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Essays on the Capital Structure Decisions

기업특성과 자본구조 의사결정의 관계에 관한 연구

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조 형 진

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이 논문을 경영학박사 학위논문으로 제출함

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ABSTRACT

Essays on the Capital Structure Decisions

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This thesis consists of two essays on the capital structure decisions. Two essays revisit prior literature on the capital structure decisions by addressing their shortcomings. Although two essays investigate different determinants of capital structure decisions (i.e., financial reporting quality for 1st essay and competition type for 2nd essay), they contribute to the literature by showing that addressing shortcomings in prior literature can yield different implications.

First essay tests the effect of reporting quality on financing choices between debt and equity financing. Extant research suggests that firms with high-quality financial reporting benefit from low costs of raising debt or equity. However, little is yet known about which benefit in debt or equity financing is greater and whether the ex ante differential in benefits turn to ex post differential in financing. This paper tests how financial reporting quality influences the interdependence of cash holding, debt financing, and equity financing to fund the financing deficit (i.e., negative free cash flow). It finds that in order to fund one dollar for financing needs,

firms in the highest decile of reporting quality use $0.27 of cash holding and issue $0.61 of debt and $0.12 of equity, whereas firms in the lowest decile use $0.29 of cash reserves and issue $0.44 of debt and $0.27 of equity. This indicates that firms with higher reporting quality rely more on debt financing than on equity financing. This paper further documents that the differential impact of reporting quality in debt financing and equity financing is more salient in firms with private long-term debts and in financially constrained firms, supporting the debt contracting value of accounting information.

Second essay highlights the difference between price and non-price competition and expands prior studies on the relations that product market competition intensity has with capital structure and payout policies. Specifically, non-price competition intensity is positively related with the use of equity financing relative to debt financing. Also, firms accumulate more cash reserves by reducing the distribution of free cash flows to outside investors as non-price competition intensifies. However, such relations are weaker for price competition industries. These findings suggest that the competition type can be an important explanatory factor on the relations between competition intensity and financial policies.

Keywords: financial reporting quality, debt contracting, financing choices, competition intensity, competition type, payout policies

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Essay 2: The Industry-Specific Relation between Competition Intensity and Financial Policies

Essay 1. The Impact of Financial Reporting Quality on the Relative Use of Debt vs. Equity Financing

Abstract

Extant research suggests that firms with high-quality financial reporting benefit from low costs of raising debt or equity. However, little is yet known about which benefit in debt or equity financing is greater and whether the *ex ante* differential in benefits turn to *ex post* differential in financing. This paper revisits this literature by employing the research design that concurs with the pecking order theory. Particularly, I test how financial reporting quality influences the interdependence of cash holding, debt financing, and equity financing to fund the financing deficit (i.e., negative free cash flow). I find that in order to fund one dollar for financing needs, firms in the highest decile of reporting quality use $0.27 of cash holding and issue $0.61 of debt and $0.12 of equity, whereas firms in the lowest decile use $0.29 of cash reserves and issue $0.44 of debt and $0.27 of equity. This indicates that firms with higher reporting quality rely more on debt financing than on equity financing.

1. Introduction

This paper revisits prior studies on the effect of financial reporting quality on the financing choices between debt and equity financing. Prior studies report that the information asymmetry between the firm and outside investors is an important determinant of external financing (Myers and Majluf, 1984). Although many studies report the benefit of high reporting quality on external financing, little is yet known about which benefit in debt or equity financing is greater and whether the *ex ante* differential in benefits turn to *ex post* differential in financing. Given that equity providers suffer more from information asymmetry problems than debt providers do (Diamond, 1984; Myers and Majluf, 1984), recent studies document that higher reporting quality is related with more use of equity financing relative to debt financing (Chang et al., 2009; Chen et al., 2013).[1] However, while these studies would correctly point out that financial reporting can improve an access to the equity financing, they are not completely informative about how financial reporting quality influences firms' financing activities.

Prior studies use the assumption of the pecking order theory in that information asymmetry drives financing choices between debt and equity financing, but conveniently ignore the possible presence of pecking order in

[1] Chang et al. (2009) document that higher audit quality allows firms to rely more on equity as opposed to debt. Chen et al. (2013) show that firms rely more on debt financing than equity financing after restatements.

financing choices. This inconsistency in the employment of the theory results in two difficulties in understanding their findings.

First, the comparison between debt and equity financing should be *conditional* on financing deficit (i.e., negative free cash flows (FCF)) because the theory suggests that the firm use external financing only after they use internal cash flows to fund the financing deficit (Myers and Majulf, 1984). However, prior studies on the effect of reporting quality on financing choices typically establish an *unconditional* relation between financial reporting quality and external financing (Chang et al., 2009; Chen et al., 2013). This research design can mislead the researcher. For instance, while prior studies interpret lower leverage associated with higher reporting quality as evidence that reporting quality reduces debt financing and increases equity financing, it can also imply that firms with high reporting quality do not need to use debt financing due to sufficient internal cash flows.[2] Another complication of controlling for FCF rests on the fact that firms with severe agency problems tend to hold small cash reserves, consistent with FCF hypothesis (Harford et al., 2008).[3] Accordingly, controlling for financing deficit associated with the limited availability of internal funds is vital to

[2] Alternatively, low leverage for firms with high reporting quality may indicate that these firms are more likely to use stock options and grants to compensate their executives (Fama and French, 2005).

[3] Similarly, the disciplining role of financial reporting quality might have affected the dissemination and thus the current amount of free cash flow (Biddle and Hilary, 2006).

gauge relative uses of debt and equity.

Second, the pecking order theory argues that debt financing decision proceeds equity financing decision because information asymmetry problem is weaker for debt financing relative to equity financing. This is supported by empirical evidence that debt financing is a preferred source for external financing relative to equity financing (Armstrong et al., 2010). Then, the mitigation of information asymmetry should have the first-order effect on debt financing rather than on equity financing if the pecking order theory holds. Thus, the negative relation between reporting quality and the use of debt financing relative to equity financing in prior studies requires a reverse pecking order of financing choices.

This paper revisits prior literature by building up the theoretical prediction on the effect of reporting quality on financing choices. To achieve this goal, I focus on the role of accounting information in debt contracting, which is often overlooked by prior studies. Given that debt investors price-protect their claims to account for potential losses from agency conflicts, the firm has *ex ante* incentives to use contracting mechanisms that reduce the manager's ability to *ex post* expropriate the wealth from debt investors (Armstrong et al., 2010). Accounting information is an important input in debt contracts because the contracts, particularly covenants, heavily rely on

accounting ratios to constrain the damage on debt investors' claims. Many studies report that low contracting value of accounting information increases interest rates and the demand for restrictive covenants (Ball et al., 2008; Bharath et al., 2008; Graham et al., 2008). Furthermore, low debt capacity due to poor reporting quality forces the firm to rely on lease agreements (Beatty et al., 2010) or even to reduce investments (Balakrishnan et al., 2014).[4]

Based on this argument, I expect high reporting quality to increase the use of debt financing relative to equity financing because high debt contracting value of accounting information increases the use of debt financing first, and then reduces the demand for equity financing. When the firm has poor reporting quality, in contrast, the difficulty of obtaining debt financing will force the firm to rely more on equity financing. Also, I expand my investigation into debt components. I expect the effect of reporting quality on long-term debt to be larger than its effect on short-term debt because longer maturity increases the demand for restrictive covenants. I also predict that reporting quality has a stronger relation with the use of private debt than the use of public debt because the former is more likely to

[4] In contrast, equity holders do not explicitly rely on accounting information although they implicitly consider its quality in their investment decisions. Even further, a few prior studies claim that high-quality accounting information often increases rather than reduce the cost of equity when it makes the firm more aggressive in its investment choices (Lambert et al., 2007; Gao, 2010).

contain restrictive covenants based on accounting numbers.

In an attempt to fairly gauge the relative financing choices at a given level of financing needs, I adopt the system of equations approach in Gatchev et al. (2009). One important consideration in their research design is to implicitly incorporate implications of possible pecking order among financing sources. Specifically, relying on the system of equations, I estimate the impact of reporting quality on the interdependence of debt financing and equity financing given a level of available funds (i.e., financing deficit).

The sample consists of US nonfinancial companies between 1974 and 2011. Using the accruals quality measure from Demerjian et al. (2013), I find that firms in the highest decile of reporting quality use $0.27 of cash holding and issue $0.61 of debt and $0.12 of equity to fund one dollar of financing needs (measured as the difference between cash flows from investing activities and operating activities). In contrast, firms in the lowest decile of reporting quality use $0.29 of cash reserves, $0.44 of debt financing and $0.27 of equity financing to satisfy one dollar of financing needs. This indicates that high-quality financial reporting increases the use of debt financing relative to equity financing when firms use external financing to fund financing needs. I also find that the effect of reporting quality on private long-term debt financing is stronger than its effects on short-term debt and

public long-term debt, supporting the role of reporting quality in debt contracting.

The results appear to be contrasting to prior evidence that high reporting quality reduces the cost of equity, but in fact are not necessarily inconsistent. Rather, I find that when the firm has zero financing deficit, high reporting quality is related with less debt financing and more equity financing, which is consistent with Chang et al. (2009) and Chen et al. (2013). The difference between *unconditional* and *conditional* relations between reporting quality and financing choices highlights the importance of controlling for financing deficit. Moreover, the positive relation between reporting quality and the use of debt financing relative to equity financing is also consistent with Lemmon and Zender's (2010) suggestion that debt capacity determines the extent that the pecking order theory works in financing decision because high reporting quality enhances the debt capacity, allowing the firm to rely more on debt financing.

In order to provide further assurance on my seemingly conflicting results, I provide a set of additional tests. I acknowledge that financial reporting quality is endogenously determined, and hence possible simultaneity between reporting quality and financing choices would bring biased inferences. Or, correlated omitted variables would affect financial

reporting quality and at the same time financing choices, which also hinder correct inferences. To mitigate this concern, I use lagged reporting quality relative to financing choice variables and control for the battery of firm characteristics in my main analysis. To address uncontrolled time-invariant firm characteristics, I also use firm fixed effect regressions. I further address the dynamic relation between financing activities and reporting quality by estimating the system generalized method of moments (GMM) estimator (Blundell and Bond, 1998). Overall results from these tests remain qualitatively unchanged.

I also examine a cross-sectional variation of the effect of reporting quality on financing choices. Particularly, debt contractibility of accounting information is more critical for financially constrained firms than for unconstrained firms because control rights are more likely to be allocated to debt investors when the firm is closer to default. Further, the use of performance covenants (e.g., interest coverage or debt-to-EBITDA ratio) relative to capital covenants (e.g., current ratio, debt-to-equity ratio) increases when the firm is financially constrained (Christensen and Nikolaev, 2012). Given that reporting quality is more closely related to performance covenants than with capital covenants, the effect of reporting quality on financing choices will be stronger for financially constrained firms compared

with unconstrained firms. I find the test results supporting this prediction. In addition, I also find that the effect of reporting quality on financing choices is salient in firms under higher information uncertainty. This indicates that debt contracting value of accounting information and subsequent influences on financing decisions are important even when outside investors underreact to public information.

Balakrishnan et al. (2014) suggest that high-quality financial reporting mitigates the impact of collateral shock on external financing. To address the effect of the change in collateral values in external financing, I employ the collateral shocks into my system of equations. The estimation results indicate that both high reporting quality and the positive change in collateral values increases the use of debt financing relative to equity financing, whereas there is the substitutive relation between reporting quality and collateral values in external financing. I further address the effect of debt financing capacity by following Lemmon and Zender (2010). When I divide the sample into high and low debt capacity subsample, the effect of *FRQ* on financing choices is stronger for firms having lower debt capacity, supporting the role of *FRQ* in enhancing debt capacity.

The main contribution of this paper is to provide seemingly conflicting but theory-consistent evidence on how reporting quality

influences financing choices between debt and equity financing. While there is a number of prior studies on the contracting value of accounting information, recent studies on the effect of reporting quality on financing choices tend to overlook its importance (Chang et al., 2006; Chen et al., 2013). Filling up this void, I present empirical evidence consistent with the critical role of accounting information in debt financing.

This paper also addresses the empirical limitations of prior studies. Its research design conforms prior studies' claims that investments are the fundamental driver of financing activities (Myers and Majluf, 1984; Kim and Weisbach, 2008), and that investments are funded by free cash flows, cash holding, debt financing and equity financing jointly (Gatchev et al., 2009; Gatchev et al., 2010). Furthermore, my focus lies on firms with financing needs rather than those with financing surplus to prevent the FCF problem from complicating my inference from empirical results. Since prior studies often overlook the FCF problem, it is unclear whether their findings should be interpreted according to the effect of reporting quality on the FCF problem.[5]

The remainder of this paper proceeds as follows. Section 2 describes prior literature and details the hypothesis development. Section 3 explains

[5] Also, my study can be viewed as an attempt to avoid the econometric problems of using matched or choice-based samples in prior studies (see Appendix B).

the research design. Section 4 describes the sample, and Section 5 presents the results. Section 6 concludes the paper.

2. Prior Literature and Hypothesis Development

2.1. Financial Reporting Quality and Financing Choices

A few studies investigate the effect of reporting quality on the financing choices between debt and equity financing. Chang et al. (2009) document that firms with high audit quality are more likely to issue equity rather than debt compare with firms with low audit quality. Chen et al. (2013) also find that firms use more debt and less equity financing after restatements because restatements reduces the credibility of accounting information. These studies are based on the assumption of the pecking order theory that the role of financial reporting quality is more important for equity than for debt financing because information asymmetry problem is more severe for equity investors than for debt investors. However, although these studies would correctly point out that reporting quality improves an access to the equity financing, they face following challenges.

First, those prior studies do not provide a fair comparison between the impacts of financial reporting quality on debt and equity financing because they ignore the possible presence of pecking order in financing

choices. Typically, they examine the *unconditional* relation between financial reporting quality and absolute amounts of debt and equity issuances or relative use of debt or equity financing (Chang et al., 2009; Chen et al., 2013). However, this research design can be biased because the pecking order theory suggests that firms use internal cash first, then debt financing and equity financing for the last resort to fund investments (see Myers and Majulf, 1984). For instance, when the researcher finds a negative relation between reporting quality and the use of debt financing relative to equity financing without consideration of internal cash flows, it can imply that firms with higher reporting quality use more equity financing because their investments already exceed their debt capacity, or that they do not obtain external financing but engage in small but frequent equity issuances for executive compensations. Thus, the researcher should examine the effects of reporting quality on debt and equity financing *conditional* on internal cash flows.

In addition, an incorporation of internal cash flows takes into account of the possible effect of agency problems on cash holdings. Several studies document that agency problems significantly influence the level of cash reserves (Harford et al., 2008; Jensen, 1986). Thus, controlling for financing deficit is important to disentangle the effect of reporting quality on

the relative uses of debt and equity financing from the effect of reporting quality on the availability of internal funds.

Second challenge to prior studies on the effect of reporting quality on financing choices comes from the importance of accounting information in debt contracting. To mitigate the information asymmetry between the borrowing firm and debt investors, explicit contracts allocate control rights of the firm to debt investors in certain states of the world and restrict activities that damage debt investors' claims (Aghion and Bolton, 1992). This contract, particularly its restrictive covenants, is written over accounting numbers. When accounting information is a noisy signal of the borrowing firm's true economic performance, the ability of debt contract to mitigate agency problems will deteriorate. Thus, transparent accounting information is essential to achieving highly efficient debt contracting (Armstrong et al., 2010; Ball et al., 2008; Shivakumar, 2013). Consistent with these arguments, previous studies find that lenders require higher interest spreads and more restrictive covenants when reporting quality is poor (Bharath et al., 2008; Graham et al., 2008). Also, other studies report that high reporting quality enhances debt capacity and results in larger investments (Balakrishnan et al., 2014; Beatty et al., 2010).

The incomplete contracting theory also highlights the contractibility

value of accounting information. Under the asymmetric information, lenders design debt contracts to restrict the firm's behavior based on incomplete information. Thus, if lenders can obtain more transparent information at the time they design debt contract, this contract is less likely to be restrictive (Garleanu and Zwiebel, 2009). More importantly, debt contracts are renegotiated when new information arrives (Denis and Wang, 2014; Garleanu and Zwiebel, 2009; Roberts and Sufi, 2009). Given that financial reports provide new information such as the firm's performance and capital structure, high-quality financial reporting will induce efficient renegotiations of debt contracts, increasing the benefit of debt financing.

In contrast, other studies question whether high reporting quality really improves an access to equity financing. Frequent equity issuances of small and high growth firms indicate that information asymmetry may not be an important determinant of equity financing (Fama and French, 2005). Also, equity investors seem to naively extrapolate past earnings in the future periods (Teoh et al., 1998a; 1998b). However, similar with prior studies on the effect of reporting quality on financing choices, these findings are obtained without controlling for internal cash flows as the determinant of external financing activities. In addition, they focus on equity financing alone, ignoring the interdependence of the change in cash holding, debt

financing, and equity financing.

2.2. Hypothesis Development

This section proposes theory-consistent predictions on the effect of reporting quality on financing choices. Particularly, I develop the prediction on the effect of reporting quality on the pecking order of financing choices. When high-quality accounting information signals the firm's true economic performance, its debt contracting value improves an access to debt financing. Given that debt financing decisions come before equity financing decisions, high contracting value of accounting information has the first-order effect on debt financing. Then, an increase of debt financing due to high reporting quality will reduce the use of equity financing. Thus, I predict that high-quality financial reporting will increase the use of debt financing relative to equity financing when firms use external financing to fund investments. Figure 1 represents this prediction.

H1: High reporting quality increases the firm's use of debt financing relative to equity financing to fund financing needs.

To obtain further assurance that debt contracting value of accounting information drives financing choices, I extend my investigation into the

components of debt because the demand for accounting information in debt contracting is different among different classes of debt financing. First, I compare the effect of reporting quality on short-term and long-term debt. Debt contracting value of accounting information is more important for long-term debt financing than for short-term debt financing because lenders require more restrictive contracting mechanism to monitor borrowing firm's activities when they lend with longer maturity. Thus, the contractibility of accounting information is more important for long-term debt than for short-term debt financing. Second, relative to public debt contracts, private debt contracts are more likely to contain restrictive covenants based on accounting ratios (Begley and Freedman, 2004; DeAngelo et al., 2002). This implies that the debt contracting value of accounting information is more important for private debt than for public debt financing. If debt contracting value of accounting information drives financing choices, it should also increase the use of debt components with higher demand for accounting information relative to the use of other debt components with lower demand for accounting information. Based on these arguments, I predict that high reporting quality should have a greater effect on private long-term debt than on short-term debt or public long-term debt.

H2: High reporting quality increases the firm's use of long-term debt

financing relative to short-term debt financing.

H3: High reporting quality increases the firm's use of private long-term debt relative to public long-term debt financing.

I further predict that an increase in the firm's use of debt financing relative to equity financing due to high reporting quality will be more pronounced when the firm is financially constrained than when it is unconstrained for following two reasons.

First, debt contracts contain clauses related to the allocation of control rights (e.g., Garleanu and Zwiebel, 2009). When a firm violates covenants or is close to bankruptcy, control rights can be allocated to lenders to prevent activities that could further damage debt holders' wealth. Since financial reporting provides information on the firm's performance and financial positions, high-quality accounting information can improve the efficiency in the allocation of control rights by reducing the suboptimal liquidation. Given that financially constrained firms are closer to default than unconstrained firms, the effect of reporting quality on the efficiency in the allocation of control rights should be more pronounced when a firm is financially constrained.

Second, the use of performance covenants relative to capital

covenants increases in the firm's financial constraints because constrained firms, typically firms with high leverage, will find it unattractive to include capital covenants in debt contract (Christensen and Nikolaev, 2012). Financial reporting quality, commonly defined as the extent in which earnings represent the firm's true economic performance, is more related with performance covenants than with capital covenants. Thus, the role of accounting information in debt contracting will be more important when the firm is financially constrained than when it is unconstrained.

H4: The effect of reporting quality on the firm's use of debt financing relative to equity financing is stronger for financially constrained firms than for unconstrained firms.

3. Research Design

3.1 The Financing Choices of Firms

As I explained above, the research designs of prior studies focus on the *unconditional* effect of reporting quality on the absolute amounts of debt and equity issuances or a relative use of debt and equity financing (Chang et al. 2009; Chen et al., 2013). Their failure to take into account of internal cash can bias the inference from empirical results because the pecking order theory suggests that firms use external financing only when their internal

cash does not suffice the investments.[6] Thus, my research design should satisfy two criteria. First, the effect of reporting quality on financing choices between debt and equity financing should be *conditional* on financing deficit, which is the difference between cash outflows from investment activities and operating cash flows. Second, when the firm's operating cash flows do not suffice cash outflows due to investment activities, this deficit should be funded by debt and equity financing only after the firm spend its own cash holdings.

Gatchev et al. (2009) develop the system of equations in which the firm's financing choices including change in cash holding, debt financing and equity financing are functions of investment activities. Their research design conforms the pecking order theory's claim that investments are the fundamental driver of financing activities (Myers and Majulf, 1984; Kim and Weisbach, 2008). Further, by imposing the restriction that the sum of financing deficit and the change in cash holding is equal to the sum of debt and equity financing, it can address the possibility that the firm fund investment by spending cash holding from the past operating cash flows. Thus, I test my predictions by including proxies of financial reporting quality

[6] Analytical studies also document that investment activities can influence the relation between financial reporting quality and the cost of equity (Lambert et al., 2007; Gao, 2010).

into the system of equations.[7]

I start the construction of the system of equations by imposing the restriction that cash inflows are equal to cash outflows as follows:

$$i'y_{i,t+1} - Def_{i,t+1} = 0 \quad (1)$$

or

$$-\Delta Cash + \Delta Debt + \Delta Equity = Def$$

where i is equal to the (-1, 1, 1) matrix, y is a 3 x 1 vector of financing choices (i.e., changes in cash holdings ($\Delta Cash$), net debt issue ($\Delta Debt$), and net equity issue ($\Delta Equity$)). Def is the measure of financing deficit which captures the firm's financing needs. It is calculated as the sum of capital expenditure, an increase in working capital, acquisitions, and dividend payments, minus sales of property, plant, and equipment, and cash flows from operations (Frank and Goyal, 2003). See the detailed definitions of variables in Appendix A.

Using this restriction, I construct the system of equations with the interaction between reporting quality and financing deficit as the

[7] Another advantage of my research design is the minimization of the information loss. Prior studies often exclude firms with financing activities that fall short of certain cutoff points (e.g., 5% of the total assets) (see Appendix B). Requiring the sample firms to have external financing larger than a certain threshold eliminates the information provided by firms that have little or no external financing. When the researcher truncates the sample based on the level of the dependent variable, it results in a selection bias which, if not corrected, will cause the OLS regression to produce inconsistent estimates (Greene, 2011).

independent variable. This tests the effect of reporting quality on the firm's reliance on each type of capitals to fund financing needs.

$$y_{i,t+1} = B_1\, FRQ_{i,t} + B_2\, Def_{i,t+1} + B_3\, Def_{i,t+1} * FRQ_{i,t} + C\, z_{i,t} + e_{t+1} \quad (2)$$

where B and C are the 3 x 1, and 3 x k vectors of coefficients on the independent variables, respectively, z is a k x 1 vector of determinants of financing choices, and *FRQ* (*FRQ1*, *FRQ2*, or *FRQ3*) is the measure of reporting quality. I use one-year-lagged values of *FRQ* to reduce the bias from simultaneity problem because a firm's desire to gain external financing can influence its choice of reporting quality (Balakrishnan et al., 2014; Linck et al., 2013). I impose the following cross-equation restrictions on the coefficients: $i'B_1 = 0_{1 \times 1}$, $i'B_2 = 1_{1 \times 1}$, $i'B_3 = 0_{1 \times 1}$, $i'C = 0_{1 \times k}$, and $i'e = 0_{1 \times 1}$. In other words, I assume that financial reporting quality affects the relation between financing deficit and financing choices, but that its net effects offset each other so that cash inflows are kept equal to cash outflows.[8] I use maximum likelihood estimation with standard errors clustered at the firm level (Gould et al., 2006).

I use the battery of control variables related with reporting quality or financing choices to mitigate correlated omitted variable problem. I include

[8] The results remain largely unchanged when I use alternative restrictions on coefficient estimates (e.g., $i'B_2 + i'B_3 = 1_{1 \times 1}$ instead of $i'B_2 = 1_{1 \times 1}$ and $i'B_3 = 0_{1 \times 1}$).

Size because large firms are exposed to increased monitoring activities, resulting in improved earnings informativeness (Dechow et al., 2010). Growth, inversely captured by *BM*, is negatively related to reporting quality due to the measurement errors in accruals, earnings management opportunities, and target-beating incentives (Dechow et al., 2010). Firms with high leverage (*Lev*) will issue equity rather than debt to fund investments because high leverage increases financial distress. *CFVola* is the volatility of operating cash flows over at least three of the last five years. Higher volatility is associated with a lower level of investment and external financing (Minton and Schrand, 1999). I also control for the economic losses in past years, captured by the percentage of years reporting losses in net income over at least three of the last five years (*Loss%*), because reporting quality is closely related to economic losses (Ball and Shivakumar, 2006). Prior studies document that asset tangibility is a strong determinant of capital structure because tangible assets can be used as collateral. Thus, I control for tangibility (*Tangible)* and depreciation and amortization costs (*Dep*). I also include R&D expenses (*R&D*) and *R&D_D*, which is an indicator variable that equals one for firms reporting R&D expenses and zero otherwise because earnings quality is closely related to intangible intensity (Srivastava, 2013). *RetVola* is the standard deviation of daily stock returns over the fiscal

year. *Ret* is the annual stock returns, controlling for market timing activities of equity financing (Baker and Wurgler, 2002).

In the prior literature, it is conventional to assume that financing activities have the same linear relationships with the financing deficit as they do with financing surplus (e.g., Shyam-Sunder and Myers, 1999). However, firms with sufficient internal cash flows to fund investments are subject to FCF problem, an agency cost that managers invest FCF in low-return projects (Jensen, 1986). Thus, relative to the financing choices of firms with financing needs, the analysis of financing choices of firms with financing surplus requires an additional consideration of FCF problems. To reduce the concern that the effect of reporting quality on FCF problems may obscure the inferences from my empirical results, I partition the sample into firms with the financing deficit and firms with the financing surplus.

3.2 Measurement of Financial Reporting Quality

High-quality financial reporting should reflect a firm's economic performance. Thus, the earnings should be mapped into the cash flows and contain minimal earnings managements (Dechow and Dichev, 2002). I avoid industry-level measures of financial reporting quality so as to preserve the cross-sectional and time-series variations in my reporting quality measures.

To reduce the selection problem and the empirical difficulties of using matched or choice-based sample (Cram et al., 2009), I also avoid external indicators of poor earnings quality such as restatements or internal control weakness. Based on this argument, I construct various measures of financial reporting quality to mitigate measurement error (Dechow et al., 2010).

The first measure of financial reporting quality is based on Demerjian et al. (2013). I estimate Equation (3) by allowing the coefficients to vary by industry and the quintile rank of firm-level measure of economic loss.[9] Controlling for economics loss can mitigate the potential bias due to a correlation between accrual quality measure and economic losses.[10] Economic loss can be measured using the following variables: the percentage of years reporting losses in net income over at least three of the last five years (*Loss%*); the percentage of years reporting losses in net income, excluding the effect of special items, over at least three of the last five years (*SI_Loss%*); the percentage of years reporting negative operating cash flows over at least three of the last five years (*NegCFO%*). After performing the regression, I take the within-firm standard deviation of residuals from year *t*-4 to year *t*, and multiply it by -1 so that its higher value corresponds with higher reporting quality.

[9] I use the industry classification in Fama and French (1997).
[10] Demerjian et al. (2013) report that a failure to control for economic loss results in the estimation error of accrual quality and leads to the bias in empirical analysis.

$$\Delta WC_t = \alpha_0 + \alpha_1 CFO_{t-1} + \alpha_2 CFO_t + \alpha_3 CFO_{t+1} + \alpha_4 \Delta REV_t + \alpha_5 PPE_t + \textit{Year-Fixed Effects} + \varepsilon_{i,t} \quad (3)$$

where ΔWC is the change in working capital ((ΔACT-ΔCHE)-(ΔLCT-ΔDLC)) scaled by the lagged total assets (AT), *CFO* is the cash flows from operations (OANCF) scaled by the lagged total assets,[11] ΔREV is the change in sales (SALE) scaled by the lagged total assets, and *PPE* is the ratio of fixed assets (PPENT) to total assets. My first measure of reporting quality (*FRQ1*) uses reporting losses in net income in at least three of the last five years as a proxy for economic loss.[12]

The second measure of reporting quality (*FRQ2*) is based on Bharath et al., (2008). I estimate three discretionary accruals models using Equations (4) to (6) for each year and industry. These regressions require at least ten observations.

$$\Delta WC_t = \alpha_0 + \alpha_1 CFO_{t-1} + \alpha_2 CFO_t + \alpha_3 CFO_{t+1} + \varepsilon_{i,t} \quad (4)$$

$$\Delta WC_t = \alpha_0 + \alpha_1 (1/AT_{t-1}) + \alpha_2 \Delta REV_t + \varepsilon_{i,t} \quad (5)$$

$$\Delta WC_t = \alpha_0 + \alpha_1 (1/AT_{t-1}) + \alpha_2 \Delta REV_t + \alpha_5 PPE_t + \varepsilon_{i,t} \quad (6)$$

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[11] Before June 1988, information on the operating cash flows is not available and this variable is thus replaced by the funds flow from operations (FOPT) minus the change in working capital.

[12] I do not report the results using other proxies for economic loss because the overall results are quite similar to those obtained using the number of years reporting losses in net income as a proxy for economic loss.

where *AT* is the total assets. After the three unsigned discretionary accruals are estimated, their first principal component is constructed. I multiply the first principal component by -1 so that a higher value of it corresponds to a smaller absolute value of discretionary accruals.

The third reporting quality measure (*FRQ3*) is based on McNichols (2002), who inserts the change in sales and the property, plant, and equipment into the accruals quality model. I estimate Equation (7) by each year and industry, and then take the within-firm standard deviation of the residuals from year *t*-4 to year *t*, and multiply it by -1. I require each year and industry group to have at least ten observations.

$$\Delta WC_t = \alpha_0 + \alpha_1 CFO_{t-1} + \alpha_2 CFO_t + \alpha_3 CFO_{t+1} + \alpha_4 \Delta REV_t + \alpha_5 PPE_t + \varepsilon_{i,t} \quad (7)$$

While many studies use the estimated values from above procedures as their proxy of financial reporting quality, I opt to modify them as the annual decile rank divide by ten to have a range from 0.1 to 1.0 for two reasons. First, the annual decile rank of reporting quality measures eliminate the potential bias in my empirical analysis due to the extreme value of reporting quality measures. Second, as Dechow et al. (2010) document, the

raw value of reporting quality measures can be associated with uncontrolled fundamentals. I expect the use of annual ranks of reporting quality to partly mitigate this correlated omitted variable problem because annual ranks of reporting quality is less likely to be correlated with uncontrolled fundamentals than their raw values unless fundamental characteristics change in accordance with the change in annual ranks of reporting quality. By construction, reporting quality measures are positively related to the quality of financial reporting.

4. The Sample

My sample includes US firms with data available from the intersection of Compustat and CRSP from 1974 to 2011. Following prior studies, I exclude financial firms (SIC codes 6000-6999) and utilities (4900-4999). To eliminate the effect of outliers, all continuous variables are winsorized at the top and bottom 1%.

Table 1 provides the mean values of the firm characteristics by decile of first measure of reporting quality, *FRQ1*. Firms in the highest decile (*FRQ1*=1.0) have a smaller financing deficit (*Def*) than those in the lowest decile (*FRQ1*=0.1). Firms with high reporting quality issue debt (*ΔDebt*) and less equity (*ΔEquity*) than firms with low reporting quality. To examine the

frequency of substantial financing activities, I construct an indicator variable, *ΔDebt*>5% (*ΔDebt*>1%), that is equal to one for firms with debt financing larger than 5% (1%) of lagged total assets, and zero otherwise. I also construct indicator variables for equity financing (*ΔEquity*>5% and *ΔEquity*>1%) in a similar manner. *FRQ1* is positively related to *ΔDebt*>1% and negatively related to *ΔEquity*>1%. In contrast, *FRQ1* is negatively related to both *ΔDebt*>5% and *ΔEquity*>5%. This evidence suggests that studies imposing a certain threshold on financing activities can induce different empirical results from studies using different thresholds. Other variables also show significant variations across deciles of reporting quality, suggesting the need to control for those variables in the regression analysis.

5. Test Results

5.1 The Association between Financial Reporting Quality and Financing Choices

Table 2 presents net debt and equity financing for the quintile ranks of *FRQ1* and financing deficit or surplus (a negative financing deficit). Note that the quintile of *FRQ1* is formed in year *t* and that the quintile of financing deficit or surplus is formed in year *t+1*. For each quintile, higher (lower) values are assigned to quintile 5 (1). Panel A and B show the financing

behaviors of firms with financing deficit (Def_{t+1}>0) in year t+1, and Panel C and D show the results of firms with financing surplus (Def_{t+1}<0) in year t+1.

In Panel A, firms in the highest quintile of *FRQ1* have a larger debt financing than those in the lowest quintile of *FRQ1* for each quintile rank of *Def*. Particularly, the difference in debt financing between the lowest and the highest quintile of reporting quality is more pronounced when the firms have larger financing needs. Panel B shows the opposite pattern for equity financing. The highest quintile of *FRQ1* has a smaller equity financing than the lowest quintile of *FRQ1* for each quintile rank of *Def*. This is consistent with my prediction that high reporting quality increases the firm's reliance on debt financing and reduces its demand for equity financing. Panel C and D indicate that high *FRQ1* firms repay smaller amount debt and repurchase more equity than low *FRQ1* firms.

Table 3 shows the estimation results of Equation (2) using various proxies of reporting quality. For brevity, I focus on Panel A, which uses my first measure of reporting quality, because results in other panels are quite similar with Panel A. The coefficients on $FRQ1_t$ in Columns (2) and (3) are significantly negative and positive, respectively. This would be interpreted that when financing deficit is low, high reporting quality reduces the use of debt financing relative to equity financing, which is consistent with prior

studies (Chang et al., 2009; Chen et al., 2014). However, the coefficients on $FRQ1_t$ capture the effect of reporting quality on financing activities that are unrelated to investments (e.g., cash accumulation or market timing). Since the investments are the main driver of financing activities, I focus on the coefficients on $Def_{t+1}*FRQ1_t$ rather than those on $FRQ1_t$.[13]

More importantly, the results for the coefficients on $Def_{t+1}*FRQ1_t$ support my first hypothesis. For the total sample, the coefficients on $Def_{t+1}*FRQ1_t$ in the net debt issue (Column (2)) and net equity issue (Column (3)) regressions are significantly positive (0.131, *p*-value: 0.00) and negative (-0.102, *p*-value: 0.00), respectively. This indicates that the use of debt financing relative to equity financing increases in financial reporting quality when the firms use external financing to fund financing needs. To eliminate the potential bias due to firms with positive FCF, I test the subsample of firms with the financing deficit in Columns (4) to (6). The coefficients on the interaction of financing deficit and reporting quality ($Def_{t+1}*FRQ1_t$) in the net debt issue regression (Column (5)) and in the net equity regression (Column (6)) are consistent with the results using total sample (Columns (2) and (3)).

This finding is economically significant. The bottom of each panel

[13] Furthermore, Table 1 and 2 are consistent with the results for the coefficients on $Def_{t+1}*FRQ1_t$.

shows the firm's financing behaviors in response to one dollar of financing deficit. The results from Columns (4) to (6) show that, to fund one dollar of financing deficit (*Def*), the average firm (*FRQ1*=0.55) borrows \$0.52 of debt (=0.417+0.55*0.194) and issues \$0.20 of equity (=0.290-0.55*0.173). To fund one dollar of *Def*, the firms in the lowest decile of reporting quality (*FRQ1*=0.1) borrow \$0.44 in debt (=0.417+0.1*0.194) and issue \$0.27 in equity (=0.290-0.1*0.173). In contrast, the firms in the highest decile of reporting quality (*FRQ1*=1.0) issue \$0.61 in debt (=0.417+1.0*0.194) and issue \$0.12 in equity (=0.290-1.0*0.173).

As expected, the estimation results using total sample is quite different from those using the subsample of firms with financing needs. The coefficient on Def_{t+1} increases from 0.34 (Column (2)) to 0.41 (Column (5)) when the dependent variables are net debt issue. It also increases from 0.19 (Column (3)) to 0.29 (Column (6)) when the dependent variables are net equity issue. Furthermore, the magnitudes of the coefficients on $Def_{t+1}*FRQ1_t$ in the net debt and equity issue regressions are drastically different between the results using total sample and those using firms with financing deficit. In the net debt issue regression, the coefficient on $Def_{t+1}*FRQ1_t$ increases by 48% from 0.13 (Column (2)) to 0.19 (Column (5)). In the net equity issue regression, the magnitude of the coefficient on

$Def_{t+1}*FRQ1_t$ increases by 70% from -0.10 (Column (3)) to -0.17 (Column (6)).

I also presented the results using the subsample of firms with financing surplus (i.e., negative financing needs) from Columns (7) to (9). These results are quite different from those using total sample or firms with financing deficit, suggesting that including firms with no needs to obtain external financing can obscure the inference from empirical results. In Column (8), the coefficient on $Def_{t+1}*FRQ1_t$ is insignificant when the dependent variable is the net debt issue (0.010, *p*-value: 0.60). While the coefficients on $Def_{t+1}*FRQ1_t$ in the net equity issue regressions in Columns (3) and (6) are significantly negative, that in Column (9) is significantly positive (0.093, *p*-value: 0.00). These indicate that firms with high reporting quality repurchase $0.068 of equity when they have one dollar of financing surplus, while firms with low reporting quality issue rather than buy back equity by $0.16 in the same situation. A larger proportion of stock repurchase on positive FCF for firms with high reporting quality would be attributable to an improved debt capacity due to high contracting value of accounting information as well as a reduction in the need to repay debt due to the mitigation of FCF problem through high reporting quality. Since this paper tests the effect of reporting quality on financing choices to fund investments,

empirical analyses hereafter focus on firms with the needs to use external financing (i.e., firms with financing deficit).

I note that a potential endogenous relation between reporting quality and financing choices can cloud my inference from empirical results. Specifically, reporting quality and financing choices would be simultaneously determined. In other words, as prior studies argue (Armstrong et al., 2010; Ball et al., 2008), reporting quality would be determined by *past* financing decisions or the firm's *expected* financing needs in the future. Further, uncontrolled firm characteristics would determine both reporting quality and financing choices (correlated omitted variable problem).

I already address this issue partly in the research design. I use lagged reporting quality relative to the dependent variables to reduce the likelihood that the reverse causality bias my results. However, while lagged reporting quality should be exogenous with respect to *unexpected* change in investment and financing decisions, it can be endogenous with respect to *expected* investment and financing decisions. To mitigate this concern, I use various firm characteristics that can be related to financing decisions and reporting quality. My results remain robust when I also include lagged external financing variables relative to the dependent variables as additional

control variables to address the contemporaneous relation between reporting quality and external financing (see Section 5.6).

Table 4 shows the alternative estimation results to further mitigate the endogeneity concern. To compare them with previous results, I present the results from Panel A of Table 3 in Columns (1) and (4) of each panel in Table 4. First, to control for omitted time-invariant firm characteristics, I estimate the firm fixed effect regressions. Column (2) and column (4) in each panel of Table 4 show that the coefficients on $Def_{t+1}*FRQ1_t$ are similar with those in Table 2. This indicates that my results are robust to the omission of time-invariant firm characteristics.[14]

Second, I use the system GMM estimator in Blundell and Bond (1998). While the instrumental variable approach is widely used to mitigate the endogeneity problem, finding proper instrumental variables (i.e., variables exogenous to the dependent variable and endogenous with the explanatory variable) is a very hard task (Larcker and Rusticus, 2010). The system GMM eliminates the need for exogenous instrumental variables because it uses the combination of variables from the firm's history as instrumental variables to obtain efficient estimates while controlling for time-invariant unobserved heterogeneity, simultaneity, and the dynamic

[14] I report the results using only the first measure of financial reporting quality for brevity since the results are similar when I use other measures of financial reporting quality.

relation between current values of the independent variables and past values of the dependent variable (Wintoki et al., 2012). Estimation results of system GMM are presented in Columns (3) and (6) of each panel in Table 4. Standard errors are estimated using Windmeijer's (2005) robust estimator.

Test results using the subsample of firms with financing deficit are similar with those in Table 3. The result using firms with financing deficit shows that, when the dependent variable is debt financing, the coefficient on $Def_{t+1}*FRQ1_t$ is significantly positive (0.159, *p*-value: 0.00, Column (3)). The coefficient on $Def_{t+1}*FRQ1_t$ in the net equity issue regression (Column (6)) is significantly negative (-0.066, *p*-value: 0.00). Insignificant values for *AR(2)* in each Column for the system GMM show that my sample does not violate the assumption of the second-order autocorrelation in first-differenced errors (*p*-value: 0.611 and 0.865 in Columns (3) and (6), respectively). Although the over-identification test in Column (3) indicates that my instruments, the variables from the firm's history, are of questionable quality in the net debt issue regression (*p*-value: 0.042), the use of instrument variables is valid in the net equity issue regression (Column (6), *p*-value: 0.443). These results show that my estimation results in Table 3 are robust to the potential endogeneity concerns.[15]

[15] I also estimate the Fama-MacBeth regression (1973) to control for the cross-sectional

Francis et al. (2005) suggest that financial reporting quality can be endogenously determined through economic fundamentals. I incorporate Francis et al. (2005) by adding the regression of accrual quality on economic fundamental variables into my system of equations. This modification provides the advantage that the endogenous nature of reporting quality and other firm characteristics can be explicitly addressed while maintaining the interdependence of financing choices to fund financing deficit. Consistent with Table 3, I impose the constraint on the coefficients on cash holding, debt issuance and equity issuance regressions, but do not restrict the coefficients on the reporting quality regression.

Table 5 shows the estimation result. In Column (4), many coefficients on economic fundamental variables are statistically significant, implying that reporting quality is endogenously determined by firm characteristics. More importantly, the coefficients on $Def_{t+1}*FRQ1_{t+1}$ are significantly positive and negative in Column (2) and (3), respectively, and they are similar with those in Table 3. This suggests that even after controlling for the effect of economic fundamentals on reporting quality, the effect of reporting quality on financing choices remains largely unchanged and significant.

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correlation. Overall results are qualitatively similar with the results in Table 3.

5.2 Reporting Quality and the Choice of Debt Maturity

To test my second hypothesis that reporting quality has a stronger effect on long-term debt than on short-term debt financing, I partition net debt issue into net short-term debt issue (*ΔShort-term Debt*) and net long-term debt issue (*ΔLong-term Debt*). Thus, I estimate the system of equations using the change in cash holdings, net short-term debt issue, net long-term debt issue, and net equity issue as the dependent variables.

Table 6 presents the estimation results. The coefficient on the interaction of financing deficit and financial reporting quality in Column (3) is significantly positive (0.206, *p*-value: 0.00), whereas that in Column (2) is insignificant (-0.007, *p*-value: 0.36). This indicates that, while high reporting quality does not have a significant effect on the use of short-term debt, it increases the firm's reliance on long-term debt issuance to fund financing needs. The coefficient on $Def_{t+1}*FRQ1_t$ in the net equity issue regression (Column (4)) remains significantly negative, consistent with that in Table 3.

These results support the second hypothesis that reporting quality has a stronger influence on the firm's reliance on long-term debt than on short-term debt financing. This is consistent with the importance of accounting information contractibility in financing decisions because long-term debt is expected to have a greater demand for accounting information

than short-term debt.

5.3 Reporting Quality and the Choice between Private and Public Debt

To test my third hypothesis on the difference between private debt and public debt, I partition net long-term debt issue into net private long-term debt issue (*ΔPrivate Long-term Debt*) and net public long-term debt issue (*ΔPublic Long-term Debt*).[16]

Table 7 presents the estimation results. The coefficient on $Def_{t+1}*FRQ1_t$ in net private long-term debt issue regression (Column (3)) is significantly positive (0.143, *p*-value: 0.00), and that in net public long-term debt issue regression (Column (4)) is marginally significant (0.057, *p*-value: 0.07). Untabulated analysis shows that the difference between two coefficients is statistically significant (χ^2: 8.31, *p*-value: 0.01). These results support the third hypothesis that reporting quality has a stronger effect on the use of private long-term debt than public long-term debt.

Faulkender and Petersen (2006) find that only 19% of their sample firms have access to public debt. Thus, my findings in Table 6 may be driven by firms without public debt. To address this concern, I exclude firms without public debt and re-estimate the system of equations. The results

[16] Following Qiang (2007), I classify notes (Compustat code: DN), capitalized lease obligations (DCLO), and other long-term debt (DLTO) as private long-term debt.

remain qualitatively unchanged, indicating that the results in Table 7 are not attributable to an over-representation of firms without public debt (untabulated).

5.4 Financial Constraints Test

To test the fourth hypothesis that the effect of reporting quality on financing choices is stronger for financially constrained firms than for unconstrained firms, I use financial constraints measure in Hadlock and Pierce (2010). Their *SA index* is calculated as -0.737 x *Size* + 0.043 x $Size^2$ – 0.040 x *Age*, where *Size* is the natural log of total assets (in millions) and *Age* is the firm age. I classify firms with values of *SA index* lower (higher) than the sample median as unconstrained (constrained).

Panels A and B of Table 8 present the results using constrained firms and unconstrained firms, respectively. The coefficient on financing deficit in the net debt issue regression for constrained firms (Column (2) of Panel A) is 0.388 (*p*-value: 0.00) and that for unconstrained firms (Column (2) of Panel B) is 0.650 (*p*-value: 0.00). In contrast, the coefficient on financing deficit in the net equity issue regression for constrained firms (Column (3) of Panel A) is 0.295 (*p*-value: 0.00) and that for unconstrained firms (Column (4) of Panel B) is 0.193 (*p*-value: 0.00). This indicates that, compared with

unconstrained firms, financially constrained firms have limited access to the debt market and are thus forced to issue more equity.

In each panel, the coefficients on the interaction between financing deficit and reporting quality are significantly positive in Column (2) and significantly negative in Column (3), suggesting that the effect of reporting quality on financing choices is persistent for both groups of firms. When I compare the coefficients on $Def_{t+1}*FRQ1_t$ in the two panels, I find that the positive effect of reporting quality on the use of debt financing relative to equity financing is stronger for constrained firms than for unconstrained firms. The coefficient on $Def_{t+1}*FRQ1_t$ in Column (2) in Panel A (0.144, *p*-value: 0.00) is larger than that in Panel B (0.097, *p*-value: 0.00). Their difference is statistically significant (*z*-stat.: 1.403, *p*-value: 0.08).[17] The coefficient on $Def_{t+1}*FRQ1_t$ in column (3) in Panel A (-0.138, *p*-value: 0.00) is more negative than that in Panel B (-0.065, *p*-value: 0.03), and the difference between them is also significant (*z*-stat.: 1.824, *p*-value: 0.03).

Prior studies document that firms close to covenant violation, due to their high reliance on debt financing in past years, are more likely to impair reporting quality to avoid violating covenants (e.g., Graham et al., 2005).

[17] I follow Clogg et al. (1995) to check whether the difference between the coefficients from two regression models is statistically significant. Specifically, I calculate the *z*-statistic as follows. $z = (bG1 - bG2) / \sqrt{[SE(bG1)^2 + SE(bG2)^2]}$, where *bG1* (*bG2*) and *SE*(*bG1*) (*SE*(*bG2*)) refer to the coefficient on the variable of interest and its standard errors in the first (second) regression, respectively.

However, this should work against finding a significant effect of reporting quality on the use of debt financing to fund investments when the firm is financially constrained. One may also argue that a failure to control for the presence of capital covenants biases above results. Particularly, firms with large debt capacity would attract debt investors by using capital covenants rather than performance covenants when their reporting quality is poor. However, I find that high reporting quality increases the firm's reliance on debt financing relative to equity financing even when the firm is financially unconstrained, suggesting that the effect of reporting quality on financing choices is robust to the potential confounding effect of capital covenants.

5.5 Financial Reporting Quality, Collateral Shocks, and Debt Capacity

Then, I examine the role of reporting quality on the effect of the change in collateral values on financing activities. High reporting quality reduces the demand for collateral by debt investors (e.g., Bharath et al., 2008). In other words, firms with lower reporting quality should provide more collateral to obtain more debt financing. Further, Balakrishnan et al. (2014) find that firms with higher reporting quality have a lower sensitivity of investment to collateral changes because reporting quality substitutes for collateral in mitigating the information asymmetry. Thus, a failure to control

for collateral shock would bias my inference from empirical results.

I follow Balakrishnan et al. (2014) to construct the market value of real estates (*RE*) and include it into the system of equations. Panel A of Table 9 presents the estimation result. The coefficient on $Def_{t+1}*RE_t$ is positive in Column (2), implying that a negative shock on the collateral value reduces the use of debt financing. Significantly negative coefficients on $Def_{t+1}*RE_t*FRQ1_{t+1}$ in Column (2) suggest that high reporting quality mitigates the reduction in debt financing due to collateral shock, consistent with Balakrishnan et al. (2014). Furthermore, the coefficient on $Def_{t+1}*Re_t*FRQ1_{t+1}$ in Column (3) is significantly positive, implying that there is the substitutive relation between the effects of reporting quality and the change in collateral value on financing choices between debt and equity financing. The coefficients on $Def_{t+1}*FRQ1_{t+1}$ are similar with those in Table 3. Thus, previous results are robust to the effect of collateral shock on financing activities.

The substitutive relation between reporting quality and collateral value of real estates in Panel A of Table 9 may indicate that the improvement of an access to debt financing due to high reporting quality can be more pronounced for the firms with low debt capacity (i.e., low collateral value of real estates). To test this possibility, I follow Lemmon and Zender (2010) and

use the likelihood of having long-term bond rating as a proxy of debt capacity. The likelihood of having long-term bond rating is estimated using the logit regression of the rating dummy on firm size, return-on-assets, tangibility, market-to-book ratio, leverage, firm age, and return volatility. Firms with lower (higher) likelihoods of having long-term bond rating than the median are assumed to have low (high) debt capacity.

Panel B of Table 9 represents the estimation results. The coefficients on $Def_{t+1}*FRQ1_{t+1}$ have same signs with those in Table 3, indicating that the effect of reporting quality on the use of debt financing relative to equity financing is robust after controlling for the firm's debt capacity. The coefficients on $Def_{t+1}*HighCapa_{t+1}$ are significantly positive and negative in Columns (2) and (3). This indicates that, consistent with Panel A, firms with larger debt capacity use more debt financing relative to equity financing. Also, the coefficients on $Def_{t+1}*HighCapa_{t+1}*FRQ1_{t+1}$ are negative and positive in Columns (2) and (3). This supports the substitutive relation between reporting quality and debt capacity in debt financing.

5.6 Robustness Tests

In this section, I perform a set of robustness tests to provide assurance on the empirical validity of previous results.

First, to check whether the different implication between prior studies and this study stems from the definition of reporting quality, I use the restatement data in Hennes et al. (2008).[18] Untabulated results shows that, while the coefficients on the interaction between financing deficit and the indicator variable for restatements are statistically insignificant, their signs indicate that firms with restatements use more equity financing relative to debt financing to fund investments in the year subsequent to the restatement, relative to firms without restatements. To mitigate the concern that insignificant results are attributable to sample attrition, I estimate the probability of restatements and use it as a proxy for financial reporting quality. Particularly, after regressing the indicator variable for restatements on firm characteristics in Equation (2) using the sample firms from 1997 to 2006, I use the estimated coefficients to calculate the probability of restatements for the full sample period. The untabulated result shows that the coefficients on the interaction between financing deficit and the probability of restatements are significantly negative (positive) when the dependent variable is net debt issue (net equity issue), similar with Table 3.

Second, to test whether different inferences from those of prior studies are attributable to the sample choice, I estimate the probit regression

[18] Restatement data is available at Andrew Leone's website (https://sbaleone.bus.miami.edu). After the data attrition, the total number of restatements in my sample from 1997 to 2006 is 872.

similar with Table 4 in Chang et al. (2009). I define an indicator variable equal to one for firms with net debt issuance larger than or equal to the threshold, and zero for firms with net equity issuance larger than or equal to the threshold. I eliminate firms with both debt and equity financing larger than threshold, or firms with both financing activities smaller than the threshold. I use 5% lagged total assets as the thresholds for the indicator variables.

Table 10 presents test results. Columns (1) to (3) show the results using total sample, and Column (4) shows the results using only firms with financing deficit. In each column, the coefficient on *Bigauditor*, an indicator variable of receiving auditing service from large accounting firm, is significantly negative. This is consistent with Chang et al. (2009) who find that receiving audit service from large accounting firms increase the likelihood that the firm uses equity financing rather than debt financing. More importantly, even after controlling for the big auditor effect on financing choices, overall results in Table 10 are consistent with my previous findings. In Columns (2), the coefficient for $FRQ1_t$ is significantly positive when financing deficit is not controlled for. When financing deficit is included as a control variable, in Column (3), the coefficient for $FRQ1_t$ is positive but insignificant, whereas the coefficient for $Def_{t+1}*FRQ1_t$ is

significantly positive. The result using financing deficit sample in Column (4) is similar with that in Column (3). These indicate that high reporting quality increases the likelihood that the firm issues a large amount of debt rather than equity even after controlling for the effect of auditor choice on financing decisions. This result alleviates the concern that different inferences from prior studies are attributable to my choice of research design.

Third, Gatchev et al. (2010) argue that empirical analysis without lagged values of financing choices as the independent variables will result in model misspecification due to omitted variable problems. Following this suggestion, I use lagged values of the dependent variables as additional independent variables in Equation (2). Table 11 shows the results. In Column (1), the coefficient on the lagged change in cash holdings ($\Delta Cash_t$) is significantly negative, indicating that an increase in cash holdings is be followed by reduction. The coefficient on $\Delta Debt_t$ in Column (2) and that on $\Delta Equity_t$ in Column (3) are significantly positive, indicating that firms revisit external funding channels that they used in the previous year. The positive coefficient on $\Delta Equity_t$ in Column (9) is consistent with the argument that many share repurchase programs are executed over multiple years (Gatchev et al., 2010). More importantly, the coefficients on the interaction between financing deficit and reporting quality in Table 11 are similar with those in

Table 3, suggesting that the results are robust to the intertemporal dependence of financing choices.

Fourth, I partition the sample into firms with low and high information uncertainty to address the concern that outside investors may fail to understand the implication of financial reporting under poor information environments (Zhang, 2006). I classify small firms, young firms, or firms with high volatility of operating cash flows for past 5 years as firms with high information uncertainty. The results in Table 11 show that the effect of reporting quality on financing choices remains significant regardless of the partitioning criteria, suggesting that the role of reporting quality on financing decision is important even when the information environment is poor.

6. Conclusion

Building on studies on the role of accounting information in debt contracting, I provide new evidence on the effect of reporting quality on financing choices between debt and equity financing. I find that the use of debt financing relative to equity financing to fund financing needs increases in financial reporting quality. My finding that reporting quality has a stronger effect on private long-term debt than short-term debt or public long-term debt reinforces the importance of accounting information in debt financing.

Thus, this study complements prior studies that examine the effect of reporting quality on capital structure such as Chang et al. (2009) and Chen et al. (2013). However, I note that my finding does not suggest that financial reporting quality has a negative effect on equity financing. Rather, it can be interpreted that the first-order effect of high reporting quality on debt financing will reduce the demand for equity financing, which is consistent with the pecking order theory as well as the debt contracting value of accounting information.

This paper also provides a new research design addressing the shortcomings of previous studies. My empirical analysis reveals how financial reporting quality influences the interdependence of financing choices to fund investments. Furthermore, I partition the sample into firms with financing deficit and surplus so as to consider the FCF problem as another potential determinant of financing choices.

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Appendix A: Variable Definition

Variable	Definition
FRQ1(*2,3*)	The decile rank of financial reporting quality, scaled by ten. *FRQ1* is based on Demerjian et al. (2013). *FRQ2* is based on Bharath et al. (2008). *FRQ3* is based on McNichols (2002).
ΔCash	The change in cash and short-term investments (Compustat code: CHE), scaled by one-year lagged total assets (AT).
ΔDebt	Net debt issue, calculated as the change in the sum of short-term debt (DLC) and long-term debt (DLTT), scaled by lagged total assets.
ΔShort-term Debt	The change in short-term debt, scaled by lagged total assets.
ΔLong-term Debt	The change in long-term debt, scaled by lagged total assets.
ΔPrivate Long-term Debt	The change in private long-term debt, scaled by one-year-lagged total assets. Private long-term debt includes notes (DN), capitalized lease obligations (DCLO), and other long-term debts (DLTO) (Qiang, 2007).
ΔPublic Long-term Debt	The change in public long-term debt, scaled by lagged total assets. Public long-term debt is total long-term debt minus private long-term debt.
ΔEquity	Net equity issue, calculated as new equity issue (SSTK) minus equity repurchase (PRSTKC), scaled by one-year-lagged total assets.
Def	Financing deficit. The sum of capital expenditure (CAPX), change in working capital (change in (ACT-CHE)-(LCT-DLC)), acquisitions (AQC) and dividend payments (DVC+DVP) minus sales of property, plant and equipment (SPPE) and cash flows from operations (OANCF), scaled by one-year-lagged total assets (Frank and Goyal, 2003).
Surplus	Financing surplus. This is the negative value of financing deficit.
Size	The natural log of total assets (AT).

Lev	The ratio of interest-bearing debt (DLC+DLTT) to total assets.
BM	The ratio of the book value of equity to the market value of equity (CSHO*PRCC_F).
CFVola	The standard deviation of cash flows from operations (OANCF) scaled by the total assets over at least three of the past five years.
Loss%	The percentage of years reporting losses in net income (NI) over at least three of the past five years.
Dep	The ratio of depreciation and amortization expenses (DP) to the previous year's total assets.
R&D	Research and development expenses (XRD), scaled by sales. Zero for firms not reporting R&D expenses.
R&D_D	An indicator variable that equals one for firms reporting R&D expenses, zero otherwise.
RetVola	The standard deviation of daily stock returns over the fiscal year.
Ret	Stock returns over the fiscal year.
Bigauditor	An indicator variable equal to one for firms audited by big accounting firm, zero otherwise.

Appendix B: Distribution of External Financing

To gauge the amount of information excluded from previous studies, Table B.1 shows the distribution of firm-year observations over the level of financing activities. The first and second columns in Table B.1 show the distribution of observations between the cutoff points of net debt issue (the sum of net short-term debt issue and net long-term debt issue) and net equity issue (equity issue minus equity repurchase), respectively. The third column shows the portion of firms with both net debt issue and net equity issue within the cutoff points. The sample consists of 85,738 firm-year observations from 1974 to 2011. The table indicates that 75.81% (55.83%) and 89.43% (47.14%) of the observations have net debt issue and net equity issue less than 5% (0%) of their lagged total assets, respectively. Thus, requiring the sample firms to have external financing above a certain threshold eliminates the information provided by firms that have little or no external financing.

Table B.1. Distribution of External Financing

Threshold	Net Debt Issue (A)	Net Equity Issue (B)	Both Net Debt Issue and Net Equity Issue (C)
Issue >= 5%	24.19%	10.57%	2.89%
4% < Issue < 5%	2.55%	1.11%	0.02%
3% < Issue < =4%	3.04%	1.65%	0.03%
2% < Issue < =3%	3.54%	2.77%	0.09%
1% < Issue < =2%	4.41%	6.26%	0.27%
0% < Issue < =1%	6.43%	30.50%	2.06%
Issue = 0%	10.67%	19.16%	1.73%
-1% <=Issue < 0%	12.16%	11.10%	2.31%
-2% <=Issue < -1%	6.37%	4.26%	0.34%
-3% <=Issue < -2%	4.73%	2.74%	0.12%
-4% <=Issue < -3%	3.68%	1.87%	0.05%
-5% <=Issue < -4%	3.05%	1.49%	0.03%
Issue < -5%	15.17%	6.53%	0.45%
Total	100.00%	100.00%	
Issue < 5%	75.81%	89.43%	
Issue <= 0%	55.83%	47.14%	

Appendix C: The Likelihood of Having Long-Term Bond Rating

Following Lemmon and Zender (2010), debt capacity is proxied by the likelihood of having long-term bond rating (Compustat: SPLTICRM). I estimated the likelihood of having long-term bond rating using the logit regression of the dummy variable of the presence of long-term bond rating on control variables. Since the long-term debt data is not fully available for the periods before 1986, the logit regression is estimated using observations from 1986 and the estimated coefficients are then used to calculated the likelihood of having long-term bond rating.

Table C.1. The Logit Regression of the Presence of Long-Term Bond Rating

Dep. Var.= 1 for firms having long-term bond rating in year *t*+1, 0 otherwise	
Intercept	-12.167***
	(0.000)
$Size_t$	1.416***
	(0.000)
ROA_t	0.530**
	(0.027)
$Tangible_t$	-0.101
	(0.292)
MB_t	-0.040***
	(0.000)
Lev_t	5.908***
	(0.000)
Age_t	0.379***
	(0.000)
$RetVola_t$	-0.656
	(0.107)
Adj. R2	0.572
Obs.	32,149

Table 1. Summary Statistics

	Def_{t+1}	$\Delta Cash_{t+1}$	$\Delta Debt_{t+1}$	ΔShort-term $Debt_{t+1}$	ΔLong-term $Debt_{t+1}$	ΔPrivate Long-term $Debt_{t+1}$	ΔPublic Long-term $Debt_{t+1}$	$\Delta Equity_{t+1}$	$\Delta Debt_{t+1}$ >5%	$\Delta Equity_{t+1}$ >5%	$\Delta Debt_{t+1}$ >1%	$\Delta Equity_{t+1}$ >1%
$FRQ1_t = 0.1$	0.112	0.055	0.028	0.004	0.024	0.024	0.004	0.082	0.255	0.220	0.361	0.352
$FRQ1_t = 0.2$	0.065	0.035	0.024	0.004	0.020	0.016	0.004	0.045	0.244	0.152	0.359	0.272
$FRQ1_t = 0.3$	0.060	0.030	0.027	0.004	0.023	0.019	0.004	0.036	0.248	0.128	0.366	0.251
$FRQ1_t = 0.4$	0.046	0.031	0.025	0.004	0.021	0.019	0.002	0.028	0.243	0.112	0.370	0.233
$FRQ1_t = 0.5$	0.040	0.022	0.023	0.004	0.018	0.015	0.003	0.022	0.234	0.098	0.361	0.212
$FRQ1_t = 0.6$	0.038	0.019	0.026	0.003	0.023	0.021	0.003	0.017	0.238	0.086	0.375	0.204
$FRQ1_t = 0.7$	0.035	0.020	0.024	0.005	0.020	0.019	0.002	0.014	0.233	0.084	0.378	0.197
$FRQ1_t = 0.8$	0.036	0.017	0.028	0.005	0.023	0.021	0.002	0.010	0.243	0.073	0.385	0.190
$FRQ1_t = 0.9$	0.035	0.015	0.028	0.006	0.022	0.020	0.002	0.006	0.238	0.064	0.400	0.174
$FRQ1_t = 1.0$	0.032	0.014	0.030	0.004	0.026	0.022	0.003	0.005	0.243	0.063	0.415	0.176
High-Low Diff	-0.079	-0.041	0.002	0.000	0.002	-0.002	0.000	-0.077	-0.013	-0.157	0.054	-0.176
p-value	(0.000)	(0.000)	(0.131)	(0.446)	(0.130)	(0.000)	(0.000)	(0.000)	(0.031)	(0.000)	(0.000)	(0.000)
Rank Corr.	-0.811	-0.900	0.427	0.483	0.289	0.190	-0.619	-0.896	-0.573	-0.907	0.899	-0.907
p-value	(0.004)	(0.001)	(0.235)	(0.173)	(0.450)	(0.001)	(0.622)	(0.027)	(0.092)	(0.000)	(0.000)	(0.000)

	$Size_t$	MB_t	Lev_t	$CFVola_t$	$Loss\%_t$	Dep_t	$Tangible_t$	$R\&D_t$	$R\&D\_D_t$	$RetVola_t$	Ret_t
$FRQ1_t = 0.1$	3.736	2.999	0.206	0.166	0.471	0.047	0.247	0.155	0.502	0.201	0.213
$FRQ1_t = 0.2$	4.008	2.376	0.208	0.117	0.366	0.046	0.272	0.095	0.488	0.176	0.214
$FRQ1_t = 0.3$	4.251	2.187	0.212	0.100	0.320	0.047	0.290	0.087	0.494	0.162	0.210
$FRQ1_t = 0.4$	4.479	2.127	0.214	0.087	0.272	0.046	0.299	0.079	0.485	0.153	0.211
$FRQ1_t = 0.5$	4.715	2.089	0.211	0.079	0.239	0.045	0.306	0.069	0.495	0.145	0.199
$FRQ1_t = 0.6$	4.953	2.110	0.210	0.073	0.196	0.045	0.316	0.065	0.494	0.136	0.198
$FRQ1_t = 0.7$	5.190	2.141	0.208	0.066	0.163	0.045	0.322	0.060	0.489	0.129	0.191

$FRQ1_t$ = 0.8	5.378	2.133	0.203	0.061	0.120	0.044	0.326	0.053	0.501	0.123	0.202
$FRQ1_t$ = 0.9	5.698	2.173	0.203	0.053	0.090	0.044	0.335	0.043	0.492	0.114	0.186
$FRQ1_t$ = 1.0	5.869	2.227	0.202	0.050	0.084	0.044	0.339	0.044	0.494	0.112	0.187
High-Low Diff	2.133	-0.772	-0.004	-0.116	-0.387	-0.003	0.092	-0.112	-0.008	-0.089	-0.025
p-value	(0.000)	(0.000)	(0.057)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.172)	(0.000)	(0.011)
Rank Corr.	0.999	-0.575	-0.621	-0.914	-0.981	-0.964	0.964	-0.887	0.012	-0.972	-0.911
p-value	(0.000)	(0.082)	(0.068)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.985)	(0.000)	(0.000)

Panel A of this table presents the summary statistics of financial reporting quality, financing activities, financing deficit, and other control variables by decile of financial reporting quality (*FRQ1*). Panel B shows the correlations among financial reporting quality, financing deficit, and financing choice variables for firms with low reporting quality (*FRQ1*<0.4) and for firms with high reporting quality (*FRQ1*>0.7). *FRQ1* is the measure of financial reporting quality based on Demerjian et al. (2013). *ΔCash* is the change in cash holdings from year *t* to year *t*+1. *ΔDebt* is net debt issue, calculated as the change in debt from year *t* to year *t*+1, scaled by total assets in year *t*. *ΔEquity* is net equity issue, measured as new equity sales minus equity repurchases in year *t*+1, scaled by total assets in year *t*. *ΔShort-term Debt* is the change in short-term debt from year *t* to year *t*+1. *ΔLong-term Debt* is the change in long-term debt from year *t* to year *t*+1. *ΔPublic Long-term Debt* is the change in public long-term debt from year *t* to year *t*+1. *ΔPrivate Long-term Debt* is the change in private long-term debt from year *t* to year *t*+1. All debt financing variables are scaled by total assets in year *t*. *ΔDebt*>5% (*ΔDebt*>1%) is an indicator variable equal to one for firms with net debt issue larger than 5% (1%) of lagged total assets, and zero otherwise. *ΔEquity*>5% (*ΔEquity*>1%) is an indicator variable equal to one for firms with net equity issue larger than 5% (1%) of lagged total assets, and zero otherwise. *Def* is the financing deficit (when positive) or financing surplus (when negative), calculated as the sum of capital expenditure, changes in working capital, dividend payments, and acquisitions, minus operating cash flows and sales of plant, property, and equipment (PPE), all scaled by the previous year's total assets. Definitions of other variables are explained in Appendix A. Correlations in bold in Panel B indicate significance at the 5% level.

Table 2. Financing Activities for the Quintiles of Financial Reporting Quality and Financing Needs

Panel A: Debt Financing of Firms with Financing Deficit

$\Delta Debt_{t+1}$		$FRQ1_t$					
		1:Low	2	3	4	5:High	High-Low
Def_{t+1}	1:Small	0.005	0.007	0.011	0.011	0.015	0.010***
	2	0.014	0.017	0.020	0.024	0.032	0.018***
	3	0.031	0.039	0.041	0.042	0.049	0.018***
	4	0.058	0.072	0.078	0.084	0.091	0.033***
	5:Large	0.143	0.170	0.196	0.205	0.223	0.080***
	Total	0.049	0.064	0.071	0.073	0.077	0.028***

Panel B: Equity Financing of Firms with Financing Deficit

$\Delta Equity_{t+1}$		$FRQ1_t$					
		1:Low	2	3	4	5:High	High-Low
Def_{t+1}	1:Small	0.014	0.006	0.001	-0.003	-0.002	-0.016***
	2	0.024	0.014	0.011	0.006	-0.001	-0.025***
	3	0.039	0.023	0.020	0.013	0.014	-0.025***
	4	0.069	0.046	0.037	0.035	0.024	-0.045***
	5:Large	0.252	0.174	0.144	0.133	0.107	-0.146***
	Total	0.078	0.057	0.043	0.035	0.026	-0.052***

Panel C: Debt Financing of Firms with Financing Surplus

$\Delta Debt_{t+1}$		$FRQ1_t$					
		1:Low	2	3	4	5:High	High-Low
$Surplus_{t+1}$ (Def_{t+1} <0)	1:Small	-0.007	-0.008	0.000	-0.001	0.003	0.009***
	2	-0.019	-0.017	-0.012	-0.009	-0.009	0.010***
	3	-0.029	-0.020	-0.018	-0.018	-0.015	0.014***
	4	-0.028	-0.034	-0.026	-0.030	-0.025	0.003
	5:Large	-0.060	-0.049	-0.047	-0.042	-0.034	0.026***
	Total	-0.030	-0.024	-0.021	-0.023	-0.015	0.015***

Panel D: Equity Financing of Firms with Financing Surplus

$\Delta Equity_{t+1}$		$FRQ1_t$					
		1:Low	2	3	4	5:High	High-Low
$Surplus_{t+1}$ (Def_{t+1} <0)	1:Small	0.012	0.004	-0.001	-0.003	-0.006	-0.018***
	2	0.009	0.001	-0.003	-0.006	-0.007	-0.016***
	3	0.013	0.004	0.001	-0.008	-0.013	-0.026***
	4	0.009	0.003	-0.007	-0.007	-0.013	-0.022***
	5:Large	0.016	0.008	0.003	-0.006	-0.014	-0.031***
	Total	0.012	0.004	-0.001	-0.006	-0.010	-0.023***

This table presents the external financing activities for the quintile ranks of *FRQ1* and financing deficit (*Def*) or financing surplus (negative *Def*). Panel A (B) shows debt (equity) financing of firms with financing deficit, and Panel C (D) shows debt (equity) financing of firms with financing surplus. The quintile of *FRQ1* is formed in year *t* and the quintile of *Def* or *Surplus* is formed at year *t+1*. Financing activities are measured at year *t+1*. *FRQ1* is the measure of financial reporting quality based on Demerjian et al. (2013). *ΔDebt* is net debt issue, calculated as the change in debt from year *t* to year *t*+1, scaled by total assets in year *t*. *ΔEquity* is net equity issue, measured as new equity sales minus equity repurchases in year *t*+1, scaled by total assets in year *t*. *Def* is the financing deficit (when positive) or financing surplus (when negative), calculated as the sum of capital expenditure, changes in working capital, dividend payments, and acquisitions, minus operating cash flows and sales of plant, property, and equipment, all scaled by the previous year's total assets. *, ** and *** denote the significance of difference between high and low *FRQ1* quintiles at the 0.10, 0.05 and 0.01 levels, respectively.

Table 3. The System of Equations on the Effect of Financial Reporting Quality and Financing Choices

Panel A: *FRQ1* is the accruals quality as modified by Demerjian et al. (2013)

Dep. Var.=	Total Sample (1) ~ (3)			Firms with Financing Deficit (4) ~ (6)			Firms with Financing Surplus (Negative Deficit) (7) ~ (9)		
	(1)$\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4)$\Delta Cash_{t+1}$	(5) $\Delta Debt_{t+1}$	(6) $\Delta Equity_{t+1}$	(7)$\Delta Cash_{t+1}$	(8) $\Delta Debt_{t+1}$	(9) $\Delta Equity_{t+1}$
Intercept	-0.011 ***	0.026 ***	-0.037 ***	-0.087 ***	0.004	-0.092 ***	-0.015 ***	0.006 **	-0.021 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.209)	(0.000)	(0.000)	(0.021)	(0.000)
$FRQ1_t$	-0.003	-0.013 ***	0.010 ***	0.005	-0.037 ***	0.042 ***	0.011 ***	-0.001	0.011 ***
	(0.106)	(0.000)	(0.000)	(0.192)	(0.000)	(0.000)	(0.001)	(0.742)	(0.000)
Def_{t+1}	-0.468 ***	0.340 ***	0.192 ***	-0.293 ***	0.417 ***	0.290 ***	-0.803 ***	0.223 ***	-0.025 *
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.052)
$Def_{t+1}*FRQ1_t$	0.029 *	0.131 ***	-0.102 ***	0.021	0.194 ***	-0.173 ***	0.103 ***	0.010	0.093 ***
	(0.059)	(0.000)	(0.000)	(0.345)	(0.000)	(0.000)	(0.000)	(0.603)	(0.000)
$Size_t$	-0.004 ***	0.003 ***	-0.006 ***	-0.001 *	0.005 ***	-0.006 ***	-0.002 ***	0.002 ***	-0.004 ***
	(0.000)	(0.000)	(0.000)	(0.073)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MB_t	0.010 ***	0.001 ***	0.009 ***	0.011 ***	-0.003 ***	0.013 ***	0.005 ***	0.004 ***	0.001 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.010)
Lev_t	-0.038 ***	-0.072 ***	0.035 ***	0.026 ***	0.003	0.023 ***	-0.120 ***	-0.155 ***	0.035 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.508)	(0.000)	(0.000)	(0.000)	(0.000)
$CFVola_t$	0.079 ***	-0.001	0.080 ***	-0.018	-0.060 ***	0.042 ***	0.099 ***	0.024 ***	0.075 ***
	(0.000)	(0.902)	(0.000)	(0.216)	(0.000)	(0.002)	(0.000)	(0.004)	(0.000)
$Loss\%_t$	0.008 ***	-0.039 ***	0.047 ***	0.012 ***	-0.047 ***	0.059 ***	0.015 ***	-0.009 ***	0.024 ***
	(0.002)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dep_t	0.060 **	-0.051 ***	0.111 ***	0.168 ***	-0.029	0.197 ***	-0.166 ***	-0.123 ***	-0.043 **
	(0.017)	(0.007)	(0.000)	(0.000)	(0.278)	(0.000)	(0.000)	(0.000)	(0.041)
$Tangible_t$	0.055 ***	0.026 ***	0.029 ***	0.094 ***	0.045 ***	0.049 ***	0.048 ***	0.029 ***	0.019 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$R\&D_t$	0.044 ***	-0.047 ***	0.091 ***	0.036 ***	-0.044 ***	0.080 ***	0.118 ***	0.020 ***	0.098 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)
$R\&D\_D_t$	-0.003 ***	-0.006 ***	0.003 ***	-0.004 **	-0.009 ***	0.005 ***	-0.002	-0.004 ***	0.002 *
	(0.010)	(0.000)	(0.001)	(0.011)	(0.000)	(0.000)	(0.242)	(0.000)	(0.074)
$RetVola_t$	0.060 ***	-0.011	0.071 ***	0.019	-0.038 ***	0.056 ***	0.081 ***	0.006	0.074 ***

	(0.000)	(0.142)	(0.000)	(0.236)	(0.001)	(0.000)	(0.000)	(0.437)	(0.000)
Ret$_t$	0.026 ***	0.004 ***	0.022 ***	0.026 ***	-0.001	0.028 ***	0.021 ***	0.006 ***	0.015 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.358)	(0.000)	(0.000)	(0.000)	(0.000)
Obs.		85,692			46,489			39,203	
Financing Choices in Response to One Dollar of Financing Deficit									
FRQ1 = 0.1: Lowest	-0.465	0.353	0.182	-0.291	0.436	0.273			
FRQ1 = 0.55: Median	-0.452	0.412	0.136	-0.282	0.523	0.195			
FRQ1 = 1.0: Highest	-0.439	0.471	0.090	-0.272	0.611	0.117			
Financing Choices in Response to One Dollar of Financing Surplus									
FRQ1 = 0.1: Lowest							0.793	-0.224	0.016
FRQ1 = 0.55: Median							0.746	-0.228	-0.026
FRQ1 = 1.0: Highest							0.700	-0.232	-0.068

Panel B: *FRQ2* is the accounting quality, based on Bharath et al. (2008).

Dep. Var.=	Total Sample (1) ~ (3)			Firms with Financing Deficit (4) ~ (6)			Firms with Financing Surplus (Negative Deficit) (7) ~ (9)		
	(1)$\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4)$\Delta Cash_{t+1}$	(5) $\Delta Debt_{t+1}$	(6) $\Delta Equity_{t+1}$	(7)$\Delta Cash_{t+1}$	(8) $\Delta Debt_{t+1}$	(9) $\Delta Equity_{t+1}$
Def_{t+1}	-0.452 ***	0.356 ***	0.192 ***	-0.275 ***	0.440 ***	0.286 ***	-0.768 ***	0.223 ***	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.935)
Def_{t+1}*$FRQ2_t$	-0.005	0.091 ***	-0.096 ***	-0.015	0.139 ***	-0.154 ***	0.029	-0.013	0.041 **
	(0.720)	(0.000)	(0.000)	(0.445)	(0.000)	(0.000)	(0.332)	(0.536)	(0.023)
Obs.		84,600			45,921			38,679	

Panel C: *FRQ3* is the accruals quality as modified by McNichols (2002).

Dep. Var.=	Total Sample (1) ~ (3)			Firms with Financing Deficit (4) ~ (6)			Firms with Financing Surplus (Negative Deficit) (7) ~ (9)		
	(1)$\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4)$\Delta Cash_{t+1}$	(5) $\Delta Debt_{t+1}$	(6) $\Delta Equity_{t+1}$	(7)$\Delta Cash_{t+1}$	(8) $\Delta Debt_{t+1}$	(9) $\Delta Equity_{t+1}$
Def_{t+1}	-0.476 ***	0.341 ***	0.183 ***	-0.300 ***	0.426 ***	0.273 ***	-0.800 ***	0.214 ***	-0.014
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.282)
Def_{t+1}*$FRQ3_t$	0.046 ***	0.126 ***	-0.081 ***	0.037 *	0.171 ***	-0.134 ***	0.095 ***	0.025	0.070 ***

	(0.002)	(0.000)	(0.000)	(0.079)	(0.000)	(0.000)	(0.001)	(0.150)	(0.001)
Obs.		84,917			46,134			38,783	

This table presents the estimation results of the system of equations with external financing and changes in cash holdings as the dependent variables (Equation (8)). The system of equations is estimated using the maximum likelihood method, and the standard errors are clustered at the firm level (Gould et al., 2006). In each panel, Columns (1) to (3), (4) to (6), and (7) to (9) show the estimation results obtained using the total sample, firms with the financing deficit, and firms with the financing surplus, respectively. Definitions of the variables are given in Appendix A. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively. "Financing Choices in Response to One Dollar of Financing Deficit" illustrates the amount of external financing and changes in cash holdings that take place when there is one dollar of financing deficit, for each level of financial reporting quality, calculated as (coefficient on Def_{t+1} + value of FRQ_t * coefficient on $Def_{t+1}*FRQ_t$). "Financing Choices in Response to One Dollar of Financing Surplus" illustrates the amount of repayment to outside investors and changes in cash holdings made in response to one dollar of financing surplus, for each level of financial reporting quality, calculated as (coefficient of Def_{t+1} + value of FRQ_t * coefficient on $Def_{t+1}*FRQ_t$)*(-1).

Table 4. Alternative Estimation of the Association between Financial Reporting Quality and Financing Choices

	Dependent Variable = $\Delta Debt_{t+1}$			Dependent Variable = $\Delta Equity_{t+1}$		
	(1) The System of Equation (Table 3)	(2) Firm Fixed Effects	(3) Dynamic GMM	(4) The System of Equation (Table 3)	(5) Firm Fixed Effects	(6) Dynamic GMM
Intercept	0.004	-0.001	0.318 ***	-0.092 ***	-0.065 ***	0.519 ***
	(0.209)	(0.927)	(0.000)	(0.000)	(0.000)	(0.000)
$FRQ1_t$	-0.037 ***	-0.041 ***	-0.022 ***	0.042 ***	0.040 ***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.932)
Def_t			0.029 ***			-0.018 ***
			(0.000)			(0.002)
Def_{t+1}	0.417 ***	0.368 ***	0.211***	0.290 ***	0.292 ***	0.138 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Def_{t+1} * $FRQ1_t$	0.194 ***	0.212 ***	0.159 ***	-0.173 ***	-0.174 ***	-0.066 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Size_t$	0.005 ***	0.006 ***	-0.066 ***	-0.006 ***	-0.011 ***	-0.191 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MB_t	-0.003 ***	-0.005 ***	-0.003 ***	0.013 ***	0.014 ***	0.015 ***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Lev_t	0.003	-0.068 ***	-0.974 ***	0.023 ***	0.060 ***	0.483 ***
	(0.508)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$CFVola_t$	-0.060 ***	-0.038 ***	-0.066 ***	0.042 ***	0.042 ***	0.047 **
	(0.000)	(0.001)	(0.002)	(0.002)	(0.002)	(0.029)
$Loss\%_t$	-0.047 ***	-0.046 ***	-0.038 ***	0.059 ***	0.039 ***	-0.111 ***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Dep_t	-0.029	-0.097 ***	0.227 ***	0.197 ***	0.346 ***	0.419 ***
	(0.278)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
$Tangible_t$	0.045 ***	0.064 ***	0.192 ***	0.049 ***	0.043 ***	0.186 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$R\&D_t$	-0.044 ***	-0.052 ***	-0.012 **	0.080 ***	0.071 ***	0.018 ***
	(0.000)	(0.000)	(0.026)	(0.000)	(0.000)	(0.008)
$R\&D\_D_t$	-0.009 ***	-0.006 ***	-0.009 *	0.005 ***	0.008 ***	-0.003
	(0.000)	(0.001)	(0.051)	(0.000)	(0.000)	(0.588)
$RetVola_t$	-0.038 ***	-0.028 **	-0.021	0.056 ***	0.012	-0.073 ***
	(0.001)	(0.034)	(0.335)	(0.000)	(0.486)	(0.001)
Ret_t	-0.001	-0.004 ***	-0.005 ***	0.028 ***	0.030 ***	0.016 ***
	(0.358)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
AR(2) test			(0.611)			(0.865)
Over-identification Test			(0.042)			(0.443)
Adj. R2		0.464			0.453	
Obs	46,489	46,489	40,045	46,489	46,489	40,045

This table presents the alternative estimation results of the association between financial reporting quality and debt or equity financing. The sample contains the subsample of firms having positive financing deficit (i.e., negative free cash flow). Columns (1) to (3) and (4) to (6) show the estimation

results using debt financing and equity financing as the dependent variable, respectively. Column (1) shows the test result using the system of equations in Table 3. Column (2) shows the test result using the firm fixed effect regression with the standard errors clustered at the firm level. Column (3) shows the test result of the two-step system GMM based on Blundell and Bond (1998). Standard errors for the system GMM are estimated using Windmeijer's (2005) robust estimator. Definitions of the variables are given in Appendix A. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 5. Seemingly Unrelated Regression with the Effects of Economic Fundamentals on Accrual Quality

Dep. Var.=:	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4) FRQ_t
Intercept	-0.083***	0.005	-0.089***	0.191***
	(0.000)	(0.204)	(0.000)	(0.000)
$FRQ1_{t-1}$				0.722***
				(0.000)
$FRQ1_t$	0.011**	-0.034***	0.046***	
	(0.018)	(0.000)	(0.000)	
Def_{t+1}	-0.251***	0.492***	0.257***	
	(0.000)	(0.000)	(0.000)	
$Def_{t+1}*FRQ1_t$	-0.006	0.180***	-0.186***	
	(0.804)	(0.000)	(0.000)	
$Size_t$	-0.001***	0.004***	-0.005***	0.005***
	(0.003)	(0.000)	(0.000)	(0.000)
MB_t	0.011***	-0.002***	0.012***	
	(0.000)	(0.000)	(0.000)	
Lev_t	0.032***	0.007	0.025***	
	(0.000)	(0.126)	(0.000)	
$CFVola_t$	-0.023	-0.078***	0.055***	-0.239***
	(0.166)	(0.000)	(0.000)	(0.000)
$Loss\%_t$	0.007*	-0.048***	0.055***	-0.112***
	(0.097)	(0.000)	(0.000)	(0.000)
Dep_t	0.183***	-0.002	0.185***	
	(0.000)	(0.953)	(0.000)	
$Tangible_t$	0.078***	0.037***	0.041***	
	(0.000)	(0.000)	(0.000)	
$R\&D_t$	0.026***	-0.054***	0.080***	
	(0.000)	(0.000)	(0.000)	
R&D_D	-0.002	-0.008***	0.006***	
	(0.288)	(0.000)	(0.000)	
$RetVola_t$	0.038**	-0.033***	0.071***	
	(0.022)	(0.010)	(0.002)	
Ret_t	0.020***	-0.003***	0.023***	
	(0.000)	(0.010)	(0.000)	
$SaleVola_t$				-0.059***
				(0.000)
$Cycle_t$				0.000
				(0.106)
Obs.		66,378		

This table presents the estimation results of the system of equations which adds the regression of reporting quality in year *t* on reporting quality in year *t*-1 and economic fundamental variables into Equation (2). The sample consists of firms with financing deficit. The system of equations is estimated using the maximum likelihood method, and the standard errors are clustered at the firm level (Gould et al., 2006). *SaleVola* is the volatility of the ratio of sales on total assets over the last 5 years. *Cycle* is the measure of operating cycle, calculated as 365/receivables turnover ratio+ 365/inventory turnover ratio. Definitions of the variables are given in Appendix A. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 6. Financial Reporting Quality and Debt Maturity Choice

Dep. Var.=:	(1)$\Delta Cash_{t+1}$	(2)Δ*Short-term Debt*$_{t+1}$	(3)Δ*Long-term Debt*$_{t+1}$	(4)$\Delta Equity_{t+1}$
Intercept	-0.087 ***	0.016 ***	-0.011 ***	-0.092 ***
	(0.000)	(0.000)	(0.001)	(0.000)
$FRQ1_t$	0.005	0.000	-0.038 ***	0.042 ***
	(0.234)	(0.720)	(0.000)	(0.000)
Def_{t+1}	-0.310 ***	0.101 ***	0.299 ***	0.290 ***
	(0.000)	(0.000)	(0.000)	(0.000)
$Def_{t+1}*FRQ1_t$	0.026	-0.007	0.206 ***	-0.173 ***
	(0.246)	(0.357)	(0.000)	(0.000)
$Size_t$	-0.001 **	-0.001 ***	0.006 ***	-0.006 ***
	(0.049)	(0.000)	(0.000)	(0.000)
MB_t	0.011 ***	-0.002 ***	-0.001 ***	0.013 ***
	(0.000)	(0.000)	(0.010)	(0.000)
Lev_t	0.029 ***	0.007 ***	-0.002	0.024 **
	(0.000)	(0.002)	(0.708)	(0.000)
$CFVola_t$	-0.015	0.005	-0.061 ***	0.042 ***
	(0.321)	(0.303)	(0.000)	(0.002)
$Loss\%_t$	0.013 ***	-0.011 ***	-0.035 ***	0.059 ***
	(0.000)	(0.000)	(0.000)	(0.000)
Dep_t	0.177 ***	-0.047 ***	0.026	0.198 ***
	(0.000)	(0.000)	(0.299)	(0.000)
$Tangible_t$	0.093 ***	-0.008 ***	0.053 ***	0.049 ***
	(0.000)	(0.000)	(0.000)	(0.000)
$R\&D_t$	0.037 ***	-0.013 ***	-0.029 ***	0.080 ***
	(0.000)	(0.000)	(0.000)	(0.000)
R&D_D	-0.003 **	0.000	-0.008 ***	0.005 ***
	(0.021)	(0.627)	(0.000)	(0.000)
$RetVola_t$	0.019	-0.005	-0.032 ***	0.056 ***
	(0.231)	(0.359)	(0.002)	(0.000)
Ret_t	0.027 ***	-0.002 ***	0.001	0.028 ***
	(0.000)	(0.000)	(0.324)	(0.000)
Obs.		46,489		
Financing Choices in Response to One Dollar of Financing Deficit				
FRQ1 = 0.1: Lowest	-0.307	0.100	0.319	0.273
FRQ1 = 0.55: Median	-0.296	0.097	0.412	0.195
FRQ1 = 1.0: Highest	-0.284	0.094	0.504	0.117

This table presents the estimation results of the system of equations with external financing and changes in cash holdings as dependent variables. The sample contains the subsample of firms having positive financing deficit (i.e., negative free cash flow). The system of equations is estimated using the maximum likelihood method, and the standard errors are clustered at the firm level (Gould et al., 2006). Definitions of the variables are given in Appendix A. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively. "Financing Choices in Response to One Dollar of Financing Deficit" illustrates the amount of external financing and changes in cash holdings made in response to one dollar of financing deficit, for each level of financial reporting quality, calculated as (coefficient on Def_{t+1} + value of FRQ_t * coefficient on $Def_{t+1}*FRQ_t$).

Table 7. Financial Reporting Quality and the Choice between Public vs. Private Debt

Dep. Var.=:	(1) $\Delta Cash_{t+1}$	(2) Δ*Short-term* $Debt_{t+1}$	(3) Δ*Private Long-term* $Debt_{t+1}$	(4) Δ*Public Long-term* $Debt_{t+1}$	(5) $\Delta Equity_{t+1}$
Intercept	-0.087 ***	0.016 ***	-0.018 ***	0.006	-0.092 ***
	(0.000)	(0.000)	(0.000)	(0.112)	(0.000)
$FRQ1_t$	0.005	0.001	-0.026 ***	-0.012 **	0.042 ***
	(0.192)	(0.668)	(0.000)	(0.013)	(0.000)
Def_{t+1}	-0.293 ***	0.102 ***	0.379 ***	-0.064 ***	0.290 ***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)
$Def_{t+1}*FRQ1_t$	0.021	-0.007	0.143 ***	0.057 *	-0.173 ***
	(0.345)	(0.320)	(0.000)	(0.071)	(0.000)
$Size_t$	-0.001 *	-0.001 ***	0.005 ***	0.000	-0.006 ***
	(0.073)	(0.000)	(0.000)	(0.262)	(0.000)
MB_t	0.011 ***	-0.002 ***	-0.003 ***	0.002 ***	0.013 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lev_t	0.026 ***	0.007 ***	0.002	-0.006	0.023 ***
	(0.000)	(0.002)	(0.742)	(0.172)	(0.000)
$CFVola_t$	-0.018	0.005	-0.077 ***	0.012	0.042 ***
	(0.216)	(0.290)	(0.000)	(0.374)	(0.002)
$Loss\%_t$	0.012 ***	-0.011 ***	-0.028 ***	-0.008 ***	0.059 ***
	(0.001)	(0.000)	(0.000)	(0.006)	(0.000)
Dep_t	0.168 ***	-0.046 ***	0.077 **	-0.060 **	0.197 ***
	(0.000)	(0.000)	(0.024)	(0.023)	(0.000)
$Tangible_t$	0.094 ***	-0.008 ***	0.041 ***	0.013 ***	0.049 ***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
$R\&D_t$	0.036 ***	-0.013 ***	-0.037 ***	0.007 ***	0.080 ***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
R&D_D	-0.004 **	0.000	-0.012 ***	0.003 ***	0.005 ***
	(0.011)	(0.654)	(0.000)	(0.009)	(0.000)
$RetVola_t$	0.019	-0.005	-0.051 ***	0.018	0.056 ***
	(0.236)	(0.337)	(0.001)	(0.162)	(0.000)
Ret_t	0.026 ***	-0.002 ***	0.002	-0.001	0.028 ***
	(0.000)	(0.000)	(0.291)	(0.463)	(0.000)
Obs.			46,489		
Financing Choices in Response to One Dollar of Financing Deficit					
FRQ1 = 0.1: Lowest	-0.291	0.101	0.393	-0.058	0.273
FRQ1 = 0.55: Median	-0.282	0.098	0.458	-0.033	0.195
FRQ1 = 1.0: Highest	-0.272	0.095	0.523	-0.007	0.117

This table presents the estimation results of the system of equations with external financing and changes in cash holdings as dependent variables. The sample contains the subsample of firms having positive financing deficit (i.e., negative free cash flow). The system of equations is estimated using the maximum likelihood method, and the standard errors are clustered at the firm level (Gould et al., 2006). Definitions of the variables are given in Appendix A. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 8. Financial Constraints and the Effect of Financial Reporting Quality and Financing Choices

Panel A: Financially Constrained Firms

Dep. Var.=:	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$
Def_{t+1}	-0.317 ***	0.388 ***	0.295 ***
	(0.000)	(0.000)	(0.000)
$Def_{t+1}*FRQ1_t$	0.005	0.144 ***	-0.138 ***
	(0.845)	(0.000)	(0.000)
Controls	Yes	Yes	Yes
Obs.		25,299	
Financing Choices in Response to One Dollar of Financing Deficit			
FRQ1 = 0.1: Lowest	-0.317	0.402	0.281
FRQ1 = 0.55: Median	-0.314	0.467	0.219
FRQ1 = 1.0: Highest	-0.312	0.532	0.156

Panel B: Unconstrained Firms

Dep. Var.=:	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$
Def_{t+1}	-0.158 ***	0.650 ***	0.193 ***
	(0.000)	(0.000)	(0.000)
$Def_{t+1}*FRQ1_t$	0.033	0.097 ***	-0.065 **
	(0.251)	(0.000)	(0.032)
Controls	Yes	Yes	Yes
Obs.		21, 190	
Financing Choices in Response to One Dollar of Financing Deficit			
FRQ1 = 0.1: Lowest	-0.155	0.659	0.186
FRQ1 = 0.55: Median	-0.140	0.703	0.157
FRQ1 = 1.0: Highest	-0.125	0.747	0.128
Comparison of Coefficients on $Def_{t+1}*FRQ1_t$			
Difference	0.027	-0.047	0.074
z-statistics	0.677	1.403	1.824
p-value	(0.249)	(0.080)	(0.034)

This table presents the estimation results of the system of equations with external financing and the changes in cash holdings as dependent variables. The sample contains the subsample of firms having positive financing deficit (i.e., negative free cash flow). Panels A and B report the results for financially constrained and unconstrained firms, respectively. I use Hadlock and Pierce's (2010) index to estimate financial constraints. The system of equations is estimated using the maximum likelihood method, and the standard errors are clustered at the firm level (Gould et al., 2006). Definitions of the variables are given in Appendix A. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively. "Financing Choices in Response to One Dollar of Financing Deficit" illustrates the amount of external financing and changes in cash holdings made in response to one dollar of financing deficit, for each level of financial reporting quality, calculated as (coefficient on Def_{t+1} + value of FRQ_t * coefficient on $Def_{t+1}*FRQ_t$). The *z*-statistics test the significance of the difference between the coefficients in the two panels (Clogg et al., 1995).

Table 9. The Effects of Financial Reporting Quality and Debt Capacity on Financing Choices

Panel A. The Joint Effect of Reporting Quality and Collateral Shock on Financing Choices

Dep. Var.=:	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$
RE_t	0.007*	0.004	0.003
	(0.078)	(0.127)	(0.338)
$FRQ1_t$	-0.001	-0.006*	0.004
	(0.693)	(0.068)	(0.669)
RE_t*FRQ1_t	-0.004	-0.003	-0.001
	(0.510)	(0.514)	(0.781)
Def_{t+1}	-0.374***	0.479***	0.147***
	(0.000)	(0.000)	(0.000)
$Def_{t+1}*RE_t$	0.019	0.042**	-0.023
	(0.423)	(0.021)	(0.251)
$Def_{t+1}*FRQ1_t$	0.055	0.125***	-0.070**
	(0.181)	(0.000)	(0.033)
$Def_{t+1}*RE_t*FRQ1_t$	0.007	-0.052*	0.059*
	(0.869)	(0.095)	(0.089)
Controls	Yes	Yes	Yes
Obs.		84,930	

Panel B. The Joint Effect of Reporting Quality and Debt Capacity on Financing Choices

Dep. Var.=:	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$
$HighCapa_{t+1}$	0.006	-0.031***	0.037***
	(0.270)	(0.000)	(0.000)
$FRQ1_t$	0.002	-0.035***	0.037***
	(0.726)	(0.000)	(0.000)
$HighCapa_{t+1}*FRQ1_t$	-0.003	0.013**	-0.016**
	(0.669)	(0.012)	(0.011)
Def_{t+1}	-0.286***	0.389***	0.325***
	(0.000)	(0.000)	(0.000)
$Def_{t+1}*HighCapa_{t+1}$	-0.026	0.167***	-0.193***
	(0.353)	(0.000)	(0.000)
$Def_{t+1}*FRQ1_t$	-0.015	0.136***	-0.151***
	(0.609)	(0.006)	(0.000)
$Def_{t+1}*HighCapa_{t+1}*FRQ1_t$	0.100**	-0.011	0.111***
	(0.026)	(0.756)	(0.008)
Controls	Yes	Yes	Yes
Obs.		45,843	

Panel A represents the estimation results of the system of equations in Equation (8) with the market value of real estates (*RE*) and its interaction terms with other variables. *RE* is the ratio of the expected market value of real estate on lagged total asset. The market value of real estate is calculated following the procedure in Balakrishnan et al. (2014). Panel B presents the estimation results of the system of

equations in Equation (8) for the subsample of firms with low and high debt capacity. The likelihood of having long-term bond rating is estimated based on the logit regression of the long-term rating dummy on firm size, return-on-assets, tangibility, market-to-book ratio, leverage, firm age, and return volatility using the observations from 1987 to 2011 (see Appendix C). Firms with lower (higher) likelihoods of having long-term bond rating than the median are assumed to have low (high) debt capacity. The sample contains the subsample of firms having positive financing deficit (i.e., negative free cash flow). I estimate the system of equations using the maximum likelihood method, and cluster the standard errors at the firm level (Gould et al. (2006)). Results on intercept and control variables are omitted for brevity. Detailed definitions of the variables are given in Appendix A. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 10. Probit Regressions of Financing Choice between Debt and Equity Financing

	(1) Total Sample	(2) Total Sample	(3) Total Sample	(4) Firms with Financing Deficit
Dep. Var.=:	$\Delta Debt_{t+1}$>5% = 1 & $\Delta Equity_{t+1}$>5% = 0	$\Delta Debt_{t+1}$>5% = 1 & $\Delta Equity_{t+1}$>5% = 0	$\Delta Debt_{t+1}$>5% = 1 & $\Delta Equity_{t+1}$>5% = 0	$\Delta Debt_{t+1}$>5% = 1 & $\Delta Equity_{t+1}$>5% = 0
Intercept	2.133***	2.122***	2.122***	2.149***
	(0.000)	(0.000)	(0.000)	(0.000)
$Bigauditor_t$	-0.057*	-0.056*	-0.060*	-0.066*
	(0.094)	(0.096)	(0.075)	(0.072)
$FRQ1_t$		0.093**	-0.004	-0.023
		(0.039)	(0.932)	(0.741)
Def_{t+1} * $FRQ1_t$			0.663***	0.443**
			(0.000)	(0.031)
Def_{t+1}	1.246***	1.245***	0.968***	0.696***
	(0.000)	(0.000)	(0.000)	(0.000)
$Deviation_t$	1.336***	1.328***	1.308***	1.477***
	(0.000)	(0.000)	(0.000)	(0.000)
$Size_t$	0.078***	0.076***	0.078***	0.071***
	(0.000)	(0.000)	(0.000)	(0.000)
MB_t	-0.082***	-0.082***	-0.080***	-0.087***
	(0.000)	(0.000)	(0.000)	(0.000)
Lev_t	-0.298***	-0.294***	-0.304***	-0.075
	(0.000)	(0.000)	(0.000)	(0.440)
$CFVola_t$	-0.800***	-0.718***	-0.693***	-0.762***
	(0.000)	(0.000)	(0.000)	(0.000)
$Loss\%_t$	-0.891***	-0.871***	-0.874***	-0.936***
	(0.000)	(0.000)	(0.000)	(0.000)
Dep_t	0.222	0.243	0.256	0.272
	(0.616)	(0.582)	(0.562)	(0.576)
$Tangible_t$	-0.005	-0.017	-0.011	-0.048
	(0.950)	(0.840)	(0.897)	(0.609)
$R\&D_t$	-0.672***	-0.676***	-0.6874***	-0.549***
	(0.000)	(0.000)	(0.000)	(0.000)
R&D_D	-0.195***	-0.194***	-0.193***	-0.187***
	(0.000)	(0.000)	(0.000)	(0.000)
$RetVola_t$	-1.185***	-1.153***	-1.153***	-1.098***
	(0.000)	(0.000)	(0.000)	(0.000)
Ret_t	-0.307***	-0.306***	-0.306***	-0.313***
	(0.000)	(0.000)	(0.000)	(0.000)
Year/industry FE	Yes	Yes	Yes	Yes
Pseudo R2	0.323	0.323	0.323	0.340
Obs.	24,763	24,763	24,763	20,249

This table presents the estimation results of the probit regressions similar with Chang et al., (2009). The dependent variable is an indicator variable equal to one for firms with net debt issuance larger than 5% of lagged total assets, and zero for firms with net equity issuance larger than 5% (1%) of lagged total assets, respectively. I exclude firms with both debt and equity financing larger than 5% of lagged total assets, and firms with both financing activities smaller than thresholds. Standard

errors are clustered at the firm-level. *Deviation* is calculated as the target book leverage minus the actual book leverage. The target book leverage is estimated as the predicted value from the regression of the leverage in year *t*+1 on control variables in year *t* other than *DEF* and *FRQ*. Definitions of the variables are given in Appendix A. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 11. The System of Equations using Lagged Dependent Variables

	Total Sample (1) ~ (3)			Financing Deficit (4) ~ (6)		
Dep. Var.=:	(1)$\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4)$\Delta Cash_{t+1}$	(5) $\Delta Debt_{t+1}$	(6) $\Delta Equity_{t+1}$
Intercept	-0.007 **	0.025 ***	-0.032 ***	-0.083 ***	0.003	-0.086 ***
	(0.012)	(0.000)	(0.000)	(0.000)	(0.340)	(0.000)
$FRQ1_t$	-0.004 *	-0.012 ***	0.009 ***	0.003	-0.037 ***	0.040 ***
	(0.055)	(0.000)	(0.000)	(0.409)	(0.000)	(0.000)
Def_{t+1}	-0.480 ***	0.343 ***	0.177 ***	-0.306 ***	0.419 ***	0.275 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Def_{t+1}*FRQ1_t$	0.033 **	0.129 ***	-0.096 ***	0.028	0.193 ***	-0.165 ***
	(0.032)	(0.000)	(0.000)	(0.205)	(0.000)	(0.000)
$Size_t$	-0.003 ***	0.003 ***	-0.006 ***	0.000	0.005 ***	-0.005 ***
	(0.000)	(0.000)	(0.000)	(0.358)	(0.000)	(0.000)
MB_t	0.010 ***	0.001 ***	0.008 ***	0.010 ****	-0.003 ***	0.012 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lev_t	-0.047 ***	-0.076 ***	0.030 ***	0.016 ***	0.000	0.017 ***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.941)	(0.000)
$CFVola_t$	0.068 ***	0.005	0.063 ***	-0.022	-0.055 ***	0.033 ***
	(0.000)	(0.511)	(0.000)	(0.118)	(0.000)	(0.009)
$Loss\%_t$	0.004	-0.036 ***	0.040 ***	0.006 *	-0.045 ***	0.052 ***
	(0.171)	(0.000)	(0.000)	(0.087)	(0.000)	(0.000)
Dep_t	0.096 ***	-0.060 ***	0.155 ***	0.194 ***	-0.040	0.234 ***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.135)	(0.000)
$Tangible_t$	0.048 ***	0.028 ***	0.020 ***	0.086 ***	0.046 ***	0.039 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$R\&D_t$	0.038 ***	-0.044 ***	0.081 ***	0.032 ***	-0.042 ***	0.074 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R&D_D	-0.003 ***	-0.006 ***	0.003 ***	-0.004 ***	-0.009 ***	0.005 ***
	(0.003)	(0.000)	(0.000)	(0.005)	(0.000)	(0.000)
$RetVola_t$	0.051 ***	-0.006	0.057 ***	0.015	-0.034 ***	0.048 ***
	(0.000)	(0.462)	(0.000)	(0.339)	(0.003)	(0.001)
Ret_t	0.028 ***	0.004 ***	0.024 ***	0.029 ***	-0.001	0.030 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.376)	(0.000)
$\Delta Cash_t$	-0.055 ***	0.000	-0.055 ***	-0.057 ***	0.002	-0.058 ***
	(0.000)	(0.975)	(0.000)	(0.000)	(0.716)	(0.000)
$\Delta Debt_t$	0.046 ***	0.014 ***	0.032 ***	0.047 ***	0.008	0.039 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.139)	(0.000)
$\Delta Equity_t$	0.102 ***	-0.030 ***	0.132 ***	0.092 ***	-0.020 ***	0.112 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)
Obs.		84,930			46,085	

This table presents the estimation results of the system of equations with lagged dependent variables as additional control variables to address the intertemporal dependence of financing choices (Gatchev et al., 2010). I estimate the system of equations using the maximum likelihood method, and cluster the standard errors at the firm level (Gould et al., 2006). Detailed definitions of the variables are given in Appendix A. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 12. The Effects of Financial Reporting Quality on Financing Choices and Information Uncertainty

Panel A. Information Uncertainty Partition by Firm Size

	Small firms			Large firms		
Dep. Var.=	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$
Def_{t+1}	-0.261***	0.437***	0.301***	-0.289***	0.449***	0.262***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Def_{t+1}*FRQ1_t$	-0.055*	0.131***	-0.186***	0.059*	0.203***	-0.144***
	(0.062)	(0.000)	(0.000)	(0.082)	(0.006)	(0.000)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.		23,735			22,747	
Difference of Def_{t+1} * $FRQ1_t$				0.114	0.072	0.042
z-statistics (p-value)				2.533	2.086	0.987
				(0.006)	(0.018)	(0.162)

Panel B. Information Uncertainty Partition by Firm Age

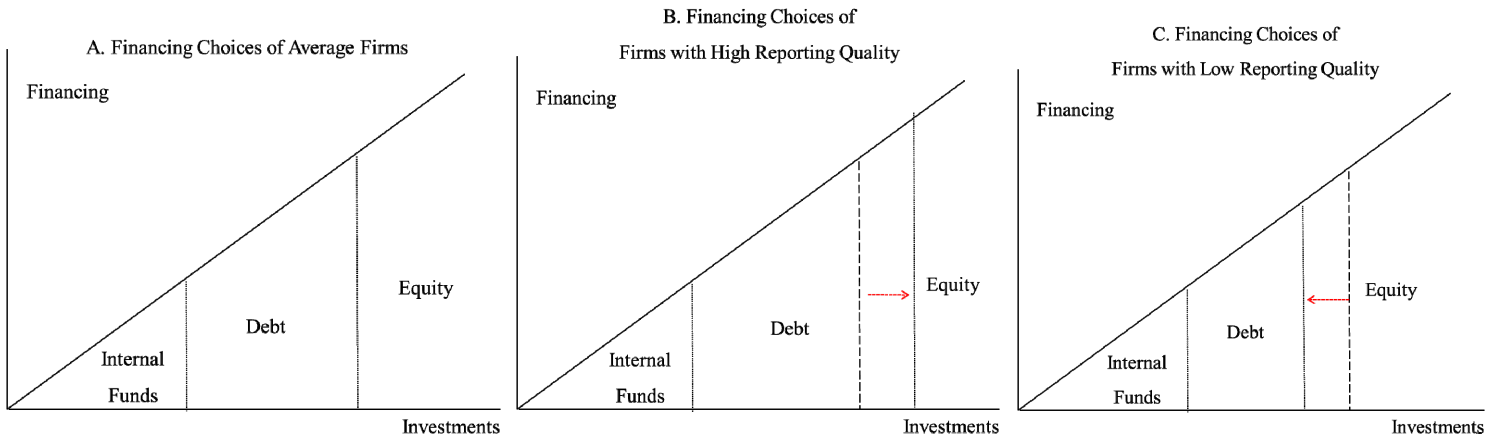
	Young firms			Old firms		
Dep. Var.=	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$
Def_{t+1}	-0.302***	0.383***	0.315***	-0.255***	0.513***	0.232***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Def_{t+1}*FRQ1_t$	0.028	0.171***	-0.143***	0.024	0.175***	-0.151***
	(0.332)	(0.000)	(0.000)	(0.512)	(0.000)	(0.000)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.		22,334			21,092	
Difference of Def_{t+1} * $FRQ1_t$				-0.004	0.005	-0.008
z-statistics (p-value)				-0.078	0.137	-0.183
				(0.469)	(0.445)	(0.428)

Panel C. Information Uncertainty Partition by the Volatility of Operating Cash Flows

	Firms with high CFO volatility			Firms with low CFO volatility		
Dep. Var.=	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$
Def_{t+1}	-0.302***	0.383***	0.315***	-0.103***	0.638***	0.260***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Def_{t+1}*FRQ1_t$	0.028	0.171***	-0.143***	-0.072**	0.069**	-0.141***
	(0.332)	(0.000)	(0.000)	(0.0372)	(0.012)	(0.000)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.		24,134			22,343	
Difference of Def_{t+1} * $FRQ1_t$				-0.094	-0.085	-0.009
z-statistics (p-value)				-2.045	-2.411	-0.196
				(0.020)	(0.008)	(0.422)

This table represents the estimation results of the system of equations in Equation (8) for the subsample of firms under high and low information uncertainty. For each partition of the sample, I classify firms with smaller size, younger age, or higher volatility of operation cash flows as firms under high information uncertainty. The sample contains the subsample of firms having positive financing deficit (i.e., negative free cash flow). I estimate the system of equations using the maximum likelihood method, and cluster the standard errors at the firm level (Gould et al., 2006). Results on intercept and control variables are omitted for brevity. Detailed definitions of the variables are given in Appendix A. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Figure 1. Illustration of the Association between Financial Reporting Quality and Financing Choices



Panel A represents the financing choices of firms with an average level of financial reporting quality based on the pecking order theory (e.g., Myers and Majluf, 1984). Panels B and C respectively show my predictions on the effect of high- and low-quality financial reporting on the financing choices made to fund investments.

Essay 2. The Industry-Specific Relation between Competition Intensity and Financial Policies

Abstract

By highlighting the difference between price and non-price competition, I expand prior studies on the relation between product market competition and financial policies such as capital structure and payout decisions. I find that the use of equity financing relative to debt financing increases in non-price competition intensity. Also, firms accumulate more cash reserves by reducing the distribution of free cash flows to outside investors as non-price competition intensifies. However, such relations are weaker for price competition industries. This paper contributes to the literature by providing evidence that the competition type can be an important explanatory factor on the relations between competition intensity and financial policies.

Keywords: product market competition, competition type, financing choice, payout policies, financial policies

The Industry-Specific Relation between Competition Intensity and Financial Policies

1. Introduction

Many studies investigate the relations between product market competition and firm's behaviors. Tougher competition reduces profitability and increases the uncertainty of future performance (Gaspar and Massa, 2007; Irvine and Pontiff, 2009). Thus, higher default risks due to intense competition induce the firms to be more conservative in financing choices as well as payout policies. Particularly, the firms under more intense competition have lower leverage (Ovtchinnikov, 2010; Xu, 2012; Morellec et al., 2014), and accumulate more cash by reducing the payout to equity investors (Hoberg et al., 2014; Morellec et al., 2014).

Using the competition intensity of US listed companies, I complement this literature by comparing the relation between competition intensity and financing policies between price and non-price competition. The economics studies show that the firm's behaviors as a response to product market competition can be different between price and non-price competition (Stigler, 1968; Sutton, 1991). While the firm under price competition competes by setting lower prices than its competitors, non-price

competition requires the firm to obtain market share by building up the brand value, improving high-quality product or service, or providing reliable guarantee services. Thus, non-price competition industries have higher reliance on intangible investments such as advertisement or research and development (R&D) expenditures than price competition industries.

This different choice of investments can yield different capital structure decisions and payout decisions. Several studies document that the advertising expenditures do not significantly increase future sales, implying that the value relevance of advertising expenses is short-lived (Ali Shah and Akbar, 2008). In contrast, most fixed assets are depreciated for more than 5 years, indicating a longer duration that capital expenditures increase the firm value. Furthermore, intangible investments are related with a higher uncertainty of future performance than capital expenditures (Kothari et al., 2002). I link the differential effects of investment choices on future performance to the relation between competition intensity and financial policies (i.e., capital structure decisions and payout decisions). Due to the differential effects of tangible and intangible investments on future performance, the negative impacts of competition intensity on future performance are pronounced for the industry with high intangible investments (i.e., non-price competition industry) than for the industry with low intangible investments (i.e., price competition industry). This indicates

that the channel that competition intensity affects financial policies is stronger for non-price competition industries than for price competition industries.

To compare the relations between competition intensity and financial policies between price and non-price competition, I use four measures of competition intensity. First two measures of competition intensity are Herfindahl-Hirschman Index (HHI) using the total assets or sales for 2-digit SIC industry. While prior studies widely use these measures, recent studies argue that HHIs using 2-digit SIC industry classification do not capture the firm's true competitive environments (e.g., Ali et al., 2014; Karuna, 2007). To address this concern, I use two additional measures of competition intensity from recent studies. The third measure of competition intensity is HHI based on new industry classification in Hoberg and Philips (2010). They document that their text-based network industry classification better explains the product market competition that the firms face. The last measure of competition intensity is the product market fluidity from Hoberg et al. (2014). In contrast to HHI measures, the fluidity measure can capture the firm-level product market competition intensity as well as the threat from potential entrants. Prior studies report that non-price competition industries have a higher reliance on advertising activities than price competition industries (Stigler, 1968; Sutton, 1991). Following them, I classify the industries with

advertising expenses-to-sales ratio higher (lower) than the median as non-price (price) competition industries.[19]

Empirical results show that the relation between competition intensity and financial policies are different between price and non-price competition industries. First, the negative relation between competition intensity and the use of debt financing relative to equity financing is more pronounced for non-price competition industries than for price competition industries. Second, the positive relation between competition intensity and conservative payout policy is stronger for non-price competition industries than for price competition industries. Specifically, firms accumulate more cash from free cash flows and distribute a smaller amount of free cash flows to debt and equity investors when non-price competition is more intense, whereas such relations are not significant in the price competition industries. Additional tests show that these findings are robust after controlling for firm-specific factors such as growth opportunities and life cycle, which can also influence the investment choices and capital structure and payout policies.

To address the case that different firms within same industry face different types of product market competition, I construct the firm-level indicator of non-price competition. Firms are assumed to face non-price

[19] Overall results remain qualitatively similar when I use the ratio of the sum of advertising expenses and R&D expenses on sale to partition the sample into price and non-price competition.

competition when advertising expenses-to-sales ratio is high, R&D expenses-to-sales ratio is high, market-to-book ratio is high, capital expenditure is small, and firm is young. The empirical results show that the negative relations that competition intensity has with the use of debt financing relative to equity financing and the payout to outside investors are more pronounced for firms with higher likelihood of facing non-price competition, supporting my previous findings.

I also examine the consequences of conservative payout policies under product market competition. I find that the positive relation between the change in cash and future investment is stronger when price competition is more intense. In contrast, non-price competition intensity does not significantly influence the relation between the change in cash holding and future investments. This suggests that the value of precautionary cash holding is higher for more intense non-price competition industries.

This study contributes to the literature by shedding lights on the differential relations between competition intensity and financial policies such as financing choices and payout decisions under different competition types. Prior studies are silent on the possibility that the relation between competition intensity and the firm's behaviors is the industry-specific phenomenon. Thus, this study shows that prior findings should be generalized cautiously.

This paper is partly related with Gatchev et al. (2009) who report that advertising expenditures and R&D expenditures are mainly funded by equity financing rather than by debt financing. However, there are two important differences between this paper and Gatchev et al. (2009). First, this study investigates the relation between competition intensity and financing choices conditional on competition types, whereas Gatchev et al. (2009) is silent on what drives the choice of investment type. Furthermore, this paper shows that firms under more intense non-price competition rely more on equity financing relative to debt financing even when they fund capital expenditures, whereas such relation does not hold under price competition (see Appendix B). Second, Gatchev et al. (2009) focus only on how firms obtain external financing to fund investments. In contrast, this study partitions the sample into firms with financing deficit and those with financing surplus to address the asymmetric relation between free cash flows and financing choices.

The remainder of this paper proceeds as follows. Section 2 describes prior literature. Section 3 explains the research design and sample. Section 4 tests the differential effect of competition intensity on future performance between price and non-price competition. Section 5 presents the results on the relation between competition intensity and financing choices, and Section 6 presents the results on the relation between competition intensity and

payout decisions. Section 7 provides additional tests and Section 8 concludes the paper.

2. The Review of Prior Literature

2.1. Product Market Competition, Financing Choices, and Payout Policies

Prior studies investigate the relation between product market competition and the firm's behavior. One widely accepted finding is that competition deteriorates profitability and increases the uncertainty of future performance (Gaspar and Massa, 2007; Irvine and Pontiff, 2009; Ovtchinnikov, 2010; Xu, 2012).[20] More intense competition caused by deregulation, technology development, or import penetration requires the firm to spend more resources to maintain its market share. A failure to match the competitors' spending results in a loss of market share and threatens the long-term survival of the firm.

A negative effect of intense competition on profitability motivates the firm to avoid default risks by maintaining lower leverage. Also, a decrease in free cash flows alleviates the concern that managers appropriate the firm's resource for private benefits, further reducing the incentive to have a debt in capital structure (Jensen, 1986). Xu (2012) find that firms

[20] Ovtchinnikov (2010) find that firms experience a significant decline in profitability after industry-level deregulation, which is expected to intensify the product market competition.

experiencing an increase in competition, proxied by import penetration, significantly reduce their leverage. Ovtchinnikov (2010) documents that an increased competition leads to the downward adjustment of leverage (see also Morellec et al., 2014).

Furthermore, the value of cash holding is higher when competition is more intense because lower profitability and high uncertainty of future performance increase the likelihood that the firm fails to meet the cash payments to its lenders or suppliers. Consistent with this argument, Morellec et al. (2014) find that firms increase their cash reserves as product market competition intensifies. Hoberg et al. (2014) also find that the product market competition intensity increases cash holding, and decreases the payout to equity holders. Fresard (2010) extends this literature by showing that a large cash holding leads to the future gain of market share, particularly when competitors face tighter financial constraints.

2.2. Price vs. Non-Price Competition

Since more intense competition enforces the firm to invest more resources to maintain its competitiveness and differential investment choices have different impacts on future performance, the relations between competition intensity and financial policies can be different between price and non-price competition industries.

In price competition industries, firms provide homogenous products or services and aggressively cut the price of their products or services to attract customers from competitors. In contrast, non-price competition refers the case that companies distinguish their products or services from competitors' by offering higher-quality product or service, establishing higher brand quality, or providing better guarantee services. Sutton (1991) highlights a higher reliance on advertising activities by non-price competition industries. He reports that advertising activities establish the barrier to entry and this enables the incumbent companies to protect their market shares from new entrants. This results in higher concentration ratio for non-price competition industries than for price-competition industries (see also Stigler, 1968). Linking the competition type to the executive compensation, Chen et al. (2015) examine the effect of competition type and competition intensity on the use of customer satisfaction measures in annual bonus contracts.

I link the literature on the association between competition intensity and financial policies to the difference between price and non-price competition. While capital expenditures build the manufacturing or operating facilities which are utilized for a relatively longer period, the effect of advertising expense on future performance is short-lived. By reviewing the studies on advertising activities, Clarke (1976) conclude that the duration

that advertising expenditures increase future sales is between 3 and 15 months. Other studies find an insignificant effect of advertising activities on sales (Ali Shah and Akbar, 2008). In contrast, many depreciable assets have the useful life exceeding 5 years (Internal Revenue Service, 2015). Furthermore, Kothari et al. (2002) find that advertising expenses and R&D expenses are related with more uncertain future performance than capital expenditures.[21]

As I explained above, prior studies argue that intense product market competition is related with capital structure decisions and payout policies due to its negative impacts on future performance (i.e., lower and more uncertain profitability). Thus, if the negative impacts of competition intensity on future performance are more pronounced for non-price competition industries than for price competition industries, the negative relations that competition intensity has with the use of debt financing relative to equity financing and the payout to outside investors will be stronger for non-price competition industries than for price competition industries.

3. Research Design and Sample

3.1 Measurement of Competition Intensity and Type

[21] Consistent with these arguments, I find that industries with higher advertising expenses have lower profitability and higher variations in profitability than industries with lower advertising expenses (see Panel B of Table 1).

I use four proxies to measure the intensity of product market competition. First, I construct the concentration ratio, or Herfindahl-Hirschman Index (HHI), using the total assets of firms within 2-digit SIC industry in Compustat Fundamentals Annual database (*HHI_Asset*). Second, I calculate HHI using sales of firms within 2-digit SIC industry (*HHI_Sale*). Lower values of HHIs correspond to more intense product market competition. Several studies point out that HHI using 2-digit SIC industry classification fail to capture true natures of product market competition.[22] Hoberg and Philips (2010) suggest that HHI measure can be more informative when the industry is defined based on the text-based network industry classification. Thus, I use the HHI measure based on their industry classification (*HHI_TNIC*) as my third measure of competition intensity.

Karuna (2007) reports limitations of concentration ratio as an empirical proxy of competition intensity. First, the concentration ratio can have conflicting findings when more firms in the industry are considered. Given that private firms are not included in the Compustat database, the concentration ratio using Compustat can overestimate competition intensity.

[22] Calculating HHI using Compustat neglects the competition from private firms because Compustat covers only public companies (Ali et al., 2009). To alleviate this concern, I also use HHI in Census of Manufactures publications provided by U.S. Census Bureau, which is based on all public and private companies. Since Census of Manufactures are published in every 5 years, I assume that HHI values of 1997, 2002, and 2007 are valid for 5 years period centered on 1997, 2002, and 2007. For example, I use HHI in 1997 Census of Manufactures for the observations from 1995 to 1999. Overall results remain largely unchanged (untabulated).

Second, the concentration ratio does not consider the possibility that prospective entrants could be influenced by the extent of industry concentration. To address these limitations of HHIs, I use an alternative measure of product market competition intensity. Hoberg et al. (2014) use the business descriptions in 10-K filings to develop the product market fluidity measure which captures the dynamic structure between the firm's product and those of rival firms. They document that the fluidity measure also addresses the threats from potential entrants. Thus, I use the product market fluidity measure (*Fluid*) from Hoberg et al. (2014) as the last proxies of competition intensity. Another advantage of using *Fluid* is that *Fluid* captures the *firm-level* competition intensity, whereas *HHI_Asset*, *HHI_Sale* and *HHI_TNIC* are estimated at the industry-level.

Lower (higher) value of *HHI_TNIC* (*Fluid*) implies tougher product market competition.[23] To ease the interpretation, I multiply *HHI_Asset*, *HHI_Sale* and *HHI_TNIC* with (-1) to make their higher value correspond to more intense competition.

Price and non-price competition industries are classified based on the advertising activities (Stigler, 1968; Sutton, 1991). Specifically, the industries with higher (lower) values of the industry-level ratio of advertising

[23] HHI measure using the text-analysis-based network industry classification and product market fluidity data are available from Gerard Hoberg's website (http://alex2.umd.edu/industrydata/).

expense on sales than the median are classified as non-price (price) competition industries. Since this classification criteria of competition type is industry-level, whether the firm is included as price or non-price competition is exogenous to the firm's investment and financing decisions.

3.2 The System of Equations Approach to Capture Financing Choices and Payout Decisions

A typical research design to investigate the relations between competition intensity and financing or payout decisions is the *unconditional* regression of external financing on the measure of competition intensity (e.g., Xu, 2012). However, this research design could be biased due to omitted variable problem because the pecking order theory suggests that firms use internal cash holdings before accessing external capital markets (Myers and Majluf, 1974). Thus, I examine the relations between competition intensity and financing and payout choices *conditional* on internal cash flows and cash holding by using the system of equations.

I use the system of equations to address the interdependence of financing activities by imposing the restriction that cash inflows (i.e., changes in cash holdings, debt and equity financing) are equal to cash outflows (financing needs). Based on Gatchev et al. (2009), the construction of the system of equations starts from the restriction that cash inflows are

equal to cash outflows as follows:

$$- \Delta Cash + \Delta Debt + \Delta Equity = Def \quad (1)$$

where *ΔCash* is the change in cash holdings, *ΔDebt* is net debt issue, and *ΔEquity* is net equity issue. *Def* is the measure of financing deficit which captures the firm's financing needs. It is calculated as the sum of capital expenditure, an increase in working capital, acquisitions, and dividend payments, minus sales of property, plant, and equipment, and cash flows from operations, all scaled by lagged total assets (Frank and Goyal 2003). See the detailed definitions of variables in Appendix A.

Using this restriction, I construct the system of equations with the interaction between competition intensity and financing deficit as the independent variable. When *Def* is positive, the system of equations tests the association between competition intensity and the interdependence of financing activities to fund financing needs. When *Def* is negative, it examines the relation between competition intensity and the distribution of free cash flows into cash reserves and debt and equity investors.

$$y_{i,t+1} = B_1 Comp_{i,t} + B_2 Def_{i,t+1} + B_3 Comp_{i,t} * Def_{i,t+1} + Cz_{i,t} + e_{t+1} \quad (2)$$

where *y* is a 3 x 1 vector of financing choices (i.e., *ΔCash*, *ΔDebt*, and *ΔEquity*). *B* and *C* are the 3 x 1, and 3 x *k* vectors of coefficients on the

independent variables, respectively. z is a k x 1 vector of determinants of financing choices, and *Comp* is the measure of competition intensity. To maintain the accounting identity in Equation (1), I impose the following cross-equation restrictions on the coefficients: $i'B_1 = 0_{1 \times 1}$, $i'B_2 = 1_{1 \times 1}$, $i'B_3 = 0_{1 \times 1}$, $i'C = 0_{1 \times k}$, and $i'e = 0_{1 \times 1}$. This means that competition intensity is related with the association between financing deficit and financing choices, but does not change the restriction in Equation (1). I use one-year-lagged values of *Comp* relative to the dependent variables to reduce the bias from simultaneity problem because capital structure choices can influence the firm's survival rate and the competition intensity. The system of equations is estimated using the maximum likelihood method with standard errors clustered at the firm-level (Gould et al., 2006).

I further mitigate correlated omitted variable problem by controlling for firm characteristics that could be related with financing choices as well as competition intensity. I control for firm size (*Size*) as larger firms have more stable cash flows and thus are more able to attract debt financing. I include the book-to-market of equity (*BM*), an inverse measure of growth opportunities, because growth options decrease the underinvestment costs and free cash flows problem, reducing the benefit of debt financing relative to equity financing (Barclay et al., 2006). Leverage (*Lev*) is positively and negatively related with equity and debt financing because high leverage

increases financial distress. *CFVola* is the volatility of operating cash flows over at least three of the last five years. Higher volatility is associated with a lower level of investment and external financing (Minton and Schrand, 1999). I also control for the economic losses in past years, captured by the percentage of years reporting losses in net income over at least three of the last five years (*Loss%*), because high default risk reduces the optimal capital structure. Tangibility (*Tangible)* and depreciation and amortization costs (*Dep*) are controlled for because fixed assets can be used as collateral (Frank and Goyal, 2009). I also include R&D expenses (*R&D*) and *R&D_D*, which is an indicator variable that equals one for firms reporting R&D expenses, zero otherwise. *RetVola* is the standard deviation of daily stock returns over the fiscal year. *Ret* is the annual stock returns, controlling for market timing activities of equity financing (Baker and Wurgler, 2002).

I estimate the system of equations after partitioning the sample by the sign of financing deficit. Prior studies conventionally assume that financing activities have the linear relationships with the financing deficit regardless of the sign of financing deficit (e.g., Shyam-Sunder and Myers, 1999). However, firms with financing surplus (i.e., negative financing deficit) do not need to obtain the proceeds from external financing. Rather, they have incentives to distribute the cash to outside investors. Furthermore, Jensen (1986) suggests that firms with sufficient internal cash flows (positive

free cash flows) are subject to an agency cost that managers invest free cash flows in low-return projects. To address a potential asymmetric relation between financing deficit and financing activities, I partition the sample into the groups of firms having positive financing deficit and those having financing surplus.

3.3. The Sample Description

The sample includes US firms with data available from the intersection of Compustat and CRSP from 1990 to 2012. Following prior studies, financial firms (SIC codes 6000-6999) and utilities (4900-4999) are excluded from the sample. I winsorize all continuous variables at the top and bottom 1% to eliminate the effect of outliers.

Panel A of Table 1 shows the annual distribution of firm-year observations with available data for financing activities and competition intensity. Note that *HHI_Asset*, *HHI_Sales*, and *HHI_TNIC* are multiplied by (-1) to make their higher values correspond to more intense product market competition. *HHI_Asset*, *HHI_Sales*, and *Fluid* show increasing trends over the sample period. For instance, *HHI_Asset* increases from -0.108 in 1990 to -0.073 in 2012. These results indicate that the product market competition has become more intensive over time. Interestingly, *HHI_TNIC* decreases from -0.193 in 1997 to -0.217 in 2012, suggesting that the pattern of product

market competition can be different depending on the measure of competition intensity.

Panel B of Table 1 displays five 2-digit SIC industries with the highest and lowest ratio of advertising expenses on sales. Industries with the lowest advertising expenses-to-sales ratio include coal mining (2-digit SIC: 12), nonmetallic minerals except fuels (14), trucking and warehousing (42), special trade contractors (17), and heavy construction except building (16). Industries with the highest advertising expenses-to-sales ratio include educational services (82), miscellaneous retail (59), metal mining (10), personal services (72), and transportation services (47). Last two columns in Panel B of Table 1 show the industry-level average return-on-assets (*ROA*) and the industry-level standard deviations of return-on-assets (*Std*(*ROA*)). Non-price competition industries have lower profitability and higher variations in profitability than price competition industries.

4. Competition Intensity, Competition Type, and Future Performance

This section examines the effect of competition intensity on future performance. Table 2 presents test results. Panel A shows the regression results of operating income scaled by lagged total assets on competition intensity and other firm characteristics. For each measure of competition intensity, I partition the sample into price and non-price competition

industries. While the coefficients on *Comp* are significantly negative under non-price competition subsample, price competition sample shows significantly negative coefficients on *Comp* only when competition intensity measure is *HHI_TNIC* or *Fluid*. More importantly, the magnitudes of the coefficients on *Comp* are larger for non-price competition industries than for price competition industries. Untabulated statistics indicate that the difference between the coefficients on *Comp* is significant at 5% level for each measure of competition intensity. Panel B reports the regression results of the industry-level standard deviation of operating income scaled by lagged total assets. While the coefficients on *Comp* are largely positive and significant, they are larger for non-price competition industries than for price competition industries. Also, their differences are statistically significant at 5% level.

Overall, the results in Table 2 suggest that the negative impact of competition intensity on future performance, particularly lower profitability and higher uncertainty, is more pronounced for non-price competition industries than for price competition industries. Since lower profitability and higher uncertainty are the main channels that more intense competition is related with lower leverage and more conservative payout policies, the results in Table 2 imply that the relations between competition intensity and financial policies would be stronger for non-price competition industries than

for price competition industries.

5. Competition Intensity, Competition Type, and Financing Choices

Table 3 shows the ratio of debt financing on debt and equity financing for the tercile ranks of financing deficit and competition intensity. To eliminate the firms that do not have incentives to obtain cash from external financing, I only use firms with positive financing deficit (negative free cash flows). Note that HHI measures (*HHI_Asset*, *HHI_Sales*, and *HHI_TNIC*) are multiplied by (-1) to make their higher value correspond with tougher product market competition. In the most tables, the ratio of debt financing on total external financing decreases in the competition intensity. This is consistent with prior studies in that product market competition intensity is negatively related with leverage (Ovtchinnikov, 2010; Xu, 2012).

More importantly, a negative relation between competition intensity and the use of debt financing relative to equity financing is more pronounced for non-price competition industries than for price competition industries. Specifically, for non-price competition industries, the firm's reliance on debt financing relative to equity financing significantly decreases in competition intensity, whereas the ratio of debt financing on external financing shows unclear pattern for price competition industries.

Table 4 shows the estimation results of the system of equations

using the subsample of price and non-price competition industries. In each panel, Columns (1) to (3) and (4) to (6) present the results using the subsample of price and non-price competition industries, respectively. There is a sharp difference in the relation between competition intensity and financing choices between price and non-price competition industries. Except in Panel D where the measure of competition intensity is *Fluid*, the coefficients on *Def*Comp* are statistically insignificant for price competition industries (an industry with the advertising expenses-to-sales ratio lower than the median). This suggests that competition intensity does not have significant relations with financing activities to fund investments for price competition industries. In contrast, the coefficients on *Def*Comp* are significant for non-price competition industries. In each panel, the coefficients on *Def*Comp* are significantly negative and positive when the dependent variables are debt and equity financing, respectively. This indicates that non-price competition industries fund investments using more equity financing relative to debt financing as product market competition becomes more intense. The bottom of each panel presents the difference in coefficients on *Def*Comp* between two samples. The difference in coefficients on the interaction of financing deficit and competition intensity are largely statistically significant, suggesting that the relation between competition intensity and financing choices to fund investments is

significantly different between price and non-price competition industries.[24]

The results in Table 4 can be explained by stronger negative impacts of competition intensity on future performance for non-price competition industries than for price competition industries (Table 2) because lower profitability and higher uncertainty motivates the firm to use more equity financing relative to debt financing. However, one can raise a concern whether the results in Table 4 could be attributable to the difference in asset collateral. Since intangible investments have lower collateral values than tangible investments, the investment choices between price and non-price competition industries would drive the difference of financing behaviors between price and non-price competition industries.

To mitigate this concern, I regress financing choices on competition intensity, capital expenditure, and their interaction term. Replacing financing deficit in Table 4 with capital expenditures reduces the possibility that the difference in collateral values between tangible and intangible investments drives financing choices. The result in Appendix B shows that there is the significant difference in financing choices to fund capital expenditure between price and non-price competition industries. For

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[24] I follow Clogg et al. (1995) to test whether the difference between the coefficients from two regression models is statistically significant. *z*-statistic is calculated as $z = (bG1 - bG2) / \sqrt{[SE(bG1)^2 + SE(bG2)^2]}$, where *bG1* (*bG2*) and *SE*(*bG1*) (*SE*(*bG2*)) refer to the coefficient on the variable of interest and its standard errors in the first (second) regression, respectively.

price competition industries, the interaction of competition intensity and capital expenditure does not have a significant effect on financing choice. However, capital expenditure under more intense non-price competition is related with larger equity financing, whereas it has no significant relation with debt financing. This indicates that the stronger relation between the use of equity financing relative to debt financing and competition intensity for non-price competition industries than for price competition industries is attributable to the different natures of product market competition rather than to investment choices.

6. Competition Intensity, Competition Type, and Payout Decisions

This section investigates the effect of competition type on the relation between competition intensity and payout decisions. Tables from 5 to 7 examine cash holding, debt repayment, and equity repurchase, respectively. Cash holding, debt repayment, and equity repurchase are scaled by financing surplus (positive free cash flows) rather than by other common variables (e.g., total asset or sales) to show how cash inflows from operating and investment activities are allocated to cash reserves, debt investors, and equity investors. I also present the estimation results of the system of equations in Table 8. In Table 5 to 8, I use only firms with financing surplus (i.e., negative financing deficit).

Table 5 presents the ratio of the change in cash on financing surplus for the tercile ranks of financing surplus and each competition intensity measure. While the ratio of the change in cash holding on financing surplus does not show a significant change over the tercile of competition intensity for price competition industries, it significantly increases in the competition intensity for non-price competition industries. This indicates that the positive relation between competition intensity and cash accumulation is stronger for non-price competition industries than for price competition industries.

Table 6 shows the univariate test of debt repayment using firms with positive financing surplus. In each panel, more intense product market competition industries repay a smaller amount of debt than less intense competition industries. When I use *Fluid* as the measure of competition intensity, debt repayment decreases from 0.218 to 0.039 for firms in the largest tercile of financing surplus. Further, a negative relation between debt repayment and competition intensity is more pronounced for non-price competition industries than for price competition industries. Debt repayment decreases by 0.136 (from 0.228 to 0.092) for price competition industries and by 0.208 (from 0.198 to -0.009) for non-price competition industries. This suggests that, firms spend a smaller amount of free cash flows to repay debt when product market competition is more intense, and this is more pronounced for non-price competition industries than for price competition

industries.

In Table 7, I present the univariate test of net equity repurchase scaled by financing surplus using firms with positive financing surplus. Net equity repurchase is calculated as gross equity repurchase minus new equity issuance. The results using price competition industries do not show a clear relation between equity repurchase and competition intensity. For instance, the equity repurchase-to-financing surplus ratio increases in the intensity of price competition when the competition intensity is measured by *HHI_Sale* (Panel B). In contrast, the results using non-price competition industries largely support the conservative payout policy in Hoberg et al. (2014). Except when *HHI_TNIC* is the measure of competition intensity, equity repurchases decrease in competition intensity under non-price competition.

I then estimate the system of equations to examine the relation between competition intensity and the distribution of financing surplus into cash reserves, debt and equity investors. Table 8 presents the estimation results. Columns (1) to (3) and (4) to (6) show the results using price and non-price competition industries. Note that *Def*, the financing deficit, is the negative value of financing surplus. Mostly, the price competition intensity does not have significant relations with the distribution of financing surplus to cash reserves and distributions to debt and equity investors. In contrast, the coefficients on *Def*Comp* are significantly negative for non-price

competition industries. The negative coefficients on *Def*Comp* in the change in cash regressions indicate that firms accumulate more cash reserves from free cash flows as non-price competition intensifies (Column (4)). Moreover, the coefficients on *Def*Comp* are significantly negative in debt and equity financing regressions, suggesting that non-price competition industries distribute less amounts of free cash flows to debt and equity investors when product market competition is more intense (Columns (5) and (6)).

Prior studies document that firm characteristics such as growth opportunities or life cycle influences financing choices between debt and equity financing, and the distribution to outside investors. Growth opportunities are negatively associated with leverage because they decrease underinvestment and free cash flow problems, thus reducing the benefit of debt financing (Barclay et al., 2006). A greater need for investments to utilize growth opportunities also increases the value of cash reserves and motivates the firm to reduce payout to outside investors (Opler et al., 1999). Young firms are expected to have high growth options than old firms. Thus, similar with the firms with high growth opportunities, young firms are more likely to have lower leverage and to be conservative in payout policies than old firms.

I investigate whether stronger relations between competition intensity and financial policies for non-price competition industries than for price competition industries are attributable to growth opportunities or life

cycle rather than the different nature of price and non-price competition. I use the market-to-book ratio of equity (*M/B*) as the proxy of growth opportunity. Life cycle is captured by the combined *Z-score* = *Z_Sale_GR* – *Z_AGE* + *Z_CAPEX* – *Z_SIZE*, where *Z-score* for each variable is calculated by subtracting its mean and dividing it by its standard deviation (Collins et al., 2014). I classify the firm in the lowest (highest) tercile of *M/B* or *Z_score* as firms with low (high) growth opportunities or old (young) firms. *M/B* or *Z_score* are ranked using the full sample to avoid the case that firms in one type of competition has higher values of *M/B* or *Z_score* than firms in other type of competition.

Table 9 presents the results. Panel A and B (C and D) show the financing choices to fund investments (the distribution of free cash flows) with the partition based on growth opportunity and life cycle, respectively. Panel A and B (C and D) use firms with financing deficit (surplus) only. The coefficients on *Def*Comp* are largely insignificant for price competition industries regardless of the level of growth opportunities or life cycle. In contrast, they are statistically significant for non-price competition industries. Except Panel D, the magnitudes of the coefficients on *Def*Comp* are larger for firms with high growth opportunities or young firms than for firms with low growth opportunities or old firms. These results indicate that, although growth opportunities and life cycle influences financing and payout

decisions, the competition type is more important factor in the differential relations between competition intensity and financial policies.

To further mitigate the concern of correlated omitted variables, I control for several firm characteristics into the system of equations. First, several studies report that the use of debt financing increases in the tax benefits of interest payments. To control for the effect of tax benefits on debt financing, I use effective tax rate variable into the system of equations. The effective tax rate is measured by tax expenses scaled by pretax income or tax paid scaled by pretax income. Regardless of the choice of effective tax rate measure, my previous findings remain largely unchanged (untabulated).

Second, prior studies document that earnings quality is an important determinant of financing choices (e.g., Cho et al., 2015). Furthermore, there is an ongoing debate on the relation between competition intensity and earnings quality. Some studies argue that competition intensity is positively related with earnings quality because firms in highly concentrated industry tend to avoid the attention of competitors or politicians by deteriorating information environment (Cheng et al., 2013). Other studies report the negative relation between competition intensity and earnings quality based on the argument that intense competition increases proprietary costs related with the disclosure of high-quality information (Ali et al., 2014). Combining this literature, Guo et al. (2014) document an inverted U-shape

relation between competition and earnings quality.

To address the concern that the omission of earnings quality in the system of equations can bias my inference, I control for accruals quality measure from Dechow and Dichev (2002) as an additional control variable. Untabulated results show that the relations between competition intensity and financial policies are stronger for non-price competition industries than for price competition industries.

7. Additional Tests

7.1 The Firm-Level Identification of Competition Type

My empirical analyses so far use the industry-level advertising expenses-to-sales ratio to identify price and non-price competition. Using an industry-level identification of price and non-price competition ignores the possibility that firms within same industry face different types of product market competition. For instance, while Apple or Samsung Electronics manufacture expensive mobile phones with higher quality, other small manufacturers would compete to provide cheaper mobile phones than their competitors. To address this concern, I develop the firm-level indicator of competition type using *Z-score* of following five firm characteristics.

(1) *Advertising expenses-to-sales*: As explained earlier, economics studies document that higher advertising expenses-to-sales

ratio is a strong indicator of non-price competition.

(2) *R&D expenses-to-sales*: Firms under non-price competition will spend more resources on R&D expenditures to develop higher-quality products or services than firms under price competition.

(3) *Market-to-book ratio*: Firms under non-price competition will have higher market-to-book ratio than firms under price competition because intangible expenditures are expense item in the income statements, whereas tangible investments are capitalized as assets in the balance sheet.

(4) *Capital expenditure*: Firms under non-price competition will rely less on capital expenditures than firms under price competition due to their higher reliance on intangible expenditures.

(5) *Firm age*: Firms use intangible investments to establish the barriers from potential entrants (Sutton, 1991). Thus, young firms are more likely to face non-price competition than old firms.

Using these five variables, I construct $Z\_score = Z\_AD + Z\_R\&D + Z\_MB - Z\_CAPEX - Z\_AGE$. I classify firms with higher (lower) value of

the composite *Z_score* than the third (first) quartile as facing non-price (price) competition. Consistent with my prediction, firms with higher value of *Z_score* have higher ratio of advertising expenses-to-sales (1.55%) than firms with lower value of *Z_score* (0.57%).

Table 10 shows the estimation results of the system of equations using the partition based on *Z_score*.[25] Panel A and B are the results using firms with financing deficit and those using financing surplus, respectively. Panel A shows that the coefficients on *Def*Comp* in the debt and equity issuance regressions are significant only for firms under non-price competition. This is consistent with my previous results that the relation between competition intensity and financing choices is significant only under non-price competition. However, Panel B shows the mixed results between firms under price and non-price competition, which may suggest the incompleteness of my firm-level indicator of non-price competition.

7.2 Do firms under tougher competition use larger cash reserves to fund investments?

My previous findings show that firms accumulate more cash reserves by reducing the distributions of free cash flows to outside investors

[25] Table 10 presents the results using *HHI_Asset* as the measure of competition intensity. Using other competition intensity measures yields similar results with Table 10.

when they face more intense non-price competition. Large cash holdings can be motivated by risker cash flows and higher default risks (Bates et al., 2009). Otherwise, firms under tougher product market competition may accumulate cash reserves to make investments even when outside investors do not provide funds (Opler et al., 1999). An ability to fund investments internally can be very important when failures to obtain external funds and to make timely investments can deter the firm's competitiveness. To test whether an increase in cash reserves of firms under intense competition leads to more investments, I estimate the following regression model.

$$Investments_{i,t+1}=b_0+b_1Investment_{i,t}+b_2\Delta Cash_{i,t}+b_3\Delta Cash_{i,t}*Comp_{i,t}$$
$$+b_4Comp_{i,t}+Controls_{i,t}+Industry\ FE+Year\ FE+e_{t+1} \quad (3)$$

where *Investments* is the sum of capital expenditure, R&D, acquisition, and the change in working capital, scaled by lagged total assets. I control the lagged value of the dependent variable to take into account of the intertemporal correlation of investment activities. I use control variables in Equation (2). I also address the industry-variant or time-variant factors of investments by including industry fixed effects and year fixed effects.

Panel A, B, and C of Table 11 show the estimation results of

Equation (3) using total sample, price competition industries, and non-price competition industries. In Panel A, positive coefficients on *Investments* are consistent with the positive intertemporal correlation of investment activities. The coefficients on *ΔCash* and *ΔCash*Comp* are positive and negative, respectively. This suggests that firms increase investments when they experience an increase in cash reserves, and this relation is attenuated when the product market competition is intense. However, this finding does not hold when I test the subsample of price competition industries. The result using price competition industries in Panel B show that the coefficients on *ΔCash*Comp* are positive. This can be interpreted that tougher price competition industries increase their investments when they experience an increase in cash holding. In contrast, non-price competition industries show negative coefficients on *ΔCash*Comp*, suggesting that they increase investments using internal cash holding only when non-price competition is loose.

These findings provide different implications of large cash reserves between price and non-price competition industries. For price competition industry, firms use large cash reserves to fund investments, which support the role of internal funding as the competitive edge in the financial constraints. This is consistent with prior studies in that firms hold cash reserves to fund investments when external financing is constrained (Opler et

al. 1999). For non-price competition industries, funding investments is not a primary motivation of stocking cash reserves. Rather, they would accumulate cash reserves to cope with cash flows volatility and the shock on default risk. This is in line with Bates et al. (2009), who report that U.S. industrial firm's cash holding increases in the cash flow risk in recent periods.

8. Conclusion

This study revisits prior studies on the relations that product market competition intensity has with capital structure decisions and payout decisions. Prior studies suggest that competition intensity influences leverage and the distribution of free cash flows to outside investors through its negative impacts on future profitability and uncertainty. Focusing on the difference between price and non-price competition, I find that the negative impacts of competition intensity on future profitability and uncertainty are more pronounced for non-price competition industries than for price competition industries. I expand this finding into capital structure and payout policies. I find that the positive relation between non-price competition intensity and the use of equity financing relative to equity financing is stronger non-price competition industries than for price competition industries. Also, the negative relation between competition intensity and payout to investors is more pronounced for non-price competition industries

than for price competition industries.

While this literature often focuses on the relation between competition intensity and financial policies, they are silent on whether the competition type changes the relation between competition intensity and the firm's behaviors. Thus, this paper contributes to the literature by shedding light on the differential effect of competition intensity and financial policies under different competition types. Another potential extension of this literature can be the comparison between the substitutive vs. complementary competition. For instance, Vrettos (2013) reports that CEO incentive contracts are different between airline service providers who compete as strategic substitutes and those who compete as complements. Given that there is no widely accepted construct to capture the substitutive or complementary competition, there is a room for the improvement in the current literature.

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Appendix A: Variable Definition

Variable	Definition
HHI_Asset (*_Sale*)	Herfindahl-Hirschman Index constructed using the total assets (sales) of U.S. listed companies in Compustat database.
HHI_TNIC	Herfindahl-Hirschman Index constructed using text-based network industry classification of U.S. listed companies in Compustat database. Provided by Hoberg and Philips (2010).
Fluid	Product market fluidity measure constructed by Hoberg et al. (2014).
ΔCash	The change in cash and short-term investments (Compustat code: CHE), scaled by one-year lagged total assets (AT).
ΔDebt	Net debt issue, calculated as the change in the sum of short-term debt (DLC) and long-term debt (DLTT), scaled by one-year lagged total assets.
ΔEquity	Net equity issue, calculated as new equity issue (SSTK) minus equity repurchase (PRSTKC), scaled by one-year-lagged total assets.
Def	Financing deficit. The sum of capital expenditure (CAPX), change in working capital (change in (ACT-CHE)-(LCT-DLC)), acquisitions (AQC) and dividend payments (DVC+DVP) minus sales of property, plant and equipment (SPPE) and cash flows from operations (OANCF), scaled by one-year-lagged total assets (Frank and Goyal 2003).
Surplus	Financing deficit multiplied by (-1) for firms having a negative value of financing deficit, zero for firms having a

	positive financing deficit.
Size	The natural log of total assets (AT).
Lev	The ratio of interest-bearing debt (DLC+DLTT) to total assets.
BM	The ratio of the book value of equity to the market value of equity (CSHO*PRCC_F).
CFVola	The standard deviation of cash flows from operations (OANCF) scaled by the total assets over at least three of the past five years.
Loss%	The percentage of years reporting losses in net income (NI) over at least three of the past five years.
Dep	The ratio of depreciation and amortization expenses (DP) to the previous year's total assets.
R&D	Research and development expenses (XRD), scaled by sales. Zero for firms not reporting R&D expenses.
R&D_D	An indicator variable that equals one for firms reporting R&D expenses, zero otherwise.
RetVola	The standard deviation of daily stock returns over the fiscal year.
Ret	Stock returns over the fiscal year.
Investments	Total investments calculated as the sum of capital expenditure (CAPX), change in working capital (change in (ACT-CHE)-(LCT-DLC)), acquisitions (AQC), and research and development expenses (XRD), scaled by one-year-lagged total assets.
ROA	Return-on-assets, calculated by net income (NI) scaled by one-year-lagged total assets.

Appendix B: Capital Expenditure, Competition Intensity, Competition Type, and Financing Choices

Table 4 shows that firms use more equity financing relative to debt financing when non-price competition is more intense, whereas price competition intensity does not have significant relation with financing choices. To investigate whether this finding is purely attributable to the difference between the investment choices of firms under price and non-price competition, I estimate the following regression for the subsample of price and non-price competition industries.

$$\Delta Debt_{i,t+1} \text{ or } \Delta Equity_{i,t+1} = b_1 Comp_{i,t} + b_2 Capex_{i,t+1} + b_3\, Comp_{i,t} * Capex_{i,t+1} + Controls + Industry\ FE + Year\ FE + e_{t+1} \qquad \text{(B.1)}$$

where *Capex* is the capital expenditure scaled by lagged total assets. I use capital expenditure rather than an aggregate measure of investments because capital expenditure is not related with intangible assets and thus unlikely to have different influences on firms' financing choices in price and non-price competition.

The results in Table B.1 show that there is the significant difference between financing choices to fund capital expenditure between

price and non-price competition industries. For price competition industries, the interaction of competition intensity and capital expenditure does not have a significant effect on financing choice between debt and equity financing. However, capital expenditure under more intense non-price competition is related with larger equity financing, whereas it has no significant relation with debt financing. This indicates that the positive relation between the reliance on equity financing relative to debt financing and non-price competition intensity is attributable to the nature of product market competition rather than to investment choices different from firms under price competition.

Table B.1. The Difference in Financing Choices to Fund Capital Expenditures between Firms under Price and Non-Price Competition

Panel A. Debt Financing

	Price competition				Non-price competition			
Dep. Var.=	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta Debt_{t+1}$	*Comp= HHI_Asset*	*Comp= HHI_Sale*	*Comp= HHI_TNIC*	*Comp= Fluid*	*Comp= HHI_Asset*	*Comp= HHI_Sale*	*Comp= HHI_TNIC*	*Comp= Fluid*
$Capex_{t+1}$	0.595***	0.593***	0.613***	0.637***	0.645***	0.634***	0.542***	0.562***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)	(0.000)	(0.000)	(0.000)
$Capex_{t+1}$	-0.438	-0.472	-0.169	-0.005	0.401	0.290	-0.364*	0.000
$*Comp_t$	(0.214)	(0.214)	(0.212)	(0.384)	(0.184)	(0.405)	(0.071)	(0.948)
Controls	yes	yes	Yes	Yes	yes	yes	yes	yes
Industry /Year FE	yes	yes	Yes	Yes	yes	yes	yes	yes
Adj. R2	0.108	0.108	0.105	0.103	0.097	0.097	0.086	0.077
n	32,681	32,681	18,361	19,895	30,924	30,924	16,292	18,846

Panel B. Equity Financing

	Price competition				Non-price competition			
Dep. Var.= $\Delta Equity_{t+1}$	(1) *Comp= HHI_Asset*	(2) *Comp= HHI_Sale*	(3) *Comp= HHI_TNIC*	(4) *Comp= Fluid*	(5) *Comp= HHI_Asset*	(6) *Comp= HHI_Sale*	(7) *Comp= HHI_TNIC*	(8) *Comp= Fluid*
$Capex_{t+1}$	0.372***	0.331***	0.213***	0.287***	0.401***	0.391***	0.242***	0.013
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.897)
$Capex_{t+1}$	-0.747	-0.703	-0.671*	0.007	1.062***	1.047***	-0.317	0.033***
$*Comp_t$	(0.206)	(0.288)	(0.055)	(0.449)	(0.002)	(0.007)	(0.306)	(0.008)
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Industry /Year FE	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R2	0.216	0.216	0.204	0.213	0.300	0.300	0.305	0.306
n	32,681	32,681	18,361	19,895	30,924	30,924	16,292	18,846

This table presents the results of the system of equations to test the association between competition intensity and the financing choices among cash holding, debt financing and equity financing under price and non-price competition. In each panel, Columns (1) to (3) ((4) to (6)) show the results using firms with financing deficit under price (non-price) competition. The system of equations is estimated using the maximum likelihood method, and the standard errors are clustered at the firm level (Gould, Pitblado, and Sribney, 2006). Coefficients on other variables are abbreviated for the brevity. Definitions of the variables are given in Appendix A. All continuous variables except competition intensity are winsorized at the top and bottom 1% to eliminate the effect of outliers. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 1. Summary Statistics

Panel A. Annual Distribution and Average Values of Competition Intensity Measures

	HHI_Asset		*HHI_Sale*		*HHI_TNIC*		*Fluid*	
Year	n	Mean	n	Mean	n	Mean	n	Mean
1990	2,386	-0.108	2,386	-0.092				
1991	2,557	-0.115	2,557	-0.097				
1992	2,553	-0.113	2,553	-0.093				
1993	2,582	-0.107	2,582	-0.090				
1994	2,627	-0.100	2,627	-0.084				
1995	2,695	-0.091	2,695	-0.082				
1996	2,850	-0.078	2,850	-0.072				
1997	2,999	-0.072	2,999	-0.066	4,575	-0.193		
1998	2,958	-0.069	2,958	-0.064	4,259	-0.189	2,824	5.760
1999	2,858	-0.066	2,858	-0.062	3,749	-0.191	2,725	6.028
2000	2,910	-0.065	2,910	-0.063	3,338	-0.188	2,785	6.161
2001	2,805	-0.063	2,805	-0.060	2,957	-0.194	2,669	6.361
2002	2,809	-0.066	2,809	-0.063	2,735	-0.212	2,670	6.805
2003	2,832	-0.069	2,832	-0.065	2,574	-0.205	2,687	6.353
2004	2,916	-0.069	2,916	-0.065	2,437	-0.222	2,738	6.647
2005	2,784	-0.068	2,784	-0.064	2,277	-0.234	2,629	5.639
2006	2,632	-0.070	2,632	-0.066	2,121	-0.238	2,486	7.894
2007	2,447	-0.070	2,447	-0.066	1,968	-0.225	2,297	6.443
2008	2,354	-0.072	2,354	-0.069	1,798	-0.228	2,209	6.479
2009	2,366	-0.072	2,366	-0.068	1,720	-0.234	2,212	5.983
2010	2,357	-0.072	2,357	-0.068	1,670	-0.229	2,197	7.571
2011	2,306	-0.072	2,306	-0.068	1,580	-0.223	2,144	7.665
2012	2,208	-0.073	2,208	-0.068	1,492	-0.217	2,050	6.729

Panel B. Industries with the Lowest or Highest Advertising-to-Sales Ratio

Five Industries with the Lowest Ratio of Advertising Expenses on Sales

SIC2	Description	Advertising Expense-to-Sales Ratio	*HHI_Asset*	*HHI_Sale*	*HHI_TNIC*	*Fluid*	*ROA*	*Std (ROA)*
12	Coal Mining	0.002	-0.144	-0.125	-0.231	9.352	0.062	0.090
14	Nonmetalic Minerals, Except Fuels	0.002	-0.134	-0.132	-0.108	5.185	0.056	0.060
42	Trucking and Warehousing	0.004	-0.029	-0.037	-0.128	4.910	0.034	0.068
17	Special Trade Contractors	0.008	-0.077	-0.057	-0.356	5.759	-0.006	0.109
16	Heavy Construction, Except Building	0.009	-0.076	-0.056	-0.335	5.951	0.024	0.100
	Mean	0.005	-0.092	-0.081	-0.232	6.231	0.034	0.086

Five Industries with the Highest Ratio of Advertising Expenses on Sales

SIC2	Description	Advertising Expense-to-Sales Ratio	*HHI_Asset*	*HHI_Sale*	*HHI_TNIC*	*Fluid*	*ROA*	*Std(ROA)*
82	Educational Services	0.069	-0.103	-0.066	-0.248	7.911	0.036	0.111
59	Miscellaneous Retail	0.070	-0.033	-0.040	-0.136	6.420	0.024	0.111
10	Metal Mining	0.071	-0.116	-0.119	-0.261	6.789	-0.022	0.175
72	Personal Services	0.080	-0.103	-0.066	-0.468	4.639	0.028	0.076
47	Transportation Services	0.092	-0.028	-0.036	-0.130	5.168	0.076	0.088
	Mean	0.076	-0.077	-0.065	-0.197	6.185	0.028	0.112

Panel A presents the annual distribution of observations for competition intensity measure. *HHI_Asset* is Herfindahl-Hirschman Index constructed using total assets of firms in Compustat Fundamentals Annual data. *HHI_Sales* is Herfindahl-Hirschman Index constructed using sales of firms in Compustat Fundamentals Annual data. *HHI_TNIC* is Herfindahl-Hirschman Index using the text-analysis-based industry classification (Hoberg and Philips, 2010). *Fluid* is the product market fluidity developed by Hoberg et al. (2014). Panel B compares five industries with the lowest and highest advertising expenses-to-sales ratio. This panel uses 2-digit SIC industry classification. *ROA* is the industry-level return-on-assets, calculated by the ratio of net income on total assets, within each industry. *Std(ROA)* is the industry-level standard deviation of return-on-assets.

Table 2. The Effect of competition Intensity on Future Performance

Panel A. Future Profitability

	$Comp_t$ = *HHI_Asset*		$Comp_t$ = *HHI_Sale*		$Comp_t$ = *HHI_TNIC*		$Comp_t$ = *Fluid*	
Dep. Var.= OI_{t+1}/AT_t	Price Competition	Non-Price Competition	Price Competition	Non-Price Competition	Price Competition	Non-Price Competition	Price Competition	Non-Price Competition
Intercept	-0.102***	-0.200***	-0.095***	-0.216***	-0.138***	-0.256***	-0.101***	-0.179***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)
$Comp_t$	-0.019	-0.132***	0.005	-0.163***	-0.040***	-0.122***	-0.014***	-0.022***
	(0.620)	(0.000)	(0.903)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Size_t$	0.030***	0.047***	0.030***	0.047***	0.029***	0.050***	0.035***	0.050***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lev_t	-0.035***	0.033***	-0.034***	0.033***	-0.062***	0.000	-0.040***	0.004
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.974)	(0.000)	(0.718)
MB_t	-0.005***	-0.006***	-0.005***	-0.006***	-0.002	-0.006***	-0.002	-0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.177)	(0.000)	(0.155)	(0.000)
Year/Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.143	0.264	0.143	0.264	0.144	0.266	0.214	0.359
n	44,340	47,944	44,340	47,944	20,239	20,258	23,919	26,167

Panel B. Future Uncertainty

Dep. Var.= Industry-level $Std(OI_{t+1}/AT_t)$	$Comp_t$ = *HHI_Asset*		$Comp_t$ = *HHI_Sale*		$Comp_t$ = *HHI_TNIC*		$Comp_t$ = *Fluid*	
	Price Competition	Non-Price Competition	Price Competition	Non-Price Competition	Price Competition	Non-Price Competition	Price Competition	Non-Price Competition
Intercept	0.130***	0.127***	0.128***	0.132***	0.057***	0.053***	0.055***	0.038***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Comp_t$	0.002	0.089***	0.013***	0.055***	0.001	0.009***	0.000***	0.001***
	(0.316)	(0.000)	(0.000)	(0.000)	(0.159)	(0.000)	(0.001)	(0.000)
$Size_t$	0.000	-0.001***	0.000	-0.001***	0.000	-0.001***	0.000**	0.000**

	(0.861)	(0.000)	(0.915)	(0.000)	(0.377)	(0.000)	(0.035)	(0.013)
Lev_t	-0.004***	-0.005***	-0.004***	-0.005***	-0.004***	0.001	-0.002**	-0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.619)	(0.038)	(0.629)
MB_t	0.001***	0.001***	0.001***	0.001***	0.001***	0.000***	0.001***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year/Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	0.783	0.854	0.783	0.853	0.833	0.875	0.838	0.882
n	44,340	47,944	44,340	47,944	20,239	20,258	23,919	26,167

Panel A presents the regression result of future profitability on competition intensity and firm characteristics. Profitability is measured by OI_{t+1}/AT_t, which is the operating income scaled by lagged total assets. Panel B presents the regression of the industry-level uncertainty of future performance on competition intensity and firm characteristics. Industry-level uncertainty of future performance is measured by the 2-digit SIC industry-level standard deviation of OI_{t+1}/AT_t. Standard errors of estimated coefficients are clustered at the firm level. Definitions of the variables are given in Appendix A. All continuous variables except competition intensity are winsorized at the top and bottom 1% to eliminate the effect of outliers. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 3. Univariate Test of Financing Activities of Firms with Financing Deficit

Panel A. Competition = *HHI_Asset*

ΔDebt		Total Sample					Price Competition Group					Non-Price Competition Group				
(*ΔDebt*+		Competition Rank					Competition Rank					Competition Rank				
ΔEquity)		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Deficit Rank	1:Small	0.663	0.653	0.635	-0.028	(0.17)	0.626	0.695	0.627	0.002	(0.48)	0.698	0.680	0.572	-0.126***	(0.00)
	2	0.589	0.507	0.549	-0.039**	(0.03)	0.551	0.617	0.597	0.046*	(0.07)	0.553	0.489	0.467	-0.086***	(0.00)
	3:Large	0.526	0.346	0.443	-0.083***	(0.00)	0.495	0.538	0.494	-0.001	(0.47)	0.447	0.288	0.379	-0.068***	(0.00)

Panel B. Competition = *HHI_Sale*

ΔDebt		Total Sample					Price Competition Group					Non-Price Competition Group				
(*ΔDebt*+		Competition Rank					Competition Rank					Competition Rank				
ΔEquity)		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Deficit Rank	1:Small	0.659	0.688	0.606	-0.053**	(0.04)	0.638	0.695	0.609	-0.029	(0.25)	0.700	0.675	0.575	-0.126***	(0.00)
	2	0.581	0.511	0.550	-0.032*	(0.06)	0.552	0.623	0.590	0.038	(0.11)	0.559	0.482	0.469	-0.089***	(0.00)
	3:Large	0.508	0.359	0.438	-0.071***	(0.00)	0.489	0.565	0.472	-0.016	(0.22)	0.440	0.298	0.368	-0.072***	(0.00)

Panel C. Competition = *HHI_TNIC*

ΔDebt		Total Sample					Price Competition Group					Non-Price Competition Group				
(*ΔDebt*+		Competition Rank					Competition Rank					Competition Rank				
ΔEquity)		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Deficit Rank	1:Small	0.757	0.752	0.666	-0.091**	(0.04)	0.789	0.840	0.672	-0.116**	(0.04)	0.728	0.729	0.638	-0.090**	(0.04)
	2	0.631	0.586	0.555	-0.075*	(0.06)	0.601	0.622	0.616	0.015*	(0.06)	0.693	0.479	0.494	-0.199*	(0.06)
	3:Large	0.560	0.444	0.433	-0.128***	(0.00)	0.581	0.554	0.576	-0.005***	(0.00)	0.533	0.310	0.347	-0.186***	(0.00)

Panel D. Competition = *Fluid*

ΔDebt (*ΔDebt*+ *ΔEquity*)		Total Sample					Price Competition Group					Non-Price Competition Group				
		Competition Rank					Competition Rank					Competition Rank				
		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Deficit Rank	1:Small	0.865	0.540	0.414	-0.452***	(0.00)	0.931	0.490	0.488	-0.443***	(0.00)	0.859	0.533	0.333	-0.526***	(0.00)
	2	0.731	0.482	0.333	-0.398***	(0.00)	0.727	0.494	0.452	-0.275***	(0.00)	0.721	0.466	0.207	-0.514***	(0.00)
	3:Large	0.696	0.438	0.217	-0.479***	(0.00)	0.708	0.489	0.373	-0.335***	(0.00)	0.639	0.367	0.137	-0.502***	(0.00)

This table presents the ratio of net debt issuance on the sum of net debt and equity issuances for the tercile ranks of financing deficit and competition intensity measures. Note that the sample of this table consists of firms with positive financing deficit (i.e., negative free cash flows). Net debt issuance (*ΔDebt*) is the change in debt from year *t* to year *t*+1, scaled by total assets in year *t*. Net equity issuance (*ΔEquity*) is new equity issue sales minus equity repurchases in year *t*+1, scaled by total assets in year *t*. *Def* is the financing deficit, calculated as the sum of capital expenditure, changes in working capital, dividend payments, and acquisitions, minus operating cash flows and sales of plant, property, and equipment, all scaled by the previous year's total assets. All continuous variables except competition intensity are winsorized at the top and bottom 1% to eliminate the effect of outliers. *, ** and *** denote the significance of difference between high and low competition intensity tercile at the 0.10, 0.05 and 0.01 levels, respectively.

Table 4. The System of Equations: Test of Competition Intensity, Competition Type, and Financing Activities of Firms with Financing Deficit

Panel A. Competition = *HHI_Asset*

	Price competition (n=15,660)			Non-price competition (n=16,127)		
Dep. Var.=	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4) $\Delta Cash_{t+1}$	(5) $\Delta Debt_{t+1}$	(6) $\Delta Equity_{t+1}$
Def_{t+1}	-0.036**	0.601***	0.363***	0.049**	0.494***	0.554***
	(0.036)	(0.000)	(0.000)	(0.010)	(0.000)	(0.000)
Def_{t+1} * HHI_Asset_t	-0.031	0.045	-0.075	0.667***	-0.301***	0.977***
	(0.833)	(0.751)	(0.731)	(0.000)	(0.005)	(0.000)
Controls	yes	yes	yes	yes	yes	Yes
ifference in Interactions						
Difference				-0.698***	0.355**	-1.052***
p-value				(0.000)	(0.023)	(0.001)

Panel B. Competition = *HHI_Sale*

	Price competition (n=15,660)			Non-price competition (n=16,127)		
Dep. Var.=	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4) $\Delta Cash_{t+1}$	(5) $\Delta Debt_{t+1}$	(6) $\Delta Equity_{t+1}$
Def_{t+1}	-0.041**	0.601***	0.358***	0.048***	0.490***	0.559***
	(0.018)	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)
Def_{t+1} * HHI_Sale_t	-0.093	0.057	-0.150	0.716***	-0.401***	1.117***
	(0.558)	(0.689)	(0.532)	(0.000)	(0.001)	(0.000)
Controls	yes	yes	yes	yes	Yes	yes
ifference in Interactions						
Difference				-0.809***	0.458***	-1.267***
p-value				(0.000)	(0.007)	(0.000)

Panel C. Competition = *HHI_TNIC*

	Price competition (n=8,346)			Non-price competition (n=8,326)		
Dep. Var.=	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4) $\Delta Cash_{t+1}$	(5) $\Delta Debt_{t+1}$	(6) $\Delta Equity_{t+1}$
Def_{t+1}	-0.055**	0.654***	0.291***	-0.022	0.506***	0.472***
	(0.019)	(0.000)	(0.000)	(0.408)	(0.000)	(0.000)
Def_{t+1} * HHI_TNIC_t	-0.056	0.089	-0.145	0.024	-0.174**	0.197*
	(0.520)	(0.146)	(0.186)	(0.789)	(0.015)	(0.069)
Controls	yes	yes	yes	yes	Yes	yes
ifference in Interactions						
Difference				-0.080	0.263***	-0.342**
p-value				(0.261)	(0.003)	(0.013)

Panel D. Competition = *Fluid*

	Price competition (n=9,191)			Non-price competition (n=9,534)		
Dep. Var.=	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Cash_{t+1}$	$\Delta Debt_{t+1}$	$\Delta Equity_{t+1}$	$\Delta Cash_{t+1}$	$\Delta Debt_{t+1}$	$\Delta Equity_{t+1}$
Def_{t+1}	-0.115***	0.738***	0.172***	-0.027	0.712***	0.261***
	(0.000)	(0.000)	(0.000)	(0.284)	(0.000)	(0.000)
Def_{t+1} * $Fluid_t$	0.008	-0.019***	0.028***	0.017***	-0.029***	0.045***
	(0.164)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Controls	yes	yes	yes	yes	yes	Yes
ifference in Interactions						
Difference				0.008	-0.010**	0.018**
p-value				(0.137)	(0.025)	(0.026)

This table presents the results of the system of equations to test the association between competition intensity and the financing choices among cash holding, debt financing and equity financing under price and non-price competition. In each panel, Columns (1) to (3) ((4) to (6)) show the results using firms with financing deficit under price (non-price) competition. The system of equations is estimated using the maximum likelihood method, and the standard errors are clustered at the firm level (Gould, Pitblado, and Sribney, 2006). Coefficients on other variables are abbreviated for the brevity. Definitions of the variables are given in Appendix A. All continuous variables except competition intensity are winsorized at the top and bottom 1% to eliminate the effect of outliers. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 5. Univariate Test of Payout Policies: Change in Cash/Financing Surplus – Surplus Sample

Panel A. Competition = *HHI_Asset*

ΔCash Surplus		Total sample					Price competition group					Non-price competition group				
		Competition rank					Competition rank					Competition rank				
		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Surplus Rank	1:Small	0.012	0.017	0.012	0.001	(0.34)	0.014	0.013	0.015	0.001	(0.40)	0.011	0.018	0.011	-0.001	(0.38)
	2	0.030	0.032	0.034	0.004**	(0.02)	0.032	0.028	0.033	0.000	(0.46)	0.028	0.035	0.035	0.006**	(0.01)
	3:Large	0.087	0.105	0.102	0.015***	(0.00)	0.087	0.082	0.090	0.003	(0.18)	0.100	0.124	0.113	0.013***	(0.00)

Panel B. Competition = *HHI_Sale*

ΔCash Surplus		Total sample					Price competition group					Non-price competition group				
		Competition rank					Competition rank					Competition rank				
		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Surplus Rank	1:Small	0.011	0.016	0.013	0.002*	(0.08)	0.013	0.013	0.016	0.003	(0.10)	0.013	0.013	0.014	0.001	(0.31)
	2	0.030	0.032	0.034	0.004**	(0.02)	0.031	0.029	0.032	0.001	(0.34)	0.031	0.031	0.037	0.006**	(0.01)
	3:Large	0.088	0.105	0.102	0.014***	(0.00)	0.086	0.084	0.089	0.004	(0.14)	0.105	0.112	0.121	0.016***	(0.00)

Panel C. Competition = *HHI_TNIC*

ΔCash Surplus		Total sample					Price competition group					Non-price competition group				
		Competition rank					Competition rank					Competition rank				
		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Surplus Rank	1:Small	0.191	0.242	0.226	0.036	(0.27)	0.209	0.191	0.226	0.017	(0.27)	0.235	0.285	0.295	0.060	(0.33)
	2	0.101	0.128	0.195	0.095***	(0.00)	0.148	0.101	0.195	0.047***	(0.00)	0.102	0.115	0.231	0.129***	(0.00)
	3:Large	0.038	0.026	0.081	0.042***	(0.00)	0.058	0.038	0.081	0.022***	(0.00)	0.029	-0.024	0.057	0.029	(0.17)

Panel D. Competition = *Fluid*

ΔCash		Total sample					Price competition group					Non-price competition group				
Surplus		Competition rank					Competition rank					Competition rank				
		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Surplus Rank	1:Small	0.007	0.014	0.022	0.015***	(0.00)	0.008	0.014	0.019	0.011***	(0.00)	0.008	0.015	0.027	0.019***	(0.00)
	2	0.025	0.031	0.045	0.020***	(0.00)	0.023	0.032	0.040	0.017***	(0.00)	0.025	0.029	0.053	0.028***	(0.00)
	3:Large	0.073	0.097	0.133	0.060***	(0.00)	0.074	0.085	0.106	0.032***	(0.00)	0.076	0.114	0.160	0.084***	(0.00)

This table presents the ratio of the change in cash holding on the financing surplus for the tercile ranks of financing surplus and competition intensity measures. Note that the sample of this table consists of firms with positive financing surplus (i.e., positive free cash flows). *ΔCash* is the change in cash holding from year *t* to year *t*+1, scaled by total assets in year *t*. *Surplus* is the financing surplus, calculated as the sum of capital expenditure, changes in working capital, dividend payments, and acquisitions, minus operating cash flows and sales of plant, property, and equipment, all scaled by the previous year's total assets and multiplied by (-1). All continuous variables except competition intensity are winsorized at the top and bottom 1% to eliminate the effect of outliers. *, ** and *** denote the significance of difference between high and low competition intensity terciles at the 0.10, 0.05 and 0.01 levels, respectively.

Table 6. Univariate Test of Payout Policies: Debt Repayment/Financing Surplus – Surplus Sample

Panel A. Competition = *HHI_Asset*

ΔDebt(-1)*		Total sample					Price competition group					Non-price competition group				
Surplus		Competition rank					Competition rank					Competition rank				
		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Surplus Rank	1:Small	0.306	0.158	0.207	-0.099	(0.11)	0.402	0.265	0.320	-0.083	(0.19)	0.229	0.472	0.405	0.176*	(0.09)
	2	0.251	0.253	0.166	-0.086***	(0.00)	0.249	0.239	0.167	-0.082***	(0.00)	0.235	0.179	0.135	-0.100***	(0.00)
	3:Large	0.149	0.077	0.080	-0.069***	(0.00)	0.174	0.142	0.111	-0.063***	(0.00)	0.146	0.091	0.088	-0.058***	(0.00)

Panel B. Competition = *HHI_Sale*

ΔDebt(-1)*		Total sample					Price competition group					Non-price competition group				
Surplus		Competition rank					Competition rank					Competition rank				
		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Surplus Rank	1:Small	0.391	0.351	0.318	-0.073	(0.12)	0.439	0.137	0.312	-0.127	(0.18)	0.311	0.525	0.280	-0.032	(0.40)
	2	0.252	0.251	0.189	-0.062***	(0.00)	0.249	0.277	0.221	-0.029	(0.19)	0.223	0.226	0.107	-0.116***	(0.00)
	3:Large	0.171	0.135	0.122	-0.050***	(0.00)	0.182	0.188	0.167	-0.016	(0.15)	0.138	0.143	0.052	-0.086***	(0.00)

Panel C. Competition = *HHI_TNIC*

ΔDebt(-1)*		Total sample					Price competition group					Non-price competition group				
Surplus		Competition rank					Competition rank					Competition rank				
		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Surplus Rank	1:Small	0.422	0.224	0.242	-0.180	(0.12)	0.352	0.028	0.210	-0.142	(0.14)	0.656	0.221	0.269	-0.387**	(0.02)
	2	0.289	0.217	0.160	-0.129***	(0.00)	0.308	0.210	0.207	-0.101**	(0.01)	0.257	0.186	0.066	-0.191***	(0.00)
	3:Large	0.222	0.134	0.076	-0.146***	(0.00)	0.226	0.172	0.085	-0.141***	(0.00)	0.212	0.108	0.060	-0.152***	(0.00)

Panel D. Competition = *Fluid*

ΔDebt(-1)*		Total sample					Price competition group					Non-price competition group				
Surplus		Competition rank					Competition rank					Competition rank				
		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Surplus Rank	1:Small	0.378	0.303	0.190	-0.188***	(0.00)	0.308	0.103	0.143	-0.165***	(0.00)	0.456	0.299	0.154	-0.302**	(0.03)
	2	0.274	0.189	0.135	-0.139***	(0.00)	0.303	0.212	0.122	-0.181***	(0.00)	0.236	0.164	0.065	-0.171***	(0.00)
	3:Large	0.218	0.137	0.039	-0.179***	(0.00)	0.228	0.162	0.092	-0.136***	(0.00)	0.198	0.121	-0.009	-0.208***	(0.00)

This table presents the ratio of debt repayment on the financing surplus for the tercile ranks of financing surplus and competition intensity measures. Note that the sample of this table consists of firms with positive financing surplus (i.e., positive free cash flows). Net debt issuance (*ΔDebt*) is the change in debt from year *t* to year *t*+1, scaled by total assets in year *t*. *Surplus* is the financing surplus, calculated as the sum of capital expenditure, changes in working capital, dividend payments, and acquisitions, minus operating cash flows and sales of plant, property, and equipment, all scaled by the previous year's total assets and multiplied by (-1). All continuous variables except competition intensity are winsorized at the top and bottom 2% to eliminate the effect of outliers. *, ** and *** denote the significance of difference between high and low competition intensity terciles at the 0.10, 0.05 and 0.01 levels, respectively.

Table 7. Univariate Test of Payout Policies: Equity Repurchase/Financing Surplus – Surplus Sample

Panel A. Competition = *HHI_Asset*

ΔEquity(-1)*		Total sample					Price competition group					Non-price competition group				
		Competition rank					Competition rank					Competition rank				
Surplus		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Surplus Rank	1:Small	-0.084	-0.117	-0.053	0.031	(0.22)	-0.146	-0.253	-0.122	0.024	(0.35)	0.051	-0.097	-0.199	-0.251***	(0.00)
	2	0.024	0.034	0.009	-0.016	(0.21)	-0.002	-0.002	-0.022	-0.020	(0.21)	0.037	-0.009	-0.035	-0.072***	(0.02)
	3:Large	-0.017	-0.052	-0.019	-0.002	(0.43)	-0.024	-0.065	-0.034	-0.010	(0.26)	-0.030	-0.113	-0.059	-0.030	(0.12)

Panel B. Competition = *HHI_Sale*

ΔEquity(-1)*		Total sample					Price competition group					Non-price competition group				
		Competition rank					Competition rank					Competition rank				
Surplus		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Surplus Rank	1:Small	-0.108	-0.076	-0.069	0.039	(0.17)	-0.370	-0.268	-0.150	0.220**	(0.01)	0.031	-0.089	-0.182	-0.214***	(0.01)
	2	0.018	0.039	0.011	-0.007	(0.36)	-0.027	-0.018	0.009	0.036	(0.15)	-0.001	0.048	-0.047	-0.047	(0.18)
	3:Large	-0.027	-0.044	-0.018	0.009	(0.23)	-0.036	-0.028	0.013	0.049**	(0.01)	-0.066	-0.026	-0.101	-0.035*	(0.10)

Panel C. Competition = *HHI_TNIC*

ΔEquity(-1)*		Total sample					Price competition group					Non-price competition group				
		Competition rank					Competition rank					Competition rank				
Surplus		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Surplus Rank	1:Small	0.191	0.242	0.226	0.036	(0.26)	0.140	0.179	0.107	-0.032	(0.34)	0.248	0.321	0.327	0.078	(0.18)
	2	0.101	0.128	0.195	0.095***	(0.00)	0.097	0.079	0.134	0.037	(0.14)	0.129	0.181	0.243	0.115***	(0.00)
	3:Large	0.038	0.026	0.081	0.042***	(0.00)	0.027	0.035	0.102	0.075***	(0.00)	0.036	0.010	0.069	0.033	(0.11)

Panel D. Competition = *Fluid*

ΔEquity(-1)*		Total sample					Price competition group					Non-price competition group				
Surplus		Competition rank					Competition rank					Competition rank				
		1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value	1:Low	2	3:High	3-1	p-value
Surplus Rank	1:Small	0.304	0.109	0.003	-0.301***	(0.00)	0.213	0.069	-0.082	-0.295***	(0.00)	0.400	0.178	0.053	-0.347***	(0.00)
	2	0.202	0.155	0.039	-0.162***	(0.00)	0.163	0.104	0.024	-0.139***	(0.00)	0.256	0.204	0.038	-0.218***	(0.00)
	3:Large	0.106	0.068	-0.005	-0.111***	(0.00)	0.069	0.064	0.036	-0.033**	(0.03)	0.143	0.073	-0.039	-0.181***	(0.00)

This table presents the ratio of debt repayment on the financing surplus for the tercile ranks of financing surplus and competition intensity measures. Note that the sample of this table consists of firms with positive financing surplus (i.e., positive free cash flows). Net debt issuance (*ΔDebt*) is the change in debt from year *t* to year *t*+1, scaled by total assets in year *t*. *Surplus* is the financing surplus, calculated as the sum of capital expenditure, changes in working capital, dividend payments, and acquisitions, minus operating cash flows and sales of plant, property, and equipment, all scaled by the previous year's total assets and multiplied by (-1). All continuous variables except competition intensity are winsorized at the top and bottom 2% to eliminate the effect of outliers. *, ** and *** denote the significance of difference between high and low competition intensity terciles at the 0.10, 0.05 and 0.01 levels, respectively.

Table 8. The System of Equations: Test of Competition Intensity, Competition Type, and Financing Activities of Firms with Financing Surplus

Panel A. Competition = *HHI_Asset*

	Price competition (n = 14,460)			Non-price competition (n =14,348)		
Dep. Var.=	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4) $\Delta Cash_{t+1}$	(5) $\Delta Debt_{t+1}$	(6) $\Delta Equity_{t+1}$
Def_{t+1}	-0.596***	0.297***	0.107***	-0.698***	0.205***	0.097***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Def_{t+1}*HHI_Asset_t	-0.194	-0.142	-0.053	-0.571***	-0.360***	-0.211*
	(0.245)	(0.276)	(0.644)	(0.000)	(0.003)	(0.058)
Controls	yes	yes	Yes	yes	yes	yes
Difference in Interactions						
Difference				0.377*	0.218	0.159
p-value				(0.050)	(0.108)	(0.159)

Panel B. Competition = *HHI_Sale*

	Price competition (n = 14,460)			Non-price competition (n =14,348)		
Dep. Var.=	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4) $\Delta Cash_{t+1}$	(5) $\Delta Debt_{t+1}$	(6) $\Delta Equity_{t+1}$
Def_{t+1}	-0.593***	0.305***	0.102***	-0.695***	0.205***	0.100***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Def_{t+1}*HHI_Sale_t	-0.179	-0.058	-0.121	-0.611***	-0.407***	-0.204*
	(0.275)	(0.647)	(0.337)	(0.000)	(0.004)	(0.080)
Controls	yes	yes	yes	yes	yes	yes
ifference in Interactions						
Difference				0.432**	0.349**	0.083
p-value				(0.035)	(0.032)	(0.315)

Panel C. Competition = *HHI_TNIC*

	Price competition (n = 8,074)			Non-price competition (n = 8,401)		
Dep. Var.=	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4) $\Delta Cash_{t+1}$	(5) $\Delta Debt_{t+1}$	(6) $\Delta Equity_{t+1}$
Def_{t+1}	-0.644***	0.238***	0.118***	-0.692***	0.198***	0.109***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Def_{t+1}*HHI_TNIC_t	-0.070	-0.091*	0.021	-0.161***	-0.152**	-0.009
	(0.316)	(0.079)	(0.729)	(0.000)	(0.037)	(0.875)
Controls	yes	yes	yes	yes	yes	yes
ifference in Interactions						
Difference				0.091	0.062	0.029
p-value				(0.223)	(0.245)	(0.359)

Panel D. Competition = *Fluid*

	Price competition group (n = 9,004)			Non-price competition group (n = 9,519)		
Dep. Var.=	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Cash_{t+1}$	$\Delta Debt_{t+1}$	$\Delta Equity_{t+1}$	$\Delta Cash_{t+1}$	$\Delta Debt_{t+1}$	$\Delta Equity_{t+1}$
Def_{t+1}	-0.553***	0.333***	0.114***	-0.366***	0.418***	0.217***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Def_{t+1}*Fluid_t$	-0.015***	-0.016***	0.001	-0.049***	-0.031***	-0.018***
	(0.010)	(0.000)	(0.797)	(0.000)	(0.000)	(0.008)
Controls	yes	yes	yes	Yes	yes	Yes
ifference in Interactions						
Difference				-0.024***	-0.010**	0.018**
p-value				(0.137)	(0.025)	(0.026)

This table presents the results of the system of equations to test the association between competition intensity and the financing choices among cash holding, debt financing and equity financing. In each panel, Columns (1) to (3) ((4) to (6)) show the results using firms with financing surplus under price (non-price) competition. The system of equations is estimated using the maximum likelihood method, and the standard errors are clustered at the firm level (Gould, Pitblado, and Sribney, 2006). Note that *Def*, the financing deficit, is the negative value of financing surplus. Also, negative values of *ΔDebt* and *ΔEquity* are debt repayments and equity repurchases, respectively. Coefficients on other variables are abbreviated for the brevity. Definitions of the variables are given in Appendix A. All continuous variables except competition intensity are winsorized at the top and bottom 1% to eliminate the effect of outliers. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 9. The Effect of Growth Opportunities and Life Cycle on the Relations between Competition and Financing and Payout Policies

Panel A. Financing Choices after Controlling for Growth opportunities

	Price competition (n= 16,224)			Non-price competition (n= 15,638)		
Coefficients on	(1)	(2)	(3)	(4)	(5)	(6)
Def_{t+1}*HHI_Asset_t	Dep.Var.= $\Delta Cash_{t+1}$	Dep.Var.= $\Delta Debt_{t+1}$	Dep.Var.= $\Delta Equity_{t+1}$	Dep.Var.= $\Delta Cash_{t+1}$	Dep.Var.= $\Delta Debt_{t+1}$	Dep.Var.= $\Delta Equity_{t+1}$
Low Growth	0.266	-0.126	0.392*	0.240	0.032	0.208
Opportunities	(0.209)	(0.503)	(0.093)	(0.199)	(0.854)	(0.408)
Middle Growth	0.232	0.363	-0.131	0.772***	-0.343	1.116***
Opportunities	(0.176)	(0.126)	(0.659)	(0.003)	(0.132)	(0.002)
High Growth	-0.209	-0.130	-0.080	0.781***	-0.518***	1.299***
Opportunities	(0.341)	(0.475)	(0.802)	(0.007)	(0.005)	(0.000)

Panel B. Financing Choices after Controlling for Life Cycle

	Price competition (n= 16,224)			Non-price competition (n= 15,638)		
Coefficients on	(1)	(2)	(3)	(4)	(5)	(6)
Def_{t+1}*HHI_Asset_t	Dep.Var.= $\Delta Cash_{t+1}$	Dep.Var.= $\Delta Debt_{t+1}$	Dep.Var.= $\Delta Equity_{t+1}$	Dep.Var.= $\Delta Cash_{t+1}$	Dep.Var.= $\Delta Debt_{t+1}$	Dep.Var.= $\Delta Equity_{t+1}$
Old Firms	0.023	0.009	0.014	0.681	0.272	0.408*
	(0.864)	(0.957)	(0.953)	(0.001)	(0.113)	(0.095)
Middle Firms	-0.023	0.185	-0.208	0.770**	-1.100***	1.870***
	(0.931)	(0.480)	(0.566)	(0.020)	(0.000)	(0.000)
Young Firms	-0.137	0.083	-0.219	0.724***	-0.419***	1.143***
	(0.656)	(0.666)	(0.548)	(0.002)	(0.023)	(0.000)

Panel C. Payout Decisions after Controlling for Growth opportunities

	Price competition (n= 14,456)			Non-price competition (n= 14,346)		
Coefficients on	(1)	(2)	(3)	(4)	(5)	(6)
Def_{t+1}*HHI_Asset_t	Dep.Var.= $\Delta Cash_{t+1}$	Dep.Var.= $\Delta Debt_{t+1}$	Dep.Var.= $\Delta Equity_{t+1}$	Dep.Var.= $\Delta Cash_{t+1}$	Dep.Var.= $\Delta Debt_{t+1}$	Dep.Var.= $\Delta Equity_{t+1}$
Low Growth	-0.013	0.027	-0.040	-0.093	-0.103	-0.238
Opportunities	(0.959)	(0.912)	(0.439)	(0.570)	(0.565)	(0.148)
Middle Growth	-0.745***	-0.341	-0.404**	-0.368	-0.130	-0.238
Opportunities	(0.003)	(0.197)	(0.011)	(0.187)	(0.565)	(0.148)
High Growth	0.209	0.062	0.147	-1.324***	-0.643***	-0.681***
Opportunities	(0.464)	(0.695)	(0.515)	(0.000)	(0.000)	(0.033)

Panel D. Payout Decisions after Controlling for Life Cycle

	Price competition (n= 14,456)			Non-price competition (n= 14,346)		
Coefficients on	(1)	(2)	(3)	(4)	(5)	(6)
Def_{t+1}*HHI_Asset_t	Dep.Var.= $\Delta Cash_{t+1}$	Dep.Var.= $\Delta Debt_{t+1}$	Dep.Var.= $\Delta Equity_{t+1}$	Dep.Var.= $\Delta Cash_{t+1}$	Dep.Var.= $\Delta Debt_{t+1}$	Dep.Var.= $\Delta Equity_{t+1}$
Old Firms	0.037	-0.122	0.160	-0.490	-0.401	-0.089
	(0.904)	(0.497)	(0.532)	(0.220)	(0.140)	(0.754)
Middle Firms	-0.291	-0.025	-0.266	-0.099	0.152	-0.252
	(0.261)	(0.893)	(0.197)	(0.722)	(0.476)	(0.157)
Young Firms	-0.122	-0.053	-0.069	-0.248*	-0.257*	0.009
	(0.516)	(0.768)	(0.280)	(0.091)	(0.051)	(0.935)

This table presents the results of the system of equations to examine the effects of growth opportunities and life cycle on the relations between financing and payout policies. Panel A and B use firms with financing deficit, and Panel C and D use firms with financing surplus (positive free cash flows). Growth opportunity is measured using the market-to-book ratio of equity. Firms in the highest (lowest) tercile of the market-to-book ratio are classified as having high (low) growth opportunities. Life cycle is measured using Z-score = *Z_Sale_GR* – *Z_AGE* + *Z_CAPEX* – *Z_SIZE*, where Z-score for each variable is calculated by subtracting its mean and dividing it by its standard deviation (Collins et al. 2014). I classify the firms in the lowest (highest) tercile of Z_score as firms with old (young) firms. M/B or Z_score are ranked using the full sample to avoid the case that firms in one type of competition has higher values of M/B or Z_score than firms in other type of competition.

In each panel, Columns (1) to (3) ((4) to (6)) show the results using firms under price (non-price) competition. The system of equations is estimated using the maximum likelihood method, and the standard errors are clustered at the firm level (Gould, Pitblado, and Sribney, 2006). Note that *Def*, the financing deficit, is the negative value of financing surplus. Also, negative values of *ΔDebt* and *ΔEquity* are debt repayments and equity repurchases, respectively. Coefficients on other variables are abbreviated for the brevity. Definitions of the variables are given in Appendix A. All continuous variables except competition intensity are winsorized at the top and bottom 1% to eliminate the effect of outliers. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 10. The Firm-Level Measure of Price vs. Non-Price Competition

Panel A. Financing Choices

	Price competition (n=9,008)			Non-price competition (n=9,531)		
Dep. Var.=	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4) $\Delta Cash_{t+1}$	(5) $\Delta Debt_{t+1}$	(6) $\Delta Equity_{t+1}$
Def_{t+1}	0.037	0.679***	0.357***	0.043*	0.341***	0.702***
	(0.136)	(0.000)	(0.000)	(0.083)	(0.000)	(0.000)
Def_{t+1}*HHI_Asset_t	0.560**	0.069	0.491	0.377***	-0.348***	0.725***
	(0.042)	(0.721)	(0.157)	(0.000)	(0.009)	(0.001)
Controls	yes	yes	yes	yes	yes	yes
ifference in Interactions						
Difference				0.183	0.417**	-0.234
p-value				(0.286)	(0.038)	(0.283)

Panel B. Payout Decisions

	Price competition (n=6,441)			Non-price competition (n=7,913)		
Dep. Var.=	(1) $\Delta Cash_{t+1}$	(2) $\Delta Debt_{t+1}$	(3) $\Delta Equity_{t+1}$	(4) $\Delta Cash_{t+1}$	(5) $\Delta Debt_{t+1}$	(6) $\Delta Equity_{t+1}$
Def_{t+1}	-0.551***	0.371***	0.078***	-0.744***	0.152***	0.105***
	(0.000)	(0.000)	(0.007)	(0.000)	(0.000)	(0.000)
Def_{t+1}*HHI_Asset_t	-0.337	0.016	-0.354**	-0.646***	-0.534***	-0.112***
	(0.217)	(0.941)	(0.015)	(0.000)	(0.000)	(0.354)
Controls	yes	yes	yes	yes	yes	yes
Difference in Interactions						
Difference				0.309	0.550**	-0.242*
p-value				(0.168)	(0.014)	(0.100)

This table presents the results of the system of equations based on the partition using the firm-level indicator of non-price competition. The firm-level indicator of non-price competition is the composite index of five firm characteristics (=*Z_AD* + *Z_R&D* + *Z_MB* – *Z_CAPEX* - *Z_AGE*). *AD* is the advertising expenses-to-sales ratio, *R&D* is the R&D expenses-to-sales ratio, *MB* is the market-to-book ratio, *CAPEX* is the ratio of capital expenditure on lagged total assets, and *AGE* is the firm age. Panel A and B show the results using firms with financing deficit and financing surplus, respective. In each panel, Columns (1) to (3) ((4) to (6)) show the results using firms under price (non-price) competition. The system of equations is estimated using the maximum likelihood method, and the standard

errors are clustered at the firm level (Gould, Pitblado, and Sribney, 2006). Coefficients on other variables are abbreviated for the brevity. Definitions of the variables are given in Appendix A. All continuous variables except competition intensity are winsorized at the top and bottom 1% to eliminate the effect of outliers. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 11. The Use of Cash Holdings on Future Investments

Panel A. Total Sample

Dep. Var.= $Investment_{t+1}$	(1) $Comp = HHI\_Asset$	(2) $Comp = HHI\_Sale$	(3) $Comp = HHI\_TNIC$	(4) $Comp = Fluid$
$Investment_t$	0.247***	0.247***	0.200***	0.215***
	(0.000)	(0.000)	(0.000)	(0.000)
$\Delta Cash_t$	0.029***	0.028***	0.022*	0.143***
	(0.000)	(0.000)	(0.071)	(0.000)
$\Delta Cash_t * Comp_t$	-0.091	-0.103	-0.088*	-0.011***
	(0.330)	(0.348)	(0.056)	(0.000)
Controls	yes	yes	yes	yes
Industry/ Year FE	yes	yes	yes	yes
Adj. R2	0.251	0.251	0.228	0.237
n	59,228	59,228	33,575	37,669

Panel B. Price Competition Sample

Dep. Var.= $Investment_{t+1}$	(1) $Comp = HHI\_Asset$	(2) $Comp = HHI\_Sale$	(3) $Comp = HHI\_TNIC$	(4) $Comp = Fluid$
$Investment_t$	0.227***	0.227***	0.181***	0.183 ***
	(0.000)	(0.000)	(0.000)	(0.000)
$\Delta Cash_t$	0.063***	0.058***	0.061***	0.100 ***
	(0.000)	(0.000)	(0.000)	(0.004)
$\Delta Cash_t * Comp_t$	0.205	0.148	-0.003	-0.004
	(0.103)	(0.304)	(0.959)	(0.414)
Controls	yes	yes	yes	yes
Industry/ Year FE	yes	yes	yes	yes
Adj. R2	0.234	0.216	0.230	0.220
n	28,954	28,954	16,857	18,628

Panel C. Non-Price Competition Sample

Dep. Var.= $Investment_{t+1}$	(1) $Comp = HHI\_Asset$	(2) $Comp = HHI\_Sale$	(3) $Comp = HHI\_TNIC$	(4) $Comp = Fluid$
$Investment_t$	0.260***	0.260***	0.210***	0.235 ***
	(0.000)	(0.000)	(0.000)	(0.000)
$\Delta Cash_t$	0.010	0.009	0.003	0.140 ***
	(0.475)	(0.506)	(0.868)	(0.000)
$\Delta Cash_t * Comp_t$	-0.297**	-0.314*	-0.141**	-0.012 ***
	(0.026)	(0.052)	(0.046)	(0.000)
Controls	yes	yes	yes	yes
Industry/ Year FE	yes	yes	yes	yes
Adj. R2	0.266	0.266	0.235	0.254
n	30,274	30,274	16,718	19,041

This table presents the results of regressing investments on lagged change in cash holding,

lagged competition intensity, their interaction, control variables, and industry and year fixed effects. Panel A, B, and C show the result using total sample, the subsample of industries with price competition, and the subsample of industries with non-price competition. The industry is classified as price (non-price) competition if its advertising expense-to-sales ratio is lower (higher) than the sample median. The standard errors are clustered at the firm level. Results on intercept, control variables, and fixed effects are omitted for brevity. Detailed definitions of the variables are given in Appendix A. The *p*-values in parentheses are two-tailed. *, ** and *** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

국문초록

기업특성과 자본구조 의사결정의 관계에 관한 연구

본 박사논문은 자본구조(capital structure)에 관한 의사결정에 관한 두 개의 논문으로 구성된다. 이 두 논문은 비록 각기 다른 기업특성이 자본구조 의사결정에 미치는 영향에 대한 연구들이지만, 기존 연구에서 고려하지 않았던 점을 지적하고 기존 연구와는 다른 결과를 도출하였다는 점에서 학계에 공헌점을 갖는다.

첫 번째 논문은 재무보고의 질이 부채와 자본을 통한 의사결정에 미치는 영향에 대한 연구이다. 이 분야의 기존 연구는 재무보고의 질이 높을 경우 부채 및 자본을 조달하는 자본비용이 낮아진다는 것을 보고하였다. 하지만 높은 재무보고의 질이 자본비용을 낮추는 것이 실제로 자금조달로 연결되는지에 대한 연구는 부족하다. 이를 조사하기 위하여 본 연구는 재무보고의 질이 보유현금, 부채발행, 및 주식발행을 통해 투자를 위한 자금부족을 충족시키는 과정에 미치는 영향을 분석하였다. 분석 결과, 재무보고의 질이 높은 기업은 1달러의 자금부족에 대하여 0.27달러만큼의 보유현금을 이용하며 각각 0.61달러 및 0.12달러만큼의 부채와 자본을 신규발행하는 것으로 나타났다. 반면, 재무보고의 질이 낮은 기업은 1달러의 자금부족을 채우기 위하여 0.29의 보유현금을 이용하며 각각 0.44달러 및 0.27달러의 부채와 자본을 신규발행하는 것으로 나타났다. 이러한 결과는 재무보고의 질이 높은 기업은 자본발행 대비 부채발행에 대한 의존도가 높다는 것을 의미한다.

두 번째 논문은 상품시장경쟁(product market competition)이 재무의사결정(financial policies)에 미치는 영향에 대한 기존 연구를 재조명한다. 구체적으로, 기존 연구가 고려하지 않았던 가격경쟁과 비가격경쟁의 차이를 재조명하고, 상품시장경쟁이 재무의사결정에 미치는 영향이 다르게 나타날 수 있음을 보여준다. 본 연구의 주요 발견으로는 (1) 상품시장경쟁과 자본발행 대비 부채발행(the use of debt financing relative to equity financing)의 음의 관계는 가격경쟁 산업보다 비가격경쟁 산업에서 더 강하게 나타나며, (2) 상품시장경쟁이 격해질수록 외부투자자로의 배분(distribution to outside investors)을 줄여 현금보유를 늘리는 현상 또한 가격경쟁 산업보다 비가격경쟁 산업에서 더 강하게 나타난다. 이러한 발견은 가격경쟁과 비가격경쟁의 구분이 기존 연구에서 주장한 상품시장경쟁과 재무의사결정의 관계에서 중요한 설명요인이라는 것을 의미한다.

주요어: 재무보고의 질, 부채계약, 자본조달선택, 상품시장경쟁, 시장경쟁의 유형, 수익배분정책
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