample median. Therefore, I get four measurement of cold market based on monthly or yearly method and IPOs or IPOs plus SEOs. $\mathrm{Cold}_{\mathrm{m,IPO}}$ is a dummy variable equals to one if there are more than six months in this year when the moving average of monthly number of IPOs is lower than the sample median. $\mathrm{Hot}_{\mathrm{m,IPO}}$ equals to one if $\mathrm{Cold}_{\mathrm{m,IPO}}$ equals to zero. $\mathrm{Cold}_{\mathrm{y,IPO}}$ is a dummy variable equals to one if the total number of IPOs in this year is lower than the sample median. $\mathrm{Hot}_{\mathrm{y,IPO}}$ equals to one if $\mathrm{Cold}_{\mathrm{y,IPO}}$ equals to zero. $\mathrm{Cold}_{\mathrm{m,SEO}}$ is a dummy variable equals to one if there are more than six months in this year when the moving average of monthly total number of IPOs and SEOs is lower than the sample median. $\mathrm{Hot}_{\mathrm{m,SEO}}$ equals to one if $\mathrm{Cold}_{\mathrm{m,SEO}}$ equals to zero. $\mathrm{Cold}_{\mathrm{y,SEO}}$ is a dummy variable equals to one if the total number of IPOs and SEOs in this year is lower than the sample median. $\mathrm{Hot}_{\mathrm{y,SEO}}$ equals to one if $\mathrm{Cold}_{\mathrm{y,SEO}}$ equals to zero.

	#IPO	**#IPO+SEO**	$\mathbf{Cold_{m,IPO}}$	$\mathbf{Cold_{y,IPO}}$	$\mathbf{Cold_{m,SEO}}$	$\mathbf{Cold_{y,SEO}}$
#IPO	1					
#IPO+SEO	0.8074	1				
$\mathbf{Cold_{m,IPO}}$	-0.8263	-0.6875	1			
$\mathbf{Cold_{y,IPO}}$	-0.8121	-0.6701	0.9512	1		
$\mathbf{Cold_{m,SEO}}$	-0.6810	-0.8709	0.6040	0.5507	1	
$\mathbf{Cold_{y,SEO}}$	-0.6954	-0.8784	0.6508	0.6000	0.9512	1

Table 15: How the effect of rating change concern varies in cold equity market and hot equity market

Dependent variable is the use of operating lease relative to debt scaled by lagged total asset. Control variables include Size, Collateral, Leverage, No dividend dummy, Tax rate and MB ratio. Their definitions are the same as in table 4. POM dummy, CreditWatch dummy and Outlook dummy are used to proxy for credit rating change concern. Minus dummy, Negative CreditWatch dummy and Negative Outlook dummy are used to proxy for negative rating change concern. Plus dummy, Positive CreditWatch dummy and Positive Outlook dummy are used to proxy for positive rating concern. The key variables are interacted with a dummy variable indicating whether the equity market this year is hot or cold. This table reports the regression coefficient and the standard error clustered by firm level Year fixed effect cannot be included in these regressions since the proxy of cold equity market varies by year.

Panel A: POM								
	Monthly IPO		Yearly IPO		Monthly IPO+SEO		Yearly IPO+SEO	
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
POM × Cold	0.0045***		0.0038***		0.0055***		0.0065***	
	(0.0013)		(0.0014)		(0.0015)		(0.0014)	
POM × Hot	0.0000		0.0010		0.0007		-0.0003	
	(0.0013)		(0.0013)		(0.0012)		(0.0012)	
Minus × Cold		0.0061***		0.0051***		0.0074***		0.0082***
		(0.0016)		(0.0017)		(0.0019)		(0.0018)
Minus × Hot		-0.0003		0.0012		0.0008		-0.0002
		(0.0016)		(0.0015)		(0.0014)		(0.0014)
Plus × Cold		0.0029*		0.0025		0.0035*		0.0047**
		(0.0017)		(0.0017)		(0.0020)		(0.0019)
Plus × Hot		0.0003		0.0008		0.0007		-0.0003
		(0.0017)		(0.0017)		(0.0015)		(0.0016)
Panel B: CreditWatch								
	Monthly IPO		Yearly IPO		Monthly IPO+SEO		Yearly IPO+SEO	
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CreditWatch × Cold	0.0114***		0.0104***		0.0097***		0.0108***	
	(0.0021)		(0.0022)		(0.0028)		(0.0025)	
CreditWatch × Hot	-0.0009		0.0014		0.0040**		0.0026	

	(0.0025)		(0.0024)		(0.0020)		(0.0021)	
Negative CreditWatch × Cold		0.0106***		0.0101***		0.0087***		0.0102***
		(0.0024)		(0.0026)		(0.0031)		(0.0029)
Negative CreditWatch × Hot		-0.0017		0.0006		0.0040		0.0020
		(0.0032)		(0.0030)		(0.0024)		(0.0027)
Positive CreditWatch × Cold		0.0136***		0.0113**		0.0133**		0.0130**
		(0.0044)		(0.0044)		(0.0065)		(0.0058)
Positive CreditWatch × Hot		0.0005		0.0031		0.0042		0.0037
		(0.0043)		(0.0042)		(0.0034)		(0.0036)

Panel C: Outlook								
	Monthly IPO		Yearly IPO		Monthly IPO+SEO		Yearly IPO+SEO	
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
POM × Cold	0.0102***		0.0105***		0.0092**		0.0112***	
	(0.0029)		(0.0030)		(0.0039)		(0.0035)	
POM × Hot	0.0019		0.0025		0.0057**		0.0035	
	(0.0036)		(0.0036)		(0.0028)		(0.0030)	
Minus × Cold		0.0112***		0.0112***		0.0105***		0.0125***
		(0.0030)		(0.0031)		(0.0040)		(0.0036)
Minus × Hot		0.0014		0.0027		0.0059*		0.0034
		(0.0041)		(0.0040)		(0.0031)		(0.0033)
Plus × Cold		0.0043		0.0064		0.0029		0.0042
		(0.0074)		(0.0075)		(0.0100)		(0.0095)
Plus × Hot		0.0040		0.0019		0.0051		0.0041
		(0.0088)		(0.0085)		(0.0068)		(0.0071)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 16: How equity valuation impacts the effect of rating change concern

Dependent variable is the use of operating lease relative to debt scaled by lagged total asset. Control variables include Size, Collateral, Leverage, No dividend dummy, Tax rate and MB ratio. Their definitions are the same as in table 4. POM dummy, CreditWatch dummy and Outlook dummy are used to proxy for credit rating change concern. Minus dummy, Negative CreditWatch dummy and Negative Outlook dummy are used to proxy for negative rating change concern. Plus dummy, Positive CreditWatch dummy and Positive Outlook dummy are used to proxy for positive rating concern. The key variables are interacted with a dummy variable indicating whether the firm's stock are undervalued or overvalued. This table reports the regression coefficient and the standard error clustered by firm level.

Firm's mispricing is calculated as:

$$\mathrm{Ln}\left(\frac{\mathrm{M}}{\mathrm{V}}\right) = \mathrm{Ln}(\mathrm{M_{it}}) - [\overline{\alpha}_{0\mathrm{j}} + \overline{\alpha}_{1\mathrm{j}}\,\mathrm{Ln}(\mathrm{B_{it}}) + \overline{\alpha}_{2\mathrm{j}}\,\mathrm{Ln}(|\mathrm{NI_{it}}|) + \overline{\alpha}_{3\mathrm{j}}\mathrm{I}^{-}\,\mathrm{Ln}(|\mathrm{NI_{it}}|) + \overline{\alpha}_{4\mathrm{j}}\left(\frac{\mathrm{D}}{\mathrm{V}}\right)]$$

Here, $\mathrm{M_{it}}$ is the market value of equity and $\mathrm{B_{it}}$ is the book value of equity. $|\mathrm{NI_{it}}|$ is the absolute value of net income. I^{-} is a dummy variable that equals one if net income is negative. $\frac{\mathrm{D}}{\mathrm{V}}$ is the market leverage ratio. Subscript i stands for firm, t stands for year and j stand for industry. The average estimated coefficient is from the following process:

$$\mathrm{Ln}(\mathrm{M_{it}}) = \alpha_{0\mathrm{jt}} + \alpha_{1\mathrm{jt}}\,\mathrm{Ln}(\mathrm{B_{it}}) + \alpha_{2\mathrm{jt}}\,\mathrm{Ln}(|\mathrm{NI_{it}}|) + \alpha_{3\mathrm{jt}}\mathrm{I}^{-}\,\mathrm{Ln}(|\mathrm{NI_{it}}|) + \alpha_{4\mathrm{jt}}\left(\frac{\mathrm{D}}{\mathrm{V}}\right) + \varepsilon_{\mathrm{it}}$$

The firms are classified into 12 industries according to Fama and French (1997) and the coefficients are estimated for each industry and each year. Then, the coefficients are averaged across years. Firms are considered to be overvalued if the mispricing is positive and are considered to be undervalued if the mispricing is negative.

	POM		CreditWatch		Outlook	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Size	-0.0035***	-0.0035***	-0.0036***	-0.0036***	-0.0036***	-0.0036***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Collateral	-0.0209***	-0.0209***	-0.0210***	-0.0209***	-0.0213***	-0.0213***
	(0.0040)	(0.0040)	(0.0040)	(0.0040)	(0.0040)	(0.0040)

Leverage	0.0422***	0.0422***	0.0408***	0.0412***	0.0408***	0.0408***
	(0.0041)	(0.0041)	(0.0041)	(0.0041)	(0.0041)	(0.0041)
No dividend	0.0059***	0.0059***	0.0060***	0.0060***	0.0060***	0.0060***
	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0016)	(0.0016)
Tax rate	0.0040**	0.0040**	0.0041**	0.0041**	0.0040**	0.0040**
	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)
MB ratio	0.0029***	0.0029***	0.0025***	0.0025***	0.0024***	0.0024***
	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0008)
Rating concern× Undervalue	**0.0057*** **		**0.0096*** **		**0.0108*** **	
	(0.0014)		**(0.0027)**		**(0.0040)**	
Rating concern× Overvalue	**0.0003**		**0.0024**		**0.0024**	
	(0.0013)		**(0.0020)**		**(0.0027)**	
Negative concern× Undervalue		**0.0049*** **		**0.0062***		**0.0107** **
		(0.0017)		**(0.0034)**		**(0.0044)**
Negative concern× Overvalue		**0.0016**		**0.0023**		**0.0024**
		(0.0015)		**(0.0024)**		**(0.0028)**
Positive concern× Undervalue		**0.0065*** **		**0.0180*** **		**0.0115**
		(0.0018)		**(0.0047)**		**(0.0082)**
Positive concern× Overvalue		**-0.0010**		**0.0027**		**0.0022**
		(0.0016)		**(0.0039)**		**(0.0077)**
Constant	0.0239***	0.0238***	0.0272***	0.0271***	0.0278***	0.0278***
	(0.0074)	(0.0074)	(0.0073)	(0.0073)	(0.0074)	(0.0074)
Observations	13,148	13,148	13,148	13,148	13,148	13,148
R-squared	0.0713	0.0715	0.0710	0.0713	0.0705	0.0705
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes