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Firm Growth and Disclosure: An Empirical Analysis

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Abstract

Extant theoretical research posits that information asymmetry and agency issues affect the cost of external financing and hence impact the ability of firms to finance their growth opportunities. In contrast, the literature on disclosure policy posits that expanded and credible disclosure lowers the cost of external financing and improves a firm's ability to pursue potentially profitable projects. An empirical implication is that disclosure can help firms grow by relaxing external financing constraints, thereby allowing capital to flow to positive net present value projects. This paper empirically evaluates this prediction using firm-level data over an 11-year period. As anticipated by theory, we find a positive relation between firm disclosure policy and the externally financed growth rate, after controlling for other influences.

I. Introduction

The corporate finance literature emphasizes the importance of information asymmetry and agency costs in influencing firm growth through their impact on the efficiency of firms' investments (Stein (2003)). In particular, these distortions serve to constrain firms' access to lower cost external financing and hence limit a firm's ability to pursue potentially profitable projects (Demirguc-Kunt and Maksimovic (1998)). However, a related literature suggests that disclosure policy is a curative mechanism through which a firm can lower its cost of external financing and improve its ability to fund growth opportunities (Verrecchia (2001), Bushman and Smith (2001), and Stein (2003)). An implication of this line of inquiry is that it anticipates a positive association between a firm's disclosure policy and its realized growth rate. This paper empirically evaluates this prediction.

Myers and Majluf (1984) argue that information asymmetry serves to increase the cost of external financing and may therefore force firms to forgo potentially profitable projects. As a result, they posit that in the presence of information

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asymmetry, a firm's growth will be constrained to its internal resources. In a similar vein, agency conflicts can also influence a firm's realized growth rate. For example, Myers (1977) identifies a "debt overhang" problem where managers may forgo positive net present value (NPV) projects in the presence of risky debt.[1] In light of distortions resulting from information asymmetry and agency conflicts, firms may confront a higher cost of external financing to fund their investment projects.

Extant theory also posits that an expanded and credible disclosure policy can improve investment efficiency by mitigating information asymmetry and agency conflicts.[2] A higher level of disclosure serves to reduce the cost of external financing by reducing information asymmetry between investors and managers. On the other hand, Bushman and Smith (2001) posit a governance role for disclosure, arguing that it affords a mechanism for investors to monitor insiders. Specifically, Bushman and Smith ((2003), p. 68) contend that an expanded disclosure policy "contributes directly to economic performance by disciplining efficient management of assets in place (for example, timely abandonment of losing projects), better project selection, and reduced expropriation of investors' wealth by the managers." Given the role of disclosure in ameliorating information asymmetry and agency conflicts, extant theory contends that an expanded disclosure policy should serve to improve a firm's access to lower cost external financing to fund its growth opportunities.[3]

If disclosure is effective in enhancing firm access to external funds, then we anticipate disclosure to improve a firm's ability to invest in potentially profitable projects for growth. We examine this prediction using a cross section of U.S. firms over an 11-year period from 1984–1994. Specifically, we examine the relation between a firm's disclosure policy and its externally financed growth rate.

To proxy for the overall level of disclosure policy that a firm adopts, we rely on financial analysts' evaluations of firms' disclosure practices and use analyst rankings of overall firm disclosure as reported in the Association of Investment Management and Research's *Annual Reviews of Corporate Reporting Practices* (AIMR reports).[4] The benefit of using the scores assigned by the analysts is that they provide a ready off-the-shelf measure that has been widely used in prior research as a comprehensive measure of corporate disclosure practices. Furthermore, prior studies (e.g., Yu (2005)) find this disclosure metric to be well behaved in that it is statistically significant in the predicted direction with the dependent variable of interest. However, we recognize that a firm's disclosure policy is not

[1] Jensen and Meckling (1976) describe another agency problem whereby managers acting in the interest of equity holders may extract value from debt holders by investing in riskier projects after debt is in place. This "asset substitution" problem will serve to further increase the cost of external financing.

[2] See Verrecchia (2001) for a review of the theoretical literature on voluntary disclosure.

[3] Prior empirical studies largely examine the relation between firm disclosure policy and cost of external capital (Botosan (1997), Sengupta (1998), and Leuz and Verrecchia (2000)). In contrast, this paper focuses on how disclosure policy contributes to firm growth.

[4] Empirical research using this database documents considerable variation in the level of disclosure across firms (Lang and Lundholm (1993)). Lundholm and Meyers (2002) cite several studies that use these disclosure rankings as a measure of a firm's disclosure policy. For example, Lang and Lundholm (1996) provide evidence that firms with higher disclosure rankings have less dispersion among individual analyst forecasts, implying that more disclosures reduce information asymmetry.

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exogenously determined. Prior research shows that a firm's disclosure policy is a function of firm-specific characteristics that influence the benefits and costs related to an expanded disclosure policy (Lang and Lundholm (1993)). To address potential identification issues, our empirical analysis takes into account the endogeneity of our disclosure metric.

We follow the approach developed by Demirguc-Kunt and Maksimovic (1998), (2002) to measure the extent to which a firm's growth is externally financed.[5] An advantage of using this approach is that it estimates the external financing need of each individual firm, while at the same time controlling for factors that may affect the demand for external capital. Specifically, we calculate for each sample firm the rate at which it can grow, using i) only its internal funds or ii) its internal funds and short-term borrowing. We then compute the extent to which a firm's actual growth rate exceeds each of these two estimated rates and use a simultaneous equation system to explicitly model excess growth rates and disclosure as endogenously determined dependent variables. As an additional sensitivity test, we measure disclosures prior to the measurement of firm growth to avoid the concern of simultaneity bias that may arise if firms with higher externally financed growth disclose more.

Using a sample of 1,436 firm-year observations over an 11-year period from 1984 to 1994, we find that analyst rankings of overall firm disclosure are positively associated with firm growth supported through external financing. These results prevail after controlling for several firm characteristics linked to external financing needs. In addition, the results are robust to alternative model specifications. Overall, we find that disclosure facilitates firm growth. Our finding is consistent with the notion that disclosure affects firm growth by improving a firm's access to lower cost external financing.

Overall, our results add to the growing literature on corporate finance and growth. Recent research emphasizes the role of institutional factors such as a country's legal environment on investment efficiency and growth.[6] For example, Levine and Zervos (1998), Rajan and Zingales (1998), and Demirguc-Kunt and Maksimovic (1998) explore the relation between financial development of countries, industries, and firms, respectively, through their impact on the cost of external financing. However, Stein (2003) notes that investment distortions arising from information asymmetry and agency conflicts can impact growth even in settings where a country's institutions such as the legal, auditing, and contracting environment are "highly evolved." In the spirit of this observation and in contrast to recent studies, this paper focuses on firms in the U.S. where, despite highly

[5] An alternative approach is to focus on corporate investment demand along the lines of Fazzari, Hubbard, and Petersen (1988) and compare the empirical sensitivity of investment to cash flow across a group of firms sorted according to a proxy for disclosure. Given that extant research (e.g., Almeida and Campello (2002), Alti (2003), Cleary (1999), Erickson and Whited (2000), Kaplan and Zingales (1997), and Poterba (1988)) has questioned the meaning of the cash flow sensitivities of investment on theoretical and empirical grounds, we sidestep these issues by focusing on the impact of disclosure on firm growth obtained through external financing. As we indicate later, the approach we use in our study estimates the excess growth made possible by external financing for each firm by directly identifying firms that cannot internally fund their investment.

[6] La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000a) also point to the role of the legal environment as an institutional governance mechanism in limiting wealth expropriation by inside managers and owners at the expense of minority shareholders.

developed legal and other institutions, information asymmetry and agency conflicts can result in investment distortions. This paper extends Demirguc-Kunt and Maksimovic's (1998) methodology to address the influence of disclosure on firm growth.

Our study also complements and extends prior research in two ways. First, prior research largely focuses on the relation between cost of capital and disclosure (Botosan (1997)). However, in the absence of a theoretical pricing model that maps a firm's disclosure level to cost of capital, Lang (1999) contends that we need to seek additional "confirming evidence using alternative approaches" before we can draw conclusions regarding the impact of disclosure policy. This paper addresses this point by linking a firm's growth to its disclosure policy. Furthermore, it also sidesteps the measurement problems associated with a firm's cost of capital. Second, an examination of the relation between cost of capital and disclosure disregards the role of disclosure in mitigating agency problems. Recent research by Bushman and Smith (2001) emphasizes that disclosure policy also affects a firm's cash flows by limiting the managerial diversion of resources as well as other agency conflict-related problems. Therefore, the focus on firm growth provides a more complete measure that captures the theoretical role of a firm's disclosure policy.

The remainder of this paper is organized as follows. In Section II, we elaborate on the role of disclosure and externally financed growth, and develop our testable hypothesis. Section III describes our methodology and data. Section IV presents our empirical findings, and Section V concludes the paper.

II. External Financing, Disclosure, and Growth

Adverse selection costs resulting from information asymmetry can prevent a firm from raising external funds to undertake new investments. Myers and Majluf (1984) argue that firms with shortages of cash flow and liquid assets might actually forgo profitable investment spending rather than issue mispriced securities to fund the investment. Consequently, these firms may have untapped investment opportunities that would increase firm value if sufficient funds could be generated. Prior research also posits that agency conflicts increase the cost of external financing. For example, Myers (1977) posits that managers may forgo positive NPV projects in the presence of risky debt. Given this potential conflict, creditors may price this risk, resulting in a higher cost of borrowing.

Extant theory also posits that an expanded disclosure policy serves to improve firms' access to lower cost external financing by ameliorating information asymmetry and agency conflicts. Verrecchia (1983) points to the role of disclosure in limiting adverse selection costs associated with information asymmetry. More recent research by Bushman and Smith (2003) highlights how disclosure can affect the investments, productivity, and value-added of firms both by lowering the cost of external financing and by reducing agency costs. Under this framework, disclosure not only reduces adverse selection, but also plays a governance role in improving investors' ability to monitor firm performance and to better evaluate managerial performance. The overall implication is that managers

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are more likely to efficiently manage assets in place and invest in positive NPV projects in the presence of a credible and expanded disclosure policy.[7]

To the extent that a firm's disclosure policy mitigates the problems arising from information asymmetry and agency conflicts between managers and outside investors, disclosure improves the efficiency of firms' investments by lowering their cost of external financing. Three points are noteworthy here. First, despite the benefits of an expanded disclosure policy, extant theory points to the existence of an interior optimal level of disclosure. This result is obtained because disclosure can be costly to firms (Verrecchia (1983)). For example, if increased disclosure reveals information to competitors or others who interact strategically with the firm, it may cause the firm to lose competitive advantage or bargaining power (Admati and Pfleiderer (2000)). In the presence of both benefits and costs of disclosure, extant theory suggests that firms will weigh the benefits and costs of disclosure to reach an optimal disclosure level.[8]

Second, prior research indicates that proprietary costs may lead firms to avoid public disclosure of firm-specific information. For example, extant research depicts privately placed debt as inside debt given the close proximity in the relation between the borrower and lender (Bhattacharya and Chiesa (1995), Campbell (1979), and Rajan (1992)). Viewed as such, extant theory posits that borrowers will turn to private debt markets when the costs associated with publicly revealing proprietary (firm-specific) information are substantial. In other words, private debt provides a channel that allows borrowers to benefit from the disclosure of firm-specific information to private debtholders without suffering the adverse consequences of public disclosure.[9]

Third, while an expanded disclosure policy may improve firm access to lower cost financing, the resulting benefit may not be equal across all firms. For example, a firm with sufficient internal resources relative to its investment opportunities is less likely to benefit from an expanded disclosure policy. Alternatively, a firm with limited internal funds relative to its investment opportunities will benefit from an expanded disclosure policy if more disclosure improves the firm's ability to pursue potentially profitable projects by providing access to lower cost external financing.

In summary, extant theory establishes that disclosure will affect firm growth through the external financing channel. Therefore, to empirically evaluate this relation we need to distinguish between a firm's internally and externally financed

[7]Lang and Lundholm (2000) report a dramatic increase in disclosure activity around seasoned equity offerings for a sample of 41 firms. However, firms that substantially increase their disclosure activity in the six months before the offering experience price increases prior to the offering relative to the control firms, but suffer negative returns relative to the control firms subsequent to the announcement, suggesting that the increased disclosure activity for some firms may have been hype that enables them to attain a lower cost of equity capital.

[8]Consistent with the existence of an optimal level of disclosure, prior empirical studies show that the level of voluntary disclosure is associated with the costs and benefits of disclosure. For example, Lang and Lundholm (1993) find that the level of disclosure is positively related to the level of information asymmetry. Similarly, Bamber and Cheon (1998) find that disclosure levels decline with proprietary and litigation costs.

[9]The empirical implication is that the effect of disclosure on externally financed growth may be related to the type of external financing. In Section IV.D, we conduct additional analysis to test this implication.

growth rates. If disclosure supports a higher growth rate through the external financing channel, then we should observe a positive association between the externally financed growth rate and the level of firm disclosure. The testable hypothesis can be stated (in the alternate form) as follows.

H1. A firm's externally financed growth rate is positively associated with the level of disclosure, ceteris paribus.

III. Methodology and Data

A. Empirical Model

Our hypothesis that externally financed growth and disclosure are positively related is based on the theoretical argument that an expanded disclosure policy improves firms' access to lower cost external financing. It is plausible that firms that are growing and performing well may also be more forthcoming in their disclosures compared to firms that are doing poorly. To the extent that these cause and effect relations are feasible, disclosure and externally financed growth variables are likely to be jointly determined. To account for the simultaneity, we estimate the relation between disclosure and externally financed growth (EFG) using the following simultaneous equation system,[10]

$$\begin{aligned}(1)\qquad \mathrm{DISCL}_{it} &= \delta_0 + \delta_1 \mathrm{LMVE}_{it} + \delta_2 \mathrm{CORR}_{it} + \delta_3 \mathrm{ROA}_{it} + \delta_4 \mathrm{STD}_{it} \\ &\quad + \delta_5 \mathrm{DISCL}_{it-1} + \delta_6 \mathrm{EFG}_{it} + u_{it},\end{aligned}$$

$$\begin{aligned}(2)\qquad \mathrm{EFG}_{it} &= \alpha + \beta_1 \mathrm{DISCL}_{it} + \beta_2 \mathrm{DIV}_{it}/\mathrm{TA}_{it} + \beta_3 \Delta \mathrm{NI}_{it}/\mathrm{NS}_{it} \\ &\quad + \beta_4 \Delta \mathrm{NS}_{it}/\mathrm{TA}_{it} + \beta_5 \mathrm{LOG_TA}_{it} \\ &\quad + \beta_6 \mathrm{Q}_{it} + \beta_7 \mathrm{FIN}_{it}/\mathrm{TA}_{it} + e_{it},\end{aligned}$$

where DISCL is a measure of a firm's overall level of disclosure; LMVE is the log of market value of equity (a proxy for size); CORR is the historical correlation between annual returns and earnings computed over the preceding 10 years (a proxy for information asymmetry); ROA is return on assets (a proxy of performance); STD is standard deviation of annual market-adjusted stock returns over the preceding five years (a proxy for performance variability); EFG is a measure to capture growth made possible by external financing; DIV/TA is total dividends/total assets; NI/NS is earnings after interest and taxes/net sales; NS/TA is net sales/total assets; LOG_TA is the natural log of total assets; Q is Tobin's Q; and FIN/TA is equity and debt issuances/total assets.

All variables (except EFG) in models (1) and (2) are averaged over the same time span over which EFG is computed. Model (1) specifies disclosure policy as a function of firm growth, lagged values of the disclosure score, and four other variables that prior research indicates are related to disclosure. Larger firms tend to disclose more because of greater demand for information; hence, the coefficient

[10]We also perform two specification checks for alternative control variables in the disclosure regression. First, we include a dummy variable equal to one for whether a firm issued equity or debt in the current year, and zero otherwise. Second, we exclude performance variability from our regression model. The results are not sensitive to any of these variations.

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on LMVE is expected to be positive. Lang and Lundholm (1993) find a negative relation between the level of the earnings-returns correlation and the firm's disclosure level and suggest that disclosures tend to be high when earnings fail to capture valuation-relevant information. Hence, the coefficient on the variable CORR is expected to be negative.

Disclosure may be positively related to firm performance in the face of adverse selection. That is, firms that exceed a certain profitability threshold will disclose more, while those below the threshold will disclose less. Hence, the coefficient on the variable ROA is expected to be positive. Similarly, performance variability may lead to improved disclosure because it increases a firm's vulnerability to legal action (Lang and Lundholm (1993)). Hence, the coefficient on the variable STD is expected to be positive.

Model (2) uses a firm's externally financed growth rate as a dependent variable and regresses it on a set of firm characteristics related to both external financing needs and our test variable proxying for firm-level disclosure. Because H1 predicts a positive relation between disclosure and externally financed growth, the variable DISCL is expected to have a positive sign in our regression model (2). An advantage of the two-stage least squares (2SLS) estimation is that it yields consistent parameter estimates because the fitted values of DISCL using all exogenous variables in equations (1) and (2) are uncorrelated with the error term in model (2).

Demirguc-Kunt and Maksimovic (1998), (2002) point out that at present we do not have an explicit theoretical model that links firm characteristics to externally financed growth. In the absence of such a model, the variables in model (2) attempt to control for factors that can influence externally financed growth, our dependent variable, in two ways. First, we control for factors that capture the availability of internal and external funds. The more the internal funds, the lower the demand for external sources of funds. Second, we control for factors that reflect the level of growth opportunities.

In regression model (2), the variables DIV/TA, ΔNS/NA, ΔNI/NS, LOG_TA, and FIN/TA control for the extent of availability of internal/external funds, while the variable, Tobin's Q controls for growth opportunities. Firms that pay more dividends (as a proportion of total assets) (DIV/TA) are viewed to have excess cash relative to their investment needs (Demirguc-Kunt and Maksimovic (1998)). In our context, the implication is that externally financed growth is likely to be smaller for firms with higher values of DIV/TA; hence, the coefficient on the variable DIV/TA is expected to be negative.

Following prior research, we also control for changes in firm performance, namely, changes in profit margin and asset turnover.[11] Fairfield and Yohn (2001) note that "profit margin measures firms' ability to control the costs incurred to generate revenues" (p. 372). As such, an increase in profit margin is expected to contribute to the available level of internal funds and hence the level of inter-

[11] Fairfield and Yohn (2001) hypothesize that the specific mix of asset turnover and profit margin is not useful in predicting future profitability because the levels of these ratios are in part the product of a firm's operating strategy. Consistent with their hypothesis, they find that it is the change in asset turnover and change in profit margins (and not the level of asset turnover and profit margin) that is useful in forecasting changes in return on assets one year ahead.

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nally financed firm growth. Conversely, an increase in profit margin reduces the demand for external funds and contributes to a lower level of externally financed firm growth. We anticipate a negative coefficient on the change in profit margin (ΔNI/NS).

Fairfield and Yohn (2001) also note that asset turnover measures a firm's ability to generate revenues from its assets. To the extent that a change in asset turnover influences a firm's ability to generate sales from its assets in place, a change in asset turnover should contribute to realized total growth as well as the level of internally financed firm growth. Recall that externally financed firm growth is estimated as the difference between the realized total firm growth and internally financed firm growth. Because a change in asset turnover influences both the realized total growth and internally financed firm growth, the impact of asset turnover on externally financed firm growth cannot be unambiguously determined. Hence, we do not predict a sign for the coefficient on change in asset turnover (ΔNS/TA).

Larger firms are more likely to grow at rates that could be financed without access to long-term credit or to stock markets. Hence, the larger the firm size, the smaller the firm's externally financed growth. Hence, the coefficient on the variables, LOG_TA, is expected to be negative. In contrast, firms with greater reliance on external financing as proxied by the amount of equity and debt raised as a proportion of their total assets (FIN/TA) are likely to exhibit more externally financed growth. Hence, the coefficient on FIN/TA is expected to be positive.

Firms with more growth opportunities tend to utilize external financing to pursue potentially profitable projects. To the extent that this is true, firms with more growth opportunities should exhibit more externally financed growth. Following prior research (e.g., La Porta et al. (2000)), we use Tobin's Q as a proxy for growth opportunities and measure Tobin's Q as the sum of market value of equity plus assets minus the book value of equity deflated by total assets. The greater the value of Tobin's Q, the greater the externally financed growth. Hence, the expected sign for the variable Tobin's Q is positive.

B. Measurement of Externally Financed Growth

To empirically measure externally financed growth, we start with Demirguc-Kunt and Maksimovic's (1998) implementation of a firm-based financial planning model to estimate the maximum rate of growth that can be financed internally. Specifically, we compute firm growth that can be achieved by relying either on internal cash flows or short-term borrowing. For each firm, we then compute the difference between the realized rate of growth and the two measures of constrained growth. This difference reflects the level of growth realized through external financing. Demirguc-Kunt and Maksimovic (1998) interpret the growth rate exceeding the constrained growth rate as evidence of external financing of marginal investment.

A firm's external financing need depends on both the availability of internal funds as well as investment opportunities.[12] Therefore, a firm's need for external

[12] It should also be noted that firms' internal cash flows and investment opportunities are endogenously determined. For example, a firm's internal cash flow depends on the profitability generated

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financing must take into account both of these factors. Following Demirguc-Kunt and Maksimovic (1998), (2002), we estimate a firm's externally financed growth using its "percentage of sales" approach to financial planning. Three points are worth noting about this approach. First, the ratio of assets used in production to sales is assumed to be constant. The upshot here is that the total investment required will be positively related to a firm's growth in sales. Second, the firm's profit rate per unit of sales is assumed to be constant. Finally, we assume economic depreciation is equal to the depreciation amount reported in firms' financial statements. As a consequence, the external financing needs of a firm at time t can be expressed as

$$\text{EFN}_t = [g_t * A_t] - [(1 + g_t) * (E_t * b_t)], \tag{3}$$

where EFN_t is a measure of external financing need, g_t is firm growth at time period t, A_t is firm assets at time period t, b_t is the proportion of the firm's earnings that are retained for reinvestment at time t, and E_t is earnings after interest and taxes at time t.

The expression on the right-hand side represents the difference between the required investment for a firm growing at g_t percent less the internally available capital for investment.

Using the model in (3), we compute two measures of constrained growth denoted as the internally financed growth rate (IG) and the short-term financed growth rate (SFG). SFG represents a less conservative estimate of a firm's constrained growth rate. The estimated IG variable represents the maximum growth rate that can be attained if a firm strictly relies only on its internal resources and the payout ratio is assumed to be constant. To estimate IG, we set EFN_t to zero and compute the variable g_t using equation (3). The resulting growth rate reduces to the following equation,

$$\text{IG}_t = (\text{ROA}_t * b_t)/(1 - \text{ROA}_t * b_t), \tag{4}$$

where ROA_t is the ratio of earnings after interest and taxes to assets.[13] As Demirguc-Kunt and Maksimovic (1998) point out, IG_t is convex and increasing in the firm's return on assets. This implies that greater profitability from assets in place supports higher growth rates.

We also estimate a second constrained growth measure, SFG_t. This estimated growth rate represents the maximum growth rate of a firm attained through both internal cash flows and short-term debt. The amount of short-term borrowing undertaken is restricted such that the short-term debt to assets ratio is maintained. The purpose of this restriction is to ensure that the growth estimate is feasible for the underlying firms involved. The shortcoming of this assumption is that it does not completely capture a firm's short-term borrowing capacity. The growth estimate, SFG_t, is obtained by first setting the variable b_t in equation (3) to one.

from its assets in place. With respect to investments, Demirguc-Kunt and Maksimovic (1998) posit that firms in capital intensive industries may require larger investments to grow.

[13] We use earnings after interest and taxes to assets to measure how much of the net income is generated from total assets and captures the extent of resources that are available internally within the firm.

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This implies that the payout ratio is zero. Given that external financing is limited such that the short-term debt to asset ratio is constant and that the dividend payout ratio is zero, the implied growth rate of the firm is expressed in equation (5) as

$$\text{SFG}_t = \text{ROLTC}_t/(1 - \text{ROLTC}_t), \tag{5}$$

where ROLTC_t is the ratio of earnings after interest and taxes to long-term capital.[14]

Following Demirguc-Kunt and Maksimovic (1998), for each firm we calculate the difference between its realized sales growth rate in the year of the disclosure measurement and its predicted internally financed growth rate, and denote it as EXCESS_IG. Similarly, for each firm we calculate the difference between its realized sales growth rate and its predicted short-term financed growth rate, and denote it as EXCESS_SFG.

Following Demirguc-Kunt and Maksimovic (1998), we also compute two metrics analogous to the two continuous metrics, EXCESS_IG and EXCESS_SFG, to reduce the effect of outliers. Specifically, for each firm we calculate the proportion of years in which its realized sales growth rate in three consecutive years exceeds its predicted internally financed growth rate, and denote it as PROP_IG.[15] Similarly, for each firm we calculate the proportion of years in which its realized sales growth rate in three consecutive years exceeds its predicted short-term financed growth rate, and denote it as PROP_SFG.

C. Test Variable

The test variable, DISCL, represents the analyst evaluations of corporate public disclosure. These scores are obtained from the annual volumes of the Report of the Corporate Information Committee (CIC) published by the Financial Analysts Federation branch of the AIMR. To evaluate the quality of corporate disclosures, CIC first forms subcommittees for a select group of industries. Each subcommittee is then completed with analysts specializing in that industry. The documents examined by each analyst within a subcommittee include annual reports, 10-Ks, quarterly reports, proxy statements, and other published information such as press releases and fact books, as well as less formal disclosures through meetings and responses to analyst inquiries (for each selected firm within that industry). For uniformity of evaluation across industries as well as firms, CIC provides a list of criteria that is to be used to evaluate corporate disclosures. The final disclosure scores for each corporation represent a consensus judgment of analysts in the industry to which the corporation belongs. Prior studies use the AIMR disclosure scores as a comprehensive measure of a firm's disclosure policy (e.g., Lang and Lundholm (1993), (1996), Sengupta (1998)).

[14] Following Demirguc-Kunt and Maksimovic, we denote the assets of the firm not financed by short-term debt as "long-term capital," which is obtained by multiplying a firm's total assets by one minus the ratio of short-term liabilities to total assets.

[15] To examine the robustness of our results to our choice of computing proportions over a three-year period, we repeat our analysis by computing proportions over two and four years, and find that the three-year cut-off is not critical for our results on the relation between externally financed growth and level of disclosure.

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The AIMR score is a weighted combination of scores based on evaluations of the three aspects of a firm's disclosure policy: annual published information, quarterly and other published information, and investor relations and related aspects. The benefit of using the scores assigned by the analysts is that they provide a ready off-the-shelf measure that is widely used in prior research as a comprehensive measure of corporate disclosure practices.[16] These scores reflect analysts' evaluations of the timeliness, detail, and clarity of information presented (Sengupta (1998)). Lang and Lundholm (1996) note that the scores quantify qualitative disclosure (e.g., new product announcements, management discussion, and analysis) and disclosure that may not have been reflected in published financial statements (e.g., conference calls to analysts). Therefore, our disclosure metric provides a comprehensive evaluation of a firm's disclosure policy.

While each committee uses a standardized template to rate disclosure, they often tailor the disclosure scores to the unique characteristics of their industries (Botosan and Plumlee (2002)). To make AIMR scores comparable across industries, we follow prior research (e.g., Healy et al. (1999), Botosan and Plumlee (2002)) and convert raw AIMR disclosure scores to within industry/year ranks, defined as the rank of a given firm's total disclosure score divided by the number of observations that have nonmissing values of the ranking variable. We rank firms in ascending order, such that firms providing higher levels of disclosure receive higher ranks.[17] Thus, a higher DISCL value reflects a more expanded disclosure policy. As discussed previously, the higher the disclosure ranks, the greater the externally financed growth. Hence, our hypothesis predicts a positive sign for disclosure rank.

D. Data

Our sample selection begins with the firm-year observations included in the AIMR Reports dated from 1982 through 1994. We require data on Compustat to compute variables necessary to estimate regression models (1) and (2) as described above. Eliminating these observations from the sample selection process yields a final sample of 1,436 firm-year observations, with a minimum of 94 observations in 1987 and a maximum of 162 observations in 1990.

IV. Empirical Results

A. Descriptive Statistics

Panel A of Table 1 reports descriptive statistics for the dependent, test, and control variables. The mean and median values of EXCESS_IG are 0.01 and

[16] Examples of studies that use these disclosure scores as a measure of firms' disclosure policies include Bamber and Cheon (1998), Botosan and Plumlee (2002), Healy, Hutton, and Palepu (1999), Lang and Lundholm (1993), (1996), Sengupta (1998), and Welker (1995).

[17] Nagar, Nanda, and Wysocki (2003) note that this ranking procedure produces larger differences between percentiles for small than for large industries. For example, in an industry with only two firms, one will have a disclosure score of 1.0 and the other 0.0, whereas if those firms were in an industry with many firms, their values would probably be less extreme. We replicated all our tests using raw AIMR disclosure scores instead of the ranked disclosure scores and our results are robust to the use of raw disclosure scores.

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−0.01, respectively, suggesting that some sample firms grow much faster than their internal growth rate constraint. The mean value of EXCESS_SFG is −0.02. The interquartile range of EXCESS_SFG suggests that there is variation in the extent to which firms grow faster than their short-term financed growth rate. The variable PROP_IG provides an estimate of the proportion of years in which a firm grows faster than our estimate of IG, the maximum internally financed growth rate. Analogously, PROP_SFG provides an estimate of the proportion of years in which a firm grows faster than our estimate of SFG, the maximum short-term financed growth rate. A comparison of the mean values of PROP_IG and PROP_SFG can highlight the relative importance of internal funds and short-term debt in providing capital for growth. Thus, a mean value of PROP_IG of 0.48 indicates that for 48% of firm-years, a firm's realized growth exceeds its estimated growth using internal funds. Of these, 11% could finance their realized growth entirely using short-term debt.

Our test variable, DISCL, represents the overall level of firm disclosure and is a rank of the total AIMR disclosure score based on a within industry/year ranking. The mean value for DISCL is 0.57. The DISCL variable exhibits considerable variation across the sample, as evidenced by the interquartile range.

On average, dividends for our sample firms constitute 3% of the total assets and change in profit margin (ΔNI/TA) is −0.01. The mean changes in asset turnover (ΔNS/TA) is −0.02%. Median firm size in terms of assets is $2,612.23 million, indicating that our average sample firm is large. The firm size ranges from $1,121.25 million in the lower quartile to over $6,118 million in the upper quartile. The mean and median values of Tobin's Q are 1.69 and 1.43, respectively. External debt and equity issuances, on average, constitute 8% of total assets.

B. Correlations

Panel B of Table 1 presents Spearman correlations among independent variables used in model (2). The correlations between DISCL and control variables are relatively low, ranging from 0.09 to −0.03. Consistent with the results of Lang and Lundholm (1996), disclosure policy is significantly positively related to firm size (LOG_TA). Although many of the pairwise correlations among the control variables are significant, all of the correlations are considerably below the 0.80 threshold suggested by Judge, Griffith, Hill, and Lee ((1980), p. 459) as indicative of a serious collinearity problem. In addition, other diagnostic measures indicate that collinearity is *not* a significant problem in interpreting the regression results. For example, the highest variance inflation factor (VIF) of ordinary least squares (OLS) yearly regressions for any control variable is 2.08 (for the DIV/TA variable) and the highest VIF for the test variable DISCL in *any* of the regressions is only 1.06, which is much lower than the threshold level of 10 that might indicate a collinearity problem (Neter, Kutner, Nachtsheim, and Wasserman (1996)). [18]

[18]The variance inflation factor (VIF) measures the interrelationship between the explanatory variables and is considered preferable to examining pairwise correlations in testing for collinearity (Neter et al. (1996)). For each of our regressions, we evaluate the sensitivity of our findings to influential observations by calculating the studentized residual for each observation (Belsley, Kuh, and Welsch (1980)). When observations with studentized residuals in excess of the absolute value of three are dropped and the regressions reestimated, the results are similar to those reported in the paper. For

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TABLE 1

Summary Statistics

All variables except EXCESS_IG, EXCESS_SFG, PROP_IG, and PROP_SFG are averaged over three years covering the same time span over which PROP_IG and PROP_SFG are computed.

EXCESS_IG = Difference between a firm's actual sales growth rate and its predicted internally financed growth rate. For each firm, the predicted internally financed growth rate is defined as ROA $*$ $b/(1 - \text{ROA} * b)$, where ROA is the ratio of earnings after taxes and interest to assets, and b is the proportion of the firm's earnings that are retained for reinvestment.

EXCESS_SFG = Difference between a firm's actual sales growth rate and its predicted short-term financed growth rate. For each firm, the predicted short-term financed growth rate is defined as ROLTC$/(1 -$ ROLTC), where ROLTC is the ratio of earnings after tax and interest to long-term capital.

PROP_IG = Proportion of years in which a firm's actual sales growth rate in three consecutive years exceeds its predicted internally financed growth rate. For each firm, the predicted internally financed growth rate is defined as ROA $*$ $b/(1 - \text{ROA} * b)$, where ROA is the ratio of earnings after taxes and interest to assets, and b is the proportion of the firm's earnings that are retained for reinvestment.

PROP_SFG = Proportion of years in which a firm's actual sales growth rate in three consecutive years exceeds its predicted short-term financed growth rate. For each firm, the predicted short-term financed growth rate is defined as ROLTC$/(1 -$ ROLTC), where ROLTC is the ratio of earnings after tax and interest to long-term capital.

DISCL = Rank of the total disclosure score (obtained from the annual volumes of the report of the Financial Analysts Federation Corporate Information Committee) based on a within industry/year ranking.

DIV/TA = Total dividends divided by total assets.

NI/NS = Earnings after interest and taxes divided by net sales.

NS/TA = Net sales divided by total assets.

LOG_TA = Natural log of total assets.

Tobin's Q = (Market value of equity − book value of equity + total assets)/total assets.

FIN/TA = (Issuance of equity + issuance of debt)/total assets.

Δ = Change in the variable relative to the previous year.

Panel A. Descriptive Statistics

Variable	N	Mean	STD	Lower Quartile	Median	Upper Quartile
EXCESS_IG	1,436	0.01	0.15	−0.06	−0.003	0.064
EXCESS_SFG	1,436	−0.02	0.17	−0.09	−0.027	0.046
PROP_IG	1,436	0.48	0.34	0.33	0.33	0.67
PROP_SFG	1,436	0.37	0.34	0.00	0.33	0.67
DISCL	1,436	0.57	0.24	0.37	0.58	0.77
DIV/TA	1,436	0.03	0.02	0.01	0.02	0.03
ΔEBIT/TA	1,436	−0.01	0.04	−0.01	0.00	0.01
ΔNS/TA	1,436	−0.02	0.07	−0.05	−0.01	0.03
TA ($ in mill.)	1,436	5,083.77	6,768.36	1,121.25	2,612.23	6,118.10
Tobin's Q	1,436	1.69	0.78	1.16	1.43	1.98
FIN/TA	1,436	0.08	0.08	0.03	0.05	0.10

Panel B. Spearman Correlation

Variable	DISCL	DIV/TA	ΔEBIT/TA	ΔNS/TA	LOG_TA	Tobin's Q	FIN/TA	PROP_IG
DIV/TA	0.04							
ΔEBIT/TA	−0.01	0.08***						
ΔNS/TA	−0.03	−0.03	0.11***					
LOG_TA	0.09***	0.03	0.01	−0.09***				
Tobin's Q	0.04*	−0.23***	0.18***	−0.07**	−0.05*			
FIN/TA	0.07***	−0.16***	−0.11***	−0.16***	0.04*	−0.14***		
PROP_IG	0.11***	−0.52***	−0.04	0.16***	−0.04	−0.22***	0.20***	
PROP_SFG	0.05**	−0.56***	−0.09***	0.17***	−0.01	−0.35***	0.31***	0.80***

*, **, *** significant at the 10%, 5%, or 1% level (two-tailed test), respectively.

C. Regression Results

Table 2 presents 2SLS regression results using PROP_IG as the dependent variable.[19] We do not use a pooled, time-series, cross-sectional model because in a pooled regression the *t*-statistics may be biased upward due to positive cross-

each of our regressions, the null hypothesis of homoskedasticity could *not* be rejected using the White (1980) test at the 0.10 level. To check whether the relation between our test variable DISCL and the dependent variable is nonlinear, we plotted the residuals against DISCL but the plots did not show a nonlinear pattern.

[19] Instrumental variables estimation of DISCL to extract the endogenous effect of disclosure yields an average adjusted R^2 of 0.43 for the 11 years.

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correlations in the residuals.[20] Rather, we estimate annual cross-sectional regressions from 1984 through 1994 and use the estimated slope coefficients for the 11 yearly regressions to obtain an across-year mean coefficient for each variable. Consistent with the prior literature (Bernard (1987)), tests of significance for the time-series mean parameter estimates are based on $Z1$ and $Z2$ statistics.[21]

The adjusted R^2s for model (2) range from 0.15 to 0.39. All yearly coefficients of DIV/TA are negative, indicating that high dividends are associated with lower rates of externally financed growth. Similarly, all the yearly coefficients of ΔNS/TA are positive, suggesting that rates of growth that exceed the predicted internally financed growth rate correlate positively with the change in asset turnover. All but four of the yearly coefficients for ΔNI/NS are negative, suggesting that firms with larger increases in profit margin are less likely to grow at rates that require them to obtain external financing. Six yearly coefficients for LOG_TA are negative. The negative sign on LOG_TA indicates that large firms tend to grow at rates that can be financed without access to external financing. In contrast, all but two of the yearly coefficients of Tobin's Q and all but one of the yearly coefficients of FIN/TA are positive and in the expected direction. For most years, the coefficients on Tobin's Q and FIN/TA are also statistically significant, indicating that the growth opportunities and reliance on external capital are positively associated with rates of growth that exceed the predicted internally financed growth rate. Both the $Z1$ and the $Z2$ test statistics indicate that DIV/TA, ΔNS/TA, LOG_TA, Tobin's Q, and FIN/TA are statistically significant at the 0.05 level.

Our main interest, in terms of H1, is whether DISCL is positively associated with the rates of growth that exceed the rate predicted by the use of internal funds. All yearly coefficients of DISCL are positive. For six years, these coefficients are also statistically significant. Both the $Z1$ and the $Z2$ test statistics indicate that the coefficient on DISCL is statistically significant at the 0.01 level.[22] The implication is that an expanded firm disclosure policy is positively associated with rates of growth that require external financing. In other words, our finding is consistent with the notion that disclosure affects firm growth by providing access to lower cost external financing.

Table 3 presents 2SLS regression results on both a yearly basis and an across-years significance test, using EXCESS_SFG as the dependent variable. Recall that EXCESS_SFG is the excess of a firm's realized sales growth rate and its predicted short-term financed growth rate. The across-years significance tests

[20]The untabulated results for the pooled regression are similar to the results for the cross-sectional regressions reported in this paper.

[21]$Z1$ and $Z2$ statistics test whether the time-series mean t-statistic equals zero,

$$Z1 = \frac{1}{\sqrt{N}} \sum_{j=1}^{N} \frac{t_j}{\sqrt{k_j/(k_j-2)}} \quad \text{and} \quad Z2 = \frac{\bar{t}}{\text{stddev}(t)/\sqrt{(N-1)}},$$

where t is the t-statistic for year j, k is the degrees of freedom for year j, and N is the number of years. $Z1$ assumes independence in the annual t-statistics whereas $Z2$ corrects for potential lack of independence.

[22]We also test for an alternative specification in which FIN/TA is interacted with DISCL. The coefficient on the interaction term is positive and statistically significant at the 0.01 level, suggesting that firms that disclose more and access external markets exhibit higher externally financed growth rates.

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TABLE 2

Regression Results
Dependent Variable: Firms Growing Faster than Predicted Internally Financed Growth Rate

$$\text{PROP_IG}_i = \alpha + \beta_1 \text{DISCL}_{it} + \beta_2 \text{DIV}_{it}/\text{TA}_{it} + \beta_3 \Delta\text{NI}_{it}/\text{NS}_{it} + \beta_4 \Delta\text{NS}_{it}/\text{NFA}_{it} + \beta_5 \text{LOG_TA}_{it} + \beta_6 \text{Tobin's Q}_{it} + \beta_7 \text{FIN}_{it}/\text{TA}_i + e_{it}$$

Regressions are estimated using two-stage least squares. The instrumental variables for DISCL are lagged DISCL, log of market value of equity, historical correlation between annual returns and earnings computed over the preceding five years, return on assets, and standard deviation of annual market-adjusted stock returns. All independent variables are averaged over three years covering the same time span over which PROP_IG is computed. Mean parameter estimates use the 11 coefficient estimates from the yearly OLS regressions to obtain an across-year mean and *t*-statistics. *Z*1 and *Z*2 statistics test whether the time-series mean *t*-statistic equals zero,

$$Z1 = \frac{1}{\sqrt{N}} \sum_{j=1}^{N} \frac{t_j}{\sqrt{k_j/(k_j-2)}} \quad \text{and} \quad Z2 = \frac{\bar{t}}{\text{stddev}(t)/\sqrt{N-1}},$$

where t is the t-statistic for year j, k is the degrees of freedom for year j, and N is the number of years.

PROP_IG = Proportion of years in which a firm's actual sales growth rate in three consecutive years exceeds its predicted internally financed growth rate. For each firm, the predicted internally financed growth rate is defined as ROA $*$ b/(1 − ROA $*$ b), where ROA is the ratio of earnings after taxes and interest to assets, and b is the proportion of the firm's earnings that are retained for reinvestment.
DISCL = Rank of the total disclosure score (obtained from the annual volumes of the report of the Financial Analysts Federation Corporate Information Committee) based on a within industry/year ranking.
DIV/TA = Total dividends divided by total assets.
NI/NS = Earnings after interest and taxes divided by net sales.
NS/TA = Net sales divided by total assets.
LOG_TA = Natural log of total assets.
Tobin's Q = (Market value of equity − book value of equity + total assets)/total assets.
FIN/TA = (Issuance of equity + issuance of debt)/total assets.
Δ = Change in the variable relative to the previous year.

			Parameter Estimates (t-statistic in parentheses)							
Year	Adj. R^2	N	Intercept	DISCL	DIV/TA	ΔEBIT/NS	ΔNS/TA	LOG_TA	Tobin's Q	FIN/TA
			Δ	+	−	−	Δ	−	+	+
1984	0.15	114	1.179 (4.32)***	0.0963 (0.76)	−5.3476 (−3.57)***	0.1316 (0.30)	0.4585 (1.15)	−0.0769 (−2.35)***	−0.0838 (−1.44)*	0.0278 (0.08)
1985	0.29	112	0.8517 (3.43)***	0.3501 (2.80)***	−9.3138 (−5.86)***	−0.6349 (−0.85)	0.4358 (1.10)	−0.0747 (−2.53)***	0.1301 (1.90)**	0.0303 (0.20)
1986	0.31	119	0.7945 (3.65)***	0.0954 (0.92)	−10.1179 (−7.00)***	0.6987 (1.19)	0.7701 (2.22)**	−0.0334 (−1.38)*	0.1019 (2.14)**	0.1528 (1.53)*
1987	0.27	94	0.3771 (1.56)	0.1696 (1.37)*	−7.8369 (−4.33)***	−3.4381 (−2.35)***	0.5267 (1.58)*	0.0101 (0.37)	0.0699 (1.42)*	0.1813 (0.66)
1988	0.35	112	0.7941 (3.91)***	0.1293 (1.20)	−11.5766 (−6.05)***	−1.4829 (−1.69)*	0.7819 (2.59)***	−0.0359 (−1.58)*	0.1457 (2.67)**	0.6031 (2.28)***
1989	0.30	132	0.5917 (3.01)***	0.2226 (2.06)**	−6.5107 (−5.17)***	−1.8273 (−1.57)*	0.8505 (2.82)***	0.0018 (0.08)	−0.0318 (−0.72)	0.6591 (2.87)***
1990	0.28	162	0.5801 (3.10)***	0.0761 (0.75)	−9.9954 (6.16)***	−1.0498 (−1.17)	0.6699 (2.33)***	0.0114 (0.53)	0.0398 (1.02)	0.5044 (1.48)*
1991	0.25	159	0.3247 (1.72)**	0.0621 (0.59)	−9.9909 (−6.20)***	1.2545 (0.60)	0.7784 (1.45)*	0.0228 (1.11)	0.0759 (1.32)*	0.8866 (1.97)**
1992	0.29	158	0.3674 (2.19)**	0.1315 (1.53)*	−8.9696 (−5.82)***	0.5229 (1.48)	0.4443 (1.96)**	0.0222 (1.01)	0.0423 (2.07)**	0.4111 (2.51)***
1993	0.34	143	0.6009 (3.32)***	0.1504 (1.64)**	−10.1417 (−7.09)***	−1.3336 (−1.56)*	0.2142 (0.49)	−0.0126 (−0.59)	0.0529 (1.66)**	0.3886 (1.32)*
1994	0.39	131	1.0973 (5.09)***	0.1529 (1.52)*	−10.1638 (−6.18)***	−0.5937 (−1.21)	1.1054 (2.21)**	−0.0468 (−1.91)**	0.0111 (0.28)	−0.1556 (−0.83)
Mean			0.6871	0.1488	−9.0877	−0.7048	0.6396	−0.0193	0.0504	0.3354
*Z*1			(9.71)***	(4.53)***	(−17.45)***	(−1.71)**	(5.48)***	(−1.99)**	(3.39)***	(3.87)***
*Z*2			(10.35)***	(6.69)***	(−18.94)***	(−1.49)*	(8.76)***	(−1.69)**	(3.06)***	(3.88)***

*, **, *** significant at the 10%, 5%, or 1% level (one-tailed test except where the sign is not predicted), respectively.

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in Table 3 indicate that all control variables except LOG_TA and Tobin's Q are associated with rates of growth that exceed short-term debt financed growth. Our main interest is in whether a higher level of disclosure is associated with realized rates of growth that exceed the estimated rate of growth using internal funds and short-term debt. Hence, our focus is on the DISCL variable. If, in fact, disclosure policy allows firms to better pursue potentially profitable projects using external funds, then we should observe a positive relation between the level of disclosure and externally financed growth. The test variable DISCL is significant with the predicted positive sign indicating that a higher disclosure level is associated with more externally financed growth.

Lang and Lundholm (2000) suggest that, for some firms, disclosure can have a more insidious effect in that it helps less deserving firms to window-dress and hype their stock price and thereby issue new capital at a lower cost. Therefore, a potential concern with the observed positive relation between externally financed growth and disclosure is that it does not distinguish between firms that access external funds to grow faster because their disclosure gains them access to capital markets, or because they manage disclosures to hype the stock to attain lower cost equity capital. However, the "hyping" argument should bias against finding a relation between an externally financed growth rate and disclosure.

To shed light on this issue, we partition our sample into two groups such that the incentives to manage disclosures vary across the two groups. Theory suggests that external financing is particularly important if a firm has growth opportunities outstanding and if these growth opportunities cannot be financed sufficiently by a firm's internal funds. Toward this end, we first identify those sample firms that issued equity in a given year.[23] Following Korajczyk and Levy (2003), we then classify these sample firms into financially constrained and unconstrained subsamples using the median value of Tobin's Q and reestimate model (2) for each subsample. Our expectation is that the positive relation between externally financed growth and disclosure should be more pronounced for our financially constrained subsample.[24]

When we use PROP_IG as the dependent variable, the coefficient on DISCL for the financially constrained subsample is higher than the coefficient on DISCL for the financially unconstrained subsample (0.3065 versus 0.2111) and the difference is statistically significant at the 0.01 level. When we repeat the analysis with PROP_SFG as the dependent variable, the coefficient on DISCL for the financially constrained subsample is higher than the coefficient on DISCL for the financially unconstrained subsample (0.1228 versus 0.0406), and again the difference is sta-

[23]Our focus on this set of firms is based on prior research that finds that firms manage earnings/disclosure prior to raising funds through external equity issuance. For example, Teoh, Welch, and Wong (1998a), (1998b) show that firms manage their earnings upward to boost share prices prior to initial public offerings (IPO) as well as secondary equity offerings (SEO), and that the stock price corrects itself in the periods following the IPO and SEO. In contrast, Lang and Lundholm (2000) focus on disclosure and find that firms that maintain a consistent disclosure level do not exhibit an unusual return behavior relative to the control firms subsequent to an equity offering announcement. However, firms that altered their disclosure policy to "hype" their stock prior to equity issuance suffer a decline in value in the period following the equity issuance.

[24]Financially constrained firms with a higher level of disclosure should be able to realize more externally financed growth. Furthermore, for financially constrained firms, the incentive to use disclosure as a means to obtain lower cost external financing should dominate any other competing incentives.

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TABLE 3

Regression Results
Dependent Variable: Firms Growing Faster than Predicted Short-Term Financed Growth Rate

$$\text{PROP_SFG}_i = \alpha + \beta_1 \text{DISCL}_{it} + \beta_2 \text{DIV}_{it}/\text{TA}_{it} + \beta_3 \Delta\text{NI}_{it}/\text{NS}_{it} + \beta_4 \Delta\text{NS}_{it}/\text{NFA}_{it} + \beta_5 \text{LOG_TA}_{it} + \beta_6 \text{Tobin's Q}_{it} + \beta_7 \text{FIN}_{it}/\text{TA}it + e_{it}$$

Regressions are estimated using two-stage least squares. The instrumental variables for DISCL are lagged DISCL, log of market value of equity, historical correlation between annual returns and earnings computed over the preceding five years, return on assets, and standard deviation of annual market-adjusted stock returns. All independent variables are averaged over three years covering the same time span over which PROP_SFG is computed. Mean parameter estimates use the 11 coefficient estimates from the yearly OLS regressions to obtain an across-year mean. *Z*1 and *Z*2 statistics test whether the time-series mean *t*-statistic equals zero,

$$Z1 = \frac{1}{\sqrt{N}} \sum_{j=1}^{N} \frac{t_j}{\sqrt{k_j/(k_j-2)}} \quad \text{and} \quad Z2 = \frac{\bar{t}}{\text{stddev}(t)/\sqrt{N-1}},$$

where t is the t-statistic for year j, k is the degrees of freedom for year j, and N is the number of years.

PROP_SFG = Proportion of years in which a firm's actual sales growth rate in three consecutive years exceeds its predicted short-term financed growth rate. For each firm, the predicted short-term financed growth rate is defined as ROLTC/(1 − ROLTC), where ROLTC is the ratio of earnings after tax and interest to long-term capital.
DISCL = Rank of the total disclosure score (obtained from the annual volumes of the report of the Financial Analysts Federation Corporate Information Committee) based on a within industry/year ranking.
DIV/TA = Total dividends divided by total assets.
NI/NS = Earnings after interest and taxes divided by net sales.
NS/TA = Net sales divided by total assets.
LOG_TA = Natural log of total assets.
Tobin's Q = (Market value of equity − book value of equity + total assets)/total assets.
FIN/TA = (Issuance of equity + issuance of debt)/total assets.
Δ = Change in the variable relative to the previous year.

			Parameter Estimates (t-statistic in parentheses)							
Year	Adj. R^2	N	Intercept	DISCL	DIV/TA	ΔEBIT/NS	ΔNS/TA	LOG_TA	Tobin's Q	FIN/TA
			Δ	+	−	−	Δ	−	+	+
1984	0.13	114	0.6949 (3.01)***	−0.0617 (−0.57)	−3.6256 (−2.86)***	−0.2291 (−0.62)	0.6204 (1.88)**	−0.0271 (−0.98)	−0.0855 (−1.74)**	0.5142 (1.16)
1985	0.23	112	0.7487 (3.40)***	0.0886 (0.79)	−6.4748 (−4.61)***	−0.8587 (−1.30)*	0.7193 (2.05)**	−0.0555 (−2.11)**	0.0408 (0.68)	0.4731 (1.55)*
1986	0.31	119	0.5888 (2.96)***	0.0306 (0.32)	−7.5416 (−5.64)***	0.1396 (0.32)	0.8654 (2.73)***	−0.0114 (−0.52)	−0.0016 (−0.04)	0.8086 (3.77)***
1987	0.44	94	0.1889 (0.89)	0.1785 (1.69)**	−5.1008 (−3.26)***	−3.2618 (−2.56)***	1.1638 (4.03)***	0.0282 (1.21)	−0.0385 (−0.90)	0.9449 (5.07)***
1988	0.32	112	0.8047 (3.75)***	0.0901 (0.80)	−8.6698 (−4.49)***	−0.8331 (−0.73)	0.8177 (2.58)***	−0.0354 (−1.48)*	0.0029 (0.05)	0.7571 (3.23)***
1989	0.23	132	0.7216 (3.35)***	0.1236 (1.05)	−4.3919 (−3.44)***	−1.4023 (−1.10)	0.6997 (2.12)**	−0.0243 (−0.99)	−0.0891 (−1.86)**	1.0498 (2.71)***
1990	0.26	162	0.5184 (2.59)***	0.0621 (0.59)	−8.5861 (−5.12)***	−1.1249 (−1.20)	0.7737 (2.57)***	0.0031 (0.14)	−0.0078 (−0.19)	0.8602 (2.24)**
1991	0.23	159	0.1564 (0.81)	0.0194 (0.19)	−9.5676 (−5.64)***	1.5756 (1.87)**	0.9883 (2.50)**	0.0394 (1.74)**	0.0606 (1.66)**	0.6382 (1.89)**
1992	0.36	158	0.0684 (0.40)	0.0433 (0.51)	−39.0379 (−6.21)***	−0.3854 (−0.44)	0.6904 (2.25)***	0.0519 (2.57)***	0.0302 (0.94)	0.9022 (2.98)***
1993	0.38	143	0.3622 (1.96)**	0.0942 (1.00)	−9.1072 (−5.98)***	−1.5232 (−1.73)**	0.3403 (0.75)	0.0047 (0.21)	0.0271 (0.82)	1.4795 (3.69)***
1994	0.39	131	0.9064 (3.77)***	0.0966 (0.87)	−9.5296 (−5.20)	−0.4495 (−0.82)	0.9209 (1.64)**	−0.0304 (−1.12)	−0.0139 (−0.32)	0.3916 (1.01)
Mean			0.5236	0.0696	−10.1484	−0.7593	0.7818	−0.0052	−0.0068	0.8018
*Z*1			(7.39)***	(2.17)**	(−14.43)***	(−2.28)**	(6.90)***	(−0.36)	(−0.24)	(8.05)***
*Z*2			(6.84)***	(3.63)***	(−14.39)***	(−2.29)**	(9.82)***	(−0.28)	(−0.26)	(7.41)***

*, **, *** significant at the 10%, 5%, or 1% level (one-tailed test except where the sign is not predicted), respectively.

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tistically significant at the 0.10 level. Taken together, these results suggest that while increased disclosure activity may improve access to lower cost external financing, the impact of disclosure is more pronounced for firms for which lower cost external financing is important.

D. Sensitivity Tests

We subject our regression results to a number of robustness checks in order to address potential concerns about estimation and other model misspecification issues. An assumption underlying our empirical tests is that the firm's profit rate on marginal sales equals its average profit rate. This also implies that the firm's cost structure remains constant. Following Demirguc-Kunt and Maksimovic (1998), we modify the growth rate estimates to allow for a lower rate of earnings on new growth. Specifically, we introduce a parameter z that measures the ratio of the profit rate on new sales to the firm's average profit rate to derive a modified IG and a modified SFG rate given by

$$\text{IG}_t = (\text{ROA}_t * b_t)/(1 - z * \text{ROA}_t * b_t) \quad \text{and} \tag{6}$$

$$\text{SFG}_t = \text{ROLTC}_t/(1 - z * \text{ROLTC}_t). \tag{7}$$

As a specification check, we reestimate the specifications in Table 4 for $z = 0$, 0.25, 0.50, 0.75, and 1. Table 4 presents the regression results assuming different values of z.[25] To save space, we only report the results for the estimated DISCL coefficients that are returned after we impose changes to the computation of our dependent variable for given values of z. Again, we report the cross-sectional mean using the estimated coefficients for DISCL for the 11 yearly regressions. We test significance for the mean parameter estimate based on $Z1$ and $Z2$ statistics. An inspection of the results in Table 4 indicates that the assumption of the equality of the profit rate on marginal sales and the average profit rate is not crucial for our results on the relation between disclosure and externally financed growth rates.

Another assumption underlying our measurement of externally financed growth constraints is that a firm's asset turnover remains constant. To the extent that this assumption does not hold, the measure of externally financed growth used in the study will reflect both internally financed growth (through improved operating performance) and externally financed growth. Therefore, we modify the estimates of the growth rate to allow for a higher rate of asset turnover on new growth. Specifically, we introduce a parameter y that measures the ratio of the assets turnover on the new sales to the firm's average assets turnover to derive a modified IG and a modified SFG rate given by

$$\text{IG}_t = (\text{ROA}_t * b_t)/(1 * y - \text{ROA}_t * b_t) \quad \text{and} \tag{8}$$

$$\text{SFG}_t = \text{ROLTC}_t/(1 * y - \text{ROLTC}_t). \tag{9}$$

[25] To assess the impact of lower cost structure (and higher profitability), we also reestimate the specification in Table 4 for $z=1.05$ and $z=1.10$. Note that in the presence of market competition, there is less room for a firm to adjust its cost structure to improve its profit margin. Therefore, we specify a narrower range of the parameter values of z. Unreported results for these alternative specifications show no evidence of a differing association between disclosure and externally financed growth for our sample.

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TABLE 4

Sensitivity Analyses for Regressions of Short-Term Financed Growth Rate Based on Different Marginal Profit Rate Assumptions

$$\text{PROP_IG}_j(\text{or PROP_SFG}) = \alpha + \beta_1 \text{DISCL}_{it} + \beta_2 \text{DIV}_{it}/\text{TA}_{it} + \beta_3 \Delta\text{NI}_{it}/\text{NS}_{it} + \beta_4 \Delta\text{NS}_{it}/\text{NFA}_{it} + \beta_5 \text{LOG_TA}_{it} + \beta_6 \text{Tobin's Q}_{it} + \beta_7 \text{FIN}_{it}/\text{TA}_{it} + e_{it}$$

Only the parameter estimates returned for DISCL are reported. Regressions are estimated using two-stage least squares. The instrumental variables for DISCL are lagged DISCL, log of market value of equity, historical correlation between annual returns and earnings computed over the preceding five years, return on assets, and standard deviation of annual market-adjusted stock returns. All independent variables are averaged over three years covering the same time span over which PROP_IG and PROP_SFG are computed. Mean parameter estimates use the 11 coefficient estimates to obtain an across-year mean. Parameter values of z measure the ratio of the profit rate on new sales to the firm's average profit rate. $Z1$ and $Z2$ test statistics test whether the time-series mean t-statistic equals zero,

$$Z1 = \frac{1}{\sqrt{N}} \sum_{j=1}^{N} \frac{t_j}{\sqrt{k_j/(k_j-2)}} \quad \text{and} \quad Z2 = \frac{\bar{t}}{\text{stddev}(t)/\sqrt{N-1}},$$

where t is the t-statistic for year j, k is the degrees of freedom for year j, and N is the number of years.

PROP_IG = Difference between a firm's actual sales growth rate and its predicted internally financed growth rate. For each firm, the predicted internally financed growth rate is defined as ROA $*$ $b/(1 - z * \text{ROA} * b)$, where ROA is the ratio of earnings after taxes and interest to assets, and b is the proportion of the firm's earnings that are retained for reinvestment.

PROP_SFG = Proportion of years in which a firm's actual sales growth rate in three consecutive years exceeds its predicted short-term financed growth rate. For each firm, the predicted short-term financed growth rate is defined as ROLTC$/(1 - z *$ ROLTC), where ROLTC is the ratio of earnings after tax and interest to long-term capital.

DISCL = Rank of the total disclosure score (obtained from the annual volumes of the report of the Financial Analysts Federation Corporate Information Committee) based on a within industry/year ranking.

DIV/TA = Total dividends divided by total assets.

NI/NS = Earnings after interest and taxes divided by net sales.

NS/TA = Net sales divided by net fixed assets.

LOG_TA = Natural log of total assets.

Tobin's Q = (Market value of equity − book value of equity + total assets)/total assets.

FIN/TA = (Issuance of equity + issuance of debt)/total assets.

Δ = Change in the variable relative to the previous year.

	Dependent Variable					
	PROP_IG			PROP_SFG		
Values of z	Mean Parameter	$Z1$	$Z2$	Mean Parameter	$Z1$	$Z2$
$z = 1$	0.1488	(4.53)***	(6.69)***	0.0696	(2.17)**	(3.63)***
$z = 0.75$	0.1118	(3.96)***	(7.85)***	0.0491	(2.00)**	(4.23)***
$z = 0.50$	0.1117	(3.95)***	(7.60)***	0.0571	(2.36)***	(5.01)***
$z = 0.25$	0.1168	(4.15)***	(9.04)***	0.0503	(2.09)**	(5.00)***
$z = 0$	0.1076	(3.77)***	(8.41)***	0.0751	(2.51)***	(9.34)***

*, **, *** significant at the 10%, 5%, or 1% level (one-tailed test except where the sign is not predicted), respectively.

As a specification check, we reestimate the specifications in Tables 2 and 3 for $y = 1.05$ and $y = 1.10$.[26] Results (not reported) of regression model (2) indicate that the assumption of the equality of the ratio of asset turnover on new sales to the firm's average assets turnover is not crucial for our results on the relation between disclosure and externally financed growth rates.

As we note in Section II, to the extent that our sample firms rely more on public debt or equity instead of private debt, the effect of disclosure on externally financed growth may be more pronounced for firms issuing public debt or equity. As a sensitivity test, we identify those sample firms that issued either private debt

[26] Our choice of the parameter values of y are based on anecdotal evidence that suggests that asset turnover tends to be sticky.

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or public debt and equity in a given year from the Securities Data Company New Issues database and classify the sample firm-years into two groups—those issuing public debt or equity and those issuing private debt. We then reestimate regression model (2) for each subsample using PROP_SFG as the dependent variable. The magnitude of the coefficient on DISCL for firms that issued public debt or equity in a given year is 0.172 and is statistically significant at the 0.01 level. For firms that issued only private debt in a given year, the magnitude of the coefficient on DISCL is 0.113 but is statistically insignificant at the 0.10 level. These results are consistent with the notion that disclosure is of more consequence to firms that raise funds in public capital markets.

As an alternative to the 2SLS estimation, we also address the endogeneity of a firm's disclosure policy in our empirical tests by measuring DISCL prior to the time period over which economic growth of the firm is computed. In these OLS estimations, we also average other firm characteristics in model (2) over the same time period for which firm growth is computed. As an example, for a firm-year observation with a fiscal year ending on December 31, 1990, we use DISCL for the year 1990, compute externally financed growth during 1991, 1992, and 1993, and average other firm characteristics (e.g., DIV_TA) for the years 1991, 1992, and 1993. Unreported results of this alternative specification are very similar to those reported in Tables 2 and 3 where disclosure and externally financed growth metrics are measured over contemporaneous time periods. Overall, the attempt to explicitly address self-selection bias supports the hypothesis that analyst rankings of overall firm disclosure are positively associated with firm growth supported by external financing.

Thus far we have focused on the level of the disclosure scores. To ensure that our results are not driven by spurious correlations, we also examine the association between changes in our excess growth metrics and changes in disclosure scores.[27] We focus on "significant and sustained improvements" in disclosure policy for several reasons.[28] First, a significant and sustained change in disclosure policy is more likely to reflect a deliberate managerial policy. Second, while extant theory is quite clear on the effects following disclosure improvements, it provides little guidance with respect to the impact of a decline in disclosure policy. Furthermore, a decline in disclosure is more likely to be endogenous to changes in disclosure costs that serve to moderate firms' disclosure policies. As Lang (1999) points out, a time-series approach works best if the disclosure changes involved are "exogenously imposed."

[27] We thank the reviewer for suggesting this robustness test.

[28] A concern in using changes in disclosure scores is that analysts' evaluations may be influenced by considerations other than improvements in firm disclosure policy. To address this concern, Healy et al. (1999) examine the reasons offered by analysts in assigning improved scores for the subject firms involved. Examples of these reasons include: "(a) Improved segment disclosures; (b) more in-depth discussion of operations and financial performance, and more candid management discussion of the company's prospects in annual and quarterly reports; (c) publication of supplemental disclosures in fact books; and (d) improved investor relations through increased analyst access to top management and additional company meetings and presentations for analysts" (Healy et al. (1999), p. 489). This supports the contention that analysts upgrade their evaluations based on improvements in firms' disclosure policies.

Following Healy et al. (1999), we compute the change in average relative ranking (ΔDISCL) for our sample firms as

$$\Delta\text{DISCL}_{it} = \frac{1}{3}\sum_{t=0}^{-2}\text{DISCL} - \frac{1}{2}\sum_{t=-3}^{-4}\text{DISCL}. \quad (10)$$

For each firm, we identify the year during the sample period for which the largest increase in average relative ranking takes place and focus on these firm-years to examine the relation between the changes in our excess growth metrics and ΔDISCL. The reduced sample consists of 180 firms with an average change of 16.1 percentage points. No firm enters the sample more than once and the sample period ranges from 1986 to 1994. We then compute ΔEFG_{it} in a manner analogous to ΔDISCL_{it}.

We, therefore, consider the following specification in which all independent variables are incorporated as flow(change) variables,

$$\begin{aligned}\Delta\text{EFG}_{it} = {} & \alpha + \beta_1\Delta\text{DISCL}_{it} + \beta_2\text{DIV}_{it}/\text{TA}_{it} + \beta_3\Delta\text{NI}_{it}/\text{NS}_{it} \\ & + \beta_4\Delta\text{NS}_{it}/\text{NFA}_{it} + \beta_5\Delta\text{LOG TA}_{it} + \beta_6\Delta\text{Tobin's Q}_{it} \\ & + \beta_7\text{FIN}_{it}/\text{TA}_{it},\end{aligned} \quad (11)$$

where all variables are as defined before and the change operator (Δ) for the dependent and independent variables other than DISCL represents a change in the variable relative to the previous year.[29] For example, ΔTobin's Q_{it} = Tobin's Q_{it} − Tobin's Q_{it-1}.

In Table 5, we report the results of estimating regression equation (11). The first model reports results using ΔEXCESS_IG as the dependent variable to proxy for ΔEFG and the second model uses ΔEXCESS_SFG$_i$ as the dependent variable. The tenor of our results is essentially unaltered by this specification. Specifically, the coefficient on ΔDISCL is positive and statistically significant at the 0.01 level in both models, suggesting that changes in disclosure levels are associated with changes in externally financed growth. Overall, the evidence from the change model complements the level specification, highlighting the importance of disclosure in easing access to external financing.

V. Conclusion

Extant research posits that information asymmetry and agency conflicts adversely affect the ability of firms to pursue potentially profitable projects. More specifically, these factors are conjectured to increase the cost of external financing. A related literature posits that an expanded and credible disclosure policy will serve to improve the ability of firms to fund their growth opportunities. In part, an expanded disclosure policy serves to reduce information asymmetry and mitigate agency conflicts by improving the ability of investors to monitor inside managers. As a consequence, it is posited that disclosure will positively affect a firm's growth rate by improving firm access to lower cost external financing.

[29] We also compute the change variables over the same time period as that used for the DISCL, and our inferences are qualitatively similar to those reported in the paper.

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TABLE 5

Regression Results for the Change Model

$$(11)\quad \Delta EFG_{it} = \alpha + \beta_1 \Delta DISCL_{it} + \beta_2 DIV_{it}/TA_{it} + \beta_3 \Delta NI_{it}/NS_{it} + \beta_4 \Delta NS_{it}/TA_{it} + \beta_5 \Delta LOG\ TA_{it} + \beta_6 \Delta Tobin's\ Q_{it} + \beta_7 FIN_{it}/TA_{it}$$

Coefficients on the year dummies are not reported.

EFG = Externally financed growth proxied by EXCESS_IG or EXCESS_SFG.

EXCESS_IG = Difference between a firm's actual sales growth rate and its predicted internally financed growth rate. For each firm, the predicted internally financed growth rate is defined as $ROA * b/(1 - ROA * b)$, where ROA is the ratio of earnings after taxes and interest to assets, and b is the proportion of the firm's earnings that are retained for reinvestment.

$$\Delta EXCESS_IG = \frac{1}{3}\sum_{t=0}^{-2} EXCESS_IG - \frac{1}{2}\sum_{t=-3}^{-4} EXCESS_IG.$$

EXCESS_SFG = Difference between a firm's actual sales growth rate and its predicted short-term financed growth rate. For each firm, the predicted short-term financed growth rate is defined as ROLTC/(1 − ROLTC), where ROLTC is the ratio of earnings after tax and interest to long-term capital.

$$\Delta EXCESS_SFG = \frac{1}{3}\sum_{t=0}^{-2} EXCESS_SFG - \frac{1}{2}\sum_{t=-3}^{-4} EXCESS_SFG.$$

DISCL = Rank of the total disclosure score (obtained from the annual volumes of the report of the Financial Analysts Federation Corporate Information Committee) based on a within industry/year ranking.

DIV/TA = Total dividends divided by total assets.

ΔNI/NS = Change in earnings after interest and taxes divided by net sales relative to previous year.

ΔNS/TA = Change in net sales divided by total assets relative to previous year.

ΔLOG_TA = Change in natural log of total assets relative to previous year.

ΔTobin's Q = Change in Tobin's Q relative to previous year where Tobin's Q is (market value of equity − book value of equity + total assets)/total assets.

FIN/TA = (Issuance of equity + issuance of debt)/total assets.

$$\Delta DISCL_{it} = \frac{1}{3}\sum_{t=0}^{-2} DISCL - \frac{1}{2}\sum_{t=-3}^{-4} DISCL.$$

	Parameter Estimates (t-statistic in parentheses)	
	Dependent Variable	
Variable	ΔExcess_IG	ΔExcess_SFG
Intercept	0.0429 (0.68)	0.1021 (1.38)
ΔDISCL	0.0476 (1.37)*	0.0693 (1.70)**
DIV/TA	−2.5932 (−4.41)***	−2.9291 (−4.24)***
ΔEBIT/TA	−0.8647 (1.83)**	−1.5705 (−2.83)***
ΔNS/TA	0.2137 (1.60)*	0.2048 (1.31)*
ΔLOG_TA	−0.0059 (−0.79)	−0.0098 (−1.10)
ΔTobin's Q	0.0292 (2.15)**	0.0012 (0.70)
Financing/TA	0.2883 (2.61)***	0.4069 (3.14)***
Year dummy	Included	Included
N	147	147
Adj. R^2	0.19	0.26

*, **, *** significant at the 10%, 5%, or 1% level (one-tailed except where the sign is not predicted), respectively.

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To evaluate this prediction, we empirically examine the association between a firm's growth and its disclosure policy. In particular, we investigate whether an expanded disclosure policy allows firms to grow at rates exceeding those that could be attained by relying strictly on their internal sources of funds or short-term borrowing. We first estimate a predicted growth rate for each firm if it strictly relies on internal cash flows or short-term borrowing. We next compute the difference between realized firm growth and the predicted growth rate. This measure reflects the amount of growth supported through external finance. Using a cross section of U.S. firms, we find a positive relation between a firm's externally financed growth rate and its level of disclosure. Our results are robust to alternative measures of externally financed growth, endogeneity of disclosure, and the inclusion of other firm-specific factors relevant in this setting.

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