7-2-2020

Analysts' Cash Flow Forecasts, Information Asymmetry, and Financing Choices of Firms

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ANALYSTS' CASH FLOW FORECASTS, INFORMATION ASYMMETRY, AND FINANCING CHOICES OF FIRMS

A dissertation submitted in partial fulfillment of

the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

BUSINESS ADMINISTRATION

by

Mengyu Ma

2020

To: Dean Joanne Li
College of Business

This dissertation, written by Mengyu Ma, and entitled, Analysts' Cash Flow Forecasts, Information Asymmetry, and Financing Choices of Firms, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this thesis and recommend that it be approved.

_____
Clark Wheatley

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Jonathan Milian

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Qiang Kang

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Abhijit Barua, Major Professor

Date of Defense: July 2, 2020

The dissertation of Mengyu Ma is approved.

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Dean Joanne Li
College of Business

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Andrés G. Gil
Vice President for Research and Economic Development
and Dean of the University Graduate School

Florida International University, 2020

DEDICATION

I dedicate this dissertation to my parents. Without their understanding, support, and love, the completion of this work would not have been possible.

ACKNOWLEDGMENTS

I would like to express my deepest gratitude and appreciation to my major professor, Dr. Abhijit Barua, for his guidance, immense knowledge, advice, motivation, patience, and enthusiasm in leading me through the process to develop my proposal and to complete this dissertation.

I would like to thank the members of my committee, Dr. Clark Wheatley, Dr. Jonathan Milian, and Dr. Qiang Kang, for their help and support. Their guidance and suggestions have been helping me in the process.

I would also like to thank my fellow graduate students in the accounting PhD program for their help and support.

I wish to give thanks to my parents; whose support was very important to my completion of this dissertation.

ABSTRACT OF THE DISSERTATION

ANALYSTS' CASH FLOW FORECASTS, INFORMATION ASYMMETRY, AND FINANCING CHOICES OF FIRMS

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Professor Abhijit Barua, Major Professor

Prior research documents mixed results regarding the usefulness of cash flow forecasts. One stream of literature documents analysts provided cash flow information is associated with more accurate earnings forecasts, better accruals quality, stronger market reaction, and more precious information about future valuation. Another stream of literature claims that cash flow forecasts are a simple extension of analysts' own earnings forecasts and are not useful. I contribute to this debate by examining potential implications of cash flow forecasts for information environment. My dissertation consists of three separate but closely related studies, which investigate how analysts' cash flow forecasts are linked with information environment, cost of equity capital and firms' financing decisions.

First, I directly test the association between availability of cash flow forecasts and information asymmetry. Prior studies suggest that analysts provided cash flow information help improve earnings forecasts accuracy and target price forecast accuracy by improving accruals and cash flow information. While those studies indicate positive implications of

cash flow forecasts for information environment, none of the prior studies directly test the association between cash flow forecasts and information asymmetry. Using bid-ask spread and shares turnover as proxies, I predict and find firms experience lower information asymmetry after the initial presence of cash flow forecasts. The results imply an additional benefit of cash flow forecasts.

Second, I test if the presence of cash flow forecasts is negatively related with information asymmetry, which in turn, reduces cost of equity capital. Extant research documents negative impact of information asymmetry on cost of equity capital. Using four implied cost of equity measures, I predict and find firms enjoy lower cost of equity capital with the presence of cash flow forecasts.

Third, if the presence of cash flow forecasts is associated with information asymmetry and costs of equity capital, it is also likely to affect financing decisions of firms. So, I test whether firms having cash forecasts tend to issue new security issuance to raise funds by firms. I also examine whether the availability of cash forecasts are associated with relatively more debt or equity security issuance, which affect capital structure. Empirical results show mixed evidence regarding equity and debt choices. This study provides additional evidence about benefits of having cash flow forecasts. This study should be of interest to investors, analysts and managers.

TABLE OF CONTENTS

LIST OF TABLES

ESSAY 1: ANALYSTS' CASH FLOW FORECASTS AND FIRMS' INFORMATION ENVIRONMENT

I. INTRODUCTION

This study examines the association between cash flow forecasts and information asymmetry. Prior studies on cash flow forecasts have been debated over the usefulness of analysts' cash flow forecasts for the last fifteen years since the work of DeFond and Hung (2003), who identify the factors affecting the demand for cash flow information. This study adds to that debate by investigating whether analysts' provided cash flow-forecasts are likely to influence the information environment of firms.

DeFond and Hung (2013) argue that the demand for cash flow forecasts stems from the informational roles of cash flow in security valuation, and that analysts are more likely to provide cash flow forecasts along with earnings forecasts when investors' demands for such information are greater. Subsequent research scrutinizes the informational roles of analysts' provided cash flow forecasts, but researchers could not reach consistent conclusions about the usefulness of cash flow forecasts. One stream of research demonstrates the usefulness and sophistication of cash flow forecasts by providing empirical evidence that analysts' cash flow forecasts are associated with higher earnings forecast accuracy (Call, Chen and Tong, 2009), higher target price accuracy (Hashim and Strong, 2018), higher accruals quality and lower earnings management (McInnis and Collins, 2011), and lower accruals anomaly and mispricing (Radhakrishnan and Wu, 2014; Mohanram, 2013). On the other hand, several researchers raise questions on the usefulness and sophistication of analyst cashflow forecasts

by providing evidence that analysts cash flow forecasts are extrapolated numbers from their earnings forecasts and less accurate than earnings forecasts (Givoly, Hayn, and Lehavy, 2009), that analysts forecast cash flow when information transparency is high and when it is less difficult to forecast (Bilinski, 2014), and that firms with cash flow forecasts tend to use classification shifting to overstate operating cash flows. Given the existing disagreement in the literature about the usefulness of analysts' cash flow forecasts, I test the informational roles of cash flow forecasts by examining whether the availability of such forecasts improves the information environment of corporations. I argue if cash flow forecasts can provide additional information that can supplement informational resources available to investors for security valuation, the availability of such forecasts are likely to reduce information asymmetry between firms' insiders and shareholders.

I test the association between the presence of cash flow forecasts and information asymmetry. Financial analysts as information intermediaries disseminate substantial firm-specific information, which affect the liquidity and depth of the market through information-based trading activities by market participants (Chung, McInish, Wood, and Wyhowski, 1995). Consistent with this view, prior studies document that number of analysts following (Brennan and Subrahmanyam (1995) and analysts' initiations of coverage (Crawford, Roulstone, and So, 2012) are associated with the improvement of market liquidity. If analysts disseminate incremental relevant information through cash flow forecasts, in addition to earnings forecast, firm-specific information environment is likely to improve. To measure information environment attributes, I use two proxies for information asymmetry, bid-ask spread and share turnover, following Mohd (2005).

I test the association between the availability of cash flow forecasts and information asymmetry using a sample of 62,268 firm-year observations over the sample period 1993 - 2017. The percentage of firms with at least one cash flow forecast has gradually increased from 1.69% (3.28%) in 1993 to 63.23% (60.04%) in 2017 in my sample (I/B/E/S population). The findings from empirical analyses are consistent with my hypothesis that the availability of analysts' cash flow forecasts is negatively associated with the information asymmetry. I find both cash flow forecasts variables, an indicator variable for firm-year observation with cash flow forecasts and a continuous variable measured as the percentage of analysts providing cash flow forecasts for a firm, are negatively associated with bid-ask spread by using both ordinary least square (OLS) and two-stage least square (2SLS) regressions. By using OLS regression, I find a significant negative association between cash flow variables and share turnover, which is inconsistent with my hypothesis. However, after controlling for endogeneity, I find a significant positive association between cash flow variables and share turnover by using 2SLS regression, which is consistent with my hypothesis.

This study contributes to the on-going debate of the usefulness of cash flow forecasts by providing evidence that the availability of cash flow forecasts tends to improve the information environment of firms. Thus, the findings reported in this study support prior studies that document merits of cash flow forecasts (e.g., Call et al. 2009; McInnis and Collins, 2011; and Hashim and Strong, 2018). Prior studies (Radhakrishnan and Wu, 2014; Mohanram, 2013) document that the availability of cash flow forecast is associated with the improvement in market efficiency by mitigating accruals mispricing, I show complementary evidence that cash flow forecasts contribute to the information environment. This study

extends prior studies (e.g., Brennan and Subrahmanyam, 1995; Crawford, Roulstone, and So, 2012) that document informational roles of analyst following in improving market liquidity.

The rest of the paper is organized as follows. Section II reviews the relevant prior literature and develops the hypothesis. Section III discusses the research design. Section IV explains the sample selection criteria and data. Section V conducts the empirical analyses, and Section VI concludes.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

DeFond and Hung (2003) is the first study to identify the determinants of investors demands for cash flow information, which create incentives for analysts to provide cash flow forecasts in addition to earnings forecasts. Over the last three decades, analysts have been showing an increasing propensity to issue cash flow forecasts, suggesting an upward trend in investors' demands for such forecasts. This trend triggers an increase in subsequent studies in this area, which predominantly focus on the usefulness of incremental information provided by cash flow forecasts.

Call et al. (2009) argue that analysts providing cash flow forecasts in addition to earnings forecasts do a more rigorous job in analyzing and forecasting full sets financial statements, which improves their forecasting performance and they find that analysts' earnings forecasts are more accurate if those are accompanied with cash flow forecasts. In a follow-up study, Call et al. (2013) document that analysts' cash flow forecasts reflect complex adjustments of accruals and working capital and those forecasts are sophisticated, and they also find a positive association between analysts cash flow forecast revisions and market returns. In the same vein, McInnis and Colins (2011) argue that analysts

disseminating both earnings and cash flow forecasts mitigate the opacity of accruals and document that firms' accruals quality improves and the propensity to meet and beat earnings expectations decreases after the initiation of cash flow forecast by analysts. Consistent with the accruals quality improvement driven by analysts cash flow forecasts, prior studies (Radhakrishnan and Wu, 2014; Mohanram, 2013) also provide evidence that the presence cash flow forecast mitigate accrual anomaly and mispricing. More recently, Hashim and Strong (2018) show the valuation implications of cash flow forecast by providing evidence that analysts target price accuracy improves after the initiation of cash flow forecasts. Thus, the evidence provided by these prior studies discussed here suggests that analysts cash flow forecasts contribute incremental information to that contained in earnings forecasts.

However, researchers are not always in agreement in their inferences about the usefulness of cash flow forecasts. Givoly et al. (2009) have questioned about the validity of the demand hypothesis of cash flow forecasts by providing evidence that analysts cash flow forecast are less accurate than earnings forecasts and that cash flow forecasts are a simple extension of analysts' earnings forecasts. Bilinski (2014) report that analysts are less likely to issue cash flow forecasts when the quality of earnings is low, which is contrary to the demand hypothesis documented in DeFond and Hung (2003). In a discussion on the impact of cash flow forecasts in mitigating accruals anomaly, Ecker and Schipper (2014) argue that firms with cash flow forecasts may not be contributing to the accruals anomaly, which have been claimed to be alleviated by the issuance of analysts' cash flow forecasts in Radhakrishnan and Wu (2014) and Mohanram (2013). On the other hand, Lee (2012) identify an unintended consequences of analysts' disclosing cash flow forecasts. She finds firms with cash flow forecasts are more likely to manage cash flow using classification

shifting to meet or beat cash flow forecasts. Brown et al. (2013) note that firms who beat both earnings and cash flow forecasts have better future performance and stronger market reaction than firms that only beat earnings forecasts. In addition, CEOs consider earnings forecasts as the most important performance measure, and cash flow forecasts are considered a greater performance feature than pro-forma earnings and economic-value-add (Graham, Harvey and Rajgopal, 2005).

In this paper, I test the usefulness of cash flow forecast by examining the association between the availability of cash flow forecasts and information environment attributes. I argue that if analysts cash flow forecasts contribute additional value relevant information it will improve firms' information environment. Prior studies (Brennan and Subrahmanyam, 1995); Crawford, Roulstone, and So, 2012) document that analysts' roles as an information intermediary reduce information asymmetry since analysts produce substantial firm-specific information (Liu 2011). Based on prior studies (e.g., Call et al., 2009; McInnis and Colins, 2011; Call et al., 2013; Radhakrishnan and Wu, 2014; Mohanram, 2013) mentioned above, analysts' cash flow forecasts accompanied with earnings forecasts contain firm-specific information that enables investors to get a better idea about firms' persistent earnings because both forecasts help decompose operating accruals and operating cash flow information. Even two studies that argue against (Givoly et al. 2009) and in favor (Call et al. 2013) of analysts' cash flow forecasts find that cash flow forecasts are superior and more accurate than forecasts based on time-series model. Thus, analysts' cash flow forecasts contribute incremental information to the market, which is likely to mitigate differential information among the market participants. I expect that the presence of cash flow forecasts is inversely related with information asymmetry. More formally, my hypothesis is as follows:

H_1: The availability of cash flow forecasts is negatively associated with information asymmetry.

III. RESEARCH DESIGN

Measures of Information Asymmetry

I use two measures of information asymmetry—the relative bid-ask spread and daily shares turnover—following Mohd (2005). The relative bid-ask spread (*SPREAD*) is measured as the annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. I use annual average of natural logarithm of daily relative bid-ask spread in empirical analyses. Daily shares turnover (*TURNOVER)* is measured as the annual average of the daily number of shares outstanding. I use annual average of natural logarithm of daily number of shares outstanding in empirical analyses.

Regression Models

Following Mohd (2005), I formulate the following two sets of regression models by using *SPREAD* and *TURNOVER* as the dependent variables:

$$SPREAD_{i,t} = \alpha_0 + \alpha_1 CFF_{i,t,} + \alpha_2 MV_{i,t} + \alpha_3 VOLATILITY_{i,t} + \alpha_4 LISTING_{i,t} + \alpha_5 PRICE_{i,t} + \alpha_6 FOLLOW_{i,t} + \alpha_7 TURNOVER_{i,t} + \alpha_8 EFF\_ACCURACY_{i,t} + IND\_FIX + YEAR\_FIX + \varepsilon. \quad (1.1a)$$

$$TURNOVER_{i,t} = \beta_0 + \beta_1 CFF_{i,t} + \beta_2 MV_{i,t} + \beta_3 FOLLOW_{i,t} + \beta_4 SHAREOUT_{i,t} + \beta_5 SPREAD_{i,t} + \beta_6 EFF\_ACCURACY_{i,t} + IND\_FIX + YEAR\_FIX + \varepsilon. \quad (1.1b)$$

$$SPREAD_{i,t} = \alpha_0 + \alpha_1 CFF\_PERCENT_{i,t} + \alpha_2 MV_{i,t} + \alpha_3 VOLATILITY_{i,t} + \alpha_4 LISTING_{i,t} + \alpha_5 PRICE_{i,t} + \alpha_6 FOLLOW_{i,t} + \alpha_7 TURNOVER_{i,t} + \alpha_8 EFF\_ACCURACY_{i,t} + IND\_FIX + YEAR\_FIX + \varepsilon. \quad (1.2a)$$

$$TURNOVER_{i,t} = \beta_0 + \beta_1 CFF\_PERCENT_{i,t} + \beta_2 MV_{i,t} + \beta_3 FOLLOW_{i,t} + \beta_4 SHAREOUT_{i,t} + \beta_5 SPREAD_{i,t} + \beta_6 EFF\_ACCURACY_{i,t} + IND\_FIX + YEAR\_FIX + \varepsilon. \quad (1.2b)$$

The variable of interests in equation (1.1a and 1.1b) is the presence of analysts cash flow forecasts (*CFF*), measured as an indicator variable equals 1 if the firm-year includes both cash flow forecasts and earnings forecasts, and $CFF_{i,t}$ equals 0 if the firm-year includes only earnings forecasts. In equation (1.2a and 1.2b), I use a continuous variable for the availability of cash flow forecasts as the number of cash flow forecasts in year as a percentage of total number of earnings forecasts issued in year (*CFF_PERCENT*). If the presence of cash flow forecasts is associated with the lower information asymmetry, I expect negative (positive) coefficients for both *CFF* and *CFF_PERCENT* in *SPREAD* (*TURNOVER*) models. Descriptions for all other control variables are provided in the Appendix.

The dependent variables, which are information asymmetry measures, happen to have endogenous nature. Since we tend to observe investors of higher bid-ask spread firms to trade shares more intensively, and the firms who have higher share turnover are more likely to experience less bid-ask spread. Thus, I also estimate both sets of regressions using two-stage least square (2SLS) methods.

IV. SAMPLE AND DATA

The sample period spans from 1993 to 2017, since 1993 is the starting year when analysts issue cash flow forecasts in the I/B/E/S/ database 1993. I obtain one year ahead earnings forecasts and cash flow forecasts before annual earnings announcements from the I/B/E/S/ detailed US Edition database, observations for control variables from the CRSP daily stock database and COMPUSTAT fundamentals annual database. I obtain the most recent analysts updates as the consensus earnings forecasts and cash flow forecasts. I also require all observations have actual earnings value to calculate earnings forecast accuracy. I calculate earnings forecasts accuracy at analysts' level as the absolute value of the difference between earnings forecasts and actual earnings. Then I take annual average of all analysts' forecast error for each firm, multiply by -1, to obtain earnings forecast accuracy. Missing COMPUSTAT, CRSP and IBES observations are eliminated from the final sample, which contains 54,478 firm-year observations. I replace the missing research and development variables by zero. Consistent with prior studies, I exclude observations from the regulated industries with SIC code from 4900 to 4999 and from financial firms with 6000 to 6999. All variables, except for indicator variables, are winsorized at 1% and 99% to mitigate outlier effects.

V. EMPIRICAL RESULTS

Descriptive Statistics

Table 1.1 Panel A presents the number of earnings forecasts and both cash flow forecasts and earnings forecasts in I/B/E/S/ detailed file as well as in the sample during the

period 1993 - 2017. Column 2 (column 5) shows that the number of firm-years with at least one earnings forecast and no cash flow forecast in the IBES database (my sample) increases from 4,571 (1,892) in 1993 to 4,860 (2,151) in 2017, while Column 3 (column 6) presents the number of firm-years with minimum one cash flow forecast and at least one earnings forecast in the IBES database (my sample) increases from 134 (36) in 1993 to 2,908 (1,374) in 2017. Column 4 (column 7) presents the percentage of observations in IBES (my sample) that have minimum one cash flow forecast accompanied by at least one earnings forecast increases from 2.93% (1.90%) in 1993 to 59.84% (63.88%) in 2017. The gradual increase in the percentage of firms with cash flow forecast is consistent with prior studies (DeFond and Hung, 2003; Call et al. 2013; Radhakrishnan and Wu, 2014). The total number of observations in the sample used in this study include 21,582 firm-years with both cash flow and earnings forecasts, and 54,478 firm-years with only earnings forecasts. The overall percentage observations with minimum one earnings forecast accompanied by minimum one cash flow forecast in IBES (the final sample) is 25.79% (28.37%).

[Insert Table 1.1 Panel A here]

Table 1.2 Panel A presents the descriptive statistics for all variables used in the final sample. Approximately 45 percent firm-year observations are listed in either NYSE or AMEX and 15 percent observations are member of S&P 500. The average number of analysts following a firm is 2.9. The mean (median) *SPREAD* is 0.011 (0.004) and the mean (median) *TURNOVER* is 0.004 (0.003) for the whole sample. I delete all observations with missing values and winsorize all continuous variables at 1 percent and 99 percent level.

[Insert Table 1.2 Panel A here]

Table 1.2 Panel B presents the descriptive statistics for the final sample after partitioning into two sub-samples based on whether observations have cash flow forecasts. I also include univariate tests of differences in means for each variable. The means and medians for relative bid-ask spread (*SPREAD)* and earnings forecast accuracy (*EFF_ACCURACY*) are significantly smaller for firms with cash flow forecasts. It implies that firm-year observations with cash flow forecasts are have smaller information asymmetry and higher earnings forecasts accuracy. Additionally, the means and medians of observations with cash flow forecasts tend to have larger market value (*MV*), more likely to be listed on NYSE or AMEX stock exchange (*LISTING*), higher stock prices (*PRICE*), more analysts following (*FOLLOW*), more number of shares outstanding (*SHAREOUT*) and are more likely to be S&P 500 (*SP 500*) firms. Consistent with prior literature, these findings suggest that cash flow forecasts observations tend to be large firms, more market liquidity, attracts more analysts following. These differences are significant (p-value<0.0001) between cash flow forecasts observations and earnings forecasts only observations.

[Insert Table 1.2 Panel B here]

Table 1.3 presents the Pearson correlation among all variables used in final sample. The results indicate that the correlations between independent variables are generally modest except for spread and turnover, which are endogenous. I address the endogenous concern using two stage regression in empirical analyses. Additionally, the results show that relative bid-ask spread (*SREAD*) is negatively associated with the presence of cash flow forecasts (*CFF*, -0.460) and percentage of analysts issuing cash flow forecasts (*CFF_PERCENT*, -0.342). Further, the shares turnover (*TURNOVER*) is positively related with presence of cash flow forecasts (*CFF*, 0.175) and percentage of analysts issuing cash flow forecasts

(*CFF_PERCENT*, 0.118). These findings show that information asymmetry is inversely correlated with cash flow forecasts.

[Insert Table 1.3 here]

Regression Results

OLS Regression Analyses

Table 1.4 reports OLS regression results for equations (1.1a) and (1.1b) in two panels. Panel A presents two sets regression results for equation (1.1a) using contemporaneous measure of cash flow forecasts (CFF_t) and using lagged measure (CFF_{t-1}) as the variable of interests. Regression results show that the coefficients for CFF_t and CFF_{t-1} are both negative and highly significant suggesting a negative association between the presence of cash flow forecasts and information asymmetry, after controlling for firm and industry fixed effects. More specifically, the relative bid-ask spread (*SPREAD*) is negatively (p-value<.001) associated with the presence of cash flow forecasts (CFF_t) in current year and lagged year (CFF_{t-1}). This finding is consistent with my hypothesis. Coefficients of all other control variables are highly significant in the predicted direction except for *FOLLOW*. The variables capturing the quantity and quality of information, such as firm size (*MV*), and earnings forecast accuracy (*EFF_ACCURACY*) are negatively associated with relative bid-ask spread. The coefficient for *TURNOVER* is negative consistent with the prediction. On the other hand, return volatility (*VOLATILITY*), a measure of uncertainty, is positively associated with information asymmetry.

[Insert Table 1.4 Here]

Panel B of Table 1.4 reports two sets OLS regression results for equation (1.1b) where the dependent variable is *TURNOVER* and the variable of interests are contemporaneous measure of cash flow forecasts (CFF_t) and using lagged measure (CFF_{t-1}). Regression results show that the coefficients for CFF_t and CFF_{t-1} are both negative and highly significant (t-value=-16.170 and t-value=-20.840) suggesting a negative association between the presence of cash flow forecasts and *TURNOVER*, another measure of information asymmetry, which is inconsistent with the hypothesis that the availability of cash flow forecast and information asymmetry are negatively associated because firms with high information asymmetry normally have lower share turnover. This inconsistent results with *TURNOVER* could be due to the endogeneity with the variable *SPREAD*. The coefficient for *SPREAD* is negative and highly significant (t-value=-16.170) consistent with the prediction.

Table 1.5 reports OLS regression results for equations (1.2a) and (1.2b) in two panels. In this set of models, the variable of interest is a continuous variable, *CFF_PERCENT*, measured as the number of analysts issuing both cash flow forecasts and earnings forecasts as a fraction of total number of analysts issuing earnings forecasts. Panel A of Table 1.5 presents two sets regression results for equation (1.2a) using contemporaneous measure of the percentage of analysts providing cash flow forecasts along with earnings forecasts ($CFF\_PERCENT_t$) and using a lagged measure ($CFF\_PERCENT_{t-1}$) as the variable of interests. Regression results show that the coefficients for $CFF\_PERCENT_t$ and $CFF\_PERCENT_{t-1}$ are both negative and highly significant suggesting a negative association between the presence of cash flow forecasts and information asymmetry, after controlling for firm and industry fixed effects. More specifically, the relative bid-ask spread (*SPREAD*) is negatively (t-value=-10.920) associated with the percentage of analysts providing cash flow

forecasts along with earnings forecasts ($CFF\_PERCENT_t$) in current year and lagged year ($CFF\_PERCENT_{t-1}$). This finding is consistent with my hypothesis. All other variables are consistent with those reported in the Panel A of Table 1.4.

[Insert Table 1.5 Here]

Panel B of Table 1.5 reports two sets OLS regression results for equation (1.2b) where the dependent variable is *TURNOVER* and the variable of interests are contemporaneous measure of the percentage of analysts providing cash flow forecasts along with earnings forecasts ($CFF\_PERCENT_t$) and a lagged measure ($CFF\_PERCENT_{t-1}$). Regression results show that the coefficients for $CFF\_PERCENT_t$ and $CFF\_PERCENT_{t-1}$ are both negative (t-value=-0.360 and t-value=-1.690) suggesting a negative association between percentage of analysts providing cash flow forecasts along with earnings forecasts and *TURNOVER*, which is inconsistent with the hypothesis, which could be due to the endogeneity with the variable *SPREAD*. The coefficient for *SPREAD* is negative and highly significant (t-value=-10.920 and t-value=-13.290) consistent with the prediction. Next I control for the endogeneity between *SPREAD* and *TURNOVER* by using two-stage least square (2-SLS) regression analyses.

2-SLS Regression Analyses

Table 1.6 present the results of two-stage least square regression analyses to test the association between the presence of cash flow forecast (*CFF*) and information asymmetry by using equations 1.1a, 1.1b 1.2a, and 1.2b in four panels. I address the endogeneity concern between two information asymmetry proxies, relative bid-ask spread (*SPREAD*) and shares turnover (*TURNOVER*) here. I first run the prediction model for *SPREAD* using related

factors identified from Mohd (2005), including natural logarithm of market capitalization (*MV*), annual average number stock return volatility (*VOLATILITY*), stock listing (*LISTING*), stock price (*PRICE*), analysts following (*FOLLOW*), earnings forecast accuracy (*EFF_ACCURACY*) and *SP 500*. I then use the predicted value $\widehat{SPREAD}$ as the variable of interest in the second stage regression of *TURNOVER*. Similarly, I estimate predicted value $\widehat{TURNOVER}$ by using all variables in equation (1.1b) and (1.2b) except *SPREAD*. The results show that information asymmetry is inversely connected with cash flow forecasts. I then use predicted value, $\widehat{TURNOVER}$ in second-stage regression.

Panel A of Table 1.6 reports first stage *SPREAD* and second stage *TURNOVER* regression by using, *CFF*, an indicator variable for the presence of cash flow forecasts as the variable of interest. First two columns report regression results of *SPREAD* with all variables in equation (1.1a) except *TURNOVER* and estimate predicted value $\widehat{SPREAD}$. The second stage regression of *TURNOVER* is reported in the last two columns. In the second stage regression, the coefficient of *CFF* is positive (0.029) and highly significant (t-value=3.390). Now after controlling for endogeneity in *TURNOVER* model, results become consistent with my hypothesis that the availability of cash flow forecasts and information asymmetry is negatively associated.

[Insert Table 1.6 Panel A Here]

Panel B of Table 1.6 reports the first stage *TURNOVER* and second stage *SPREAD* regression by using, *CFF*, an indicator variable for the presence of cash flow forecasts as the variable of interest. First two columns report regression results of *TURNOVER* with all variables in equation (1.1a) except *SPREAD* and estimate predicted value $\widehat{TURNOVER}$. The

second stage regression of *SPREAD* is reported in the last two columns. The results are consistent with those reported with the OLS regression and consistent with my hypothesis.

[Insert Table 1.6 Panel B Here]

Panel A and B of Table 1.7 report 2-SLS regression results using equations (1.2a) and (1.2b) with variable of interest, *CFF_PERCENT*, a continuous variable representing number of analysts providing both cash flow forecasts and earnings forecasts as a percentage of total number of analysts issuing earnings forecasts. During the first stage regression, I use *CFF_PERCENT* and control variables to predict $\widehat{TURNOVER}$ ($\widehat{SPREAD}$). Then I use the predicted $\widehat{TURNOVER}$ ($\widehat{SPREAD}$) in the second stage regression. The results are consistent with my prediction that cash flow forecasts are negatively associated with information asymmetry using both information asymmetry proxies.

[Insert Table 1.7 Here]

VI. CONCLUSION

There is a gradual upward trend in the availability of analysts provided cash flow forecasts over the last three decades. While the trend in the supply of cash flow forecasts implies an escalating demand for such information, prior studies in this area have been debated over whether analysts provided cash flow forecast are useful and sophisticated. I test the usefulness of cash flow forecasts by examining whether cash flow forecasts provide incremental information to firms' information environment. By using two market microstructure-based measures of information asymmetry, the relative bid-ask spread and average daily share turnover, I document a negative association between cash flow forecasts

and information asymmetry. The results are consistent in using both OLS regressions and two-stage least square regressions.

These analyses are important because the improvement of information environment can facilitate market participants' ability to make better decisions for resource allocation. I plan to extend my empirical analyses of this study by conducting additional tests on subsamples of firm-year observations before and after the initiation of cash flow forecasts to make stronger claims about the ability of such forecasts in mitigating information asymmetry.

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Table 1.1 (a)
Annual Observations with Earnings Forecasts and Cash Flow Forecasts

Availability of analysts' cash flow forecasts, based on IBES population and sample

	IBES			Sample		
Year	# of firms with EFF	# of firms with EFF & CFF	% of firms with CFF	# of firms with EFF	# of firms with EFF & CFF	% of firms with CFF
1993	4,571	134	2.93%	1,892	36	1.90%
1994	5,070	385	7.59%	2,051	145	7.07%
1995	5,419	339	6.26%	2,158	36	1.67%
1996	6,150	392	6.37%	2,322	160	6.89%
1997	6,552	427	6.52%	2,548	198	7.77%
1998	6,305	433	6.87%	2,504	163	6.51%
1999	6,141	1,113	18.12%	2,342	490	20.92%
2000	5,616	1,157	20.60%	2,271	526	23.16%
2001	4,690	544	11.60%	2,180	291	13.35%
2002	4,548	1,490	32.76%	2,094	840	40.11%
2003	4,469	1,822	40.77%	2,084	947	45.44%
2004	4,826	2,107	43.66%	2,124	1,053	49.58%
2005	5,001	2,307	46.13%	2,231	1,157	51.86%
2006	5,155	2,386	46.29%	2,232	1,177	52.73%
2007	5,220	2,434	46.63%	2,218	1,198	54.01%
2008	4,812	2,305	47.90%	2,243	1,222	54.48%
2009	4,656	2,251	48.35%	2,112	1,171	55.45%
2010	4,776	2,585	54.12%	2,057	1,256	61.06%
2011	4,628	2,538	54.84%	2,043	1,279	62.60%
2012	4,600	2,488	54.09%	2,039	1,272	62.38%
2013	4,899	2,706	55.24%	2,077	1,290	62.11%
2014	5,213	3,145	60.33%	2,131	1,440	67.57%
2015	5,215	3,183	61.04%	2,201	1,452	65.97%
2016	4,952	3,017	60.92%	2,173	1,409	64.84%
2017	4,860	2,908	59.84%	2,151	1,374	63.88%
Total	128,344	44,596	25.79%	54,478	21,582	28.37%

Note: Table 1.1 (a) presents annual number of firms with analysts' earnings forecast and cash flow forecasts available in the I/B/E/S/ detailed file and in the sample used in this study. The sample period span from 1993 to 2017. Column 2 and column 5 show the number of firm-years with at least one earnings forecast (i.e., *EFF*) and no cash flow forecast (i.e., *CFF*). Column 3 and column 6 present the number of firm-years with at least one cash flow forecast and at least one earnings forecast. Column 4 and column 7 present the percentage of firm-years that have at least one cash flow forecast accompanied by at least one earnings forecast.

Table 1.2 (a)
Descriptive Statistics for the Whole Sample

Descriptive statistics for variables used in information asymmetry analyses (total observations=54,478 including 21,582 with cash flow forecasts in the prior year)

Observations	N	Mean	Standard Deviation	Q1	Median	Q3
SPREAD $_{i,t}$	54,478	0.011	0.015	0.001	0.004	0.016
TURNOVER $_{i,t}$	54,478	0.004	0.003	0.002	0.003	0.005
CFF_PERCENT $_{i,t}$	54,478	0.108	0.196	0.000	0.000	0.154
CFF_PERCENT $_{i,t-1}$	54,478	0.100	0.192	0.000	0.000	0.143
MV $_{i,t}$	54,478	4,002	11,832	185	621	2,188
EFF-ACCURACY $_{i,t}$	54,478	-0.023	0.178	0.000	0.000	0.000
VOLATILITY $_{i,t}$	54,478	-3.635	0.420	-3.936	-3.629	-3.320
LISTING $_{i,t}$	54,478	0.449	0.497	0.000	0.000	1.000
PRICE $_{i,t}$	54,478	26.143	23.843	9.147	19.368	35.353
FOLLOW $_{i,t}$	54,478	2.926	0.909	2.386	2.946	3.639
SHAREOUT $_{i,t}$	54,478	17,497	1,233	16,632	17,365	18,182
SP500 $_{i,t}$	54,478	0.153	0.360	0.000	0.000	0.000

Note: Table 1.2 (a) presents the descriptive statistics for the information asymmetry OLS regression final sample (total observations=54,478 including 21,582 with cash flow forecasts). *SPREAD*=annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. I use annual average of natural logarithm of daily relative bid-ask spread in empirical analyses. *TURNOVER*=average of the daily turnover, defined as trading volume in shares divided by number of shares outstanding. I use annual average of natural logarithm of daily turnover in empirical analyses. *CFF_PERCENT*= total number of analysts issuing both cash flow forecasts and earnings forecasts as a percentage of total number of analysts issuing earnings forecasts only. *MV*=the market capitalization as of fiscal year-end. I use natural logarithm of daily turnover in empirical analyses. *EFF-ACCURACY*=-1 multiply the average of forecast error for firm *i* in year *t* (difference between the actual eps and the forecasted eps by analyst *j* for firm *i* in year *t*) minus the average of absolute forecast error for firm *i* in year *t*, scaled by the average of forecast error for firm *i* in year *t*. *VOLATILITY*=the logarithm of stock return volatility, defined as the standard deviation of daily stock returns of firm i in fiscal year t. *LISTING*=a dummy variable that equals 1 if firm i is listed on NYSE or AMEX in fiscal year t, and 0 if it is listed on the NASDAQ. *PRICE*=the annual average of the daily stock price of firm i in fiscal year t. I use annual average of natural logarithm of daily stock price in empirical analyses. *FOLLOW*=the logarithm of analyst following + 1. *SHAREOUT* =is the annual average of the daily number of shares outstanding. I use annual average of natural logarithm of daily number of shares outstanding in empirical analyses. *SP500*=dummy variable that equals 1 if firm *i* is included in the S&P 500 index in fiscal year *t*, and 0 otherwise.

Table 1.2 (b)
Descriptive Statistics for Subsamples

Descriptive statistics for variables used in information asymmetry analyses (total observations=54,478 including 21,582 with cash flow forecasts in the prior year)

Observations	N	Mean	Standard Deviation	Q1	Median	Q3	t-test p-value
SPREAD $_{i,t}$							
Cash flow forecasts firms	21,582	0.003	0.007	0.001	0.001	0.002	<0.0001
No cash flow forecast firms	32,896	0.016	0.017	0.003	0.011	0.023	
TURNOVER $_{i,t}$							
Cash flow forecasts firms	21,582	0.005	0.003	0.003	0.004	0.007	<0.0001
No cash flow forecast firms	32,896	0.003	0.003	0.001	0.002	0.005	
CFF_PERCENT $_{i,t}$							
Cash flow forecasts firms	21,582	0.273	0.228	0.125	0.200	0.333	<0.0001
No cash flow forecast firms	32,896	0.000	0.006	0.000	0.000	0.000	
CFF_PERCENT $_{i,t-1}$							
Cash flow forecasts firms	21,582	0.232	0.238	0.077	0.167	0.300	<0.0001
No cash flow forecast firms	32,896	0.013	0.068	0.000	0.000	0.000	
MV $_{i,t}$							
Cash flow forecasts firms	21,582	7,767	16,336	696	1,936	6,095	<0.0001
No cash flow forecast firms	32,896	1,532	6,431	111	306	860	
EFF-ACCURACY $_{i,t}$							
Cash flow forecasts firms	21,582	-0.018	0.151	0.000	0.000	0.000	<0.0001
No cash flow forecast firms	32,896	-0.026	0.193	0.000	0.000	0.000	
VOLATILITY $_{i,t}$							
Cash flow forecasts firms	21,582	-3.788	0.405	-4.078	-3.801	-3.510	0.014
No cash flow forecast firms	32,896	-3.534	0.399	-3.815	-3.510	-3.234	
LISTING $_{i,t}$							
Cash flow forecasts firms	21,582	0.573	0.495	0.000	1.000	1.000	<0.0001
No cash flow forecast firms	32,896	0.367	0.482	0.000	0.000	1.000	
PRICE $_{i,t}$							
Cash flow forecasts firms	21,582	34.992	27.873	14.886	27.996	47.146	<0.0001
No cash flow forecast firms	32,896	20.338	18.620	7.154	15.068	27.639	
FOLLOW $_{i,t}$							
Cash flow forecasts firms	21,582	3.482	0.688	3.079	3.565	3.996	<0.0001
No cash flow forecast firms	32,896	2.560	0.849	2.099	2.609	3.197	
SHAREOUT $_{i,t}$							
Cash flow forecasts firms	21,582	18,221	1,183	17,388	18,048	18,907	<0.0001
No cash flow forecast firms	32,896	17,021	1,015	16,313	16,946	17,609	
SP500 $_{i,t}$							
Cash flow forecasts firms	21,582	0.268	0.443	0.000	0.000	1.000	<0.0001
No cash flow forecast firms	32,896	0.077	0.266	0.000	0.000	0.000	

Note: Table 1.2 (b) presents the descriptive statistics for the information asymmetry OLS regression final sample (total observations=54,478 including 21,582 with cash flow forecasts). *SPREAD*=annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. I use annual average of natural logarithm of daily relative bid-ask spread in empirical analyses. *TURNOVER*=average of the daily turnover, defined as trading volume in shares divided by number of shares outstanding. I use annual average of natural logarithm of daily turnover in empirical analyses. *CFF_PERCENT*= total number of analysts issuing both cash flow forecasts and earnings forecasts as a percentage of total number of analysts issuing earnings forecasts only. total number of analysts issuing both cash flow forecasts and earnings forecasts as a percentage of total number of analysts issuing earnings forecasts only. *MV*=the market capitalization as of fiscal year-end. I use natural logarithm of daily turnover in empirical analyses. *EFF-ACCURACY*=-1 multiply the average of forecast error for firm *i* in year *t* (difference between the actual eps and the forecasted eps by analyst *j* for firm *i* in year *t*) minus the average of absolute forecast error for firm *i* in year *t*, scaled by the average of forecast error for firm *i* in year *t*. *VOLATILITY*=the logarithm of stock return volatility, defined as the standard deviation of daily stock returns of firm i in fiscal year t. *LISTING*=a dummy variable that equals 1 if firm i is listed on NYSE or AMEX in fiscal year t, and 0 if it is listed on the NASDAQ. *PRICE*=the annual average of the daily stock price of firm i in fiscal year t. I use annual average of natural logarithm of daily stock price in empirical analyses. *FOLLOW*=the logarithm of analyst following + 1. *SHAREOUT* =is the annual average of the daily number of shares outstanding. I use annual average of natural logarithm of daily number of shares outstanding in empirical analyses. *SP500*=dummy variable that equals 1 if firm *i* is included in the S&P 500 index in fiscal year *t*, and 0 otherwise.

Table 1.3 (a)
Pearson Correlation Coefficients with Two-Tailed P-Values

Pearson (upper) correlation coefficients with two-tailed p-values (total observations=54,478)

	SPREAD $_{i,t}$	*TURNOVER* $_{i, t-1}$	*CFF* $_{i,t}$	*CFF_PERCENT* $_{i, t}$	*MV* $_{i,t}$	*EFF-ACCURACY* $_{i,t}$	*VOLATILITY* $_{i,t}$	*LISTING* $_{i,t}$	*PRICE* $_{i,t}$	*FOLLOW* $_{i,t}$	*SHAREOUT* $_{i,t}$	*SP 500* $_{i,t}$
SPREAD $_{i,t}$		**-0.386**	**-0.460**	**-0.342**	**-0.316**	**-0.051**	**0.480**	**-0.143**	**-0.526**	**-0.530**	**-0.541**	**-0.266**
TURNOVER $_{i, t-1}$			**0.175**	**0.118**	**-0.018**	**-0.061**	**0.247**	**-0.121**	**0.124**	**0.374**	**0.204**	**0.021**
CFF i,t				**0.325**	**0.176**	**0.023**	**-0.265**	**0.213**	**0.272**	**0.436**	**0.421**	**0.215**
CFF_PERCENT $_{i, t}$					**0.125**	**-0.010**	**-0.152**	**0.222**	**0.163**	**0.247**	**0.260**	**0.105**
MV $_{i,t}$						**0.020**	**-0.315**	**0.169**	**0.444**	**0.402**	**0.606**	**0.555**
EFF-ACCURACY $_{i,t}$							**-0.116**	**0.047**	**0.069**	**0.051**	**0.018**	**0.042**
VOLATILITY $_{i,t}$								**-0.387**	**-0.524**	**-0.320**	**-0.323**	**-0.356**
LISTING $_{i,t}$									**0.266**	**0.212**	**0.281**	**0.272**
PRICE $_{i,t}$										**0.448**	**0.303**	**0.401**
FOLLOW $_{i,t}$											**0.677**	**0.479**
SHAREOUT i,t												**0.619**
SP 500 i,t												

Note: Table 1.3 (a) reports Pearson correlations between variables in the information asymmetry OLS regression models. Bold indicates significance at a p-value, 0.05. *SPREAD*=annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. I use annual average of natural logarithm of daily relative bid-ask spread in empirical analyses. *TURNOVER*=average of the daily turnover, defined as trading volume in shares divided by number of shares outstanding. I use annual average of natural logarithm of daily turnover in empirical analyses. *CFF* = indicator variable equals 1 if the firm-year observation has at least 1 cash flow forecast and at least 1 earnings forecast, 0 otherwise. *CFF_PERCENT*= total number of analysts issuing both cash flow forecasts and earnings forecasts as a percentage of total number of analysts issuing earnings forecasts only. *MV*=the market capitalization as of fiscal year-end. I use natural logarithm of daily turnover in empirical analyses. *EFF-ACCURACY*=-1 multiply the average of forecast error for firm *i* in year *t* (difference between the actual eps and the forecasted eps by analyst *j* for firm *i* in year *t*) minus the average of absolute forecast error for firm *i* in year *t*, scaled by the average of forecast error for firm *i* in year *t*. *VOLATILITY*=the logarithm of stock return volatility, defined as the standard deviation of daily stock returns of firm i in fiscal year t. *LISTING*=a dummy variable that equals 1 if firm i is listed on NYSE or AMEX in fiscal year t, and 0 if it is listed on the NASDAQ. *PRICE*=the annual average of the daily stock price of firm i in fiscal year t. I use annual average of natural logarithm of daily stock price in empirical analyses. *FOLLOW*=the logarithm of analyst following + 1. *SHAREOUT* =is the annual average of the daily number of shares outstanding. I use annual average of natural logarithm of daily number of shares outstanding in empirical analyses. *SP500*=dummy variable that equals 1 if firm *i* is included in the S&P 500 index in fiscal year *t*, and 0 otherwise.

Table 1.4 (a)
OLS Regression Results

OLS Regression of Information Asymmetry (*SPREAD*)

$SPREAD_{i,t} = \alpha_0 + \alpha_1 CFF_{i,t,t-1} + \alpha_2 MV_{i,t} + \alpha_3 VOLATILITY_{i,t} + \alpha_4 LISTING_{i,t} + \alpha_5 PRICE_{i,t} + \alpha_6 FOLLOW_{i,t} + \alpha_7 TURNOVER_{i,t} + \alpha_8 EFF\_ACCURACY_{i,t} + INDUSTRY\_FE + YEAR\_FE + \varepsilon.$

		SPREAD			
Variable	Predicted Sign	Coefficient	t-Value	Coefficient	t-Value
INTERCEPT	?	-5.156	-92.230	-5.161	-92.470
CFF $_{i,t}$	-	-0.083	-16.170		
CFF $_{i,t-1}$	-			-0.107	-20.840
MV $_{i,t}$	-	-0.169	-74.290	-0.168	-73.710
VOLATILITY $_{i,t}$	+	0.373	43.800	0.369	43.430
LISTING $_{i,t}$	?	0.050	11.270	0.051	11.510
PRICE $_{i,t}$	-	-0.403	-121.990	-0.405	-122.650
FOLLOW $_{i,t}$	-	0.002	0.510	0.003	0.740
TURNOVER $_{i,t}$	-	-0.375	-126.230	-0.374	-126.260
EFF_ACCURACY $_{i,t}$	-	-0.105	-10.070	-0.106	-10.120
INDUSTRY_FE		Yes		Yes	
YEAR_FE		Yes		Yes	
Adj. R2		0.930		0.930	
N		54,478		54,478	

Note: Table 1.4 (a) presents the OLS regression results of regressing information asymmetry on cash flow forecasts and control variables. *SPREAD*=annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. *CFF*=the dummy variable equals 1 if the firm-year includes both cash flow forecasts and earnings forecasts, and *CFF* equals 0 if the firm-year includes only earnings forecasts. *MV*=the logarithm of market capitalization as of fiscal year-end. *VOLATILITY*=the logarithm of stock return volatility, defined as the standard deviation of daily stock returns of firm i in fiscal year t. *LISTING*=a dummy variable that equals 1 if firm i is listed on NYSE or AMEX in fiscal year t, and 0 if it is listed on the NASDAQ. *PRICE*=the annual average of the logarithm of daily stock price of firm i in fiscal year t. *FOLLOW*=the logarithm of analyst following + 1. *TURNOVER*=average of the logarithm of daily turnover, defined as trading volume in shares divided by number of shares outstanding. *EFF-ACCURACY*=-1 multiply the average of forecast error for firm *i* in year *t* (difference between the actual eps and the forecasted eps by analyst *j* for firm *i* in year *t*) minus the average of absolute forecast error for firm *i* in year *t*, scaled by the average of forecast error for firm *i* in year *t*. *INDUSTRY_FE*=industry fixed effects. *YEAR_FE*=year fixed effects.

Table 1.4 (b)

OLS Regression of Information Asymmetry (*TURNOVER*)

$$TURNOVER_{i,t} = \beta_0 + \beta_1 CFF_{i,t,t-1} + \beta_2 MV_{i,t} + \beta_3 FOLLOW_{i,t} + \beta_4 SHAREOUT_{i,t} + \beta_5 SPREAD_{i,t} + \beta_6 EFF\_ACCURACY_{i,t} + \beta_7 SP\ 500_{i,t} + INDUSTRY\_FE + YEAR\_FE + \varepsilon.$$

		TURNOVER			
Variable	Predicted Sign	Coefficient	t-Value	Coefficient	t-Value
INTERCEPT	?	-12.400	-114.170	-12.426	-114.400
$CFF_{i,t}$	+	-0.031	-4.030		
$CFF_{i,t-1}$	+			-0.059	-7.530
$MV_{i,t}$	+	-0.293	-64.060	-0.293	-64.170
$FOLLOW_{i,t}$	+	0.400	79.620	0.402	80.660
$SHAREOUT_{i,t}$	+	0.151	31.050	0.152	31.310
$SPREAD_{i,t}$	-	-0.616	-113.830	-0.618	-114.090
$EFF\_ACCURACY_{i,t}$	+	-0.294	-18.560	-0.295	-18.570
$SP\ 500_{i,t}$	+	-0.237	-22.280	-0.235	-22.100
INDUSTRY_FE		Yes		Yes	
YEAR_FE		Yes		Yes	
Adj. R^2		0.540		0.541	
N		54,478		54,478	

Note: Table 1.4 (b) presents the regression coefficients of information asymmetry on the availability of cash flow forecasts and control variables. *TURNOVER*=average of the logarithm of daily turnover, defined as trading volume in shares divided by number of shares outstanding. *CFF* = an indicator variable equals 1 if the firm-year observation includes both cash flow forecasts and earnings forecasts, and *CFF* equals 0 if the firm-year observation includes only earnings forecasts. *MV*=the logarithm of market capitalization as of fiscal year-end. *FOLLOW*=the logarithm of analyst following + 1. *SHAREOUT* =is the annual average of the logarithm of daily number of shares outstanding. *SPREAD*=annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. *EFF_ACCURACY*=-1 multiply the average of forecast error for firm *i* in year *t* (difference between the actual eps and the forecasted eps by analyst *j* for firm *i* in year *t*) minus the average of absolute forecast error for firm *i* in year *t*, scaled by the average of forecast error for firm *i* in year *t*. *SP500*=dummy variable that equals 1 if firm *i* is included in the S&P 500 index in fiscal year *t*, and 0 otherwise. *INDUSTRY_FE*=industry fixed effects. *YEAR_FE*=year fixed effects.

Table 1.5 (a)
OLS Regression Results

OLS Regression of Information Asymmetry (*SPREAD*)

$SPREAD_{i,t} = \alpha_0 + \alpha_1 CFF\_PERCENT_{i,t,t-1} + \alpha_2 MV_{i,t} + \alpha_3 VOLATILITY_{i,t} + \alpha_4 LISTING_{i,t} + \alpha_5 PRICE_{i,t} + \alpha_6 FOLLOW_{i,t} + \alpha_7 TURNOVER_{i,t} + \alpha_8 EFF\_ACCURACY_{i,t} + INDUSTRY\_FE + YEAR\_FE + \varepsilon.$

		SPREAD			
Variable	Predicted Sign	Coefficient	t-Value	Coefficient	t-Value
INTERCEPT	?	-5.120	-91.470	-5.111	-91.350
CFF_PERCENT $_{i,t}$	-	-0.147	-10.920		
CFF_PERCENT $_{i,t-1}$	-			-0.176	-13.290
MV $_{i,t}$	-	-0.171	-75.220	-0.171	-75.280
VOLATILITY $_{i,t}$	+	0.380	44.510	0.381	44.720
LISTING $_{i,t}$	?	0.050	11.280	0.051	11.440
PRICE $_{i,t}$	-	-0.402	-121.320	-0.402	-121.350
FOLLOW $_{i,t}$	-	-0.009	-2.550	-0.008	-2.370
TURNOVER $_{i,t}$	-	-0.376	-126.550	-0.376	-126.690
EFF_ACCURACY $_{i,t}$	-	-0.108	-10.300	-0.108	-10.320
INDUSTRY_FE		Yes		Yes	
YEAR_FE		Yes		Yes	
Adj. R^2		0.930		0.930	
N		54,478		54,478	

Note: Table 1.5 (a) presents the OLS regression results of regressing information asymmetry on cash flow forecasts and control variables. *SPREAD*=annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. *CFF_PERCENT*= total number of analysts issuing both cash flow forecasts and earnings forecasts as a percentage of total number of analysts issuing earnings forecasts only. *MV*=the logarithm of market capitalization as of fiscal year-end. *VOLATILITY*=the logarithm of stock return volatility, defined as the standard deviation of daily stock returns of firm i in fiscal year t. *LISTING*=a dummy variable that equals 1 if firm i is listed on NYSE or AMEX in fiscal year t, and 0 if it is listed on the NASDAQ. *PRICE*=the annual average of the logarithm of daily stock price of firm i in fiscal year t. *FOLLOW*=the logarithm of analyst following + 1. *TURNOVER*=average of the logarithm of daily turnover, defined as trading volume in shares divided by number of shares outstanding. *EFF-ACCURACY*=-1 multiply the average of forecast error for firm *i* in year *t* (difference between the actual eps and the forecasted eps by analyst *j* for firm *i* in year *t*) minus the average of absolute forecast error for firm *i* in year *t*, scaled by the average of forecast error for firm *i* in year *t*. *INDUSTRY_FE*=industry fixed effects. *YEAR_FE*=year fixed effects.

Table 1.5 (b)
OLS Regression Results

OLS Regression of information asymmetry (*TURNOVER*)

$TURNOVER_{i,t} = \beta_0 + \beta_1 CFF\_PERCENT_{i,t,t-1} + \beta_2 MV_{i,t} + \beta_3 FOLLOW_{i,t} + \beta_4 SHAREOUT_{i,t} + \beta_5 SPREAD_{i,t} + \beta_6 EFF\_ACCURACY_{i,t} + \beta_7 SP\ 500_{i,t} + INDUSTRY\_FE + YEAR\_FE + \varepsilon.$

		TURNOVER			
Variable	Predicted Sign	Coefficient	t-Value	Coefficient	t-Value
INTERCEPT	?	-12.378	-114.090	-12.380	-114.110
CFF_PERCENT $_{i,t}$	+	-0.007	-0.360		
CFF_PERCENT $_{i,t-1}$	+			-0.034	-1.690
MV $_{i,t}$	+	-0.294	-64.140	-0.293	-64.180
FOLLOW $_{i,t}$	+	0.396	80.450	0.396	80.480
SHAREOUT $_{i,t}$	+	0.150	30.930	0.150	30.960
SPREAD $_{i,t}$	-	-0.615	-113.730	-0.615	-113.750
EFF_ACCURACY $_{i,t}$	+	-0.295	-18.600	-0.295	-18.610
SP 500 $_{i,t}$	+	-0.238	-22.330	-0.238	-22.350
INDUSTRY_FE		Yes		Yes	
YEAR_FE		Yes		Yes	
Adj. R^2		0.540		0.540	
N		54,478		54,478	

Note: Table 1.5 (b) presents the regression coefficients of information asymmetry proxies on the availability of cash flow forecasts and control variables. *TURNOVER*=average of the logarithm of daily turnover, defined as trading volume in shares divided by number of shares outstanding. *CFF_PERCENT*= total number of analysts issuing both cash flow forecasts and earnings forecasts as a percentage of total number of analysts issuing earnings forecasts only. *MV*=the logarithm of market capitalization as of fiscal year-end. *FOLLOW*=the logarithm of analyst following + 1. *SHAREOUT* =is the annual average of the logarithm of daily number of shares outstanding. *SPREAD*=annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. *EFF_ACCURACY*=-1 multiply the average of forecast error for firm *i* in year *t* (difference between the actual eps and the forecasted eps by analyst *j* for firm *i* in year *t*) minus the average of absolute forecast error for firm *i* in year *t*, scaled by the average of forecast error for firm *i* in year *t*. *SP500*=dummy variable that equals 1 if firm *i* is included in the S&P 500 index in fiscal year *t*, and 0 otherwise. *INDUSTRY_FE*=industry fixed effects. *YEAR_FE*=year fixed effects.

Table 1.6 (a)
Two-Stage Least Square Regression

Two Stage Regression of Information Asymmetry

$TURNOVER_{i,t} = \beta_0 + \beta_1 CFF_{i,t} + \beta_2 MV_{i,t} + \beta_3 FOLLOW_{i,t} + \beta_4 SHAREOUT_{i,t} + \beta_5 SPREAD_{i,t} + \beta_6 EFF\_ACCURACY_{i,t} + INDUSTRY\_FE + YEAR\_FE + \varepsilon.$

	First Stage SPREAD			Second Stage TURNOVER		
Variable	Predicted Sign	Coefficient	t-Value	Predicted Sign	Coefficient	t-Value
INTERCEPT	?	-0.723	-16.090	?	-7.578	-67.370
$CFF_{i,t}$	-	-1.154	-106.600	+	0.029	3.390
$MV_{i,t}$	-	-0.367	-71.440	+	0.079	21.350
$SHAREOUT_{i,t}$	n/a			?	0.513	93.280
$\widehat{SPREAD}_{i,t}$	n/a			-	-0.074	-14.730
$VOLATILITY_{i,t}$	-	0.566	39.380	n/a		
$LISTING_{i,t}$	?	0.529	53.480	n/a		
$PRICE_{i,t}$	-	-0.136	-18.960	n/a		
$FOLLOW_{i,t}$	-	0.023	3.010	+	-0.003	-1.260
$TURNOVER_{i,t}$	n/a			n/a		
$EFF\_ACCURACY_{i,t}$	-	0.181	7.160	+	-0.248	-14.050
$SP\ 500_{i,t}$	n/a			+	-0.377	-32.030
INDUSTRY_FE		No			Yes	
YEAR_FE		No			Yes	
Adj. R^2		0.579			0.431	
N		54,478			54,478	

Note: Table 1.6 (a) presents the two stage regression coefficients of information asymmetry on the availability of cash flow forecasts and control variables. *TURNOVER*=average of the logarithm of daily turnover, defined as trading volume in shares divided by number of shares outstanding. *CFF* = an indicator variable equals 1 if the firm-year observation includes both cash flow forecasts and earnings forecasts, and *CFF* equals 0 if the firm-year observation includes only earnings forecasts. *MV*=the logarithm of market capitalization as of fiscal year-end. *SHAREOUT* =is the annual average of the logarithm of daily number of shares outstanding. *SPREAD*=annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. *VOLATILITY*=the logarithm of stock return volatility, defined as the standard deviation of daily stock returns of firm *i* in fiscal year *t*. *LISTING*=a dummy variable that equals 1 if firm *i* is listed on NYSE or AMEX in fiscal year *t*, and 0 if it is listed on the NASDAQ. *PRICE*=the annual average of the logarithm of daily stock price of firm *i* in fiscal year *t*. *FOLLOW*=the logarithm of analyst following + 1. *EFF_ACCURACY*=-1 multiply the average of forecast error for firm *i* in year *t* (difference between the actual eps and the forecasted eps by analyst *j* for firm *i* in year *t*) minus the average of absolute forecast error for firm *i* in year *t*, scaled by the average of forecast error for firm *i* in year *t*. *SP500*=dummy variable that equals 1 if firm *i* is included in the S&P 500 index in fiscal year *t*, and 0 otherwise. *INDUSTRY_FE*=industry fixed effects. *YEAR_FE*=year fixed effects.

Table 1.6 (b)
Two-Stage Least Square Regression

Panel B: Two Stage Regression of Information Asymmetry

$SPREAD_{i,t} = \alpha_0 + \alpha_1 CFF_{i,t} + \alpha_2 MV_{i,t} + \alpha_3 VOLATILITY_{i,t} + \alpha_4 LISTING_{i,t} + \alpha_5 PRICE_{i,t} + \alpha_6 FOLLOW_{i,t} + \alpha_7 TURNOVER_{i,t} + \alpha_8 EFF\_ACCURACY_{i,t} + \beta_9 SP\ 500_{i,t} + INDUSTRY\_FE + YEAR\_FE + \varepsilon.$

	First Stage TURNOVER			Second Stage SPREAD		
Variable	Predicted Sign	Coefficient	t-Value	Predicted Sign	Coefficient	t-Value
INTERCEPT	?	-8.677	-118.730	?	-3.746	-60.140
$\widehat{CFF}_{i,t}$	+	0.250	30.540	-	-0.103	-17.750
$MV_{i,t}$	+	0.042	11.470	-	-0.193	-74.860
$SHAREOUT_{i,t}$	?	0.480	83.950	n/a		
$SPREAD_{i,t}$	n/a			n/a		
$VOLATILITY_{i,t}$	n/a			-	-0.177	-21.200
$LISTING_{i,t}$	n/a			?	0.074	14.570
$PRICE_{i,t}$	n/a			-	-0.529	-147.550
$FOLLOW_{i,t}$	+	0.051	10.190	-	-0.150	-40.400
$\widehat{TURNOVER}_{i,t}$	n/a			-	0.000	-0.740
$EFF\_ACCURACY_{i,t}$	+	-0.303	-15.880	-	-0.045	-3.750
$SP\ 500_{i,t}$	+	-0.585	-47.460	n/a		
INDUSTRY_FE		Yes			Yes	
YEAR_FE		Yes			Yes	
Adj. R^2		0.318			0.910	
N		54,478			54,478	

Note: Table 1.6 (b) presents the two stage regression coefficients of information asymmetry on the availability of cash flow forecasts and control variables. *TURNOVER*=average of the logarithm of daily turnover, defined as trading volume in shares divided by number of shares outstanding. *CFF* = an indicator variable equals 1 if the firm-year observation includes both cash flow forecasts and earnings forecasts, and *CFF* equals 0 if the firm-year observation includes only earnings forecasts. *MV*=the logarithm of market capitalization as of fiscal year-end. *SHAREOUT* =is the annual average of the logarithm of daily number of shares outstanding. *SPREAD*=annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. *VOLATILITY*=the logarithm of stock return volatility, defined as the standard deviation of daily stock returns of firm *i* in fiscal year *t*. *LISTING*=a dummy variable that equals 1 if firm *i* is listed on NYSE or AMEX in fiscal year *t*, and 0 if it is listed on the NASDAQ. *PRICE*=the annual average of the logarithm of daily stock price of firm *i* in fiscal year *t*. *FOLLOW*=the logarithm of analyst following + 1. *EFF_ACCURACY*=-1 multiply the average of forecast error for firm *i* in year *t* (difference between the actual eps and the forecasted eps by analyst *j* for firm *i* in year *t*) minus the average of absolute forecast error for firm *i* in year *t*, scaled by the average of forecast error for firm *i* in year *t*. *SP500*=dummy variable that equals 1 if firm *i* is included in the S&P 500 index in fiscal year *t*, and 0 otherwise. *INDUSTRY_FE*=industry fixed effects. *YEAR_FE*=year fixed effects.

Table 1.7 (a)
Two-Stage Least Square Regression

Two Stage Regression of Information Asymmetry

$TURNOVER_{i,t} = \beta_0 + \beta_1 CFF\_PERCENT_{i,t} + \beta_2 MV_{i,t} + \beta_3 FOLLOW_{i,t} + \beta_4 SHAREOUT_{i,t} + \beta_5 SPREAD_{i,t} + \beta_6 EFF\_ACCURACY_{i,t} + INDUSTRY\_FE + YEAR\_FE + \varepsilon.$

		First Stage SPREAD			Second Stage TURNOVER	
Variable	Predicted Sign	Coefficient	t-Value	Predicted Sign	Coefficient	t-Value
INTERCEPT	?	0.137	2.950	?	-7.587	-67.730
CFF_PERCENT $_{i,t}$	-	-1.617	-63.840	+	0.084	3.710
MV $_{i,t}$	-	-0.437	-81.240	+	0.079	21.360
SHAREOUT $_{i,t}$	n/a			?	0.516	96.220
$\widehat{SPREAD}_{i,t}$	n/a			-	-0.073	-14.680
VOLATILITY $_{i,t}$	-	0.699	46.100	n/a		
LISTING $_{i,t}$	?	0.592	55.890	n/a		
PRICE $_{i,t}$	-	-0.070	-9.220	n/a		
FOLLOW $_{i,t}$	-	-0.119	-15.050	+	-0.003	-1.450
TURNOVER $_{i,t}$	n/a			n/a		
EFF_ACCURACY $_{i,t}$	-	0.168	6.270	+	-0.247	-13.980
SP 500 $_{i,t}$	n/a			+	-0.376	-31.920
INDUSTRY_FE		No			Yes	
YEAR_FE		No			Yes	
Adj. R^2		0.527			0.431	
N		54,478			54,478	

Note: Table 1.7 (a) presents the two stage regression coefficients of information asymmetry on the availability of cash flow forecasts and control variables. *TURNOVER*=average of the logarithm of daily turnover, defined as trading volume in shares divided by number of shares outstanding. *CFF_PERCENT*= total number of analysts issuing both cash flow forecasts and earnings forecasts as a percentage of total number of analysts issuing earnings forecasts only. *MV*=the logarithm of market capitalization as of fiscal year-end. *SHAREOUT* =is the annual average of the logarithm of daily number of shares outstanding. *SPREAD*=annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. *VOLATILITY*=the logarithm of stock return volatility, defined as the standard deviation of daily stock returns of firm *i* in fiscal year *t*. *LISTING*=a dummy variable that equals 1 if firm *i* is listed on NYSE or AMEX in fiscal year *t*, and 0 if it is listed on the NASDAQ. *PRICE*=the annual average of the logarithm of daily stock price of firm *i* in fiscal year *t*. *FOLLOW*=the logarithm of analyst following + 1. *EFF_ACCURACY*=-1 multiply the average of forecast error for firm *i* in year *t* (difference between the actual eps and the forecasted eps by analyst *j* for firm *i* in year *t*) minus the average of absolute forecast error for firm *i* in year *t*, scaled by the average of forecast error for firm *i* in year *t*. *SP500*=dummy variable that equals 1 if firm *i* is included in the S&P 500 index in fiscal year *t*, and 0 otherwise. *INDUSTRY_FE*=industry fixed effects. *YEAR_FE*=year fixed effects.

Table 1.7 (b)
Two-Stage Least Square Regression

Two Stage Regression of Information Asymmetry

$SPREAD_{i,t} = \alpha_0 + \alpha_1 CFF\_PERCENT_{i,t} + \alpha_2 MV_{i,t} + \alpha_3 VOLATILITY_{i,t} + \alpha_4 LISTING_{i,t} + \alpha_5 PRICE_{i,t} + \alpha_6 FOLLOW_{i,t} + \alpha_7 TURNOVER_{i,t} + \alpha_8 EFF\_ACCURACY_{i,t} + \beta_9 SP\ 500_{i,t} + INDUSTRY\_FE + YEAR\_FE + \varepsilon.$

	First Stage TURNOVER			Second Stage SPREAD		
Variable	Predicted Sign	Coefficient	t-Value	Predicted Sign	Coefficient	t-Value
INTERCEPT	?	-9.024	-124.190	?	-3.696	-59.240
$CFF\_PERCENT_{i,t}$	+	0.202	11.190	-	-0.160	-10.470
$MV_{i,t}$	+	0.053	14.290	-	-0.196	-76.000
$SHAREOUT_{i,t}$	?	0.511	90.450	n/a		
$SPREAD_{i,t}$	n/a			n/a		
$VOLATILITY_{i,t}$	n/a			-	-0.171	-20.480
$LISTING_{i,t}$	n/a			?	0.073	14.460
$PRICE_{i,t}$	n/a			-	-0.528	-146.850
$FOLLOW_{i,t}$	+	0.066	13.230	-	-0.164	-45.180
$\widehat{TURNOVER}_{i,t}$	n/a			-	-0.001	-0.940
$EFF\_ACCURACY_{i,t}$	+	-0.303	-15.770	-	-0.047	-3.990
$SP\ 500_{i,t}$	+	-0.612	-49.290	n/a		
INDUSTRY_FE		No			Yes	
YEAR_FE		No			Yes	
Adj. R^2		0.308			0.909	
N		54,478			54,478	

Note: Table 1.7 (b) presents the two stage regression coefficients of information asymmetry on the availability of cash flow forecasts and control variables. *TURNOVER*=average of the logarithm of daily turnover, defined as trading volume in shares divided by number of shares outstanding. *CFF_PERCENT*= total number of analysts issuing both cash flow forecasts and earnings forecasts as a percentage of total number of analysts issuing earnings forecasts only. *MV*=the logarithm of market capitalization as of fiscal year-end. *SHAREOUT* =is the annual average of the logarithm of daily number of shares outstanding. *SPREAD*=annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. *VOLATILITY*=the logarithm of stock return volatility, defined as the standard deviation of daily stock returns of firm *i* in fiscal year *t*. *LISTING*=a dummy variable that equals 1 if firm *i* is listed on NYSE or AMEX in fiscal year *t*, and 0 if it is listed on the NASDAQ. *PRICE*=the annual average of the logarithm of daily stock price of firm *i* in fiscal year *t*. *FOLLOW*=the logarithm of analyst following + 1. *EFF_ACCURACY*=-1 multiply the average of forecast error for firm *i* in year *t* (difference between the actual eps and the forecasted eps by analyst *j* for firm *i* in year *t*) minus the average of absolute forecast error for firm *i* in year *t*, scaled by the average of forecast error for firm *i* in year *t*. *SP500*=dummy variable that equals 1 if firm *i* is included in the S&P 500 index in fiscal year *t*, and 0 otherwise. *INDUSTRY_FE*=industry fixed effects. *YEAR_FE*=year fixed effects.

APPENDIX A

Variable Definition:

CFF	:	the dummy variable equals 1 if the firm-year includes both cash flow forecasts and earnings forecasts, and *CFF* $_{i,t}$ equals 0 if the firm-year includes only earnings forecasts
ACCRUALS	:	calculated as |Net income before extra-ordinary items minus operating cash flows| / total assets, measured in the year immediately prior to the forecasted year
ACCOUNTING CHOICE	:	an index ranging from 0 to 1 that captures the comparability of a firm's accounting choice with its industry peers. The index is computed by assigning a value of one to each firm whose accounting choice differs from the most frequently chosen method in that firm's industry group, for each of the following five accounting choices: (1) inventory valuation; (2) investment tax credit; (3) depreciation; (4) successful-efforts vs. full-cost for companies with extraction activities; and (5) purchase vs. pooling.7 If a firm has no information or a missing value for a given accounting choice, the choice is coded as zero (consistent with the firm selecting the most common accounting choice in the industry). The score for each firm is summed, and then scaled by the number of accounting choices in the industry: 5 for firms in the petroleum and natural gas industry (because they are eligible for all 5 choices); 3 for firms in banking, insurance, real estate, and trading industries (because they have no inventory choice and are not extractive industries); and 4 for firms in all other industries (because they are not extractive industries).
ALTMAN-Z	:	Altman's Z-score measured in the year immediately prior to the forecasted year. Following Altman (1968), the Z score equals 1.2(Net working capital/Total assets)+1.4(Retained earnings/Total assets)+3.3(Earnings before interest and taxes/Total assets)+0.6(Market value of equity/Book value of liabilities)+1.0(Sales/Total assets). Lower Altman's Z-scores indicate poorer financial health.
CAPITAL	:	ratio of gross property, plant and equipment divided by sales revenue in the year immediately prior to the forecasted year
LOG(SIZE)	:	natural log of market value of equity in millions of dollars, measured in the year immediately prior to the forecasted year
R&D	:	research and development expenditures in year t divided by total assets at the beginning of year t.
MB	:	market value of equity divided by the book value of equity in year t

SPREAD	:	annual average of the daily relative bid-ask spread, defined as the absolute value of the bid-ask spread divided by the average of bid and ask. I use annual average of natural logarithm of daily relative bid-ask spread in empirical analyses
TURNOVER	:	the average of the daily turnover, defined as trading volume in shares divided by number of shares outstanding. I use annual average of natural logarithm of daily turnover in empirical analyses.
CFF_PERCENT	:	number of analysts providing both cash flow forecasts and earnings forecasts as a percentage of total number of analysts issuing earnings forecasts.
MV	:	logarithm of market capitalization as of fiscal year-end.
EFF-ACCURACY	:	-1 multiply the average of forecast error for firm *i* in year *t* (difference between the actual *EPS* and the forecasted *EPS* by analyst *j* for firm *i* in year *t*) minus the average of absolute forecast error for firm *i* in year *t*, scaled by the average of forecast error for firm *i* in year *t*.
VOLATILITY	:	logarithm of stock return volatility, defined as the standard deviation of daily stock returns of firm i in fiscal year t.
LISTING	:	dummy variable that equals 1 if firm i is listed on NYSE or AMEX in fiscal year t, and 0 if it is listed on the NASDAQ.
PRICE	:	the annual average of the daily stock price of firm i in fiscal year t. I use annual average of natural logarithm of daily stock price in empirical analyses
FOLLOW	:	logarithm of analyst following + 1.
SHAREOUT	:	annual average of the daily number of shares outstanding. I use annual average of natural logarithm of daily number of shares outstanding in empirical analyses.
SP500	:	dummy variable that equals 1 if firm *i* is included in the S&P 500 index in fiscal year *t*, and 0 otherwise.

ESSAY 2: ANALYSTS' CASH FLOW FORECASTS AND THE COST OF EQUITY CAPITAL

I. INTRODUCTION

This study examines whether financial analysts' cash flow forecasts are associated with firms' cost of capital. Prior studies document that the issuance of cash flow forecasts along with earnings forecasts improves accruals quality (McInnis and Collins, 2011), earnings forecast accuracy (Call et al. 2009) and provide sophisticated prediction of future cash flows (Call, Chen and Tong, 2013). Consistent with this findings, prior studies also document implications of the availability of analysts' cash flow forecast for the valuation consequences, specifically, in mitigating accrual anomaly and mispricing (Radhakrishnan and Wu, 2014; Mohanram 2014). The first essay of this dissertation shows that the availability of cash flow forecasts is negatively associated with information asymmetry. In this essay, I examine whether the availability of cash flow forecasts is associated with costs of capital.

I think testing the association between cash flow forecasts and costs of capital is interesting because the findings from this investigation can contribute to the ongoing debate over whether the analysts provided cash flow forecasts accompanied with earnings forecasts are useful and sophisticated (Givoly, Hayn and Lehavy, 2009; Call et al. 2013). Givoly et al. (2009) argue and provide evidence that analysts' cash flow forecasts are extrapolated numbers from their earnings forecasts and less accurate than earnings forecasts. On the other hand, Call et al. (2012) show that analysts cash flow forecasts are sophisticated and provide

incremental information regarding working capital accruals and other adjustments. Moreover, Call et al. (2009) documents that the accuracy of analysts' earnings forecasts improves if those are accompanied with cash flow forecasts. Since most of the implied costs of capital estimates used in the literature are based on analysts' earnings forecasts, it provides a good setting for testing the usefulness of cash flow forecasts.

However, studies in the both side of the debate agree that analysts cash flow forecasts are more accurate than forecasts based on time-series models, which suggest analyst forecast contain additional information. Analysts obtain better understanding and put in more effort to study the full-set financial statements (DeFond and Hung, 2003; Call et al., 2013), so the information gap between analysts and managers are lower when cash flow forecasts are issued in addition to earnings forecasts. Prior studies (Barth, Konchitchki and Landsman 2013; Welker, 1995; Fu, Kraft and Zhang, 2012) show that higher information transparency leads to lower cost of equity. Moreover, McInnis and Collins (2011) argue that analysts indirectly forecast accruals when forecasting cash flows and they provide evidence that analysts cash flow forecasts improve firms' accruals quality and reduces accrual-based earnings management. Francis, Nanda, Olsson (2005) directly link the cost of capital with accrual quality and finds higher accrual quality is associated with lower cost of capital. Therefore, I predict the availability of cash flow forecasts to be inversely associated with cost of equity.

I test the association between the availability of cash flow forecasts and costs of equity capital. I use three widely-used measures of implied cost of equity capital—PEG model used in Easton (2004), Gode and Mohanram (2003) measure, and Claus and Thomas

(2001) model. In the empirical analyses, I use each of the three cost of equity measures separately as well as a combined summary measure by averaging these three measures. My whole sample comprised of 37,926 firm-year observations spanning from 1993 to 2017 obtained from the intersection of the Compustat, CRSP and I/B/E/S database with available data for forecasts and financial statement-based variables. Empirical analyses show that all three measures of implied cost of equity capital are negatively associated with the availability of cash flow forecasts. I find even stronger association when I use a composite measure that combines all three measures. These findings are consistent with my first essay that report a negative association between the presence of cash flow forecasts and information asymmetry.

This study also contributes to capital market literature by showing that firms with cash flow forecasts enjoy a lower cost of equity capital directly and indirectly through lower information asymmetry. Moreover, findings in this study further reinforce the empirical evidence of the usefulness and sophistication of cash flow forecasts provided in prior studies (Call et al. 2009; Mcinnis and Collins, 2011; Call et al. 2012; Radhakrishnan and Wu, 2014; Mohanram, 2014; Hashim and Strong, 2018). This study also extends prior studies that investigate analyst forecasts errors and cost of equity capital (Larocque, 2013) and analysts' forecast characteristics and cost of debt capital (Mansi, Maxwell, and Miller, 2011).

The rest of the paper is organized as follows. Section II reviews the literature and develop the hypothesis. Section III discusses the research design. Section IV explains the sample selection criteria and data. Section V conducts the empirical analyses, and Section VI concludes.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Cost of Equity and Information Asymmetry

Cost of equity capital is an essential valuation measure. It is the equity investors' required rate of return on their investment. Cost of equity is very important to equity holders and firms, since it measures the required returns for investors and cost of raising funds for firms. It also affects many corporate decisions, such as firms' minimum required project returns and capital structure (Easley and O'Hara, 2004). Given the importance of this issue, the extant literature investigates various factors affecting cost of equity capital.

The extant literature provides mixed results regarding the relation between information asymmetry and cost of equity (Diamond and Verrecchia, 1991; Welker, 1995; Botosan, 1997; Bhattacharya, Ecker, Olsson and Schipper, 2012; Easley and O'Hara, 2004). Conventionally, firms with higher information transparency enjoy a lower cost of equity (Diamond and Verrecchia, 1991; Welker, 1995; Amihud and Mendelson,1986). Baiman and Verrecchia (1996) report that managers increase disclosure when firms need equity investments, and they argue that enhanced disclosure will improve liquidity and reduce cost of equity. Better information environment mitigates information asymmetry and investors require lower return on their investment. Information environment is greatly improved through the roles of financial analysts as information intermediary (Frankel and Li, 2004). In this study, I argue that cash flow forecasts by financial analysts disseminate additional information to the market participants. These findings show that better information transparency in general helps lower firms' cost of equity capital, whether it is analysts provided information or managers disclosed information. On the contrary, increased information transparency may damage firms' future cash flows. Voluntary disclosure may introduce negative information to the market, causing investors to sell shares to a point, where it leads to lower liquidity in the future. As a result, increased information

asymmetry may increase cost of equity capital (Diamond and Verrecchia, 1991). Using the CAPM model as implied cost of equity measure, Hughes, Liu and Liu (2007) finds that beta is only affected by systematic risk rather than idiosyncratic risk in a large economy. Cost of equity is not associated with information asymmetry once beta is controlled.

Several elements contribute to firms' information environment. First, voluntary disclosure contributes to a large portion of firms' information environment. Extant literature finds mixed results regarding the link between voluntary disclosure and cost of equity capital. On the one hand, voluntary disclosure reduces information asymmetry. For example, Diamond (1984) explains the incentive of releasing public information is to prevent investors, who have access to private information, from taking advantage of the private information to cheat against the majority shareholders, who only have public information. Under this theory, all investors should benefit from the public information release. Fu, Kraft and Zhang (2012) document a lower cost of equity associated with more frequent financial reporting, since high frequent financial reporting represents more frequent disclosure, less adverse selection and estimation risks. Moreover, increased disclosure reduces transaction costs between investors, which in turn, reduces cost of equity capital (Amihud and Mendelson, 1986; Diamond and Verrecchia, 1991). These studies suggest that increased disclosure reduces revealed information from stock trading, which reduces cost of equity capital.

On the other hand, voluntary disclosure may lead to higher information asymmetry. For example, voluntary disclosures can disseminate proprietary information rather than nonproprietary information to the market. Such a trade-off between disclosing nonproprietary

information and disclosing proprietary information may reduce firms' overall cash flow (Dye, 1986). Extant literature argues the cost of equity may positively connected with the level of voluntary disclosure, since higher disclosure may unnecessarily reveal information to the competitors and put firms at a disadvantage in the market (Feltham and Xie,1992; Diamond and Verrecchia, 1991). Feltham and Xie (1992) argue that managers tend to communicate good news to the capital market and try to hide bad news from the capital market, while they tend to communicate bad news to competitors and hide good news from competitors. Zhang (2001) shows that cost of capital could be associated with disclosure level in both directions, which depends on the specific factors, which causes variations in particular sample.

Third, private and public information components also affect information asymmetry. Botoson, Plumlee and Yuan (2004) find the more accurate public information is associated with lower cost of equity. Easley and O'Hara (2004) find that investors require higher stock returns for firms holding private information. Since better informed investors hold the good news stocks and can adjust their portfolio corresponding to their private information, investors with only public information are hurt from holding bad news stocks. Thus, investors require higher returns for potential downfall of private information stocks.

Fourth, accounting quality affects information asymmetry, which further, influence cost of equity capital. One stream of literature finds accounting quality is inversely associated with cost of equity, since accounting quality are often seen as a representative of information risk. Using both accounting based and market-based proxies for earnings quality, Francis, LaFond, Olsson and Schipper (2005) find higher accounting quality leads to lower cost of

equity capital. They confirm that each of the seven proxies, including accrual quality, persistence, timeliness, smoothness, quality, persistence, and timeliness, affect cost of equity. Francis, Nanda and Olsson (2008) argue that accounting quality over shades voluntary disclosure in reducing firms' information asymmetry to the degree that the effect of voluntary disclosure can be neglected after controlling for accounting quality. Using information asymmetry as the mediator, Bhattacharya, Ecker, Olsson and Schipper (2012) find earnings quality is negatively associated with information asymmetry, which further, reduces cost of equity. Barth, Konchitchki and Landsman (2013) find that a firm's earnings transparency is negatively associated with cost of capital. Lambert, Leuz and Verrecchia (2007) find that accounting quality influences cost of capital via direct and indirect effects. The direct effect refers to increased relative disclosure level (compared to other firms) may increase firms' liquidity, which further, reduces cost of equity. The indirect effect refers to the change of disclosure level influences firms' real decisions. First, increased disclosure may reduce the amount of cash available for managers themselves, which mitigates agency issues, which in turn, increases stock price and reduces cost of equity. Second, increased disclosure may affect firms' investing decisions, which also affect cost of equity capital. Since both accounting information and earnings quality are important indicators for information risks, these studies further show the inverse relation between information asymmetry and cost of equity. Using a setting of accounting restatement, Hribar and Jenkins (2004) find accounting restatement is associated with higher cost of equity capital. Overall, the literature suggest higher accounting quality is associated with lower cost of equity.

Fifth, nonfinancial disclosure, such as corporate social responsibilities, affects information asymmetry, which affects cost of equity. Prior studies find mixed results

regarding the link between nonfinancial disclosure and cost of equity. On the one hand, extant literature finds that firms with lower cost of equity in the prior year tend to issue corporate social responsibilities report and subsequently enjoy lower cost of equity in the next year. Analysts who follow these firms also have better forecast accuracy (Dhaliwal, Li, Tsang, and Yang, 2011). More specifically, improvement in product strategies, environmental responsibilities, and better employee relations especially reduces cost of equity capital (Ghoul, Guedhami, Kwok and Mishra, 2011). On the other hand, firms' social responsibility disclosure may have negative effects on cost of equity capital. Using Canadian setting, Richardson and Welker (2001) find that firms that reveal social responsibility information experience higher cost of equity capital. This negative effect is mitigated when firms have positive financial performance.

Sixth, prior literature finds mixed results regarding the association between information intermediaries, such as financial analysts and auditors, and cost of equity capital. Using seasonal equity offering pricing as a proxy for cost of equity capital, Bowen, Chen and Cheng (2008) find that increased analysts coverage is associated with lower cost of equity, shown from the reduced seasonal equity offering underpricing. Their study mitigates the potential measurement bias of different estimates of implied cost of equity capital, since the pricing of seasonal equity offering directly represents cost of equity, unlike commonly used analysts forecast based or market based implied cost of equity capital measures. Using U.S. and Canadian data, Botosan (1997) and Richardson and Welker (2001) find that reduced cost of equity is associated with higher disclosure level, under the condition that the number of analysts following firms is small. Mixed results are found from auditors' perspective. For example, Ogneva, Subramanyam and Raghunandan (2007) find no evidence that cost of

equity capital is linked with internal control weaknesses. To the opposite, Hribar and Jenkins (2004) find a positive association between accounting restatement and cost of equity capital. Additionally, Skaife, Collins, Kinney and LaFond (2009) find that cost of equity is influenced correspondingly by effective internal control. One potential explanation suggests that the paradox could solely due to the differences in proxies of implied cost of equity (Botosan, Plumlee and Wen, 2011).

Analysts' Cash Flow Forecasts and Information Asymmetry

Under informational view, analysts are information middleman for firms, and they interpret and create information for investors. Their forecasts reduce information asymmetry between managers and shareholders. Earnings backed by operating cash flows are sustainable and repeatable, and they are considered high quality earnings by analysts (Brown et al. 2015). Under the monitor view, analysts are considered efficient gatekeepers and monitors, and they monitor a manager's behavior by reducing earnings management and audit fees (Jensen and Meckling, 1976; Yu, 2008; Gotti, Han, Higgs and Kang, 2012; McInnis and Collins, 2011). Consistent with the informational view, financial analysts interact with managers by appearing frequently in the earnings release conference calls, issuing stock recommendations, expressing their concerns in media and writing research reports to their clients.

Recent literature sheds light on analysts' cash flow forecasts. One stream of literature claim that analysts simply extend earnings forecasts to issue cash flow forecasts, which is not sophisticated (Givoly et al. 2009). Another stream of literature contradicts the finding from several aspects. First, DeFond and Hung (2003) identify five determining factors for analysts

to issue cash flow forecasts. Call et al. (2013) note that cash flow forecasts are sophisticated and analysts do not ignorantly extend earnings forecasts to provide cash flow forecast information. They find that analysts' cash flow forecasts tend to be more precise than respective cash flow forecasts. Cash flow forecasts also benefit stockholders by sharing valuable information (DeFond and Hung, 2003; Brown et al. 2013). Additionally, cash flow forecast accuracy is very useful for analysts to remain employed (Call et al. 2013).

Second, cash flow forecasts increase the accruals quality and reduce accruals earnings management. Since earnings include accruals and cash flows components, analysts implicitly forecast accruals while forecast cash flows. Accruals earnings management is reduced if analysts issue cash flow forecasts, which also assist in regulating a manager's behavior (McInnis and Collins, 2011). Additionally, analysts' cash flow forecasts correctly predict the sign and size of actual accruals than time-series cash flow forecast model (Call et al. 2013). Last but not the least, accrual mispricing, operating cash flow mispricing and accruals anomaly is mitigated with cash flow information (Radhakrishnan and Wu, 2014; Mohanram, 2014). Analysts issued cash flow forecasts also mitigates the future inverse relation between accruals and stock return (Mohanram, 2014).

Third, analysts' cash flow forecasts contribute to firms' valuation and future performance. Cash flow forecasts is positively linked with the precision of target price forecast accuracy (Hashim and Strong, 2018). Brown et al. (2013) find that firms who beat both earnings and cash flow forecasts have better future performance and stronger market reaction than firms that only beat earnings forecasts. In addition, CEOs believe cash flow forecasts are a greater performance feature (Graham, Harvey and Rajgopal, 2005).

Forth, Ayers, Call and Schwab (2018) finds the presence of cash flow forecasts improves firms' future cash flow health. From the perspective of tax planning, managers tend to engage in permanent tax savings after the first issuance of cash flow forecasts. Their study finds an 8.2 cent cash tax reduction per share, or $35.4 million reduction in cash tax payment during a three-year period after analyst issue cash flow forecasts for the first time.

Although above studies confirm the sophistication and benefits of cash flow forecasts, three studies provide contradicting findings. First, GHL find that analysts simply extend earnings forecasts to construct cash flow forecasts, by adjust depreciation and other accruals in earnings forecasts. Second, Ecker and Schipper (2014) discuss Mohanram (2014) and Radhakrishnan and Wu (2014) to cast doubt on these studies' research design and information content of cash flows. Third, Bilinski (2014) finds that analysts shy away from forecasting cash for firms with lower accounting quality. Therefore, it is an empirical question whether cash flow forecasts are useful and sophisticated. If they are useful, I expect that the presence of cash flow forecasts is inversely linked with information asymmetry.

If the presence of cash flow forecasts reduces firms' information symmetry and reduces firms' risk, it should reduce cost of equity. This leads to my hypothesis, stated in alternative form:

H_1: Cost of equity capital is lower for firms with both earnings and cash flow forecasts than firms with only earnings forecasts.

III. RESEARCH DESIGN

Implied Cost of Equity Measures

There is an on-going debate regarding the validity of implied cost of equity proxies (Botosan and Plumlee, 2002; Guay, Kothari and Shu, 2005; Easton and Monahan, 2005; Botosan, Plumlee and Wen, 2011). There are two broad categories of implied cost equity capital measure — the market based measures, such as Fama-French three factor model and the Capital Asset Pricing Model (CAPM) model, and analysts forecasts based measures, such as PEG ratio model (Easton, 2004), Claus and Thomas (2001) measure and Gode and Mohanram (2003) measure. Prior studies suggest that the proxy selection could potentially affect the empirical results. For example, Skaife, Collins, Kinney and LaFond (2009) find that internal control effectiveness significantly affect the subsequent cost of equity, while Ogneva, Subramanyam, and Raghunandan (2007) finds that cost of equity does not change significantly given internal control weakness (Botosan, Plumlee and Wen, 2011). Since focus on the link between presence of cash flow forecasts and cost of equity capital, rather than discussing differences between cost of equity proxies, I follow Imhof, Seavey and Smith (2017) to use three analysts forecasts based measures of cost of equity capital, and I also take an average of the three measures to calculate the summary measure of cost of equity to mitigate the potential bias in each of the individual measures.

Three measures of implied costs of equity capital are the PEG ratio model by Easton (2004) and implied cost of capital measure by Gode and Mohanram (2003), and Claus and Thomas (2001).

Easton (2004) states that the PEG ratio combines stock prices and analysts earnings forecasts and forecasted earnings growth to develop a measure for stock recommendations.

$$PEG = (\frac{P0}{eps1})/growth$$

Where P0 is the stock price at year 0, eps1 is the actual earnings per shares at year1, and growth is the analysts forecasted five-year growth rate.

The second measure I use is the cost of equity measure suggested by Gode and Mohanram (2003). In their measure, they modify Ohlson–Juettner Model (Ohlson–Juettner, 2003) and calculate the cost of equity based on analysts' forecasts. They combine analysts' forecasts and stock prices with earnings growth rates to calculate cost of equity. I calculate the following:

$$COEi,t = A + \sqrt{A^2 + \frac{eps1}{P0} * \frac{eps2 - eps1}{eps1} - (r - 1))}$$

Where $A = \frac{1}{2}(r - 1) + dps1/p0$, and eps1 is the analysts' earnings forecasts at year 1, eps2 is the analysts' earnings forecasts at year 2, dps1 is the expected dividends per share at year 1, P_0 is the stock price at year 0, and r represents the nominal long-term economic growth, calculated as 1 + (r_f - 3%) where r_f is the interest rate on the 10-year treasury bill.

I also calculate cost of equity capital using Claus and Thomas model, which also combines the firms' book value, stock price and analysts' forecasts. I calculate the following:

$$P0 = BV0 + \frac{ae1}{1+k} + \frac{ae2}{(1+k)^2} + \frac{ae3}{(1+k)^3} + \frac{ae4}{(1+k)^4} + \frac{ae5}{(1+k)^5} + \frac{ae5(1+gae)}{(k-gae)*(1+k)^5}$$

where $aet = et - k * (bvt - 1)$, and BV_0 is the book value per share at year 0, ae_t is the abnormal eps calculated using the above formula, g_{ae} is the terminal growth rate of abnormal eps past year 5, calculated as (r_f - 3%) where r_f is the interest rate on the 10-year treasury bill.

I use the average of these three estimates of implied costs of capital as the summary measure of costs of equity capital.

Regression Model

To test the hypothesis, I use the following regression model in line with Imhof, Seavey and Smith (2017):

$$COE_{i,t} = CFF_{i,t} + Size_{i,t} + BM_{i,t} + ROA_{i,t} + DEBT_{i,t} + R\&D_{i,t} + Depreciation_{i,t} + STD\_Returns_{i,t} + STD\_CFO_{i,t} + ABACC_{i,t} + Year\ FE + Industry\ FE + \varepsilon. \quad (2.1)$$

I control for the common control variables, such as size, return to asset, debt, research and development, and depreciation. Following Barth et al. (2013) and Imhof et al. (2017), I control for risk factors, including book-to-market, standard deviation of operating cash flows, standard deviation of daily stock returns, and abnormal accruals. I also test for multi-collinearity and find that multi-collinearity is not an issue in my multivariant model.

IV. SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

The sample period spans from 1993 to 2017, where 1993 is the first year when analysts' cash flow forecasts appear in the I/B/E/S/ database. I obtain earnings forecasts, cash flow forecasts and stock price data from the I/B/E/S/ detailed history US file and summary history US file, observations for control variables from the CRSP daily stock database and COMPUSTAT fundamentals annual database. I obtain one to five year ahead earnings forecasts data and analysts forecasted five-year earnings growth rate from IBES summary history US file. I use the most recent analysts' forecast updates as the consensus forecasts,

before annual earnings announcements. I identify firm-year observations with both cash flow forecasts and earnings forecasts and observations with earnings forecasts only. I delete all observations with missing COMPUSTAT, CRSP or IBES values. All observations are winsorized at 1% and 99% level to reduce outlier effects. I replace the missing research and development variables by zero. Consistent with prior studies, I exclude observations from the regulated industries with SIC code from 4900 to 4999 and from financial firms with 6000 to 6999. The overall sample consists of 37,926 observations with analysts' earnings forecasts and 16,554 observations have both earnings forecasts and cash flow forecasts. I test my hypotheses using the whole sample with available data for estimating each costs of capital measure.

Table 2.1 presents annual distribution of observations with earnings forecasts as well as observations with both earnings and cash flow forecasts, along with the percentage of firm-years with cash flow forecasts during the joint sample period. The percentage of firms with cash flow forecasts increases from 1.60 percent in 1993 to 74.31 percent in 2017. It indicates that the market demand of cash flow forecasts increases tremendously during the sample period (DeFond and Hung, 2003).

[Insert Table 2.1 Here]

Table 2.2 provides descriptive statistics of the dependent variable and control variables for the three separate samples, when cost of equity is calculated following Easton (2004), Claus and Thomas (2001) and Gode and Mohanram (2003). The Easton sample consists of 37,926 firm-year observations, including 21,372 observations with only earnings forecasts and 16,554 observations with both earnings forecasts and cash flow forecasts. The

mean and median of cost of equity is 11.5 percent and 10.3 percent in the earnings forecasts sample, which is consistent with prior studies. The mean and median of cost of equity is 11.2 percent and 10.0 percent in the earnings forecasts and cash flow forecasts sample, which is also consistent with prior studies. Following Call et al. (2009), I compute CFO_Forecast as an indicator variable set to one if the firm-year has both cash flow forecasts and earnings forecasts, and zero if the firm-year only contains earnings forecasts. Size is calculated as total assets at current year, with a mean of 1208.426 and a median of 323.032 in the Easton sample. BM is the book to market ratio, which has a mean of 0.521 and median of 0.443. ROA is the return on asset, which controls for the operating performance of the firm. Debt is the debt to asset ratio, which measures the solvency of the firm. In addition to the common control variables, such as depreciation and research and development expenditures, I also include risk factors to control for the risk of firms. The risk factors include standard deviation of daily stock returns in the previous year, with a mean of 0.027, the standard deviation of operating cash flows in the current four and previous eight quarters, with a mean of 0.046, and the absolute value of abnormal accruals of the current year, with a mean of 0.070 (Barth et al. 2013; Imhof et al. 2017).

[Insert Table 2.2 Here]

Table 2.3 reports Pearson and Spearman correlations among the variables, based on the Easton (2004) sample. Consistent with the prediction, cash flow forecasts are negatively related with the cost of equity capital, which is also consistent with regression results. Standard deviations of the previous year's daily stock returns and standard deviation of

operating cash flows are both positively related with cost of equity capital, consistent with the prediction.

[Insert Table 2.3 Here]

V. EMPIRICAL RESULTS

Table 2.4 presents the main finding of the study. This table provides multivariate regression results for equation (2.1) by using the three cost of equity measures—the PEG ratio model by Easton (2004) and implied cost of capital measure by Gode and Mohanram (2003), and Claus and Thomas (2001). In the regression, the variable of interest, *CFO_FORECAST*, is consistently negative and significant in using all three measures of cost of equity capital. The results are consistent with my prediction that availability of cash flow forecasts is associated with a lower costs of equity capital. Multicollinearity test has been performed, which suggests multicollinearity is not an issue in my multivariate model.

Consistent with the prediction, the cost of equity is positively related with the risk factor, the standard deviation of the daily stock returns of the prior year. Because cost of equity increases with risk level of firms, the risk factor is positively related with the cost of equity. The standard deviation of the daily stock returns, which measures the volatility of stock returns, is positively related with cost of equity. The absolute value of abnormal accruals, which measure accounting quality, are positively related with the cost of equity. When accounting quality is higher and information risk is lower, investors require a lower cost of equity.

[Insert Table 2.4 Here]

VI. ADDITIONAL TESTS

Table 2.5 presents the regression results for equation (2.1) by using the combined measure of cost of equity capital, which is the average of all three measures. Using the joint measure, the availability of cash flow forecasts is negatively related with the cost of equity. (the coefficient on *CFF* is -0.003, p = 0.0002). It indicates that the cost of equity reduces by 30 basis points when firms receive cash flow forecasts. The result is both economically and statistically significant. Overall, the results indicate that cash flow forecasts reduce cost of equity capital. This result is consistent with the main regression results, where cost of equity is computed as the average of all three measures.

[Insert Table 2.5 Here]

VII. CONCLUSION

This study investigates whether sell-side analysts' cash flow forecasts are associated with cost of equity capital. Given existing debate over the usefulness of cash flow forecasts, I think costs of equity capital provide a convenient setting for testing usefulness of such forecasts. Cash flow forecasts can be associated with the cost of equity capital: (a) if analysts' earnings forecasts are more accurate when those are accompanied with cash flow forecasts (Call et al. 2009), such accuracy will affect cost of equity capital and (b) if the presence of cash flow forecasts improves information transparency by improving accruals

quality (McInnis and Colins, 2011), it will reduce information risk. I use three widely-used measures of implied cost of equity capital—PEG model used in Easton (2004), Gode and Mohanram (2003) measure, and Claus and Thomas (2001) model, and also a combined measure averaging these three measures. In empirical analyses, results show all three measures are consistently negatively associated with the availability of cash flow forecasts, which is consistent with the hypothesis. To the best of my knowledge, no other prior studies test the association between cost of equity with cash flow forecasts.

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Table 2.1
Availability of Analysts' Cash Flow Forecast

Year	# of firms with EFF Only	# of firms with EFF&CFF	% of firms with CFF
1993	1,371	22	1.60%
1994	1,564	112	7.16%
1995	1,613	28	1.74%
1996	1,718	115	6.69%
1997	1,803	138	7.65%
1998	1,782	107	6.00%
1999	1,763	410	23.26%
2000	1,578	448	28.39%
2001	1,418	234	16.50%
2002	1,429	654	45.77%
2003	1,540	784	50.91%
2004	1,704	938	55.05%
2005	1,660	984	59.28%
2006	1,672	997	59.63%
2007	1,583	990	62.54%
2008	1,479	943	63.76%
2009	1,439	918	63.79%
2010	1,492	1,010	67.69%
2011	1,494	1,034	69.21%
2012	1,443	993	68.81%
2013	1,362	958	70.34%
2014	1,367	1,029	75.27%
2015	1,219	909	74.57%
2016	1,207	888	73.57%
2017	1,226	911	74.31%
Total	**37,926**	**16,554**	**43.65%**

Note: Table 2.1 represents the descriptive statistics for analysts' cash flow forecasts and earnings forecasts from I/B/E/S/ detailed file during the period 1993 - 2017. The sample is obtained when cost of equity is calculated following Easton (2004). Column 1 shows the number of firm-years with at least one earnings forecast (i.e., *EFF*) and no cash flow forecast (i.e., *CFF*). Column 2 presents the number of firm-years with at least one cash flow forecast and at least one earnings forecast. Column 3 presents the percentage of firm-years that have at least one cash flow forecast accompanied by at least one earnings forecast.

TABLE 2.2
Descriptive Statistics
Firm-years with Earning Forecasts and Cash Flow Forecasts

Variable	Easton		Claus and Thomas		Gode and Mohanram	
	EFF (n=21,372)	EFF & CFF (n=16,554)	EFF (n=18,040)	EFF & CFF (n=15,102)	EFF (n=9,605)	EFF & CFF (n=12,558)
	Mean (Median)	Mean (Median)	Mean (Median)	Mean (Median)	Mean (Median)	Mean (Median)
COE	0.115	0.112	0.097	0.082	0.133	0.117
	(0.103)	(0.100)	(0.088)	(0.072)	(0.120)	(0.100)
CFF	0	1	0	1	0	1
	(0)	(1)	(0)	(1)	(0)	(1)
Size	1208.426	6481.19	1128.442	6734.901	2071.339	7696.379
	(323.032)	(1981.136)	(301.387)	(2008.74)	(586.637)	(2350.246)
BM	0.521	0.440	0.474	0.405	0.425	0.408
	(0.443)	(0.371)	(0.417)	(0.35)	(0.362)	(0.346)
ROA	0.133	0.123	0.142	0.128	0.139	0.118
	(0.117)	(0.108)	(0.123)	(0.112)	(0.128)	(0.108)
Debt	0.192	0.247	0.196	0.251	0.210	0.254
	(0.133)	(0.212)	(0.128)	(0.212)	(0.157)	(0.220)
RD	0.040	0.030	0.041	0.030	0.045	0.030
	(0.002)	(0)	(0.003)	(0)	(0.005)	(0)
Depreciation	0.054	0.052	0.054	0.051	0.058	0.053
	(0.048)	(0.044)	(0.048)	(0.044)	(0.051)	(0.045)
STD_Returns	0.029	0.023	0.029	0.023	0.028	0.024
	(0.027)	(0.022)	(0.028)	(0.021)	(0.026)	(0.022)
STD_CFO	0.049	0.046	0.050	0.046	0.047	0.045
	(0.044)	0.041	0.044	0.042	(0.042)	(0.041)
ABACC	0.077	0.068	0.080	0.068	0.075	0.067
	(0.052)	(0.044)	(0.053)	(0.044)	(0.050)	(0.044)

Note: Table 2.2 presents the descriptive statistics for three separate samples, where cost of equity is calculated following Easton (2004), Claus and Thomas (2001) and Gode and Mohanram (2003). All continuous variables are winsorized at the 1st and 99th percentile. *COE* is the expected cost of equity capital for firm i in year t, calculated following Easton (2004), Claus and Thomas (2001) and Gode and Mohanram (2003). *CFF* is an indicator variable equals 1 if the firm-year includes both cash flow forecasts and earnings forecasts, and *CFF* equals 0 if the firm-year includes only earnings forecasts. *Size* is total assets, in millions, for a firm i at the beginning of the year t. *BM* is the book value of equity divided by the market value of equity in year t. *ROA* is the operating income after depreciation in year t divided by total assets in the beginning of year t. *DEBT* is total debt in year t divided by total assets of the firm at the beginning of year t. *R&D* is the research and development expenditures in year t divided by total assets at the beginning of year t. *Depreciation* is the depreciation in year t divided by total assets at the beginning of year t. *STD_Returns* is the annual standard deviation of daily stock returns for year t-1. *STD_CFO* is the standard deviation of the current four and prior eight quarters of operating cash flows, divided by total assets in year t. $ABACC_{i,t}$ is the absolute value of the abnormal accruals measure calculated following Jones (1991).

TABLE 2.3

Pearson (Spearman) Correlation on the Upper (Lower) Diagonal

	COE	CFF	Size	BM	ROA	Debt	RD	Depreciation	STD_Returns	STD_CFO	ABACC
COE		-0.030***	0.048***	0.035***	0.254***	0.054***	-0.021***	0.024***	0.085***	0.055***	0.086***
CFF	0.039***		0.298***	0.116***	0.049***	0.122***	-0.080***	-0.045***	-0.248***	-0.069***	0.059***
Size	0.077***	0.523***		0.080***	0.044***	0.057***	0.068***AF27	-0.062***	-0.259***	-0.105***	0.077***
BM	0.00	-0.124***	0.093***		0.409***	0.044***	-0.198***	-0.056***	0.163***	-0.150***	0.041***
ROA	0.300***	-0.045***	0.093***	0.481***		0.039***	0.020***	0.055***	-0.069***	0.305***	0.099***
Debt	0.032***	0.147***	0.347***	0.01	0.078***		-0.234***	0.165***	-0.115***	-0.270***	0.064***
RD	0.054***	-0.059***	0.118***	0.208***	0.017***	0.288***		0.050***	0.234***	0.085***	0.072***
Depreciation	0.00	-0.074***	0.109***	0.058***	0.067***	0.139***	-0.046***		0.133***	0.139***	0.135***
STD_Returns	0.064***	-0.258***	0.508***	0.160***	0.114***	0.175***	0.117***	0.113***		0.147***	0.139***
STD_CFO	0.048***	-0.059***	0.184***	0.223***	0.32	-0.33	0.03	0.15	0.12		0.085***
ABACC	0.047***	-0.064***	0.134***	-0.05***	0.059***	0.010***	0.056***	0.104***	0.126***	0.078***	

Note: Table 2.3 shows the Pearson (upper) and Spearman (lower) correlations for the variables in the Easton (2004) sample. All continuous variables are winsorized at the 1st and 99th percentile. *COE* is the expected cost of equity capital for firm i in year t, calculated following Easton (2004). *CFF* is an indicator variable equals 1 if the firm-year includes both cash flow forecasts and earnings forecasts, and *CFF* equals 0 if the firm-year includes only earnings forecasts. *Size* is total assets, in millions, for a firm i at the beginning of the year t. *BM* is the book value of equity divided by the market value of equity in year t. *ROA* is the operating income after depreciation in year t divided by total assets in the beginning of year t. *DEBT* is total debt in year t divided by total assets of the firm at the beginning of year t. *R&D* is the research and development expenditures in year t divided by total assets at the beginning of year t. *Depreciation* is the depreciation in year t divided by total assets at the beginning of year t. *STD_Returns* is the annual standard deviation of daily stock returns for year t-1. *STD_CFO* is the standard deviation of the current four and prior eight quarters of operating cash flows, divided by total assets in year t. $ABACC_{i,t}$ is the absolute value of the abnormal accruals measure calculated following Jones (1991).

TABLE 2.4

Regression of Cost of Equity on Cash Flow Forecasts and Control Variables

$COE_{i,t} = CFF_{i,t} + Size_{i,t} + BM_{i,t} + ROA_{i,t} + DEBT_{i,t} + R\&D_{i,t} + Depreciation_{i,t} + STD\_Returns_{i,t} + STD\_CFO_{i,t} + ABACC_{i,t} + Year\ FE + Industry\ FE + \varepsilon.$

		Easton		Claus and Thomas		Gode and Mohanram	
Variable	**Predicted Sign**	**Coefficient**	**t-Value**	**Coefficient**	**t-Value**	**Coefficient**	**t-Value**
Intercept	?	0.037	3.130	0.022	2.020	0.026	1.300
CFF	-	(0.001)	(1.950)	(0.002)	(2.770)	(0.004)	(3.590)
Size	-	0.002	7.220	0.000	1.780	0.001	2.330
BM	?	0.022	24.910	0.031	31.850	0.017	11.000
ROA	-	0.193	60.560	0.086	27.920	(0.054)	(11.910)
Debt	-	0.017	12.970	0.027	22.060	0.041	20.080
RD	?	(0.020)	(3.750)	(0.037)	(7.430)	(0.049)	(5.840)
Depreciation	?	(0.058)	(5.860)	(0.041)	(4.250)	(0.049)	(3.160)
STD_Returns	+	1.032	29.700	0.746	22.370	1.954	33.140
STD_CFO	+	(0.012)	(0.970)	0.010	0.880	0.285	13.780
ABACC	+	0.028	8.310	0.026	8.140	0.071	12.940
Adj R^2		0.180		0.484		0.377	
N		37,926		33,142		22,163	
Year FE		Yes		Yes		Yes	
Industry FE		Yes		Yes		Yes	

Note: Table 2.4 shows the main regression coefficients. All continuous variables are winsorized at the 1st and 99th percentile. *COE* is the expected cost of equity capital for firm i in year t, calculated following Easton (2004), Claus and Thomas (2001) and Gode and Mohanram (2003). *CFF* is an indicator variable equals 1 if the firm-year includes both cash flow forecasts and earnings forecasts, and *CFF* equals 0 if the firm-year includes only earnings forecasts. *Size* is the natural log of total assets, in millions, for a firm i at the beginning of the year t. *BM* is the book value of equity divided by the market value of equity in year t. *ROA* is the operating income after depreciation in year t divided by total assets in the beginning of year t. *DEBT* is total debt in year t divided by total assets of the firm at the beginning of year t. *R&D* is the research and development expenditures in year t divided by total assets at the beginning of year t. *Depreciation* is the depreciation in year t divided by total assets at the beginning of year t. *STD_Returns* is the annual standard deviation of daily stock returns for year t-1. *STD_CFO* is the standard deviation of the current four and prior eight quarters of operating cash flows, divided by total assets in year t. $ABACC_{i,t}$ is the absolute value of the abnormal accruals measure calculated following Jones (1991), multiplied by (-1) in my empirical study.

TABLE 2.5

Regression of Cost of Equity on Cash Flow Forecasts and Control Variables

$COE_{i,t} = CFF_{i,t} + Size_{i,t} + BM_{i,t} + ROA_{i,t} + DEBT_{i,t} + R\&D_{i,t} + Depreciation_{i,t} + STD\_Returns_{i,t} + STD\_CFO_{i,t} + ABACC_{i,t} + Year\ FE + Industry\ FE + \varepsilon.$

Variable	Predicted Sign	Coefficient	t-Value	P-Value
Intercept	?	0.029	2.400	0.016
CFF	-	(0.003)	(3.670)	0.000
Size	-	0.001	4.650	<.0001
BM	?	0.035	24.640	<.0001
ROA	-	0.106	29.280	<.0001
Debt	-	0.023	16.010	<.0001
RD	?	(0.031)	(5.360)	<.0001
Depreciation	?	(0.037)	(3.300)	0.001
STD_Returns	+	1.053	24.270	<.0001
STD_CFO	+	(0.017)	(1.060)	0.289
ABACC	+	0.032	8.280	<.0001
Adj R^2		0.436		
N		17,344		
Year FE		Yes		
Industry FE		Yes		

Note: Table 2.5 shows the additional regression coefficients. All continuous variables are winsorized at the 1st and 99th percentile. *COE* is the average of the expected cost of equity capital for firm i in year t, calculated following Easton (2004), Claus and Thomas (2001) and Gode and Mohanram (2003). *CFF* is an indicator variable equals 1 if the firm-year includes both cash flow forecasts and earnings forecasts, and *CFF* equals 0 if the firm-year includes only earnings forecasts. *Size* is the natural log of total assets, in millions, for a firm i at the beginning of the year t. *BM* is the book value of equity divided by the market value of equity in year t. *ROA* is the operating income after depreciation in year t divided by total assets in the beginning of year t. *DEBT* is total debt in year t divided by total assets of the firm at the beginning of year t. *R&D* is the research and development expenditures in year t divided by total assets at the beginning of year t. *Depreciation* is the depreciation in year t divided by total assets at the beginning of year t. *STD_Returns* is the annual standard deviation of daily stock returns for year t-1. *STD_CFO* is the standard deviation of the current four and prior eight quarters of operating cash flows, divided by total assets in year t. $ABACC_{i,t}$ is the absolute value of the abnormal accruals measure calculated following Jones (1991).

Appendix B

Variable Definition:

$COE_{i,t}$	:	average of the expected cost of equity capital for firm *i* in year *t*, calculated following Easton (2004), Gode and Mohanram (2003), and Claus and Thomas (2001).
$CFF_{i,t}$	:	an indicator variable equals 1 if analysts provide both cash flow forecasts and earnings forecasts for the firm-year. $CFF_{i,t}$ equals 0 if analysts provide only earnings forecasts for the firm-year.
$Size_{i,t}$	:	total assets, in millions, for a firm *i* at the beginning of the year *t*. In the empirical studies, I use the natural log of Size.
$BM_{i,t}$	:	book value of equity divided by the market value of equity in year *t*.
$ROA_{i,t}$	:	operating income after depreciation in year *t* divided by total assets in the beginning of year *t*.
$DEBT_{i,t}$	:	total debt in year *t* divided by total assets of the firm at the beginning of year *t*.
$R\&D_{i,t}$	:	research and development expenditures in year *t* divided by total assets at the beginning of year *t*.
$Depreciation_{i,t}$	:	depreciation in year *t* divided by total assets at the beginning of year *t*.
$STD\_Returns_{i,t}$	:	annual standard deviation of daily stock returns for year *t-1*.
$STD\_CFO_{i,t}$	:	standard deviation of the current four and prior eight quarters of operating cash flows, divided by total assets in year *t*.
$ABACC_{i,t}$	:	absolute value of abnormal accrual calculated following Jones (1991).
Year FE	:	year fixed effect.
Industry FE	:	industry fixed effect.

ESSAY 3: ANALYSTS' CASH FLOW FORECASTS AND FIRMS' FINANCING CHOICES

I. INTRODUCTION

One of the important financial economic questions is how firms choose capital structure under information asymmetry (Lemmon, Roberts, and Zender,2008; Fulghieri and Lukin, 2001). Prior literature suggests that it is more profitable for firms to invest in multiple types of financial claims, because of a diversified claim of securities (Boot and Thakor, 1993). Conventionally, there are two dominant theories in capital structure literature, the trade-off theory and the pecking order theory. The pecking order theory suggests that firms first exhaust internal funds, then issue debt financing and finally raise equity. The trade-off theory suggests that there is a trade-off between benefits and costs of issuing debt and equity, including tax benefits, the opportunities to pursue positive value investments, and the signaling effect of future free cash flows and firm value (Modigliani and Miller, 1958; Jensen and Meckling, 1976; Myers, 1977; Ross, 1977; Stulz, 1990; Hart and Moore, 1994; Myers 1984; Myers and Majluf, 1984). Both the pecking order theory and trade-off theory consider cost of financing as an important issue, which can be affected by the attributes of information environment and information uncertainty. The extant literature suggests that analysts' provided cash flow forecasts introduces more information to firms' information environment and improve the transparency (DeFond and Hung, 2003; McInnis and Collins, 2011; Call, Chen and Tong, 2009). Consistently, prior studies suggest that information asymmetry is associated with firms' financing decisions (Fama and French, 2005; Agarwal and O'Hara, 2007; Petacchi, 2015). Since analysts provided cash flow forecasts provide additional value

relevant information to the market, this study examines whether the availability analysts' cash flow forecasts is associated with firms' subsequent financing choices, including new capital issuance and capital structure change.

First two parts of this dissertation show that analysts' cash flow forecasts are associated with improved information attributes and lower cost of equity capital. Hinkel (2013) shows that the presence of cash flow forecasts is associated with lower cost of debt. Given the empirical evidence that the availability of cash flow forecast is associated with both lower costs of equity and debt, it would be interesting to examine whether initiation cash flow forecasts are more likely to link with corporate financing decisions. More specifically, I examine the association between the availability of cash flow forecasts and subsequent issuance of debt and equity securities. However, the risk-return judgement criteria of equity investors and debtholders are different. While the equity holders usually have unlimited upside potential on firm value, debt holders' claims against firms' assets are fixed and they care about the downside risks. If the cash flow forecasts can provide incremental information about firms' default risks, the availability of such information may influence the costs of debt and equity securities differentially, which may affect the issuance of debt and equity securities divergently. Thus, I also investigate how the availability of cash flow forecasts is separately associated with debt versus equity security issuance.

I conduct empirical analyses by using a

sample of 42,889 firm-year observations from a sample period 1993 – 2016. I find firms with cash flow forecasts are more likely to issue new securities. Results are consistent irrespective of using indicator variable for security issuance or continuous variable for new

capital raised as the dependent variable. I also document that firms with cash flow forecasts are more likely to issue debt securities relative than equity securities.

This study contributes to the on-going debate about the functionality of cash flow forecasts. This study's findings favor the stream of literature that cash flow forecasts are beneficial to firms. The result contributes to the literature by providing further evidence on the usefulness of cash flow forecasts. The study also contributes to the on-going debate over capital structure theories, and provides new insights about the role of additional information through analysts cash follow forecasts in corporate financing decisions.

The paper proceeds as follows. Section 2 reviews the literature and develops the hypothesis. I discuss the research design in Section 3. Section 4 explains the sample selection criteria. Section 4 conducts the empirical analyses, and Section 5 concludes.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Analysts serve as information intermediaries between firms and investors, and their forecasts reduce information asymmetry between managers and shareholders. Earnings backed by operating cash flows are sustainable and repeatable, and they are considered high quality earnings by analysts (Brown, Call, Clement and Sharp, 2015). Analysts are considered efficient gatekeepers and monitors, and they monitor a manager's behavior (Jensen and Meckling, 1976; Yu, 2008; Gotti, Han, Higgs and Kang, 2012). Consistent with the information view, financial analysts interact with managers by appearing frequently in the earnings release conference calls, issuing stock recommendations, expressing their concerns in media and writing research reports to their clients. Through their intense interaction with the management and through their information intermediation, analysts can

assess investors' demand for cash flow information. DeFond and Hung (2013) argue that financial analysts provide cash flow forecasts along with earnings forecasts when they observe greater demand for cash flow information from market participants. In this dissertation, I argue and provide evidence that analysts' cash flow forecasts are negatively associated with information asymmetry and lower cost of equity capital. Hinkel (2013) shows that the presence of cash flow forecasts is associated with lower cost of debt. Thus, analysts cash flow forecasts reduce both cost of equity and debt capital. The cost of equity and debt are important factors in two prominent capital structure theories: the pecking order theory and the trade-off theory.

The pecking order theory (Myers, 1984; Myers and Majluf, 1984) suggests that firms use external financing sources, when internally generated funds from retained earnings are inadequate, and firms prefer debt to equity when external financing becomes necessary. The order of financing choices is based on adverse selection problems and information costs associated with issuing securities, although other factors can also play roles in firms' financing and capital structure decisions, for example, tax advantages and financial distress risks in trade-off theory and free-cash flow theory. If the availability of cash flow forecasts has positive influences on the overall information environment, it likely to be associated with the financing decisions of firms. Based on this conjecture, I predict the following hypothesis:

H_1: Firms tend to issue securities to raise new capital with the presence of cash flow forecasts.

While prior studies suggest that the presence of cash flow forecasts is negatively associated with cost of equity and cost of debt (Hinkel, 2020; Ma, 2020), it remains an empirical question which type of capital firms may issue. Conventionally, the pecking order

theory suggests that capital issuance follows pecking order so firms may first issue debt capital and then use equity capital as the last financing resort. On the contrary, prior literature finds that firms with lower information asymmetry tend to issue new equity capital, while firms with higher information asymmetry are likely to borrow debt capital, because debt holders are less sensitive to asymmetric information, compared to equity investors (Agarwal and O'Hara, 2007). Using a setting of Regulation FD, Petacchi (2015) finds a positive association between information asymmetry and firms' leverage. She interprets it that firms with higher information asymmetry tend to be small firms with lower earnings performance and higher information symmetry, so it is difficult for these firms to borrow from public debt holders, who demand high information transparency. Equity investors have more opportunities for upward rewards if stock price increases and they have limited liability for stock failure, while debt holders have limited upward rewards but bear the entire risk for debt failure. Thus, equity holders tend to be more sensitive to asymmetric information.

Cash Flow Forecasts, Capital Structure and Firms' Financing Choice

There are three major theories related with capital structure, the pecking order theory, free cash flow theory and the trade-off theory (Modigliani and Miller, 1963; Jensen and Meckling, 1976; Myers, 1977; Ross, 1977; Stulz, 1990; Hart and Moore, 1994; Myers 1984; Myers and Majluf, 1984). Pecking order theory is based on information asymmetry that managers holds more private information than investors (Myers, 1984). Myers and Majluf (1984) argue that equity issuance should be the last resort of firms' financing decisions following internal fund and private and public debt, since shareholders perceive managers holding more private information than equity holders, and thus, require higher rate of return for their investment. Hence, the pecking order suggests that firms should first seek low cost

internal fund, then exhaust private and public debt, and finally raise equity since it is the most expensive way of financing. The free cash flow theory suggests that excessive borrowing increase firms' value, even though firms face the risk of financial distress (Ross, 1977). The trade-off theory evaluates the benefits and costs of leverage. On the one hand, new capital issuance may affect firms' capital structure. On the other hand, prior literature suggests that firms' capital structure is stable overtime.

Even though corporate capital structure is in general stable, firms adjust financing decisions when macroeconomic conditions change (Korajczyk and Levy, 2003). Additionally, capital structure is stable over time, with some trend of moving toward the moderate leverage level (Lemmon, Roberts, and Zender, 2008). However, new capital issuance may influence firms' capital structure.

The pecking order theory suggests that firms first exhaust internal fund, then issue debt capital before raising fund from equity market. There is an on-going debate about the relevance of pecking order theory. Prior studies verify and modify pecking order theory. Fama and French (2002) confirm the pecking order theory and suggest that it is a superior theory than the trade-off theory, and more profitable firms have higher leverage. On the contrary, Leary and Roberts (2010) find that pecking theory order applies to less than 20% of firms regarding debt equity choice but applies to 77% of the cases regarding internal and external fund selection. Frank and Goyal (2003) find that equity financing contributes more to firms' external financing than debt does. Further, equity financing tracks more closely to financing deficit than debt does. The pecking order theory suggests that small firms with high growth rate tend to issue large external financing due to higher information asymmetry. Contrary to the finding, Frank and Goyal (2003) find that large firms that have consistent

trading activities tend to issue external funds. My focus is the association between information asymmetry and firms' financing decisions. Fama and French (2005) find that information asymmetry is an important if not the only explanation for pecking order theory. Vishwanath (1993) finds that under-valued firms tend to issue non-information sensitive risky debt, while over-valued firms tend to issue information sensitive equity.

Additionally, the cost of obtaining private information also explains pecking order. Fulghieri and Lukin (2001) find that firms with preferred private information may choose less information sensitive security such as debt, rather than information sensitive security, such as equity. Due to information asymmetry, the market price of firms with favorable private information may be lower than insiders' attributed value, firms may better off borrowing from the debt market than raising fund. They document that the cost of obtaining information determines capital structure. In particular, firms issue information insensitive debt equity, when information cost is large, while firms issue information sensitive equity when this cost is low.

There are several benefits related with debt issuance. First, under the free cash flow theory, debt issuance monitors managers' behavior. Debt borrowing bonds managers that they promise to pay out cash flow in the future. This bonding promise creates stronger constrain on managers' behavior than dividends policies, which is easier to be changed in the future (Jensen, 1986). Second, under the pecking order theory, debt is a cheaper external financing method than equity. Myers and Majluf (1984) introduce the pecking order theory that firms tend to exhaust internal funds first, then borrow debt capital, which reveals less firm information to competitors and cheaper, and finally issue equity capital, which the most expensive and requires more information disclosure. Third, firms could pursue value

increasing investments from borrowing extra cash (Jensen and Meckling,1984). Forth, corporate debt borrowing create tax shelter for firms (Modigliani and Miller, 1963; Graham, 2000; Mackie-Mason, 1990). Fifth, the signaling effect of capital structure shows that higher leverage indicates future cash flows, which increases investors' perceived firm value (Ross, 1977). Additionally, capital structure choice forces firms to disclose information and achieves better information equilibrium (John and Williams, 1985).

On the contrary, there are several costs related with debt issuance. First, risky debt issuance could mitigate future investment strategies and future cash flows. Myers (1977) notes the reason why firms don't borrow as much as possible is due to the trade-off between issuing risky debt to take advantage of tax shelter and compromise future optimal investment strategies. Second, under the trade off theory, agency issue between managers and creditors could potentially increase to the point where cost of borrowing surpasses benefit of borrowing. Jensen and Meckling (1984) and Robichek and Myers (1966) explain the agency costs of debt, including bankruptcy risks and reorganization costs, which affects the financing decisions of firms and explains why debt capital does not completely contribute to the entire external financing sources.

Given the continuous debate about pecking order theory and the mixed findings about debt financing, I predict the following hypothesis:

H_2: Firms tend to issue new debt capital with the presence of cash flow forecasts.

There are several reasons that firms may not closely follow the pecking order theory to exhaust debt capital first and then issue equity capital. First, even though the pecking order theory may under certain circumstances, be a first-order theory for firms' financing

decisions, it is not a cut-off theory for all firms' financing decisions (Shyam-Sunder and Myer, 1999; Fama and French, 2005; Leary and Roberts, 2005). Fama and French (2005) find that information asymmetry might be the only explanation for the pecking order theory. Leary and Roberts (2005) find that less than 20% of firm financing decisions follow the pecking order theory.

Second, extant studies find that firms tend issue equity capital when information asymmetry is reduced. Since cash flow forecasts provide additional information about information environment, it may be associated with new equity issuance as well as new debt issuance. Extant literature directly links information asymmetry with firms' financing choices. On the one hand, information asymmetry affects firms' financing decisions (Myers and Majluf, 1984; Noe, 1988; Fama and French, 2005; Agarwal and O'Hara, 2005; Bharath et al. 2008; Petacchi, 2015; Pan et al. 2017; Lemmon and Zender, 2019). On the other hand, firms' capital structure has a signaling effect, which reveals firm information (John and Williams, 1985). This study focuses on the first association. Using Regulation FD (Reg FD) as an external shock, Petacchi (2015) argues that firms may find equity financing cheaper than debt financing post Reg FD. Since Reg FD has barely any impact on debt market, it increases information transparency in equity market, which in turn, lowers cost of equity. Her study finds that firms tend to issue equity capital when information asymmetry decreases, since firms with higher information asymmetry tend to be smaller in size, have fewer number of analysts following and don't disclose to public as much as big firms. As a result, although debt financing is a cheaper choice than equity financing, these firms may have difficulty disclose sufficient private information to creditors to have access to debt market (Petacchi, 2015). Bayless and Chaplinsky (1996) find that reduced information asymmetry provides a

window of opportunities for equity issuance. Using several proxies of information asymmetry, Bharath et al. (2008) directly test and find that information asymmetry is positively related with firms' leverage. Noe (1988) argues that pecking order is compromised when information asymmetry is lower, while pecking order is followed when managers have perfect information about firms' future cash flows. Fama and French (2005) find that information asymmetry may be the only explanation why many firms don't follow packing order theory closely to issue debt capital before equity capital. They find that many firms' financing decisions contradicts the pecking order theory, such as issuing and retiring equity capital every year, repurchase stock during financial deficiency time and raise fund even if firms have excess cash. Using information rating as a proxy for information asymmetry, Pan et al. (2017) find that firms' leverage is inversely associated with information asymmetry. They find that firms' leverage ratio reduces when firms move from lower information rating to higher information rating. Their information rating includes timeliness of information, forward looking information, information compliance with regulations, and information disclosed on company website and annual reports. This finding is consistent with Agarwal and O'Hara (2005) that firms with higher information asymmetry issues more equity than firms with lower information asymmetry. Using analysts coverage as a proxy for information asymmetry, extent literature finds that firms with more analysts following tend to issue more equity than firms with less analysts coverage, because analysts coverage either reduces information asymmetry or analysts tend to follow firms with more transparency (Chang, Dasgupta, and Hilary, 2006). Further, they find that information asymmetry constrains firms from issuing equity, but when information asymmetry is lower, firms take advantage of the

information transparency to issue a large amount of equity. Thus, analysts provided cash flow information may be associated with equity issuance, in addition to debt issuance.

Third, firms' capital structure depends on the demand side (firms' perspective) and the supply side (financing constrains). Both the pecking order theory and the trade-off theory explains capital structure from the firms' perspective. On the demand side, firms' capital structure depends on firms' external financing needs, which may not necessarily follow pecking order. For example, firms facing positive investment opportunities may issue more external fund even before internal fund is exhausted, and highly profitable firms with limited investment opportunities may prefer equity over debt (Shyam-Sunder and Myer, 1999). Extant literature argues that firms face debt constrains, so firms may not achieve the optimal capital structure due to supply side constrains (Faulkender and Petersen, 2005; Petacchi, 2015). Information asymmetry affects private and public debt sources, which in turn, may affect capital structure and debt equity financing decisions. After exhausting internal fund, firms prefer issuing public debt for the lower cost than issuing private debt and equity financing. However, high information symmetry may restrain firms from issuing public debt, whose investors require more transparent information, since public debt holders don't have access to private information as private lenders do. Thus, firms with high information asymmetry (even if preferred information asymmetry) may have limited ability to issue public debt and forced to switch to equity market, after private debt is exhausted.

Fourth, information asymmetry may play a role in firms' financing decisions through private and public debt sources. Public debt is cheaper than private debt, but private debt lenders, such as banks, have superior ability in information access than public debt holders. Thus, firms with higher private information facing higher threshold to enter public debt

market, who require more enhanced disclosure than private lenders (Faulkender and Petersen, 2005). As a result, rather than borrowing from the cheaper public debt source, firms with higher information asymmetry may only borrow from private debt source, since both public debt holders and equity market have higher demand for information disclosure. Hence, firms with higher information asymmetry have no choice but to raise fund through debt capital rather than equity financing. Cash flow forecasts may affect information asymmetry, which in turn, influences firms' subsequent financing decisions. However, it remains a mystery whether firms issue more equity or debt capital subsequent to reduced information asymmetry. I predict the following hypothesis:

H_3: Firms tend to issue new equity capital with the presence of cash flow forecasts.

III. RESEARCH DESIGN

My research interest is whether firms issue new capital with the presence of cash flow forecasts, and whether firms issue new debt or equity capital or both with the presence of cash flow forecasts. Thus, the analyses are conducted using firms with cash flow forecasts in addition to earnings forecasts, and firms without cash flow forecasts but only earnings forecasts. Following DeFond and Hung (2003), I include cash flow forecasts indicator variable, *CFF*, to test the effect of presence of cash flow forecasts on capital issuance, including new capital issuance in general, and new equity and debt issuance, respectively. To test H_1, I follow Frank and Goyal (2003), Biddle, Hilary and Verdi (2009) and Weber and Yang (2020) to develop the following models:

$$NEW\_ISSUE_{i,t} = \gamma_0 + \gamma_1 CFF_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 MB_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 TANGIBILITY_{i,t} + \gamma_6 ALTMAN\text{-}Z_{i,t} + \gamma_7 SALES\ GROWTH_{i,t} + \gamma_8 SENIOR\ DEBT\ RATING_{i,t} + \gamma_9 LEVERAGE_{i,t} + \gamma_{10} DEF_{i,t} + \gamma_{11} RD\_SALES_{i,t} + \gamma_{12} PRICE\_CHANGE_{i,t} + \gamma_{13} MTR_{i,t} + \gamma_{14} IND\_FE + \gamma_{15} YEAR\_FE + \varepsilon. \quad (3.1)$$

The dependent variable in equation (3.1) is a dichotomous variable and I estimate the model using the logistic regression approach. Following Leary and Roberts (2010), I define new capital issuance, *NEW_ISSUE*, as an indicator variable that equals one when the net issue size is greater than or equals to 5% of beginning total assets, to eliminate the stock compensation and other trivial capital issuance. If a firm has net capital purchase, or an issue size smaller than 5% of beginning total assets, then *NEW_ISSUE* is zero.

$$ISSUE\_PERCENTAGE_{i,t} = \gamma_0 + \gamma_1 CFF_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 MB_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 TANGIBILITY_{i,t} + \gamma_6 ALTMAN\text{-}Z_{i,t} + \gamma_7 SALES\ GROWTH_{i,t} + \gamma_8 SENIOR\ DEBT\ RATING_{i,t} + \gamma_9 LEVERAGE_{i,t} + \gamma_{10} DEF_{i,t} + \gamma_{11} RD\_SALES_{i,t} + \gamma_{12} PRICE\_CHANGE_{i,t} + \gamma_{13} MTR_{i,t} + \gamma_{14} IND\_FE + \gamma_{15} YEAR\_FE + \varepsilon. \quad (3.2)$$

Equation (3.2) tests whether the scale of issuance is associated with the presence of cash flow forecasts. The dependent variable *ISSUE_PERCENTAGE*, is measured as the net issue size divided by total assets when the net issue size is great than or equal to 5% of total asset.

To test H_2 and H_3, I follow Frank and Goyal (2003), Biddle, Hilary and Verdi (2009) and Weber and Yang (2020) to develop the following models:

$$DEBT\_ISSUE_{i,t} = \gamma_0 + \gamma_1 CFF_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 MB_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 TANGIBILITY_{i,t} + \gamma_6 ALTMAN\text{-}Z_{i,t} + \gamma_7 SALES\ GROWTH_{i,t} + \gamma_8 SENIOR\ DEBT\ RATING_{i,t} + \gamma_9 LEVERAGE_{i,t} + \gamma_{10} DEF_{i,t} + \gamma_{11} RD\_SALES_{i,t} + \gamma_{12} MTR_{i,t} + \gamma_{13} IND\_FE + \gamma_{14} YEAR\_FE + \varepsilon. \quad (3.3)$$

$$EQUITY\_ISSUE_{i,t} = \gamma_0 + \gamma_1 CFF_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 MB_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 TANGIBILITY_{i,t} + \gamma_6 ALTMAN\text{-}Z_{i,t} + \gamma_7 SALES\ GROWTH_{i,t} + \gamma_8 SENIOR\ DEBT\ RATING_{i,t} + \gamma_9 LEVERAGE_{i,t} + \gamma_{10} DEF_{i,t} + \gamma_{11} RD\_SALES_{i,t} + \gamma_{12} PRICE\_CHANGE_{i,t} + \gamma_{13} MTR_{i,t} + \gamma_{14} IND\_FE + \gamma_{15} YEAR\_FE + \varepsilon. \quad (3.4)$$

I define new equity issuance, *EQUITY_ISSUE*, and new debt issuance, *DEBT_ISSUE*, as indicator variables that equal one when the net issue size is greater than or equals to 5% of beginning total assets. If a firm has net equity repurchase or debt retirement, or an issue size smaller than 5% of beginning total assets, then *EQUITY_ISSUE* or *DEBT_ISSUE* is zero. I include control variables following Frank and Goyal (2003), Biddle, Hilary and Verdi (2009), and Weber and Yang (2020).

IV. SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

The sample period spans from 1993 to 2016, where 1993 is the first year when analysts' cash flow forecasts appear in the I/B/E/S/ database. I obtain one year ahead earnings forecasts and cash flow forecasts data, and analysts' information from the I/B/E/S/ detail history US file. I obtain marginal tax rate data from Compustat data base. I obtain consensus forecasts using the most recent analysts updated forecasts. Observations for control variables and dependent variables are from Compustat fundamentals annual database. I replace the following missing data items by zero following Frank and Goyal (2003): research and development expenses, long-term debt reduction, debt in current liabilities, purchase of common and preferred stock, interest and related expense – total, depreciation and amortization (cash flow), current debt – changes, acquisitions, extraordinary items and

discontinued operations, deferred taxes, sale of property plant and equipment and investments – gain (loss), accounts receivable – decrease (increase), inventory – decrease (increase), accounts payable and accrued liabilities - increase/(decrease), assets and liabilities - other - net change, income taxes - accrued - increase/(decrease), financing activities – other, capital expenditures – funds used for additions to property, plant, and equipment, excluding amounts arising from acquisitions, capital expenditure, increase in investments, sale of property, plant, and equipment, sale of investments, short-term investments – change, investing activities – other, cash dividends, equity in net loss – earnings, funds from operations – other, and exchange rate effect. Consistent with prior studies, I exclude observations from the regulated industries with SIC code from 4900 to 4999 and from financial firms with 6000 to 6999. The final sample contains 48,006 firm-year observations. All variables, except for indicator variables, are winsorized at 1% and 99% level to mitigate the influence of outliers.

Table 3.1 presents annual distribution of firm-year observations with earnings forecasts only and with both earnings and cash flow forecasts, along with the percentage of firm-years with cash flow forecasts during the joint sample period. The percentage of firms with cash flow forecasts increases from 3.28 percent in 1993 to 61.26 percent in 2016 in the I/B/E/S/ population. Consistent with prior findings, it indicates that the market demand of cash flow forecasts increases tremendously during the sample period (Call et al. 2009).

[Insert Table 3.1 Here]

Table 3.2 Panel A provides descriptive statistics of the dependent variables and control variables for the whole sample. The whole sample contains 42,889 firm-year observations over 14 fiscal years. Panel B provides descriptive statistics, which are presented

based on whether firms have cash flow forecasts (cash flow forecasts sample) or only have earnings forecasts but no cash flow forecasts (earnings forecasts sample). All variables are significantly different across the two samples (t-test p-value < 0.0001). The mean and median of new capital issuance (*NEW_ISSUE*) is 21.3 percent and 0 in the cash flow forecasts sample, and 10.2 percent and 0 in the earnings forecasts sample. It shows that firms with cash flow forecasts tend to issue new capital more frequently than firms without. In addition to the higher issuance frequency, the mean and median of the percentage of new capital issuance (*ISSUE_PERCENTAGE*) is 7.0 percent and 0 in the cash flow forecasts sample, and 5.2 percent and 0 in the earnings forecasts sample. It shows that firms in the cash flow forecasts sample not only issue new capital more frequently, but also issue in a larger scale when they issue. The mean and median of new debt issuance (*DEBT_ISSUE*) is 16.2 percent and 0 in the cash flow forecasts sample, and 5.1 percent and 0 in the earnings forecasts sample. It shows that firms with cash flow forecasts tend to issue new debt capital more frequently. The mean and median of new equity issuance (*EQUITY_ISSUE*) is 6.9 percent and 0 in the cash flow forecasts sample, and 6.0 percent and 0 in the earnings forecasts sample. It shows that firms with cash flow forecasts tend to issue new equity capital more frequently. The mean and median of capital structure change (*CAP STRUCTURE CHANGE*) is 11.9 percent and 0 in the cash flow forecasts sample, while 3.9 and 0 for the earnings forecasts sample, which means net debt issuance attributes to most of the external capital net issuance for firm-year observations. Following DeFond and Hung (2003), I compute *CFF* as an indicator variable set to one if the firm-year has both cash flow forecasts and earnings forecasts, and zero if the firm-year only contains earnings forecasts. Consistent with DeFond and Hung (2003), analysts issue cash flow forecasts for capital intensive firms. The means and medians of firm

size (*SIZE*, calculated as the total assets of firms) for earnings forecasts sample is 918.671 and 211.935 while 6,047.290 and 1,806.950 for firms in the cash flow forecasts sample. I used the natural logarithm of total assets in the empirical analyses. *MB* is the market to book ratio, which has a mean of 3.290 and median of 2.364 for cash flow forecasts sample, and 2.743 and 1.933 for earnings forecasts sample. *ROA* is the return on asset, which controls for the operating performance of the firm. *TANGIBILITY* is the ratio of fixed assets to total assets. *ALTMAN-Z* measures the financial health of firms. Consistent with DeFond and Hung (2003), firms in cash flow forecast sample tend to be in financial distress (Altman-Z = 4.258) compared to firms in earnings forecast sample (Altman-Z = 4.704). *SALES GROWTH* measures the change of sales compared with prior year. *SENIOR DEBT RATING* is an indicator variable equals one if a firm has senior debt rating. *PRICE CHANGE* is the stock price change from prior year, which may affect new equity issuance. In addition to the common control variables, such as research and development expenditures (*RD*), leverage (*LEVERAGE*) and financial deficiency (*DEF*), I also follow Weber and Yang (2020) to include marginal tax rate (*MTR*) to control for the tax benefits associated with capital issuance.

Table 3.2 Panel C provides descriptive statistics of the dependent variables and control variables, where the sample is split into firms have cash flow forecasts and firms with no cash flow forecasts. Compared with firms with no cash flow forecasts, firms with cash flow forecasts tend to issue more new capital, new equity and debt capital. Additionally, the change in capital structure is in larger scale, which means net debt issuance attributes to most of the external capital net issuance for firm-year observations with cash flow forecasts. Firms with cash flow forecasts tend to be larger firms and more likely to be in financial distress

than firms with no cash flow forecasts. These findings are consistent with DeFond and Hung (2003). Firms with cash flow forecasts also have larger stock price changes than firms with no cash flow forecasts.

[Insert Table 3.2 Here]

Table 3.3 reports Pearson correlations among the variables, based on the whole sample. Consistent with the prediction, cash flow forecasts (*CFF*) are positively significantly associated with the new capital issuance (*NEW_ISSUE*) and new issue percentage (*ISSUE_PERCENTAGE*), and capital structure change (*CAP STRUCTURE CHANGE*), as well as new equity issuance (*EQUITY_ISSUE*) and new debt issuance (*DEBT_ISSUE*) (with p-values <= 0.05), which is also consistent with regression results. Control variables, such as firms' size (*SIZE*), market to book value (*MB*), *ROA*, *TANGIBILITY*, *SALES GROWTH*, *LEVERAGE*, financing deficit (*DEF*) and stock price change (*PRICE_CHANGE*) are all positively significantly associated with the presence of cash flow forecasts (*CFF*). Other control variables, including marginal tax rate (*MTR*), Altman-Z score (*ALTMAN-Z*), and research and development expenses (*RD*), are negatively significantly associated with the presence of cash flow forecasts (*CFF*).

[Insert Table 3.3 Here]

V. EMPIRICAL RESULTS

Table 3.4 to Table 3.6 presents regression results. I control for industry and year fixed effects for all empirical analysis. Consistent with prediction, Table 3.4 shows that firms with cash flow forecasts not only have a higher probability of issuing new capital, but also issue at

larger size. Panel A shows that the presence of cash flow forecasts (*CFF*) is positively significantly associated with new capital issuance (*NEW_ISSUE*) (coefficient = 0.131 and p-value = 0.004), which means firms with cash flow forecasts on average are 1.131 times more likely to issue new capital than firms without cash flow forecasts. Control variable coefficient are consistent with prior literature. Table 3.4 Panel B shows the that cash flow forecasts firms (*CFF*) have larger issue size (*ISSUE_PERCENTAGE*) than firms without cash flow forecasts (coefficient = 0.031 and p-value < 0.0001). The result is significant when analysts issue cash flow forecasts in the current year and prior year.

[Insert Table 3.4 Here]

Table 3.5 shows that firms have a higher chance of issuing debt capital with the presence of cash flow forecasts. Table 3.5 Panel A shows a negative association between new equity issuance (EQUITY_ISSUE) and presence of cash flow forecasts in lagged year (CFF). Table 3.5 Panel B shows the logistic regression results for new debt issuance that firms with cash flow forecasts (*CFF*) tend to issue new debt capital (*DEBT_ISSUE*) (coefficient = 0.119 and p-value = 0.022).

[Insert Table 3.5 Here]

Using a restricted sample of firm-year observations that only issue new capital, Table 3.6 shows that cash flow forecasts firms have a higher chance of issuing new debt equity. Table 3.6 Panel A presents a negative association between cash flow forecasts availability (*CFF*) in both current and lagged year and the likelihood of new equity issuance in current year (*EQUITY_ISSUE*). Table 3.6 Panel B shows that firms have a higher chance of issuing new

debt (*DEBT_ISSUE*) when cash flow forecasts are available in the current or lagged year (*CFF*) (coefficient = 0.219 and p-value = 0.036)

[Insert Table 3.6 Here]

VI. CONCLUSION

This study investigates the association between the presence of cash flow forecasts and new capital issuance, capital structure change and new debt and equity issuance. Analysts provided cash flow information provides more information to firms' information environment, which in turn, reduces cost of equity and debt. Based on existing capital structure theories in the literature, the cost of capital plays an important role in making decisions relating to issuance of new securities to raise fund. So, I predict and provide evidence that the presence of cash flow forecasts is associated with firms financing decisions. Consistent with my hypothesis, empirical results in this study show that firms tend to issue new capital with the presence of cash flow forecasts. I find consistent results by using both an indicator variable for cash flow forecasts and a continuous variable based on the magnitude of the amount of capital raised. I also show that firms with cash flow forecasts are more likely to issue debt capital relative to equity capital. Overall, my findings contribute to the cash flow forecasts literature by showing that cash flow forecasts are relevant for capital structure decisions suggesting the usefulness of such information. Moreover, this study extends the capital structure and financing decisions literature by showing how corporate financing choices are likely to be affected by the information environment attributes.

For future research, I plan to further investigate whether firms issue more private or public debt after the initiation of cash flow forecasts, since the information disclosure requirement varies significantly across the two debt markets, and cash flow forecasts are associated with lower information asymmetry.

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Table 3.1
Annual Observations with Earnings Forecasts and Cash Flow Forecasts

Availability of analysts' cash flow forecasts, based on IBES population and sample

	IBES			Sample		
Year	# of firms with EF Only	# of firms with EF & CFF	% of firms with CFF	# of firms with EF Only	# of firms with EF & CFF	% of firms with CFF
1993	4,509	153	3.28%	1,438	15	1.03%
1994	4,803	376	7.26%	1,497	87	5.49%
1995	5,200	346	6.24%	1,526	23	1.48%
1996	5,879	410	6.52%	1,550	78	4.79%
1997	6,223	430	6.46%	1,747	87	4.74%
1998	5,933	457	7.15%	1,666	88	5.02%
1999	5,030	1,143	18.52%	1,293	322	19.94%
2000	4,427	1,159	20.75%	1,233	344	21.81%
2001	4,200	534	11.28%	1,554	206	11.70%
2002	3,034	1,563	34.00%	1,156	621	34.95%
2003	2,669	1,851	40.95%	1,021	773	43.09%
2004	2,704	2,161	44.42%	977	873	47.19%
2005	2,679	2,349	46.72%	996	988	49.80%
2006	2,785	2,413	46.42%	972	1,011	50.98%
2007	2,794	2,442	46.64%	957	1,015	51.47%
2008	2,513	2,321	48.01%	933	985	51.36%
2009	2,414	2,268	48.44%	844	951	52.98%
2010	2,191	2,608	54.34%	842	1,040	55.26%
2011	2,070	2,546	55.16%	903	1,237	57.80%
2012	2,130	2,499	53.99%	858	1,195	58.21%
2013	2,175	2,751	55.85%	735	993	57.47%
2014	2,049	3,176	60.78%	646	1,105	63.11%
2015	2,029	3,201	61.20%	650	1,126	63.40%
2016	1,915	3,028	61.26%	634	1,098	63.39%
Total	82,355	42,185	33.87%	26,628	16,261	37.91%

Note: Table 2.1 Panel A represents the descriptive statistics of the population and sample for analysts' cash flow forecasts and earnings forecasts from I/B/E/S/ detailed file during the period 1993 – 2016. Column 1 and column 4 show the number of firm-years with at least one earnings forecast (i.e., *EF*) and no cash flow forecast (i.e., *CFF*). Column 2 and column 5 present the number of firm-years with at least one cash flow forecast and at least one earnings forecast. Column 3 and column 6 present the percentage of firm-years that have at least one cash flow forecast accompanied by at least one earnings forecast.

Table 3.2 (a)

Descriptive Statistics

Descriptive Statistics for Variables Used in OLS Model (total observations=42,889 including 18,587 with cash flow forecasts)

Observations	Number of Observations	Mean	Standard Deviation	Q1	Median	Q3
NEW_ISSUE	42,889	0.144	0.351	0.000	0.000	0.000
ISSUE_PERCENTAGE	42,889	0.059	0.235	0.000	0.000	0.000
CAP STRUCTURE CHANGE	42,889	0.070	0.341	0.000	0.000	0.000
DEBT_ISSUE	42,889	0.093	0.291	0.000	0.000	0.000
EQUITY_ISSUE	42,889	0.063	0.243	0.000	0.000	0.000
SIZE	42,889	2,863.140	7,473.460	128.005	453.123	1,787.550
MB	42,889	2.950	3.803	1.269	2.094	3.550
ROA	42,889	0.034	0.201	0.011	0.077	0.131
TANGIBILITY	42,889	0.254	0.218	0.085	0.185	0.361
ALTMAN-Z	42,889	4.535	5.980	1.946	3.506	5.876
SALES GROWTH	42,889	0.037	0.299	-0.024	0.067	0.162
SENIOR DEBT RATING	42,889	0.061	0.239	0.000	0.000	0.000
LEVERAGE	42,889	0.180	0.210	0.003	0.105	0.280
DEF	42,889	0.004	0.364	-0.082	-0.004	0.032
RD	42,889	0.289	1.428	0.000	0.007	0.094
PRICE CHANGE	42,889	1.100	0.580	0.746	1.029	1.326
MTR	42,889	0.261	0.109	0.186	0.320	0.343

Notes: Table 3.2 presents the descriptive statistics for the final sample used in the regression. *With cash flow forecasts* is firm-year observations with at least one cash flow forecasts in addition to at least one earnings forecast. *Without cash flow forecasts* is firm-year observations with no cash flow forecasts. ***NEW_ISSUE*** is an indicator variable that takes a value of one if a firm-year observation issues new equity or new debt to raise capital, only if the issuance size of equity or debt is greater than or equal to 5% of beginning total assets, and zero otherwise. ***ISSUE_PERCENTAGE*** is (net equity issuance + net debt issuance)/(total long-term debt at beginning of the year + total stock holders' equity at beginning of the year). ***CAP STRUCTURE CHANGE*** is $\Delta D_{i,t}/(\Delta D_{i,t} + \Delta E_{i,t})$, where $\Delta D_{i,t}$ is net debt issued in year *t* ($\Delta D_{i,t}$ is long-term debt issuance - long-term debt reduction) and $\Delta E_{i,t}$ is net equity issued in year *t* ($\Delta E_{i,t}$ is the sale of common stock minus stock repurchases). ***DEBT_ISSUE*** is an indicator variable equals 1 when firms issue new debt capital in year *t*, and the issue size is greater than or equal to 5% of total asset at beginning of year *t*, 0 otherwise. ***EQUITY_ISSUE*** is an indicator variable equals 1 when firms issue new equity capital in year *t*, and the issue size is greater than or equal to 5% of total asset at beginning of year *t*, 0 otherwise. ***SIZE*** is total assets in year *t*, and natural log of total asset is used in empirical analysis. ***MB*** is market to book ratio, measured as the market value of equity divided by book value of equity. ***ROA*** is return on asset measured as operating income after depreciation divided by total asset. ***TANGIBILITY*** is the ratio of fixed assets to total assets, measured as PPE divided by total assets. ***ALTMAN-Z*** is Altman Z score. Following Altman (1968), the Z score equals 1.2(net working capital/total assets)+1.4(retained earnings/total assets)+3.3(earnings before interest and taxes/total assets)+0.6(market value of equity/book value of liabilities)+1.0(sales/total assets). Lower Altman's Z-scores indicate poorer financial health. ***SALES GROWTH*** is the percentage change of sales at year *t* compared to year *t-1*. ***SENIOR DEBT RATING*** is an indicator variable equals 1 for senior bonds and 0 for subordinate bonds. ***LEVERAGE*** is the ratio of book value of debt divided by book debt plus book equity. ***DEF*** is financial deficiency, calculated as cash dividend plus investments, plus change in working capital, and minus operating cash flow after interest and taxes. ***RD*** is ratio of research and development expense to sales. *RD* is set to 0 if research and development expense is missing. ***PRICE CHANGE*** is the ratio of split-adjusted stock price at the end of year *t* to that at the beginning of year *t*. ***MTR*** is the marginal tax rate.

Table 3.2 (b)

Descriptive statistics for variables used in OLS model (total observations=42,889 including 16,261 with cash flow forecasts)

Observations	Number of Observations	Mean	Standard Deviation	Q1	Median	Q3	t-test p-value
NEW_ISSUE							
With cash flow forecasts	16,261	0.213	0.409	0.000	0.000	0.000	<0.0001
Without cash flow forecasts	26,628	0.102	0.303	0.000	0.000	0.000	
ISSUE_PERCENTAGE							
With cash flow forecasts	16,261	0.070	0.241	0.000	0.000	0.000	<0.0001
Without cash flow forecasts	26,628	0.052	0.231	0.000	0.000	0.000	
CAP STRUCTURE CHANGE							
With cash flow forecasts	16,261	0.119	0.451	0.000	0.000	0.000	<0.0001
Without cash flow forecasts	26,628	0.039	0.247	0.000	0.000	0.000	
DEBT_ISSUE							
With cash flow forecasts	16,261	0.162	0.369	0.000	0.000	0.000	<0.0001
Without cash flow forecasts	26,628	0.051	0.220	0.000	0.000	0.000	
EQUITY_ISSUE							
With cash flow forecasts	16,261	0.069	0.253	0.000	0.000	0.000	<0.0001
Without cash flow forecasts	26,628	0.060	0.237	0.000	0.000	0.000	
SIZE							
With cash flow forecasts	16,261	6,047.290	10,770.910	609.737	#######	5,509.200	<0.0001
Without cash flow forecasts	26,628	918.671	3024.000	77.898	211.935	626.587	
MB							
With cash flow forecasts	16,261	3.290	4.173	1.451	2.364	3.949	<0.0001
Without cash flow forecasts	26,628	2.743	3.541	1.180	1.933	3.291	
ROA							
With cash flow forecasts	16,261	0.068	0.152	0.040	0.086	0.136	<0.0001
Without cash flow forecasts	26,628	0.013	0.223	-0.015	0.070	0.127	
TANGIBILITY							
With cash flow forecasts	16,261	0.294	0.248	0.092	0.208	0.447	<0.0001
Without cash flow forecasts	26,628	0.230	0.193	0.081	0.174	0.323	
ALTMAN-Z							
With cash flow forecasts	16,261	4.258	5.055	1.858	3.237	5.263	<0.0001
Without cash flow forecasts	26,628	4.704	6.475	2.011	3.706	6.243	
SALES GROWTH							
With cash flow forecasts	16,261	0.049	0.259	-0.011	0.069	0.154	<0.0001
Without cash flow forecasts	26,628	0.029	0.321	-0.033	0.066	0.167	
SENIOR DEBT RATING							
With cash flow forecasts	16,261	0.106	0.308	0.000	0.000	0.000	<0.0001
Without cash flow forecasts	26,628	0.033	0.179	0.000	0.000	0.000	
LEVERAGE							
With cash flow forecasts	16,261	0.206	0.207	0.030	0.152	0.310	0.0656
Without cash flow forecasts	26,628	0.164	0.210	0.001	0.072	0.255	
DEF							
With cash flow forecasts	16,261	0.007	0.398	-0.110	-0.013	0.051	<0.0001
Without cash flow forecasts	26,628	0.002	0.342	-0.065	-0.001	0.027	
RD							
With cash flow forecasts	16,261	0.166	1.047	0.000	0.000	0.060	<0.0001
Without cash flow forecasts	26,628	0.364	1.612	0.000	0.012	0.114	
PRICE CHANGE							
With cash flow forecasts	16,261	1.112	0.506	0.817	1.065	1.321	<0.0001
Without cash flow forecasts	26,628	1.093	0.621	0.702	1.003	1.329	
MTR							
With cash flow forecasts	16,261	0.282	0.098	0.256	0.333	0.346	<0.0001
Without cash flow forecasts	26,628	0.248	0.113	0.151	0.307	0.340	

Notes: Table 3.2 (b) presents the descriptive statistics for the final sample used in the regression. *With cash flow forecasts* is firm-year observations with at least one cash flow forecasts in addition to at least one earnings forecast. *Without cash flow forecasts* is firm-year observations with no cash flow forecasts. ***NEW_ISSUE*** is an indicator variable that takes a value of one if a firm-year observation issues new equity or new debt to raise capital, only if the issuance size of equity or debt is greater than or equal to 5% of beginning total assets, and zero otherwise. ***ISSUE_PERCENTAGE*** is (net equity issuance + net debt issuance)/(total long-term debt at beginning of the year + total stock holders' equity at beginning of the year). ***CAP STRUCTURE CHANGE*** is $\Delta D_{i,t}/(\Delta D_{i,t} + \Delta E_{i,t})$, where $\Delta D_{i,t}$ is net debt issued in year *t* ($\Delta D_{i,t}$ is long-term debt issuance - long-term debt reduction) and $\Delta E_{i,t}$ is net equity issued in year *t* ($\Delta E_{i,t}$ is the sale of common stock minus stock repurchases). ***DEBT_ISSUE*** is an indicator variable equals 1 when firms issue new debt capital in year *t*, and the issue size is greater than or equal to 5% of total asset at beginning of year *t*, 0 otherwise. ***EQUITY_ISSUE*** is an indicator variable equals 1 when firms issue new equity capital in year *t*, and the issue size is greater than or equal to 5% of total asset at beginning of year *t*, 0 otherwise. ***SIZE*** is total assets in year *t*, and natural log of total asset is used in empirical analysis. ***MB*** is market to book ratio, measured as the market value of equity divided by book value of equity. ***ROA*** is return on asset measured as operating income after depreciation divided by total asset. ***TANGIBILITY*** is the ratio of fixed assets to total assets, measured as PPE divided by total assets. ***ALTMAN-Z*** is Altman Z score. Following Altman (1968), the Z score equals 1.2(net working capital/total assets)+1.4(retained earnings/total assets)+3.3(earnings before interest and taxes/total assets)+0.6(market value of equity/book value of liabilities)+1.0(sales/total assets). Lower Altman's Z-scores indicate poorer financial health. ***SALES GROWTH*** is the percentage change of sales at year *t* compared to year *t-1*. ***SENIOR DEBT RATING*** is an indicator variable equals 1 for senior bonds and 0 for subordinate bonds. ***LEVERAGE*** is the ratio of book value of debt divided by book debt plus book equity. ***DEF*** is financial deficiency, calculated as cash dividend plus investments, plus change in working capital, and minus operating cash flow after interest and taxes. ***RD*** is ratio of research and development expense to sales. *RD* is set to 0 if research and development expense is missing. ***PRICE CHANGE*** is the ratio of split-adjusted stock price at the end of year *t* to that at the beginning of year *t*. ***MTR*** is the marginal tax rate.

Table 3.3
Correlation Coefficients

Pearson correlation coefficients with two-tailed p-values (total observations=42,889)

	CFF	*NEW_ISSUE*	*ISSUE_PERCENTAGE*	*CAP STRUCTURE CHANGE*	*SIZE*	*MB*	*ROA*	*TANGIBILITY*	*ALTMAN-Z*	*SALES GROWTH*	*SENIOR DEBT RATING*	*LEVERAGE*	*DEF*	*RD*	*PRICE CHANGE*	*MTR*	*EQUITY_ISSUE*	*DEBT_ISSUE*
CFF		**0.158**	**0.045**	**0.119**	**0.321**	**0.074**	**0.132**	**0.136**	**-0.033**	**0.036**	**0.149**	**0.085**	**0.010**	**-0.066**	**0.018**	**0.149**	**0.028**	**0.185**
NEW_ISSUE			**0.620**	**0.511**	**0.025**	**0.103**	**-0.187**	-0.007	**-0.095**	**0.061**	**0.105**	**0.039**	**0.406**	**0.199**	**0.045**	**-0.147**	**0.639**	**0.778**
ISSUE_PERCENTAGE				**0.269**	**-0.037**	**0.114**	**-0.292**	**-0.081**	**-0.064**	**0.059**	**0.091**	**-0.022**	**0.500**	**0.318**	**0.059**	**-0.227**	**0.636**	**0.365**
CAP STRUCTURE CHANGE					**0.049**	**-0.017**	-0.001	**0.049**	**-0.079**	**0.047**	**0.085**	**0.120**	**0.238**	**-0.017**	-0.008	**0.021**	0.004	**0.673**
SIZE						**0.053**	**0.123**	**0.113**	**-0.055**	**0.013**	**0.072**	**0.085**	**-0.025**	**-0.064**	**0.009**	**0.189**	**-0.060**	**0.079**
MB							**0.041**	**-0.090**	**0.238**	**0.111**	-0.009	**-0.226**	**0.017**	**0.071**	**0.222**	**0.015**	**0.118**	**0.037**
ROA								**0.122**	**0.407**	**0.280**	**-0.053**	0.004	**-0.199**	**-0.517**	**0.205**	**0.639**	**-0.317**	-0.003
TANGIBILITY									**-0.127**	**0.011**	**0.020**	**0.328**	**-0.036**	**-0.142**	0.002	**0.122**	**-0.070**	**0.060**
ALTMAN-Z										**0.182**	**-0.124**	**-0.382**	**-0.044**	**-0.048**	**0.222**	**0.319**	**-0.044**	**-0.109**
SALES GROWTH											**0.011**	**-0.073**	**0.067**	**-0.184**	**0.140**	**0.179**	**0.028**	**0.065**
SENIOR DEBT RATING												**0.137**	**0.048**	**0.023**	-0.003	**-0.082**	**0.055**	**0.115**
LEVERAGE													**-0.016**	**-0.114**	**-0.161**	**-0.101**	**-0.085**	**0.130**
DEF														**0.174**	0.003	**-0.145**	**0.345**	**0.287**
RD															**-0.047**	**-0.319**	**0.322**	0.004
PRICE CHANGE																**0.051**	**0.082**	-0.007
MTR																	**-0.281**	**0.025**
EQUITY_ISSUE																		0.092
DEBT_ISSUE																		

Note: Table 3.3 reports Pearson correlations between variables in regression models. Bold indicates significance at a p-value, 0.05. ***CFF*** is an indicator variable takes the value of 1 if the firm-year observation has at least one cash flow forecast in addition to at least one earnings forecast, 0 otherwise. ***NEW_ISSUE*** is an indicator variable that takes a value of one if a firm-year observation issues new equity or new debt to raise capital, only if the issuance size of equity or debt is greater than or equal to 5% of beginning total assets, and zero otherwise. ***ISSUE_PERCENTAGE*** is (net equity issuance + net debt issuance)/(total long-term debt at beginning of the year + total stock holders' equity at beginning of the year). ***CAP STRUCTURE CHANGE*** is $\Delta D_{i,t}/(\Delta D_{i,t} + \Delta E_{i,t})$, where $\Delta D_{i,t}$ is net debt issued in year t ($\Delta D_{i,t}$ is long-term debt issuance - long-term debt reduction) and $\Delta E_{i,t}$ is net equity issued in year t ($\Delta E_{i,t}$ is the sale of common stock minus stock repurchases). ***DEBT_ISSUE*** is an indicator variable equals 1 when firms issue new debt capital in year *t*, and the issue size is greater than or equal to 5% of total asset at beginning of year *t*, 0 otherwise. ***EQUITY_ISSUE*** is an indicator variable equals 1 when firms issue new equity capital in year *t*, and the issue size is greater than or equal to 5% of total asset at beginning of year *t*, 0 otherwise. ***SIZE*** is total assets in year *t*, and natural log of total asset is used in empirical analysis. ***MB*** is market to book ratio, measured as the market value of equity divided by book value of equity. ***ROA*** is return on asset measured as operating income after depreciation divided by total asset. ***TANGIBILITY*** is the ratio of fixed assets to total assets, measured as PPE divided by total assets. ***ALTMAN-Z*** is Altman Z score. Following Altman (1968), the Z score equals 1.2(net working capital/total assets)+1.4(retained earnings/total assets)+3.3(earnings before interest and taxes/total assets)+0.6(market value of equity/book value of liabilities)+1.0(sales/total assets). Lower Altman's Z-scores indicate poorer financial health. ***SALES GROWTH*** is the percentage change of sales at year *t* compared to year *t-1*. ***SENIOR DEBT RATING*** is an indicator variable equals 1 for senior bonds and 0 for subordinate bonds. ***LEVERAGE*** is the ratio of book value of debt divided by book debt plus book equity. ***DEF*** is financial deficiency, calculated as cash dividend plus investments, plus change in working capital, and minus operating cash flow after interest and taxes. ***RD*** is ratio of research and development expense to sales. *RD* is set to 0 if research and development expense is missing. ***PRICE CHANGE*** is the ratio of split-adjusted stock price at the end of year *t* to that at the beginning of year *t*. ***MTR*** is the marginal tax rate.

Table 3.4 (a)

Logistic regression results: Issuance of new capital

$NEW\_ISSUE_{i,t} = \gamma_0 + \gamma_1 CFF_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 MB_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 TANGIBILITY_{i,t} + \gamma_6 ALTMAN\text{-}Z_{i,t} + \gamma_7 SALES\ GROWTH_{i,t} + \gamma_8 SENIOR\ DEBT\ RATING_{i,t} + \gamma_9 LEVERAGE_{i,t} + \gamma_{10} DEF_{i,t} + \gamma_{11} RD\_SALES_{i,t} + \gamma_{12} PRICE\_CHANGE_{i,t} + \gamma_{13} MTR_{i,t} + \varepsilon$

	Pred. sign	Coeff.	p-val.	Coeff.	p-val.
$CFF_{i,t}$	+	0.131	0.004		
$CFF_{i,t-1}$	+			0.048	0.292
$SIZE_{i,t}$	?	-0.003	0.847	0.010	0.501
$MB_{i,t}$	+	0.038	<.0001	0.039	<.0001
$ROA_{i,t}$	-	-1.623	<.0001	-1.634	<.0001
$TANGIBILITY_{i,t}$	-	-0.041	0.747	-0.031	0.804
$ALTMAN\text{-}Z_{i,t}$	-	-0.016	<.0001	-0.016	<.0001
$SALES\ GROWTH_{i,t}$	+	0.984	<.0001	0.989	<.0001
$SENIOR\ DEBT\ RATING_{i,t}$	?	0.197	0.001	0.202	0.001
$LEVERAGE_{i,t}$	+	0.908	<.0001	0.893	<.0001
$DEF_{i,t}$	+	3.110	<.0001	3.111	<.0001
$RD\_SALES_{i,t}$	+	0.135	<.0001	0.135	<.0001
$PRICE\_CHANGE_{i,t}$	+	0.355	<.0001	0.351	<.0001
$MTR_{i,t}$	-	1.255	<.0001	1.256	<.0001
INDUSTRY		Yes		Yes	
YEAR		Yes		Yes	
N		42,889		42,889	
R-SQUARE		0.277		0.277	

Note: Table 3.4 (a) presents the logistic regression coefficients for new capital issuance percentage from pooled regression over the sample period 1993 to 2016, with industry and year fixed effects. ***CFF*** is an indicator variable takes the value of 1 if the firm-year observation has at least one cash flow forecast in addition to at least one earnings forecast, 0 otherwise. ***NEW_ISSUE*** is an indicator variable that takes a value of one if a firm-year observation issues new equity or new debt to raise capital, only if the issuance size is greater than or equal to 5% of beginning total assets, and zero otherwise. ***SIZE*** is total assets in year *t*, and natural log of total asset is used in empirical analysis. ***MB*** is market to book ratio, measured as the market value of equity divided by book value of equity. ***ROA*** is return on asset measured as operating income after depreciation divided by total asset. ***TANGIBILITY*** is the ratio of fixed assets to total assets, measured as PPE divided by total assets. ***ALTMAN-Z*** is Altman Z score. Following Altman (1968), the Z score equals 1.2(net working capital/total assets)+1.4(retained earnings/total assets)+3.3(earnings before interest and taxes/total assets)+0.6(market value of equity/book value of liabilities)+1.0(sales/total assets). Lower Altman's Z-scores indicate poorer financial health. ***SALES GROWTH*** is the percentage change of sales at year *t* compared to year *t-1*. ***SENIOR DEBT RATING*** is an indicator variable equals 1 for senior bonds and 0 for subordinate bonds. ***LEVERAGE*** is the ratio of book value of debt divided by book debt plus book equity. ***DEF*** is financial deficiency, calculated as cash dividend plus investments, plus change in working capital, and minus operating cash flow after interest and taxes. ***RD*** is ratio of research and development expense to sales. *RD* is set to 0 if research and development expense is missing. ***PRICE CHANGE*** is the ratio of split-adjusted stock price at the end of year *t* to that at the beginning of year *t*. ***MTR*** is the marginal tax rate.

Table 3.4 (b)

OLS regression results: Issuance of new capital (issuance percentage as continuous variable).

$ISSUE\_PERCENTAGE_{i,t} = \gamma_0 + \gamma_1 CFF_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 MB_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 TANGIBILITY_{i,t} + \gamma_6 ALTMAN\text{-}Z_{i,t} + \gamma_7 SALES\ GROWTH_{i,t} + \gamma_8 SENIOR\ DEBT\ RATING_{i,t} + \gamma_9 LEVERAGE_{i,t} + \gamma_{10} DEF_{i,t} + \gamma_{11} RD\_SALES_{i,t} + \gamma_{12} PRICE\_CHANGE_{i,t} + \gamma_{13} MTR_{i,t} + \varepsilon$

	Pred. sign	Coeff.	p-val.	Coeff.	p-val.
Intercept	n/a	0.030	<.0001	0.025	<.0001
$CFF_{i,t}$	+	0.031	<.0001		
$CFF_{i,t-1}$	+			0.022	<.0001
$SIZE_{i,t}$	?	-0.002	0.001	-0.001	0.169
$MB_{i,t}$	+	0.004	<.0001	0.004	<.0001
$ROA_{i,t}$	-	-0.146	<.0001	-0.147	<.0001
$TANGIBILITY_{i,t}$	-	-0.037	<.0001	-0.036	<.0001
$ALTMAN\text{-}Z_{i,t}$	-	0.000	0.527	0.000	0.741
$SALES\ GROWTH_{i,t}$	+	0.067	<.0001	0.068	<.0001
$SENIOR\ DEBT\ RATING_{i,t}$	?	0.043	<.0001	0.045	<.0001
$LEVERAGE_{i,t}$	+	0.036	<.0001	0.034	<.0001
$DEF_{i,t}$	+	0.289	<.0001	0.290	<.0001
$RD\_SALES_{i,t}$	+	0.028	<.0001	0.028	<.0001
$PRICE\_CHANGE_{i,t}$	+	0.031	<.0001	0.030	<.0001
$MTR_{i,t}$	-	-0.077	<.0001	-0.079	<.0001
INDUSTRY		Yes		Yes	
YEAR		Yes		Yes	
N		42,889		42,889	
R-SQUARE		0.362		0.361	

Note: Table 3.4 (b) presents the regression coefficients for new capital issuance percentage from pooled regression over the sample period 1993 to 2016, with industry and year fixed effects. ***CFF*** is an indicator variable takes the value of 1 if the firm-year observation has at least one cash flow forecast in addition to at least one earnings forecast, 0 otherwise. ***ISSUE_PERCENTAGE*** is (net equity issuance + net debt issuance)/(total long-term debt at beginning of the year + total stock holders' equity at beginning of the year). ***SIZE*** is total assets in year *t*, and natural log of total asset is used in empirical analysis. ***MB*** is market to book ratio, measured as the market value of equity divided by book value of equity. ***ROA*** is return on asset measured as operating income after depreciation divided by total asset. ***TANGIBILITY*** is the ratio of fixed assets to total assets, measured as PPE divided by total assets. ***ALTMAN-Z*** is Altman Z score. Following Altman (1968), the Z score equals 1.2(net working capital/total assets)+1.4(retained earnings/total assets)+3.3(earnings before interest and taxes/total assets)+0.6(market value of equity/book value of liabilities)+1.0(sales/total assets). Lower Altman's Z-scores indicate poorer financial health. ***SALES GROWTH*** is the percentage change of sales at year *t* compared to year *t-1*. ***SENIOR DEBT RATING*** is an indicator variable equals 1 for senior bonds and 0 for subordinate bonds. ***LEVERAGE*** is the ratio of book value of debt divided by book debt plus book equity. ***DEF*** is financial deficiency, calculated as cash dividend plus investments, plus change in working capital, and minus operating cash flow after interest and taxes. ***RD*** is ratio of research and development expense to sales. *RD* is set to 0 if research and development expense is missing. ***PRICE CHANGE*** is the ratio of split-adjusted stock price at the end of year *t* to that at the beginning of year *t*. ***MTR*** is the marginal tax rate.

Table 3.5 (a)

Logistic regression results: Issuance of new capital

$EQUITY\_ISSUE_{i,t} = \gamma_0 + \gamma_1 CFF_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 MB_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 TANGIBILITY_{i,t} + \gamma_6 ALTMAN\text{-}Z_{i,t} + \gamma_7 SALES\ GROWTH_{i,t} + \gamma_8 SENIOR\ DEBT\ RATING_{i,t} + \gamma_9 LEVERAGE_{i,t} + \gamma_{10} DEF_{i,t} + \gamma_{11} RD\_SALES_{i,t} + \gamma_{12} PRICE\_CHANGE_{i,t} + \gamma_{13} MTR_{i,t} + \varepsilon.$

	Pred. Sign	Coeff.	p-val.	Coeff.	p-val.
$CFF_{i,t}$	+	0.105	0.122		
$CFF_{i,t-1}$	+			-0.125	0.057
$SIZE_{i,t}$	-	-0.130	<.0001	-0.096	<.0001
$MB_{i,t}$	-	-0.044	<.0001	-0.042	<.0001
$ROA_{i,t}$	-	-2.297	<.0001	-2.344	<.0001
$TANGIBILITY_{i,t}$	-	0.302	0.121	0.339	0.081
$ALTMAN\text{-}Z_{i,t}$	-	0.038	<.0001	0.039	<.0001
$SALES\ GROWTH_{i,t}$	+	0.776	<.0001	0.776	<.0001
$SENIOR\ DEBT\ RATING_{i,t}$	?	0.227	0.012	0.243	0.007
$LEVERAGE_{i,t}$	+	-1.836	<.0001	-1.862	<.0001
$DEF_{i,t}$	+	2.050	<.0001	2.048	<.0001
$RD\_SALES_{i,t}$	+	0.084	<.0001	0.082	<.0001
$PRICE\_CHANGE_{i,t}$	+	0.663	<.0001	0.656	<.0001
$MTR_{i,t}$	-	-3.934	<.0001	-3.941	<.0001
INDUSTRY		Yes		Yes	
YEAR		Yes		Yes	
N		42,889		42,889	
R-SQUARE		0.352		0.352	

Note: Table 3.5 (a) presents the regression coefficients for equity issuance logistic regression over the sample period 1993 to 2016, with industry and year fixed effects. ***CFF*** is an indicator variable takes the value of 1 if the firm-year observation has at least one cash flow forecast in addition to at least one earnings forecast, 0 otherwise. ***EQUITY_ISSUE*** is an indicator variable equals 1 when firms issue new equity capital in year *t*, and the issue size is greater than or equal to 5% of total asset at beginning of year *t*, 0 otherwise. ***SIZE*** is total assets in year *t*, and natural log of total asset is used in empirical analysis. ***MB*** is market to book ratio, measured as the market value of equity divided by book value of equity. ***ROA*** is return on asset measured as operating income after depreciation divided by total asset. ***TANGIBILITY*** is the ratio of fixed assets to total assets, measured as PPE divided by total assets. ***ALTMAN-Z*** is Altman Z score. Following Altman (1968), the Z score equals 1.2(net working capital/total assets)+1.4(retained earnings/total assets)+3.3(earnings before interest and taxes/total assets)+0.6(market value of equity/book value of liabilities)+1.0(sales/total assets). Lower Altman's Z-scores indicate poorer financial health. ***SALES GROWTH*** is the percentage change of sales at year *t* compared to year *t-1*. ***SENIOR DEBT RATING*** is an indicator variable equals 1 for senior bonds and 0 for subordinate bonds. ***LEVERAGE*** is the ratio of book value of debt divided by book debt plus book equity. ***DEF*** is financial deficiency, calculated as cash dividend plus investments, plus change in working capital, and minus operating cash flow after interest and taxes. ***RD*** is ratio of research and development expense to sales. *RD* is set to 0 if research and development expense is missing. ***PRICE CHANGE*** is the ratio of split-adjusted stock price at the end of year *t* to that at the beginning of year *t*. ***MTR*** is the marginal tax rate.

Table 3.5 (b)

Logistic regression results: Issuance of new capital

$DEBT\_ISSUE_{i,t} = \gamma_0 + \gamma_1 CFF_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 MB_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 TANGIBILITY_{i,t} + \gamma_6 ALTMAN\text{-}Z_{i,t} + \gamma_7 SALES\ GROWTH_{i,t} + \gamma_8 SENIOR\ DEBT\ RATING_{i,t} + \gamma_9 LEVERAGE_{i,t} + \gamma_{10} DEF_{i,t} + \gamma_{11} RD\_SALES_{i,t} + \gamma_{12} MTR_{i,t} + \varepsilon.$

	Pred. sign	Coeff.	p-val.	Coeff.	p-val.
$CFF_{i,t}$	+	0.119	0.022		
$CFF_{i,t-1}$	+			0.115	0.029
$SIZE_{i,t}$	+	0.049	0.003	0.051	0.002
$MB_{i,t}$	+	0.023	<.0001	0.023	<.0001
$ROA_{i,t}$	-	1.442	<.0001	1.446	<.0001
$TANGIBILITY_{i,t}$	+	0.192	0.161	0.193	0.159
$ALTMAN\text{-}Z_{i,t}$	-	-0.098	<.0001	-0.098	<.0001
$SALES\ GROWTH_{i,t}$	+	0.880	<.0001	0.887	<.0001
$SENIOR\ DEBT\ RATING_{i,t}$	+	0.382	<.0001	0.383	<.0001
$LEVERAGE_{i,t}$	+	1.794	<.0001	1.789	<.0001
$DEF_{i,t}$	+	2.043	<.0001	2.045	<.0001
$RD\_SALES_{i,t}$	?	0.026	0.156	0.027	0.145
$MTR_{i,t}$	?	4.595	<.0001	4.595	<.0001
INDUSTRY		Yes		Yes	
YEAR		Yes		Yes	
N		42,889		42,889	
R-SQUARE		0.223		0.223	

Note: Table 3.5 (b) presents the regression coefficients for debt issuance logistic regression over the sample period 1993 to 2016, with industry and year fixed effects. ***CFF*** is an indicator variable takes the value of 1 if the firm-year observation has at least one cash flow forecast in addition to at least one earnings forecast, 0 otherwise. ***DEBT_ISSUE*** is an indicator variable equals 1 when firms issue new debt capital in year *t*, and the issue size is greater than or equal to 5% of total asset at beginning of year *t*, 0 otherwise. ***SIZE*** is total assets in year *t*, and natural log of total asset is used in empirical analysis. ***MB*** is market to book ratio, measured as the market value of equity divided by book value of equity. ***ROA*** is return on asset measured as operating income after depreciation divided by total asset. ***TANGIBILITY*** is the ratio of fixed assets to total assets, measured as PPE divided by total assets. ***ALTMAN-Z*** is Altman Z score. Following Altman (1968), the Z score equals 1.2(net working capital/total assets)+1.4(retained earnings/total assets)+3.3(earnings before interest and taxes/total assets)+0.6(market value of equity/book value of liabilities)+1.0(sales/total assets). Lower Altman's Z-scores indicate poorer financial health. ***SALES GROWTH*** is the percentage change of sales at year *t* compared to year *t-1*. ***SENIOR DEBT RATING*** is an indicator variable equals 1 for senior bonds and 0 for subordinate bonds. ***LEVERAGE*** is the ratio of book value of debt divided by book debt plus book equity. ***DEF*** is financial deficiency, calculated as cash dividend plus investments, plus change in working capital, and minus operating cash flow after interest and taxes. ***RD*** is ratio of research and development expense to sales. *RD* is set to 0 if research and development expense is missing. ***MTR*** is the marginal tax rate.

Table 3.6 (a)

Logistic regression results: Issuance of new capital (restricted sample).

$EQUITY\_ISSUE_{i,t} = \gamma_0 + \gamma_1 CFF_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 MB_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 TANGIBILITY_{i,t} + \gamma_6 ALTMAN\text{-}Z_{i,t} + \gamma_7 SALES\ GROWTH_{i,t} + \gamma_8 SENIOR\ DEBT\ RATING_{i,t} + \gamma_9 LEVERAGE_{i,t} + \gamma_{10} DEF_{i,t} + \gamma_{11} RD\_SALES_{i,t} + \gamma_{12} PRICE\_CHANGE_{i,t} + \gamma 13\ MTR_{i,t} + \varepsilon.$

	Pred. sign	Coeff.	p-val.	Coeff.	p-val.
$CFF_{i,t}$	+	-0.117	0.261		
$CFF_{i,t-1}$	+			-0.238	0.020
$SIZE_{i,t}$	-	-0.197	<.0001	-0.178	<.0001
$MB_{i,t}$	-	-0.071	<.0001	-0.070	<.0001
$ROA_{i,t}$	-	-2.733	<.0001	-2.770	<.0001
$TANGIBILITY_{i,t}$	-	-0.105	0.711	-0.077	0.785
$ALTMAN\text{-}Z_{i,t}$	-	0.132	<.0001	0.131	<.0001
$SALES\ GROWTH_{i,t}$	+	0.470	0.000	0.469	0.000
$SENIOR\ DEBT\ RATING_{i,t}$	?	-0.320	0.006	-0.312	0.007
$LEVERAGE_{i,t}$	-	-3.120	<.0001	-3.123	<.0001
$DEF_{i,t}$	+	0.629	<.0001	0.619	<.0001
$RD\_SALES_{i,t}$	+	0.058	0.046	0.057	0.050
$PRICE\_CHANGE_{i,t}$	+	0.523	<.0001	0.520	<.0001
$MTR_{i,t}$	-	-7.527	<.0001	-7.549	<.0001
INDUSTRY		Yes		Yes	
YEAR		Yes		Yes	
N		6,180		6,180	
R-SQUARE		0.508		0.509	

Note: Table 3.6 (a) presents the regression coefficients for equity issuance logistic regression over the sample period 1993 to 2016, with industry and year fixed effects. The sample is restricted to firm-year observations that issue new capital. ***CFF*** is an indicator variable takes the value of 1 if the firm-year observation has at least one cash flow forecast in addition to at least one earnings forecast, 0 otherwise. ***EQUITY_ISSUE*** is an indicator variable equals 1 when firms issue new equity capital in year *t*, and the issue size is greater than or equal to 5% of total asset at beginning of year *t*, 0 otherwise. ***SIZE*** is total assets in year *t*, and natural log of total asset is used in empirical analysis. ***MB*** is market to book ratio, measured as the market value of equity divided by book value of equity. ***ROA*** is return on asset measured as operating income after depreciation divided by total asset. ***TANGIBILITY*** is the ratio of fixed assets to total assets, measured as PPE divided by total assets. ***ALTMAN-Z*** is Altman Z score. Following Altman (1968), the Z score equals 1.2(net working capital/total assets)+1.4(retained earnings/total assets)+3.3(earnings before interest and taxes/total assets)+0.6(market value of equity/book value of liabilities)+1.0(sales/total assets). Lower Altman's Z-scores indicate poorer financial health. ***SALES GROWTH*** is the percentage change of sales at year *t* compared to year *t-1*. ***SENIOR DEBT RATING*** is an indicator variable equals 1 for senior bonds and 0 for subordinate bonds. ***LEVERAGE*** is the ratio of book value of debt divided by book debt plus book equity. ***DEF*** is financial deficiency, calculated as cash dividend plus investments, plus change in working capital, and minus operating cash flow after interest and taxes. ***RD*** is ratio of research and development expense to sales. *RD* is set to 0 if research and development expense is missing. ***PRICE CHANGE*** is the ratio of split-adjusted stock price at the end of year *t* to that at the beginning of year *t*. ***MTR*** is the marginal tax rate.

Table 3.6 (b)

Logistic regression results: Issuance of new capital (restricted sample).

$DEBT\_ISSUE_{i,t} = \gamma_0 + \gamma_1 CFF_{i,t} + \gamma_2 SIZE_{i,t} + \gamma_3 MB_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 TANGIBILITY_{i,t} + \gamma_6 ALTMAN\text{-}Z_{i,t} + \gamma_7 SALES\ GROWTH_{i,t} + \gamma_8 SENIOR\ DEBT\ RATING\ i,t + \gamma_9 LEVERAGE\ i,t + \gamma_{10} DEF\ i,t + \gamma_{11} RD\_SALES_{i,t} + \gamma_{12} MTR_{i,t} + \varepsilon.$

	Pred. sign	Coeff.	p-val.	Coeff.	p-val.
$CFF_{i,t}$	+	0.219	0.036		
$CFF_{i,t-1}$	+			0.208	0.041
$SIZE_{i,t}$	+	0.275	<.0001	0.275	<.0001
$MB_{i,t}$	+	0.009	0.295	0.009	0.309
$ROA_{i,t}$	-	1.039	<.0001	1.044	<.0001
$TANGIBILITY_{i,t}$	+	0.236	0.449	0.230	0.461
$ALTMAN\text{-}Z_{i,t}$	-	-0.112	<.0001	-0.111	<.0001
$SALES\ GROWTH_{i,t}$	+	-0.017	0.870	-0.013	0.901
$SENIOR\ DEBT\ RATING_{i,t}$	+	0.565	<.0001	0.570	<.0001
$LEVERAGE_{i,t}$	+	4.676	<.0001	4.646	<.0001
$DEF_{i,t}$	+	0.309	<.0001	0.313	<.0001
$RD\_SALES_{i,t}$	?	0.004	0.842	0.005	0.810
$MTR_{i,t}$	?	7.353	<.0001	7.342	<.0001
INDUSTRY		Yes		Yes	
YEAR		Yes		Yes	
N		6,180		6,180	
R-SQUARE		0.495		0.495	

Note: Table 3.6 (b) presents the regression coefficients for debt issuance logistic regression over the sample period 1993 to 2016, with industry and year fixed effects. The sample is restricted to firm-year observations that issue new capital. ***CFF*** is an indicator variable takes the value of 1 if the firm-year observation has at least one cash flow forecast in addition to at least one earnings forecast, 0 otherwise. ***DEBT_ISSUE*** is an indicator variable equals 1 when firms issue new debt capital in year *t*, and the issue size is greater than or equal to 5% of total asset at beginning of year *t*, 0 otherwise. ***SIZE*** is total assets in year *t*, and natural log of total asset is used in empirical analysis. ***MB*** is market to book ratio, measured as the market value of equity divided by book value of equity. ***ROA*** is return on asset measured as operating income after depreciation divided by total asset. ***TANGIBILITY*** is the ratio of fixed assets to total assets, measured as PPE divided by total assets. ***ALTMAN-Z*** is Altman Z score. Following Altman (1968), the Z score equals 1.2(net working capital/total assets)+1.4(retained earnings/total assets)+3.3(earnings before interest and taxes/total assets)+0.6(market value of equity/book value of liabilities)+1.0(sales/total assets). Lower Altman's Z-scores indicate poorer financial health. ***SALES GROWTH*** is the percentage change of sales at year *t* compared to year *t-1*. ***SENIOR DEBT RATING*** is an indicator variable equals 1 for senior bonds and 0 for subordinate bonds. ***LEVERAGE*** is the ratio of book value of debt divided by book debt plus book equity. ***DEF*** is financial deficiency, calculated as cash dividend plus investments, plus change in working capital, and minus operating cash flow after interest and taxes. ***RD*** is ratio of research and development expense to sales. *RD* is set to 0 if research and development expense is missing. ***MTR*** is the marginal tax rate.

Appendix C

Variable Definition:

NEW_ISSUE	:	an indicator variable that takes a value of one if a firm-year observation issues new equity or new debt to raise capital, only if the issuance size of equity or debt is greater than or equal to 5% of beginning total assets, and zero otherwise.
ISSUE_PERCENTAGE	:	(net equity issuance + net debt issuance)/(total long-term debt at beginning of the year + total stock holders' equity at beginning of the year).
CAP_STRUCTURE_CHANGE	:	is $\Delta D_{i,t}/(\Delta D_{i,t} + \Delta E_{i,t})$, where $\Delta D_{i,t}$ is net debt issued in year *t* ($\Delta D_{i,t}$ is long-term debt issuance - long-term debt reduction) and $\Delta E_{i,t}$ is net equity issued in year *t* ($\Delta E_{i,t}$ is the sale of common stock minus stock repurchases).
DEBT_ISSUE	:	an indicator variable equals 1 when firms issue new debt capital in year *t*, and the issue size is greater than or equal to 5% of total asset at beginning of year *t*, 0 otherwise.
EQUITY_ISSUE	:	an indicator variable equals 1 when firms issue new equity capital in year *t*, and the issue size is greater than or equal to 5% of total asset at beginning of year *t*, 0 otherwise.
CFF	:	an indicator variable takes the value of 1 if the firm-year observation has at least one cash flow forecast in addition to at least one earnings forecast, 0 otherwise.
SIZE	:	total assets in year *t*, and natural log of total asset is used in empirical analysis.
MB	:	market to book ratio, measured as the market value of equity divided by book value of equity.
ROA	:	return on asset measured as operating income after depreciation divided by total asset.
TANGIBILITY	:	the ratio of fixed assets to total assets, measured as PPE. divided by total assets.
ALTMAN-Z	:	Altman Z score. Following Altman (1968), the Z score equals 1.2(net working capital/total assets)+1.4(retained earnings/total assets)+3.3(earnings before interest and taxes/total assets)+0.6(market value of equity/book value of liabilities)+1.0(sales/total assets). Lower Altman's Z-scores indicate poorer financial health.
SALES GROWTH	:	the percentage change of sales at year *t* compared to year *t-1*.
SENIOR DEBT RATING	:	an indicator variable equals 1 for senior bonds and 0 for subordinate bonds.
LEVERAGE	:	the ratio of book value of debt divided by book debt plus book equity.
DEF	:	financial deficiency, calculated as cash dividend plus investments, plus change in working capital, and minus operating cash flow after interest and taxes.

RD	:	ratio of research and development expense to sales. *RD* is set to 0 if research and development expense is missing.
PRICE CHANGE	:	the ratio of split-adjusted stock price at the end of year *t* to that at the beginning of year *t*.
MTR	:	the marginal tax rate.
POST	:	an indicator variable equals 1 if firm started issuing cash flow. forecasts, else 0.

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