Firm Specific Information and Cost of Equity

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Abstract

We develop a comprehensive and large-sample measure of a firm's disclosure quality. The measure is the ratio of firm-specific return variation to firm-specific cash-flow variation. Empirical evidence supports the validity of our measure. Using this measure, we find that cost of equity capital decreases by about -0.4% on an annual basis if a firm's disclosure quality increases by one standard deviation. This is consistent with the joint hypotheses that (1) firm-specific stock returns contain economic information as argued by Morck, Yeung, and Yu (2000) and (2) better disclosure can lower the cost of equity.

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1 Introduction

When there is uncertainty and information asymmetry, disclosure may affect cost of equity. This could happen because of parameter uncertainty (Barry and Brown (1985)) or because of adverse-selection problems between traders (Diamond and Verrecchia (1991)).

However, the empirical evidence on the hypothesis is typically based on small sample and short time period. Botosan (1997) finds that greater disclosure is associated with lower cost of capital, for firms with low analysts following. She uses a sample of 122 manufacturing firms, and measures disclosure as the amount of voluntary disclosure provided in the 1990 annual reports. Botosan and Plumlee (2003) find a negative correlation between cost of capital and the Association for Investment and Management Research (AIMR) analyst rankings of corporate disclosure. The rankings are available for about 200 firms from 1979 to 1996. Leuz and Verrecchia (2000) show that German firms that switch from German Generally Accepted Accounting Principles (German GAAP) to International Accounting Standard (IAS) or U.S. Generally Accepted Accounting Principles (U.S. GAAP) have a lower information asymmetry component of cost-of-capital. Gore (2004) finds that the cost of municipal bond is lower in states that have mandated the GAAP disclosure.

The lack of large sample evidence is probably due to the difficulty in constructing a good empirical measure of overall disclosure quality. We attempt to address this issue by developing a measure of disclosure quality based on firm-specific information. In our model, investors value a firm using a weighted average of the firm's reported profitability and industry level profitability. The higher the disclosure quality, the more weight is put on the firm-specific information. In the extreme case of no disclosure, a firm will be valued at industry mean level of profitability. We show that disclosure quality can be measured as the ratio of idiosyncratic volatility of returns to the idiosyncratic volatility of reported cash flows.

This measure is related to the recent development in the finance literature of firm-specific stock returns. Traditionally, firm-specific returns have mostly been regarded as "noise". Roll (1988) argues that the low R-squared of popular asset pricing model could be consistent with noise in prices. West (1988) argues theoretically that more firm-specific volatility is associated with less information.

Several recent papers, however, attempt to empirically link firm-specific returns to economic efficiency. Morck, Yeung, and Yu (2000) find greater firm-specific price variation (i.e., less synchronicity of returns across firms) in economies where government better protects outside investors' private property rights. The results are consistent with the hypothesis that strong property rights promote informed arbitrage, leading to the impounding of more firm-specific information and thus less comovement in stock returns across firms. Durnev, Morck, Yeung, and Zarowin (2003) find that firms and industries with lower market model R^2 statistics exhibit higher association between current returns and future earnings, indicating more information about future earnings in current stock returns. Durnev, Morck, and Yeung (2004) find a positive relation between firm-specific variation in stock returns and a measure of the economic efficiency of corporate investment efficiency. Consistent with the firm-specific information argument, Fox, Morck, Yeung, and Durnev (2003) find that the Management Discussion and Analysis (MD&A) disclosure requirements adopted in 1981 increase the firm-specific stock returns for bad-news firms.

We contribute to this literature by decomposing firm-specific stock returns into firm-specific cash flow news and disclosure quality. We show that, a firm can have high firm-specific return variation because it has high firm-specific cash flow variation or high quality of disclosure. Hence, we can measure the quality of disclosure with firm-specific returns by controlling the underlying fundamentals.

Our empirical results are the following. We first construct the disclosure quality measure using firm-specific stock returns and cash flows. We then validate the measure by correlating it with some mandatory disclosure variables. Consistent with our measure capturing disclosure quality, we find that the firm-specific information increased for pension-intensive firms after the mandatory disclosure requirement of the pension information in the 1980s. Firms in the Oil and Gas industry also experienced an increase of firm-specific information after they disclose their reserve information following a regulation event. Our measure is positively correlated with the ranking of disclosure policies by AIMR analysts, further lending support to the measure. In addition, firms with higher disclosure based on our measure have higher more analyst coverage and lower dispersion in analyst forecasts.

We find that cost of equity is negatively related to disclosure quality. We measure cost of equity in two ways: implied cost of equity approach based on both Gebhardt, Lee, and Swaminathan (2001) and Easton (2004) and Fama and French (1993) three-factor model. We find that for a one standard deviation increase in disclosure quality, the cost of equity decreases by about 0.4%. The results are consistent across the two measures of cost of equity.

Our findings are consistent with the joint hypotheses that firm-specific stock returns contain meaningful information and that firms' disclosure quality affects cost of equity. Our contributions are thus two-folds. First, the results in the paper lend support to the argument by papers starting from Morck, Yeung, and Yu (2000) that idiosyncratic stock returns contain interesting economic information. Our results indicate that more firm-specific information in stock returns is related to lower cost of equity and hence potentially improves the capital allocation efficiency of the economy. Second, we provide large sample evidence on the effect of disclosure quality on cost of equity. This corroborates the findings from many previous studies based on small sample, short time period and partial measure of disclosure.

The paper proceeds as follows. In the next section, we develop a measure of disclosure quality using firm-specific returns and discuss the empirical estimations. Section 3 validates the measure by correlating it with changes of mandatory disclosure requirement and AIMR analyst rankings. Section 4 links the disclosure measure with cost of equity and Section 5 discusses a future refinement of our measure. The last section concludes.

2 Measure of Disclosure Quality

In this section, we develop a simple measure of corporate disclosure quality. The idea is that when disclosure quality is high, investors trust the numbers that are reported by the firm. When disclosure quality is poor, investors treat the firm like an average firm in its industry. It turns out that our measure is the ratio of idiosyncratic return volatility to the idiosyncratic (reported) cash-flow volatility. The rest of this section tries to establish the link between our measure and the disclosure quality.

Assume that investors perceive a firm's permanent earnings as a geometrically weighted average of reported earnings and industry average earnings. If the firm has good disclosure, investors put more weight on firm's reported earnings. If investors don't trust the disclosure, they put more weight on industry earnings. We denote $\tilde{E}_{j,t}$ as investors' perception of the firm j's permanent earnings in year t; $E_{j,t}$ as the firm's reported earnings; and $E_{I,t}$ as the industry average earnings. We scale the earnings by firm assets $A_{j,t}$ and industry total assets $A_{I,t}$. Formally, the permanent earnings perceived by investors is

$$\frac{\tilde{E}_{j,t}}{A_{j,t-1}} = \left(\frac{E_{j,t}}{A_{j,t-1}}\right)^{\delta} \left(\frac{E_{I,t}}{A_{I,t-1}}\right)^{1-\delta} \tag{1}$$

Here, δ is between 0 and 1 and is the weight put on firm-specific information.

Taking logarithms and then first-order difference, we have

$$\tilde{e}_{j,t} = \delta e_{j,t} + (1-\delta)e_{I,t} + (1-\delta)\left(log\left(\frac{A_{j,t-1}}{A_{I,t-1}}\right) - log\left(\frac{A_{j,t-2}}{A_{I,t-2}}\right)\right) \tag{2}$$

Here the lower case variables denote the log-growth rate of the variable. That is, $\tilde{e}_{j,t}{=}log\left(\frac{\tilde{E}_{j,t}}{\tilde{E}_{j,t-1}}\right)$, $e_{j,t}{=}log\left(\frac{E_{j,t}}{E_{j,t-1}}\right)$, $e_{I,t}{=}log\left(\frac{E_{I,t}}{E_{I,t-1}}\right)$. $\frac{A_{j,t}}{A_{I,t}}$ represents the firm's share in the whole industry. Assuming that the share of the firm in the industry does not change much from year $t-2$ to year $t-1$, then we have approximately

$$\tilde{e}_{j,t} = \delta e_{j,t} + (1-\delta)e_{I,t} \tag{3}$$

Prices are determined by investor's perceived permanent earnings. Further assuming firm have constant cost of equity capital and constant expected growth rate, we have

$$P_{j,t} = \frac{\tilde{E}_{j,t}}{\mu_j - g_j} \tag{4}$$

where μ_j is the constant discount rate, and g_j is the constant growth rate.

In this setup, $r_{j,t}$=$\tilde{e}_{j,t}$, i.e., a firm's stock return is the same as its permanent earnings growth rate. This implies that the idiosyncratic variance of the return must be equal to the idiosyncratic variance of the perceived permanent earnings.

Defining idiosyncratic as relative to the industry, we assume the following relation between firm returns and industry returns and between firm earnings and industry earnings:

$$r_{j,t} = \tilde{e}_{j,t} = \alpha + \beta r_{I,t} + \epsilon^r_{j,t} \tag{5}$$

$$e_{j,t} = a + be_{I,t} + \epsilon^e_{j,t} \tag{6}$$

It's easy to see that the idiosyncratic variance of the perceived earnings is equal to δ^2 times the idiosyncratic variance of the reported earnings growth. That is,

$$var(\epsilon^r_j) = \delta^2 var(\epsilon^e_j) \tag{7}$$

Thus, δ, which measures the disclosure quality, can be calculated as the idiosyncratic volatility of stock returns divided by idiosyncratic volatility of earnings:

$$\delta = \frac{vol(\epsilon^r_j)}{vol(\epsilon^e_j)} \tag{8}$$

2.1 Empirically Measuring Disclosure Quality

2.1.1 Measuring Idiosyncratic Returns Volatility

For stocks in year t (t between 1972 and 2004), we use monthly return data from year t-5 to t-1 to calculate idiosyncratic volatility in the following regression.

$$r^j_t = a_j + b^M_j r^M_t + b^I_j r^I_t + \epsilon^j_t \tag{9}$$

where r_t^j is firm monthly return, r_t^M is CRSP value-weighted return, and r_t^I is the Fama and French (1997) industry return. We define the annualized idiosyncratic volatility ($\sqrt{1}2 * std(\epsilon_t^j)$) as $IVOL_{ret}$.

To ensure the accuracy of the regression, we require the firm to have at least 50 valid monthly returns.

2.1.2 Measuring Idiosyncratic Earnings Volatility

For stocks in year t (t between 1972 and 2004), we use quarterly Compustat data from year t-5 to t-1 to calculate idiosyncratic earnings volatility with the following regression.

$$EG_t^j = a_j + b_j^M EG_t^M + b_j^I EG_t^I + \epsilon_t^j \tag{10}$$

where EG_t^j is the growth rates of operating earnings constructed as $\frac{\text{Operating Earnings}_t}{\text{Operating Earnings}_{t-4}} - 1$. Operating earnings is data8 in quarterly Compustat dataset. To avoid complications that arise from seasonality, the denominator is lagged 1 year, so they are always in the same quarter. If lagged earnings is negative, the growth rate is not meaningful and we drop the observation.[1] EG_t^I is the industry earnings growth rate, where industry is defined as in Fama and French (1997). EG_t^M is the market earnings growth rates, We require at least 15 quarterly data. We term the idiosyncratic volatility as $IVOL_{cf}$.

2.1.3 Measure of Disclosure Quality

We construct the disclosure quality score as $\frac{IVOL_{ret}}{IVOL_{cf}}$. The intuition of this measure is that, controlling for cash flow idiosyncratic volatility, the better a firm's disclosure quality, the higher its firm-specific return volatility. Compared with other empirical measures of disclosure, our measure captures the overall quality of disclosure from the perspectives of the equity investors.

Because the number of firms that have enough quarterly earnings from Compustat before 1980 is relatively small (typically less than 100), we limit our sample to post-1980 intersection of Compustat and CRSP. In later tests where the implied cost of

[1] Since we use operating earnings rather than net income, the percentage of loss firms is small and there is no impact on our estimation.

equity is used, we further limit our sample to post-1984 because of the availability of analyst forecast data.

The mean of our disclosure quality measure is 0.72, while the median is 0.36 (Table I). There is huge variation across firms in disclosure quality: standard deviation is about 1 and the inter-quartile range is about 0.7. About 10% of the sample firm-years have disclosure score greater than the theoretical upper bound of 1 in our framework. This indicates that our measure may be biased upward because of time-varying expected returns. We will address this issue in our future work.

3 Relating Disclosure Quality to Other Measures of Disclosure

In this section, we empirically validate our construct of disclosure quality by examining its association with some measures of disclosure. Specifically, we find that our disclosure quality measure changed after two events of disclosure regulations, in a way that we expected. We also find that our measure is positively correlated with AIMR analyst rankings of disclosure. Furthermore, we find that firms that are followed by analysts tend to have higher disclosure quality, and analyst forecast dispersion is smaller for firms with higher disclosure quality. All evidence support the notion that our measure indeed captures quality of corporate disclosure.

3.1 Pension Disclosure Regulation Event

We first check whether the mandatory disclosure requirement on pension affects our measure of disclosure. The event we use is Statement of Financial Accounting Standard 35 (SFAS35). SFAS35 (Accounting and Reporting by Defined Benefit Pension Plans) is issued in March 1980 and effective for fiscal years after 1980.

Prior to this statement, firms are not required by report their pension obligations. This Statement establishes standards of financial accounting and reporting for the annual financial statements of a defined benefit pension plan. It requires the financial statements include information regarding (a) the net assets available for benefits as of the end of the plan year, (b) the changes in net assets during the plan year, (c) the actuarial present value of accumulated plan benefits as of either the beginning or end of the plan year, and (d) the effects, if significant, of certain factors affecting the year-to-year change in the actuarial present value of accumulated plan benefits. Either or both of those categories of information may be presented on the face of one or more financial statements or in accompanying notes.

We examine the change of disclosure quality for public firms around the issuance of SFAS35. More specifically, we look at the disclosure quality change from 1977-1979 to 1985-1987 and see whether firms that have more pension liability experience more increase in our disclosure measure.[2]

Panel A of Table II shows the results from the regression of disclosure quality on POST, PENSION, and the interaction term of POST and PENSION. POST is a year dummy that equals 1 if it is post-SFAS35 and 0 otherwise. PENSION is a measure of pension intensity, calculated as the amount of Projected Benefit Obligation from defined benefit pension scaled by total assets. As can be seen from Table II, the interaction term of POST and PENSION loads up positive and significantly different from zero.

The empirical evidence is consistent with SFAS35 improves pension-intensive firms' disclosure quality and lends support to our measure of disclosure.

3.2 Oil and Gas Disclosure Regulation Event

Statement of Financial Accounting Standard 69 (SFAS69) significantly improves the disclosure requirement for Oil and Gas companies. SFAS69 (Disclosures about Oil and Gas Producing Activities), became effective for fiscal years beginning on or after December 15, 1982. In this section, we check the change in our disclosure measure for Oil and Gas companies before and after SFAS69.

[2] Years from 1980 to 1984 are dropped because our estimates of disclosure quality for year t use the data from year $t-5$ to $t-1$. Hence, the disclosure quality estimates for 1980 to 1984 will be contaminated by pre-SFAS35 data. However, including the 1980-1984 does not change our results.

SFAS69 establishes a comprehensive set of disclosures for oil and gas producing activities and replaces requirements of several earlier Statements. Publicly traded enterprises with significant oil and gas activities, when presenting a complete set of annual financial statements, are required to disclose the following as supplementary information: proved oil and gas reserve quantities; costs relating to oil and gas producing activities; costs incurred in oil and gas property acquisition, exploration, and development activities; results of operations for oil and gas producing activities; and a standardized measure of discounted future net cash flows relating to proved oil and gas reserve quantities.

To the extent that our disclosure quality measure is effective, we would expect an increase in the measure for Oil and Gas companies upon the implementation of SFAS69. This is indeed the case. Table II Panel B shows the results of a regression of disclosure on a time dummy POST (a dummy that equals on if it is after 1982 and 0 otherwise), a Oil & Gas industry dummy OIL (firms with SIC code between 1300 and 1339, 1370 and 1382, 1389, between 2900 and 2912, or between 2990 and 2999), and interaction of OIL and POST. We find that the interaction term between loads up significantly positive – firms from Oil & Gas industries experience a 0.29 increase in disclosure quality relative to non-Oil firms. This is consistent with SFAS69 improving disclosure quality of Oil & Gas firms.

3.3 AIMR Analyst Ranking of Corporate Disclosure

Next, we check whether our measure of disclosure quality is correlated with the annual ranking of corporate disclosure practices published by the Association for Investment and Management Research (AIMR). Prior studies has used AIMR scores as a proxy for disclosure quality (Lang and Lundholm (1993) and Lang and Lundholm (1996)). It is a direct and overall measure of disclosure quality, but it has a relatively small sample size. The data series are only available for about 200 firms from 1979 to 1996.

In Table III, we examine the relation between out measure of disclosure quality and AIMR scores. AR, QR, IR, and TS are disclosure scores by AIMR calculated as in Bushee and Noe (2001) and are defined as the following: AR is the ranking by analysts of the disclosure quality of firms' annual report/10-K disclosure; QR is the ranking by analysts of the disclosure quality of firms' interim report/10-Q disclosure; IR is the ranking by analysts of the disclosure quality of firms' investor relations activities; TS is the overall disclosure quality as rated by AIMR analysts. From Panel A, we find that our disclosure measure is positively correlated with all four measures of AIMR disclosure ranking and significantly so with three of them (AR, IR, and TS). In Panel B, where disclosure is demeaned using the AIMR industries defined in Bushee and Noe (2001), it is still positively associated with AIMR scores and the correlation is significant for AR and IR. This confirms that our measure captures quality of corporate disclosure.

Past studies also find a positive relation between total stock return volatility and AIMR scores (Land and Lundholm (1993)). To make sure that our measure of disclosure does not correlated with AIMR disclosure rankings through total stock volatility, we also control for total volatility in the test above. Untabulated results show that our disclosure measure is still positively associated with AIMR scores, further confirming the validity of the measure.

3.4 Analyst Coverage and Forecast Dispersion

We now examine how our measure of disclosure quality is related to analyst coverage. We hypothesize that analysts tend to improve corporate disclosure quality. We also hypothesize that for firms with good disclosure, there should be less dispersion among analysts. If our measure captures corporate disclosure quality, We should expect it to be positively correlated to analyst coverage and negatively to the dispersion of analyst forecasts. We find this is indeed the case.

In Table IV, we regress our disclosure measure on the number of analysts that are covering a firm and the dispersion of the forecasts (the logarithm of standard deviation of forecasts divided by mean forecasts of EPS). We find that firms with more analysts following have higher disclosure quality based on our measure, while firms with more dispersed analyst forecasts have lower disclosure quality. This provides further support for our measure.

Given the four pieces of evidence above, we are confident that we have a reasonably good measure of disclosure quality. In the next section, we use our measure to examine the effect of corporate disclosure on cost of equity capital.

4 The Effects of Disclosure Quality on Cost of Equity

At least two theoretical papers have the predictions that disclosure can reduce cost of capital. In Barry and Brown (1985) disclosure reduces cost of capital by reducing the parameter uncertainty. In Diamond and Verrecchia (1991), disclosure reduces cost of capital by reducing the adverse-selection problems between traders. However, the empirical evidence on the hypothesis is typically based on small sample and short time period. In this section, we establish large-sample evidence of this theoretical prediction.

Specifically, we construct two measures of cost of equity. The first one is the implied cost of equity a la Gebhardt, Lee, and Swaminathan (2001). The second one is based on Fama and French (1993) three-factor model. We find that our measure of disclosure quality is negatively correlated with both measures of cost of equity.

4.1 Measuring cost of Equity

4.1.1 Implied Cost of Equity

The first approach we use to estimate cost of equity is the implied cost of equity method. This approach assumes a valuation model and infer cost of equity using equity price and other variables in the model (such as future cash flows).

- GLS method.

  We first follow Gebhardt, Lee, and Swaminathan (2001) to calculate the implied cost of capital using the residual income model.

  Assuming the dividend discount model,

$$P_t = \sum_{i=1}^{\infty} \frac{E_t(D_{t+i})}{(1+r_e)^i} \tag{11}$$

and clean surplus accounting, we get the residual income equity valuation model

$$P_t = B_t + \sum_{i=1}^{\infty} \frac{E_t[(ROE_{t+i} - r_e)B_{t+i-1}]}{(1+r_e)^i} \tag{12}$$

where P is stock price, D is dividend, r_e is the discount rate, ROE is return on equity, B is the book value of equity, and $E(.)$ is expectation notation.

We can thus solve for the cost of equity from the equation above using current stock price, current book value of equity, and forecasts of future ROE and book value of equity. Following Gebhardt, Lee, and Swaminathan (2001), we do the forecasts in the following way.

First, we do earnings forecast in two steps: 1) we forecast earnings explicitly for the next three years using I/B/E/S EPS and EPS growth forecast, and 2) we forecast earnings beyond year three implicitly, by mean reverting the period t+3 ROE to the median industry ROE (described below) by period T. The mean reversion is achieved through simple linear interpolation between period t+3 ROE and the industry median ROE. The industry median ROE is a moving median of ROEs from all firms in the same Fama-French industry in the past ten years.

Second, by assuming a clean-surplus accounting system and assuming a constant dividend payout ratio, we forecast future book value of equity using the forecasted future earnings.

With future earnings and book value of equity, we can then calculate future ROE ($FROE$) and stock price at year t will be:

$$\begin{aligned} P_t &= B_t + \frac{FROE_{t+1} - r_e}{(1+r_e)} B_t + \frac{FROE_{t+2} - r_e}{(1+r_e)^2} B_{t+1} + TV \\ &= B_t + \frac{FROE_{t+1} - r_e}{(1+r_e)} B_t + \frac{FROE_{t+2} - r_e}{(1+r_e)^2} B_{t+1} \\ &\quad + \sum_{i=3}^{T-1} \frac{FROE_{t+i} - r_e}{(1+r_e)^i} B_{t+i-1} + \frac{FROE_{t+T} - r_e}{r_e(1+r_e)^{T-1}} B_{t+T-1} \end{aligned} \tag{13}$$

where $FROE_{t+1}$ and $FROE_{t+2}$ are earnings forecast for the next two years, and TV is the terminal value estimate.

We estimate the implied cost of equity by numerically solving the above equation. Since I/B/E/S only has large sample data on EPS forecast for post-1984 years, we constrain our sample to 1984-2004. From Table I, the mean and median cost of equity for our sample are both 12% with a standard deviation of 5% and an inter-quartile range of 6%.

- Easton method.

  The GLS method (and all other valuation methods based on residual income model) assumes clean-surplus accounting, which may not hold for many reasons (Ohlson (2001) and Easton (2004)). In addition, the terminal growth rate is often arbitrary in the empirical models and this brings further estimation errors. We hence adopt the approach proposed by Easton (2004) to estimate the implied cost of equity and redo our tests.

  Easton (2004) models equity price as a function of earnings and earnings growth and provides an empirical means of simultaneously estimating the expected rate of return and the rate of change in abnormal growth in earnings beyond the (short) forecast horizon.

  Starting with a no-arbitrage assumption and assuming a perpetual rate of change in abnormal growth in earnings, Easton (2004) derives the following equation for equity price:

$$P_t = eps_{t+1}/r + agr_{t+1}/(r(r - \Delta agr)) \tag{14}$$

  where $agr_{t+1} = eps_{t+2} + r * dps_{t+1} - (1+r)eps_{t+1}$ is the expected abnormal growth in accounting earnings, eps_{t+1} is the EPS forecast in year $t+1$, dps_{t+1} is the expected dividends per share, r is the expected return, and Δagr is the perpetual rate of change in agr.

  Rearranging terms, we have

$$ceps_{t+2}/P_t = \gamma_0 + \gamma_1 eps_{t+1}/P_t + e_t \tag{15}$$

  where $\gamma_0 = r(r - \Delta agr)$ and $\gamma_1 = (1 + \Delta agr)$ and $ceps_{t+2}$ is the cum-dividend EPS forecast in year $t+2$.

Hence, the following regression can be used to estimate the parameters.

$$ceps_{i,t+2}/P_{it} = \gamma_0 + \gamma_1 eps_{i,t+1}/P_{it} + e_{it} \tag{16}$$

In the regression, $\gamma_0 = r(r - \Delta agr)$ and $\gamma_1 = (1 + \Delta agr)$, and we can solve for r and Δagr with the estimates of γ_0 and γ_1.

Following the suggestions in Easton (2004), we first sort firms into 40 portfolios every year based on the disclosure quality. For each portfolio, we run the above regression to estimate γ_0 and γ_1 and solve for the portfolio-specific cost of equity. We then check whether the cost of equity is systematically different across the portfolios.

The cost of equity using Easton method is slightly higher than that from the GLS approach. Mean and median of cost of equity estimates are both 15% and the standard deviation is about 3%.

4.1.2 Fama-French 3-Factor Model Cost of Equity

As a second measure of cost of equity, we use Fama-French three factor model. For stocks in year t (t between 1980 and 2000), we run the following regression with monthly data in year t to year t+4:

$$r_t^j - r_t^f = \alpha_j + \beta_j(r_t^M - r_t^f) + \beta_h HML_t + \beta_s SMB_t + \epsilon_t^j \tag{17}$$

We then construct Fama-French cost of capital as follows:

$$FFCOC = r_t^f + \beta_j(r^M - r^f) + \beta_h HML + \beta_s SMB \tag{18}$$

where the market premium $(r^M - r^f)$, HML, and SMB are the average returns from 1925 to 2004.

The mean and median of $FFCOC$ are slightly bigger than the estimates using the implied cost of equity approach (both about 14%). The standard deviation is about 7% and the inter-quartile range is 9%.

4.2 The Relation Between Disclosure Quality and Cost of Equity

In Table V and VI, we regress our two measures of cost of equity on our measure of disclosure quality, and other control variables. In Table V, we use implied cost of equity. In Table VI, we use the Fama-French 3-factor model based cost of equity. Because cost of equity tend to be autocorrelated, we use two techniques to address this autocorrelation. In Panel A of the two tables, we use pooled regression, but we calculate the Newey-West robust standard errors. We use 3 lags. In Panel B of the two tables, we run the regression year by year, and then report the average coefficient from the time series. The standard errors are also calculated with the Newey-West procedure.

4.2.1 Univariate Regressions

As can be seen from Panel A of Table V, there is a negative and significant relation between our measure of disclosure and the GLS implied cost of capital. The coefficient on disclosure in a simple regression of cost of capital on disclosure quality is -0.4% with a Newey-West t-statistics of -13.26. The results are almost the same if Fama and MacBeth (1973) regressions are used (Panel B). This is consistent with the hypothesis that better disclosure lowers the cost of equity. The economic magnitude of the coefficient is reasonable. For a one standard deviation increase in disclosure quality, the cost of equity reduces by -0.4% on an annual basis.

We get similar results using cost of equity calculated using Easton (2004) and Fama-French three-factor model (Table VI and Table VII). The economic magnitude is very comparable to the implied cost of equity approach. For a one standard deviation increase in disclosure quality, Fama-French cost of capital goes down by about 0.4% to 0.5% on an annual basis.

4.2.2 Controlling for Other Determinants of Cost of Equity

We also include the following control variables and find that our results are robust.

- Herfindahl Index. By construction our measure of disclosure quality δ captures the weight investors put on firm's reported earnings versus industry earnings. Here we have attributed δ to disclosure quality. But δ may be proxying for other things. In particular, it might proxy for industry competitiveness. For instance, if a firm has some sort of monopoly power, then its earnings can be expected to persist for a long time before it reverts to the industry level. This kind of firm will have high δ. So our findings are also consistent with the hypothesis as that monopolistic firms (or firms in highly concentrated industries) have lower cost of capital. Indeed, Hou and Robinson (2005) find that firms in concentrated industries have lower realized returns.

  To address this issue, we control for industry concentration measured using the Herfindahl Index. Following Hou and Robinson (2005), we construct the Herfindahl index for an industry as

$$Herfindahl_j = \sum_{i=1}^{I} s_{i,j}^2 \tag{19}$$

  where $s_{i,j}$ is firm i's market share of sales in industry j. We define industry as the three-digit SIC codes. We perform the above calculations each year for each industry, and then average the values over the past three years. This ensures that potential data errors do not have undue influence on our Herfindahl index.

- CAPM β. In Barry and Brown (1985), disclosure affects cost of equity in addition to the CAPM β that is estimated the usual way. Hence, we include β as a control variable to see whether our disclosure measure has incremental power in explaining cost of equity. We measure the CAPM β in year t using monthly returns from year t to year t+4.

- Firm Age. Pástor and Veronesi (2003) argue that firm age affects equity price because of decreasing uncertainty as firms become mature. Therefore, we explicitly control for firm age (logarithm of one plus the number of years since a firm shows up in CRSP data) in our regressions.

- Analyst Coverage and Forecast Dispersion. In a previous section, we show that analysts coverage and especially analyst forecast dispersion are correlated with our measure of disclosure. Diether, Malloy, and Scherbina (2002) document that stocks with high analyst forecast dispersion have lower realized returns. To mitigate the concern that our disclosure measure merely captures potential analyst forecast effect, we also include them as control variables. Interestingly, we find that in most of our specifications, analyst dispersion seem to be positively correlated with cost of capital.

- Growth. Finally, we also control for firm growth as measured by logarithm of three-year sales growth rate. Prior literature has shown that some growth variables can predict returns even after controlling for typical determinants of returns.

Table V and Table VI show that our results are robust to the inclusion of the control variables. Both the statistical significance and economic magnitude remain the same or become stronger, suggesting that our results are not likely to be driven by omitted variables.

To mitigate the concern that there is common industry components in our measure of cost of equity and disclosure, we further check the association between them by exploiting within-industry variations. In most columns in Panel A of Table V and Table VI, we use industry fixed effects. The results indicate that the relation between our measure of disclosure quality and measures of cost of equity is still statistically significant and the economic magnitude remains the same. This suggests that our empirical results are not merely capturing across-industry effects.

Overall we conclude that disclosure quality is significantly negatively correlated with cost of capital, both statistically and economically.

5 Future Refinement of the Measure

In developing our measure, we make the assumption that expected return is constant. There has been substantial evidence that expected returns for the market are not constant (e.g., see Campbell (1991) and Campbell and Ammer (1993)). Although Vuolteenaho (2002) show that for individual stocks, cash flow variation is much more important than expected return variation, we wish to consider the effect of time-varying expected returns on our measure of disclosure quality.

5.1 Alternative Interpretation: Time-Varying Expected Returns

In our current model, we assume that expected return is constant for a firm. Therefore, we argue that our measure captures the disclosure quality. In reality, expected returns are time-varying. For a traditional asset pricer, our measure may be capturing the relative importance of the idiosyncratic expected return news to the idiosyncratic cash-flow news.

To see this, assume that framework as in the traditional asset pricing. Assume that there is perfect disclosure and time-varying expected returns. The first assumption means that firm reported earning is true earnings. From $P_{j,t}=\frac{E_{j,t}}{R_{j,t}}$, define $r_{j,t}=log(\frac{P_{j,t}}{P_{j,t-1}})$, $e_{j,t}=log(\frac{E_{j,t}}{E_{j,t-1}})$, and $\mu_{j,t}=log(\frac{R_{j,t}}{R_{j,t-1}})$. Then

$$r_{j,t} = e_{j,t} + \mu_{j,t} \tag{20}$$

This also hold for the industry return,

$$r_{I,t} = e_{I,t} + \mu_{I,t} \tag{21}$$

Now assume that firm cash flow news are related to the industry cash flow news, but not related to the industry expected return news:

$$e_{j,t} = a + b * e_{I,t} + \epsilon^{e}_{j,t} \tag{22}$$

and that the firm expected return news are related to the industry expected return news, but not related to the industry cash flow news:

$$\mu_{j,t} = c + d * \mu_{I,t} + \epsilon^{\mu}_{j,t} \tag{23}$$

Then

$$r_{j,t} = a + c + be_{I,t} + d\mu_{I,t} + \epsilon^{e}_{j,t} + \epsilon^{\mu}_{j,t} \tag{24}$$

Now assume that b=d, then

$$r_{j,t} = a + c + b * r_{I,t} + \epsilon^{e}_{j,t} + \epsilon^{\mu}_{j,t} \tag{25}$$

Therefore, idiosyncratic return ϵ^{r}_{j}=ϵ^{e}_{j}+ϵ^{μ}_{j}. And

$$\frac{var(\epsilon^{r}_{j})}{var(\epsilon^{e}_{j})} = 1 + \frac{var(\epsilon^{\mu}_{j})}{var(\epsilon^{e}_{j})} \tag{26}$$

Therefore, our disclosure variable may be measuring the relative importance of idiosyncratic cash flow news versus idiosyncratic discount rate news.

5.2 Refinement: Model of Three Way Decomposition

In the future, we plan to refine our measure by considering a three-way decomposition of return variance. That is, we consider return variance being determined by the expected return news component, firm cash flow component and disclosure quality. Now let's assume that

$$r_{j,t} = \delta e_{j,t} + (1 - \delta) e_{I,t} + \mu_{j,t} \tag{27}$$

Intuitively,

$$var(\epsilon^{r}_{j}) = \delta^2 var(\epsilon^{e}_{j}) + var(\epsilon^{\mu}_{j}) \tag{28}$$

Thus we can refine our measure as

$$\delta^2 = \frac{var(\epsilon^{r}_{j}) - var(\epsilon^{\mu}_{j})}{var(\epsilon^{e}_{j})} \tag{29}$$

6 Conclusions

We propose a new way of measuring corporate disclosure quality. We assume that when pricing stocks, investors use a weighted average of firms' reported earnings and industry earnings. Investors put more weights on firm's reported earnings when the disclosure quality is high. It turns out that we can use the ratio of idiosyncratic volatility of returns to that of cash flow to measure the disclosure quality.

Several tests confirm that our measure indeed relates to disclosure quality. After regulations that mandate disclosure of pension obligations and oil reserves in the 1980's, our measure increased particularly for the firms that have high pension obligations and those in the oil industries. Our measure of disclosure is also correlated with the AIMR analyst rankings of corporate disclosure. Furthermore, our measure of disclosure quality is positively correlated with analyst coverage and negatively correlated with forecast dispersion.

Because our measure can be readily calculated for almost all firms, we are able to provide large-sample evidence that disclosure quality is negatively related to cost of capital. We use two approaches to estimate cost of capital: Implied Cost of Capital (GLS (2001) and Easton (2004)) and Fama-French cost of capital. Our results remain robust after controlling for a number of variables. This confirms the findings from many previous studies based on small sample, short time period and partial measure of disclosure.

Our empirical evidence lends additional support for the argument that idiosyncratic stock returns are informative and more firm-specific information in stock returns can potentially improve the capital allocation efficiency of the economy (Durnev, Morck, and Yeung (2004)).

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Table I: Descriptive Statistics

This table shows the descriptive statistics of the main variables. The sample consists of the intersection of COMPUSTAT-CRSP firm-years from 1980 to 2004. For GLS COC (implied cost of equity measure using the approach in Gebhardt, Lee, and Swaminathan (2001)and Easton COC (implied cost of equity measure using the approach in Easton (2004)), the sample is from 1984 to 2004. IVOL(return) is the idiosyncratic volatility for firm i in year t. It is the standard deviation of the residuals in the regressions of firm i's monthly stock returns on value-weighted market returns and industry returns using data in the last five years($t-5$ to $t-1$). Industries are defined as in Fama and French (1997). Return R^2 is the R-squared from the regression. IVOL(earnings) for firm i in year t is the standard deviation of the residuals in the regressions of firm i's quarterly growth in operating earnings over the same quarter of last year on value-weighted market earnings growth and Fama and French (1997) industry earnings growth, using data in the last five years ($t-5$ to $t-1$). Earnings R^2 is the R-squared from the regression. Disclosure is calculated as IVOL(return)/IVOL(earnings). FF COC is the cost of equity implied by Fama and French (1993) three-factor model.

Variable	N	Mean	Std Dev	Min	25th Pctl	Median	75th Pctl	Max
Year	41615	-	-	1980	1987	1992	1996	2000
IVOL(return)	41615	0.35	0.21	0.00	0.21	0.30	0.44	4.11
Return R^2	41615	0.27	0.19	0.00	0.11	0.23	0.39	1.00
IVOL(earnings)	41615	4.44	30.73	0.00	0.30	0.83	2.50	2309.87
Earnings R^2	41554	0.29	0.25	0.00	0.09	0.22	0.42	1.00
Disclosure	41615	0.72	1.00	0.00	0.14	0.36	0.83	5.00
GLS COC	25365	0.12	0.05	0.00	0.09	0.12	0.15	0.29
Easton COC	29349	0.15	0.03	0.10	0.13	0.15	0.16	0.54
FF COC	41615	0.14	0.07	-0.07	0.09	0.14	0.18	0.36

Table II: The Effect of Mandatory Disclosure Event on Disclosure

This table shows the results from the regressions of disclosure on mandatory disclosure event variables. In both Panel A and Panel B, the dependent variable is disclosure, as defined in Table I. In Panel A, POST is a dummy variable that equals one if the year is greater than 1980 and zero otherwise. PENSION is the amount of Projected Benefit Obligation of a firm's defined benefit pension plan divided by its assets. In Panel B, POST is a dummy variable that equals one if the year is greater than 1983 and zero otherwise. OIL is a dummy variable that equals one if a firm is in the Oil & Gas industry and zero otherwise. All standard errors are Newey-West adjusted with a 3 lags.

Panel A

	Constant	Post	Pension	Pension*Post	Observations	R^2
(1)	0.89	-0.14			6350	0.14%
	(19.44)***	(-3.02)***				
(2)	1.08	-0.34	-4.20	4.44	6350	0.59%
	(18.26)***	(-5.66)***	(-5.02)***	(5.24)***		

Panel B

	Constant	Post	Oil	Oil*post	Observations	R^2
(1)	0.81	-0.12			14401	0.31%
	(57.31)***	(-6.69)***				
(2)	0.82	-0.13	-0.13	0.29	14401	0.41%
	(56.38)***	(-7.29)***	(-1.95)*	(3.48)***		

t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table III: Regressions of Disclosure on AIMR Scores

This table shows the average coefficients and t-statistics from the annual regressions of disclosure on AIMR analyst ranking of corporate disclosure. In Panel A, the dependent variable is quality of disclosure defined as in Table I. In Panel B, the dependent variable is disclosure demeaned by industry defined for AIMR ranking as in Bushee and Noe (2001). AR, QR, IR, and TS are disclosure scores by AIMR calculated as in Bushee and Noe (2001). AR is the ranking by analysts of the disclosure quality of firms' annual report/10-K disclosure. QR is the ranking by analysts of the disclosure quality of firms' interim (quarterly) report/10-Q disclosure. IR is the ranking by analysts of the disclosure quality of firms' investor relations activities. TS is the overall disclosure quality as rated by AIMR analysts. All standard errors are Newey-West adjusted with 3 lags.

Panel A: Disclosure Quality on AIMR rankings

	Constant	AR	QR	IR	TS	Observations	R^2
(1)	0.74	0.0012				152	0.46%
	(13.76)***	(1.79)*					
(2)	0.78		0.0004			153	0.86%
	(12.91)***		(0.42)				
(3)	0.69			0.0021		148	1.04%
	(27.01)***			(2.96)***			
(4)	0.79				0.0014	219	0.62%
	(16.54)***				(1.80)*		

Panel B: Demeaned Disclosure Quality on AIMR rankings

	Constant	AR	QR	IR	TS	Observations	R^2
(1)	-0.05	0.0013				152	0.69%
	(-1.02)	(1.68)*					
(2)	-0.0058		0.0005			153	1.26%
	(-0.09)		(0.44)				
(3)	-0.08			0.0019		148	1.22%
	(-2.35)***			(2.79)***			
(4)	-0.03				0.0009	219	0.59%
	(-0.99)				(1.43)		

t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table IV: Regressions of Disclosure on Analyst Coverage and Forecast Dispersion

This table shows the average coefficients and t-statistics from the annual regressions of disclosure on analyst coverage and EPS forecast dispersion. The dependent variable is quality of disclosure defined as in Table I. Analyst coverage is logarithm of (1+ # of analysts) for a given firm-year is the number of analysts that are covering the company in that year. Forecast dispersion is the logarithm of standard deviation of the EPS forecasts divided by the mean forecasts at the end of the fiscal year end. All standard errors are Newey-West adjusted with a 3 lags.

	Constant	Analyst Coverage	Forecast Dispersion	Observations	R^2
(1)	0.72	0.04		3121	0.86%
	(28.73)***	(1.90)*			
(2)	0.16		-0.21	1161	7.07%
	(7.17)***		(-11.09)***		
(3)	0.06	0.05	-0.20	1161	7.77%
	(0.64)	(1.33)	(-12.92)***		

t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table V: Regressions of GLS Implied Cost of Capital on Disclosure

This table shows the results from the regressions of implied cost of equity on disclosure and control variables. The dependent variable is the cost of equity calculated following Gebhardt, Lee, and Swaminathan (2001). Disclosure is defined as in Table I. Herfindahl is the Herfindahl index for the three-digit SIC industry that a firm belongs to. CAPM β is estimated using monthly data from t-5 to t-1. Age is the logarithm of one plus the number of years a firm has been on CRSP. Analyst coverage is the logarithm of one plus the number of analysts following the firm. Dispersion is the logarithm of the standard deviation of analyst EPS forecasts divided by the mean forecast. Sales growth is the logarithm of firm's three-year sales growth. Panel A shows pooled regressions results and Panel B shows Fama-MacBeth regression results. All standard errors are Newey-West adjusted with a 3 lags.

Panel A: Pooled regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.13	0.173	0.132	0.13	0.142	0.131	0.196
	(28.18)***	(97.13)***	(24.99)***	(27.81)***	(33.18)***	(28.53)***	(57.29)***
Disclosure	-0.004	-0.003	-0.005	-0.004	-0.003	-0.004	-0.004
	(-13.26)***	(-5.85)***	(-11.86)***	(-13.18)***	(-10.37)***	(-12.84)***	(-5.83)***
Herfindahl		0.002					-0.03
		(0.39)					(-5.26)***
CAPM β			-0.005				-0.01
			(-5.69)***				(-8.81)***
Age				0.001			0.001
				(1.36)			(0.16)
Analyst Coverage					-0.001		-0.001
					(-15.43)***		(-9.07)***
Dispersion					0.001		-0.003
					(4.79)***		(-5.33)***
Sales Growth						-0.004	-0.011
						(-5.53)***	(-6.35)***
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	No	Yes	Yes	Yes	Yes	No
Observations	25365	25365	14767	25365	21248	25146	12992

Panel B: Fama-Macbeth regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.13	0.13	0.14	0.12	0.14	0.13	0.16
	(17.60)***	(13.55)***	(28.13)***	(9.40)***	(30.62)***	(20.14)***	(26.54)***
Disclosure	-0.0031	-0.0031	-0.0041	-0.0031	-0.0040	-0.0029	-0.0043
	(-4.02)***	(-4.22)***	(-6.12)***	(-3.90)***	(-4.27)***	(-4.23)***	(-6.32)***
Herfindahl		-0.011					-0.032
		(-0.66)					(-3.61)***
CAPM β			-0.007				-0.0047
			(-1.47)				(-1.16)
Age				0.0031			-0.0002
				(1.67)*			(-0.13)
Analyst Coverage					-0.009		-0.0083
					(-2.90)***		(-2.91)***
Dispersion					-0.004		-0.0035
					(-8.74)***		(-7.72)***
Sales Growth						-0.0062	-0.01
						(-1.54)	(-2.10)**
Observations	1208	1208	869	1208	1012	1197	764
R^2	0.56%	2.05%	3.21%	1.22%	3.89%	1.75%	8.64%

t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table VI: Regressions of Easton (2004) Implied Cost of Capital on Disclosure

This table shows the results from the regressions of implied cost of equity on disclosure and control variables. The dependent variable is the cost of equity calculated following Easton (2004). Each year all firms are sorted into 40 portfolios based on their disclosure quality and cost of equity is estimated at portfolio level using the method in Easton (2004). Disclosure is defined as in Table I. Herfindahl is the Herfindahl index for the three-digit SIC industry that a firm belongs to. CAPM β is estimated using monthly data from t-5 to t-1. Age is the logarithm of one plus the number of years a firm has been on CRSP. Analyst coverage is the logarithm of one plus the number of analysts following the firm. Dispersion is the logarithm of the standard deviation of analyst EPS forecasts divided by the mean forecast. Sales growth is the logarithm of firm's three-year sales growth. Panel A shows pooled regressions results and Panel B shows Fama-MacBeth regression results. All standard errors are Newey-West adjusted with a 3 lags.

Panel A: Pooled regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.155	0.150	0.165	0.166	0.156	0.149	0.148
	(71.77)***	(29.44)***	(20.49)***	(8.96)***	(12.84)***	(50.63)***	(5.51)***
Disclosure	-0.007	-0.007	-0.009	-0.007	-0.006	-0.009	-0.018
	(-2.13)**	(-2.28)***	(-2.43)**	(-2.23)**	(-1.20)	(-2.90)***	(-2.40)**
Herfindahl		0.032					0.051
		(1.21)					(1.74)*
CAPM β			-0.008				-0.003
			(-1.31)				(-0.50)
Age				-0.004			-0.005
				(-0.61)			(-0.61)
Analyst Coverage					-0.001		0.002
					(-0.12)		(0.32)
Dispersion					-0.000		-0.005
					(-0.09)		(-1.08)
Sales Growth						0.022	0.008
						(3.31)***	(0.74)
Observations	959	959	799	959	959	959	799

Panel B: Fama-Macbeth regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.155	0.144	0.155	0.211	0.185	0.151	0.223
	(41.79)***	(23.24)***	(11.80)***	(12.30)***	(14.22)***	(22.85)***	(6.19)***
Disclosure	-0.007	-0.008	-0.008	-0.009	-0.003	-0.007	-0.009
	(-2.11)**	(-3.16)***	(-2.18)**	(-3.10)***	(-0.41)	(-2.86)**	(-1.73)*
Herfindahl		0.064					0.067
		(2.66)**					(1.84)*
CAPM β			0.001				-0.011
			(0.15)				(-1.04)
Age				-0.019			-0.020
				(-3.14)***			(-1.86)*
Analyst Coverage					-0.012		-0.004
					(-2.70)**		(-1.15)
Dispersion					0.003		0.002
					(0.67)		(0.46)
Sales Growth						0.014	0.006
						(0.99)	(0.39)
Observations	40	40	40	40	40	40	40
R^2	3.85%	7.66%	7.35%	6.48%	9.37%	7.45%	21.69%

t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table VII: Regressions of Fama-French Three-factor Cost of Capital on Disclosure

This table shows the results from the regressions of Fama-French three-factor cost of equity on disclosure and control variables. The dependent variable is the cost of equity calculated using the three-factor model in Fama and French (1993) Disclosure is defined as in Table I. Herfindahl is the Herfindahl index for the three-digit SIC industry that a firm belongs to. CAPM β is estimated using monthly data from t-5 to t-1. Age is the logarithm of one plus the number of years a firm has been on CRSP. Analyst coverage is the logarithm of one plus the number of analysts following the firm. Dispersion is the logarithm of the standard deviation of analyst EPS forecasts divided by the mean forecast. Sales growth is the logarithm of firm's three-year sales growth. Panel A shows pooled regressions results and Panel B shows Fama-MacBeth regression results. All standard errors are Newey-West adjusted with a 3 lags.

Panel A: Pooled regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.134	0.138	0.095	0.135	0.136	0.128	0.124
	(11.32)***	(85.02)***	(8.65)***	(11.44)***	(13.69)***	(12.36)***	(39.10)***
Disclosure	-0.004	-0.004	-0.004	-0.004	-0.005	-0.005	-0.004
	(-9.71)***	(-9.50)***	(-9.40)***	(-9.78)***	(-7.71)***	(-10.37)***	(-6.40)***
Herfindahl		0.021					-0.001
		(5.85)***					(-0.32)
CAPM β			0.046				0.043
			(50.11)***				(29.56)***
Age				0.001			0.001
				(2.96)***			(3.27)***
Analyst Coverage					-0.001		-0.001
					(-9.84)***		(-12.89)***
Dispersion					0.006		0.006
					(11.71)***		(11.97)***
Sales Growth						0.004	-0.006
						(3.69)***	(-3.28)***
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	No	Yes	Yes	Yes	Yes	No
Observations	41615	41598	41615	41607	17828	41359	17809

Panel B: Fama-Macbeth regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.144	0.140	0.100	0.164	0.188	0.143	0.144
	(92.65)***	(141.39)***	(17.89)***	(33.70)***	(52.10)***	(126.06)***	(22.67)***
Disclosure	-0.0054	-0.0054	-0.0053	-0.0056	-0.0053	-0.0057	-0.0043
	(-3.93)***	(-3.91)***	(-3.63)***	(-3.90)***	(-7.01)***	(-4.56)***	(-5.67)***
Herfindahl		0.023					-0.0044
		(3.50)***					(-0.26)
CAPM β			0.045				0.046
			(11.80)***				(7.93)***
Age				-0.0068			0.0010
				(-3.59)***			(0.56)
Analyst Coverage					-0.0076		-0.011
					(-8.96)***		(-15.20)***
Dispersion					0.0081		0.0065
					(8.48)***		(7.63)***
Sales Growth						0.0025	-0.0088
						(1.27)	(-1.97)**
Observations	1982	1981	1982	1981	849	1969	848
R^2	1.02%	1.36%	17.29%	1.75%	6.40%	1.42%	22.59%

t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%