Analyst Coverage and Financing Decisions

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ABSTRACT

We provide evidence that analyst coverage affects security issuance. First, firms covered by fewer analysts are less likely to issue equity as opposed to debt. They issue equity less frequently, but when they do so, it is in larger amounts. Moreover, these firms depend more on favorable market conditions for their equity issuance decisions. Finally, debt ratios of less covered firms are more affected by Baker and Wurgler's (2002) "external finance-weighted" average market-to-book ratio. These results are consistent with market timing behavior associated with information asymmetry, as well as behavior implied by dynamic adverse selection models of equity issuance.

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Recent research on the financing behavior of firms has resulted in a series of empirical challenges of the Pecking Order Hypothesis (POH), historically one of the most influential theories of firms' security issuance decisions. Frank and Goyal (2003b), for example, find that small firms, that is, those expected to be especially susceptible to information asymmetry problems, issue significant amounts of equity. The POH, however, suggests equity should be the financing of last resort for these firms.[1] More recently, Leary and Roberts (2004) explicitly test for the POH's implied financial hierarchy between external and internal funds and debt versus equity. They find that firms appear to consistently violate this hierarchy. In fact, the theory performs particularly poorly in predicting equity issuance. The violation is especially significant for larger firms.

Although information asymmetry is an integral part of the POH, the apparent failure of this theory to explain firms' financial choices does not imply that information asymmetry is irrelevant for financing decisions. Indeed, a large number of studies find that equity issuance follows stock price run-ups, as the dynamic adverse selection models imply (e.g., Lucas and McDonald (1990)).[2] Moreover, consistent with the idea of time-varying adverse selection, Choe, Masulis, and Nanda (1993) find evidence that equity issuance volume is significantly higher and the stock price reaction to equity issuance announcements is significantly lower during expansionary periods of the business cycle (see also Korajczyk, Lucas, and McDonald (1991) and Bayless and Chaplinsky (1996) for related results).[3]

Perhaps more significantly, survey evidence reveals that one of the most important considerations for equity issuance is the extent to which managers view the share price of their companies to be overvalued or undervalued at a given point of time (Graham and Harvey (2001)). This suggests that managers take advantage of a "window of opportunity" to time their equity (and possibly also debt) issues. The fact that equity issuances are preceded by increases in stock prices, as discussed above, is consistent with market timing behavior. Additionally, recent studies document several other empirical phenomena that suggest market timing. For instance, Ritter (1991), Speiss and Affleck-Graves (1995), Loughran and Ritter (1995), and Gompers and Lerner (2003) document that equity issuers underperform size-matched control firms as well as the market index by as much as 20% to 40% over the subsequent five-year period. In contrast to these firm-level studies, Baker and Wurgler (2000) examine aggregate data and find that a period in which aggregate equity issuance (relative to total debt and equity issuance) is high is followed by a period of low stock market returns.[4]

Timing behavior requires two essential ingredients. First, the information sets of managers and financial markets concerning the value of the firm must be different, that is, managers must think they can recognize when stock prices have diverged from fundamental value. Second, for this strategy to succeed, the market must underreact to equity issuance announcements (so that a misvaluation perceived by the managers is not immediately corrected). If these conditions hold and managers are indeed correct on average, timing behavior can create value for a firm's long-term shareholders. Since information asymmetry is an integral element of market timing behavior, one would expect that firms that are more susceptible to information asymmetry would also be the ones that are more inclined to time the market. This rationale leads to the main hypothesis we examine in this paper, namely, that equity issuances of firms that are subject to more information asymmetry will be more influenced by market conditions.

Our proxy for information asymmetry between managers and outside investors is the number of analysts that cover a firm. Existing empirical evidence strongly suggests that analyst following is negatively correlated with information asymmetry, either because analysts reduce information asymmetry or because they extend coverage to more transparent firms. On account of this asymmetry, less covered firms will be more consistently misvalued. The information asymmetry works against the firm when the firm is undervalued and is unable to issue equity; however, when it is overvalued, it is presented with a window of opportunity that is especially valuable given its inability to issue equity more regularly. Moreover, given the greater information asymmetry, ceteris paribus, high stock valuations are more likely to represent greater misvaluation. Thus, our empirical predictions are that firms that receive less coverage issue equity less frequently, but when they are presented with a window of opportunity, they issue a large amount of equity.[5] This is exactly what we find. Multinomial Logit regressions indicate that the probability of large equity issues relative to small equity issues is higher for firms that receive less coverage; further, while the volume of equity issues in general is increasing in the stock price run-up prior to the issuance, this effect is stronger for firms with fewer analysts. We also find that Baker and Wurgler's (2002) (BW, hereafter) external finance-weighted market-to-book ratio has a significant negative effect on the leverage ratio, but this effect is stronger for firms with fewer analysts.

Our results hold for the overall sample of Compustat firms as well as for each of three groups of firms classified according to size. Notably, our results are especially strong for the group consisting of the smallest firms. The POH and market timing theory have opposite implications regarding the financing behavior of smaller firms, that is, those firms that are likely to be subject to greater information asymmetry. As a result of this asymmetry, the POH implies that smaller firms should rely most heavily on debt financing – yet, as we note above, existing evidence suggests quite the opposite.[6] The market timing theory, on the other hand, implies that to the extent that they are subject to more information asymmetry, smaller firms are likely to show stronger tendencies to time the market. Moreover, market timing suggests the effect of factors that mitigate information asymmetry (such as greater analyst coverage) should be greatest for smaller firms. Our results are consistent with the latter implication.

The rest of the paper is organized as follows. Section I discusses our hypotheses and methodology. In section II, we define the sample and variables. Section III presents our empirical results. Section IV concludes the paper.

I. Development of Hypotheses

Our main hypothesis is that firms that receive less analyst coverage are subject to more information asymmetry, which in turn creates greater incentives and opportunities for a firm to take market conditions into account before issuing securities. We first discuss existing research that suggests analyst coverage mitigates information asymmetry (or, at least, is associated with lower asymmetry). We then develop our hypotheses about how information asymmetry is likely to affect the pattern of equity issuance.

A. Analyst Coverage and Information Asymmetry

Financial analysts play a key role in mitigating information asymmetry. Specifically, they offer market participants essentially two services. First, they aggregate complex information and synthesize it in a form that is more easily understandable by less sophisticated investors. Second, they provide information that is not widely known by market participants (for example, from discussions with managers or from visits to facilities). Although this role has been reduced by the enactment of the Regulation Fair Disclosure, it remains an important analyst function. The empirical literature supports the beneficial and informative role of analysts. For example, Hong, Lim, and Stein (2000) find that stocks with high analyst coverage are more informative and that the profitability of momentum strategies is lower for such firms, Barth and Hutton (2000) find that stock prices of firms with higher analyst coverage incorporate information on accruals and cash flows more rapidly than do prices of firms with lower coverage, and Bowen, Chen, and Cheng (2004) find that higher analyst coverage significantly reduces the underpricing associated with Seasoned Equity Offerings (SEOs). The literature also shows that analysts' forecasts and recommendations affect stock prices (e.g., Givoly and Lakonishok (1979), Lys and Sohn (1990), Francis and Soffer (1997)).

Even if analysts played no role in reducing information asymmetry, they are attracted to more transparent firms. This result is not immediately obvious from a theoretical point of view because, while opaque firms are presumably harder to follow (i.e., it is costlier for analysts to cover these firms), the demand for coverage is also greater (the benefit from coverage is higher). However, the empirical literature consistently finds that analysts follow firms that are easier to understand. For example, Bhushan (1989) reports that more complex firms (as measured by a firm's number of business segments) suffer from lower analyst coverage. Francis and Soffer (1997) show that firms that make corporate presentations to analysts enjoy greater analyst coverage. Similarly, Lang and Lundholm (1993) and Healy and Wahlen (1999) report that firms that expand their voluntary disclosure (as proxied by AIMR ratings) enjoy greater analyst coverage. Whether analysts actively reduce information asymmetry or are simply attracted to firms with lower asymmetry, while an interesting empirical question, is irrelevant for our purposes, however – since the relation between coverage and asymmetry is negative in both instances.

Note that growing literature points to a somewhat different role for analysts, arguing that analysts, motivated by investment banking considerations and trading profits, generate over-optimistic recommendations that cause prices to be higher than a firm's fundamental value (e.g., Hayes (1998), Lin and McNichols (1998), Alford and Berger (1999), Michaely and Womack (1999), among others). This "hyping up" of their stock provides managers opportunities to issue overvalued equity. If such analyst-driven overvaluation is systematic and more prevalent for firms that enjoy greater coverage, then our results should be weakened. Indeed, our results are somewhat weaker for larger firms that enjoy much more coverage on average. Our results are the strongest for relatively small firms that enjoy considerably less coverage (a median of one analyst per firm) than larger firms. For these firms, it is unlikely that analysts would be "hyping up" stock prices.

B. Analyst Coverage, Adverse Selection, and Market Timing Theory

Our main hypothesis is that the equity issuance decisions of firms that are subject to greater information asymmetry will be more influenced by market conditions. In particular, such firms should issue equity less frequently; however, we would expect these firms to make relatively larger issues, especially after stock price run-ups. The paragraphs below elaborate upon these predictions. We provide two (not mutually exclusive) sets of arguments based upon the idea that managers and investors have different information sets and that managers act in the interest of long-term shareholders.

B.1. Market Timing

In essence, market timing theory implies that managers look at current conditions in both the debt and equity markets and select the financing option that appears to be more favorable at the moment (or issue no securities at all if market conditions are not favorable). We explore two versions of how analyst coverage, our proxy for information asymmetry, can affect the timing behavior of firms.

First, firms that are subject to greater information asymmetry are more likely to suffer from unfavorable misvaluation (Myers and Majluf (1984)) on a regular basis. If managers want to avoid issuing at a discount, they need to wait for this undervaluation to disappear. Therefore, we expect firms with fewer analysts to issue equity less frequently. On the other hand, when stock prices diverge upwards from fundamental value, managers acting in the interests of long-term shareholders take advantage of the temporary overvaluation and issue equity. If investors do not completely take this incentive into account when they invest in the new issues, the overvaluation will not be immediately corrected. To the extent that analysts generate firm-specific information, deviations of stock prices from their fundamental values caused, for example, by investor sentiment should be more significant for less covered firms. We therefore expect to find a stronger relation between price run-ups and equity issuance when firms experience lower analyst coverage. This prediction is consistent with Hong, Lim, and Stein (2000), who find that firm-specific news (especially bad news) gets incorporated in stock prices more slowly if fewer analysts cover the firm.

While it is intuitive from the above argument that the size of an equity issue should be positively related to the extent of overvaluation, to demonstrate this more formally one needs a model in which the size of the issue is determined endogenously. In Appendix A, we outline a model, similar in spirit to those of Stein (1996), Baker, Stein, and Wurgler (2003), Baker, Ruback, and Wurgler (2004), and Shleifer and Vishny (2003), in which the firm's managers issue overvalued equity to maximize the objectives of the firm's long-term shareholders. As in these papers, we assume that the market underreacts to the news of an equity issuance. The optimal size of the equity issue trades off the gain to long-term shareholders from issuing overvalued equity against the cost of issuing too much equity.[7] In this setting, we show that, given the capital in place, the net present value of the project per dollar invested, and the fundamental value per unit of capital (q), the size of the equity issue is increasing in the market value per unit of capital (Q), which, empirically, is positively correlated with the price run-up. If analyst coverage reduces the divergence between Q and q, then for given Q, the size of the issue would be smaller for better covered firms.[8]

Alternatively, the need to rebalance its capital structure could also explain why a firm with less analyst following may be more inclined to time the market and issue larger amounts of equity when market conditions are more favorable.[9] If firms followed by fewer analysts suffer from greater information asymmetry, they will be more frequently misvalued. When they are undervalued and are unable to issue equity, they may be forced to seek alternative means of financing, such as debt, for their projects. Thus, these firms will issue equity less frequently, and will also be further away from an optimal target debt ratio. On the other hand, when they are overvalued, or when the information asymmetry is reduced because of improvements in general business conditions (see Choe, Masulis, and Nanda (1993)), these firms will have an incentive to make larger issues of equity to rebalance their capital structures. Since these firms are likely to be more responsive to improvements in market conditions, we would expect to find a stronger link between the issue size and past returns of these firms. Even if the high valuation automatically moves the firms closer to a target market value-to-leverage ratio, they still might issue more aggressively, since equity issuance may be more difficult in the future for these firms. In other words, they might trade off the cost of becoming temporarily underlevered against the benefits of a reduction in the likelihood of being overlevered in the future and of greater financial flexibility (e.g., higher debt capacity).

Insert Figure 1 here.

In Figure 1, we provide some evidence in support of the idea that, on average, firms with less analyst coverage will be further away from their target leverage ratios, and will rebalance more actively after market conditions improve. Panel A shows, for each of three size groups of firms, the mean deviations from an estimated target leverage ratio based on whether the firms have above-median or below-median analyst coverage.[10] To mitigate endogeneity, we classify firms within each size group into "more analysts" and "fewer analysts" groups based on the number of analysts lagged three periods. The figure shows that the firms covered by fewer analysts are generally further away from the target. Panel B gives further evidence of sluggish adjustment by less covered firms. Specifically, the panel tracks the leverage ratio of firms after a large positive deviation (upper panel) and a large negative deviation (lower panel) from the estimated target debt ratio, where "large positive (negative) deviation" is defined as a deviation in the top (bottom) quartile of positive (negative) deviations. Firms are classified into "fewer analysts" and "more analysts" groups as discussed above for each size category. The figure shows that while both groups rebalance and adjust their debt ratios towards the target after the deviation, it takes the group with more analysts only three years to reach the level that the group with fewer analysts reaches in five years. Finally, in Panel C, we show the proportion of firms in the two groups that issue equity after a positive equity shock (stock returns at least one standard deviation above the firm-specific mean). A much higher proportion of firms in the "fewer analysts" group issue equity immediately after such a shock.

B.2. Dynamic Adverse Selection

Lucas and McDonald (1990) provide a dynamic adverse selection model in which firms' managers have "one-step-ahead" knowledge of the value of assets in place. The market receives news about the value of the assets in place each period, but the managers know the true value one period before it is publicly revealed to the market. At most one positive net present value project arrives randomly per period. If the firm is undervalued (in the sense that the true value of assets in place next period is higher than expected), then the manager will postpone issuing equity to finance the project. In other words, the firm will take the project only when it foresees a decrease in asset value. In this setting, the stock price will increase as a firm waits one more period before taking a project. The stock price increases for two reasons: (i) The market receives favorable news one period later, and (ii) the likelihood that the firm has a positive net present value project increases the longer it waits. The average stock return for firms that issue equity exceeds the unconditional return because firms that experience price increases are the ones that postpone taking projects, and they are overrepresented in the sample that issue equity. In other words, on average, equity issuances are preceded by stock price run-ups.

Importantly, in the Lucas and McDonald (1990) setting, if a firm with a project receives a second project, the second displaces the first, so that the firm has at most only one project at any given point of time. Thus, the size of the equity issue is fixed and determined by the scale of the project. However, one could easily extend the model by assuming that each period, either the firm has a project or it does not, but conditional on there being a project, the scale of the project is randomly drawn.[11] Such an extension allows for variable issue size. In this case, because the net present value is proportional to the scale of projects, a new project displaces an existing one only if it is of larger scale. In this framework, firms that wait longer will have a longer history of price run-ups and also larger projects, on average. Thus, when firms issue equity, larger issue sizes will be associated with higher stock price run-ups.[12]

This framework can also incorporate the effect of analyst coverage on the relation between the run-up and issue size. For example, if the likelihood that the private information of managers becomes public is an increasing function of the number of analysts that follow the firm, then for firms that enjoy higher coverage, delays will be of shorter duration since the information asymmetry will be resolved more frequently. In other words, firms with more analysts will issue more frequently. Since firms with more coverage on average will not wait as long, the scale of the project and hence the size of the issue will be smaller for firms with more analysts. When projects of larger size are financed by firms with more coverage, it will be because firms were lucky and drew larger projects, not because they waited due to adverse selection. Thus, for better covered firms, higher run-ups (a more prolonged sequence of good news) will not be as strongly associated with larger issue size.

II. Sample, Summary Statistics, and Econometric Specification

A. Sample

Our sample consists of firms listed in the Compustat Industrial Annual Files at any point between 1985 and 2000.[13] We obtain data on stock prices and returns from the Center for Research on Security Prices (CRSP) Files. We exclude financial, insurance, and real estate firms (SIC code 6000-6900), regulated utilities (SIC code 4900-4999), and firms with missing book values of assets or with book values smaller than 10 million.[14] Since the construction of several key variables requires five years of data in the Compustat files, we also exclude firms that have missing data on stock prices, equity issues, and debt issues in the past five years. This leads to a sample of 35,697 firm-year observations. We then evenly split the sample into three size groups according to the book value of assets at the beginning of the fiscal year. Group 1 consists of the smallest firms and Group 3 includes the largest firms.[15] All variables are winsorized at the 0.5% level at both tails of the distribution to mitigate the impact of outliers or mis-recorded data.

We obtain the data on analyst coverage from the *I/B/E/S Historical Summary File*. For each year, we set the number of analysts following a firm (*NbrAnal*) as the maximum number of analysts who make annual earnings forecasts in any month over a 12-month period. We assume that firms not covered by *I/B/E/S* have no analyst coverage. Untabulated results show that our findings are virtually invariant after dropping firms that are not covered by *I/B/E/S*. As we discuss in Section III.E, our results are also unaffected if we use the log of the number of analysts (plus one) instead of the raw number.[16]

B. Summary Statistics

Table I reports descriptive statistics separately for the overall sample and for the three size groups. In the overall sample, the median number of analysts following a firm is three, with 73% of firms covered by at least one analyst. Noticeably, large firms attract more analysts: the percentage of firms covered by analysts in the largest size group is much higher than that in the smallest size group (94% versus 44%). In contrast, 26% of the firms have debt ratings assigned by Standard & Poor's. The size effect of the debt ratings is also remarkable, with only 1% of the smallest firms rated by a debt rating agency versus 65% of the firms in the largest size group.

Panel B of Table I presents the summary statistics on the debt-equity choice. We define equity and debt issues using cash flow statement data. Equity issues (*Eisu*) equal the sale of common and preferred stock minus the purchase of common and preferred stock, and debt issues (*Disu*) equal long-term debt issuance minus long-term debt reduction plus changes in current debt.[17] Issue size is the net amount issued deflated by the book value of assets at the beginning of the fiscal year. We classify firms as issuing debt or equity when the issue size exceeds 5%.

Insert Table I here.

Firms in the smallest group have a much higher proportion of equity issues relative to debt issues than do firms in the other size groups, although debt issues outnumber equity issues both in the entire sample and in the three size groups. The median size of the debt or equity issues is significantly higher for the smallest size group than for the other groups, especially for equity issues.

Insert Table II here.

Table II reports the correlation coefficients among several variables of interest. The number of analysts is negatively related to the leverage ratio. Although the debt ratio itself is not an explanatory variable in our regressions, the negative relationship between the debt ratio and analyst coverage is consistent with the idea that analysts mitigate information asymmetry, and so firms with less coverage may have higher debt ratios as they are unable to issue equity regularly. The number of analysts is positively correlated with the log of assets, market-to-book asset ratio, debt rating dummy, and return on assets (ROA). Thus, while the number of analysts is positively correlated with variables such as the market-to-book ratio and the return on assets that previous research finds are associated with low leverage ratios, it is also positively correlated with other variables such as debt ratings that are typically associated with high leverage ratios.

C. Econometric Specification

Endogeneity between analyst coverage and financing decisions is a potentially serious issue for our study. To address this problem, we follow two main strategies.

In one approach, we use the three-period lagged value of the number of analysts that follow a firm in all our regressions. We also control for the one-period lagged deviation of the debt ratio from a target, as well as the amount of equity issued over the last three periods. This specification addresses two sets of issues.

First, a firm may attract more analysts in a given period for reasons that also affect its issue decisions. This simultaneity could potentially bias our estimates. For instance, firms may enjoy greater coverage because analysts anticipate that the firm would be issuing equity. Further, analyst coverage may be affected by issue decisions in the recent past, which, in turn, could affect issue decisions in the current period if firms gradually adjust to a target capital structure. By looking at the number of analysts with a sufficient lag, while controlling for the interim volume of equity issues as well as the lagged deviation of the debt ratio from a target, we try to avoid these problems.

Second, some firms may be pre-disposed to issuing more equity or debt because of characteristics that we cannot control for. Firms that might issue more equity on average may also enjoy greater analyst following since analysts are likely to follow firms that issue more equity. Since we control for the volume of equity issues over the past three years, this concern is reduced.

In a second approach, we replicate all our tests using a two-stage procedure. Faulkender and Petersen (2003), who study how the presence of debt analysts affects capital structure choice, encounter an endogeneity problem very similar to ours; they adopt a similar two-stage procedure. Lowry and Shu (2002) and Cliff and Denis (2004) also follow a comparable strategy. In the first step, we use a count-data methodology (i.e., a negative binomial regression model, as in Rock, Sedo, and Willenborg (2000)) to predict the number of analysts lagged one period based on firm-specific variables (lagged two periods). In the second stage (i.e., in regressions addressing firms' financing decisions), we use the predicted value instead of the actual number of analysts covering the firm. We estimate the confidence intervals from 500 bootstrap replications of the two-step process resampled from the actual data set. Our results from the two-stage procedure are very similar to those that we obtain by lagging the number of analysts by three periods.

Insert Table III here.

Table III reports the results of our analysis of the determinants of analyst coverage (i.e., our first-step estimation), both for the overall sample and for each size-based sub-sample. We use several variables as instruments in the first stage, namely, an S&P 500 dummy, the industry median number of analysts, stock exchange dummies, the Herfindahl index at the three-digit industry level, a dummy variable that takes the value of one if the firm is a large player in its industry (zero otherwise), the log of the stock price, and the firm's expected sales growth. One notable feature of the results is that variables that are commonly associated with greater information asymmetry (lower size, more segments, stock return volatility, a "small player" in the industry, and no debt ratings) all have a negative effect on analyst following. Other variables such as the volume of past equity issues (firms that issue equity have to disclose more information – Almazan, Suarez, and Titman (2003)), expected sales growth (firms with high expected sales growth are more willing to disclose information), and the Herfindahl index (firms in more concentrated industries are less willing to disclose information for strategic reasons) also have effects consistent with the idea that analysts follow more transparent firms.

Insert Table III here.

III. Empirical Tests and Results

This section reports our results on the effect of analyst coverage on firms' financing choices. We first examine how analyst coverage affects firms' choices regarding debt versus equity, and large versus small issues of equity. We then examine how analyst coverage affects firms' incentives to take advantage of market conditions in determining their issue decisions.

A. Debt versus Equity

First, we present results on the relation between analyst coverage and firms' debt-equity choices. Our tests are motivated by the idea that firms followed by more analysts should be less subject to information asymmetry and therefore should experience lower costs of issuing equity relative to debt. As a consequence, we expect that firms followed by more analysts have a lower likelihood of issuing debt as opposed to equity, ceteris paribus.

We use Logit regressions similar to those used by Hovakimian, Opler, and Titman (2002) to examine how a firm's debt-equity choice in a given year is affected by analyst coverage. Specifically, we estimate the model

$$\Pr[Dissue = 1] = F(\alpha + \beta C + \gamma NbrAnal), \quad (1)$$

where the dependent variable, *Dissue*, takes a value of one if net debt issued constitutes more than 5% of total assets, and zero if net equity issued exceeds 5% of total assets. Only issue years in which the firm issues net debt or equity exceeding 5% of book value of assets are considered; years in which both are issued or neither are above the 5% cutoff are not considered.[18] The variable *F* denotes the logistic cumulative distribution function. The coefficient on *NbrAnal*, the number of analysts, is expected to be negative. Finally, *C* denotes a set of pre-determined (one-period lagged) control variables (detailed in Appendix B) and includes, in particular, the deviation of the one-period lagged debt ratio from the estimated target debt ratio. We include this variable because the tradeoff theory suggests that firms that are above (below) a target debt ratio should issue equity (debt).

Table IV presents the estimation results that correspond to equation (1). As we discuss in Section II, we deal with the potential endogeneity of analyst coverage in two ways. First, we replace *NbrAnal* at time *t* with *NbrAnal* lagged three periods, that is, at *t*-3, while also controlling for both the deviation of the debt ratio from an estimate of the target, and the volume of equity issues in the recent past. Second, we use the predicted number of analysts at *t*-1 (based on the estimated model in Table III) as a regressor in place of the number of analysts in the second step. Throughout our empirical tests, the standard errors we use in the calculation of the *t*-statistics are based on the heteroskedastic-consistent Huber-White sandwich estimator and allow for firm-level clustering of observations (i.e., the assumption

Insert Table IV here.

that errors are identically and independently distributed for observations of the same firm is dropped). The results (not tabulated) are very similar when we allow for clustering of observations by years instead of by firms.

The results in Table IV indicate that the probability of debt issuance decreases with the number of analysts lagged three periods (the *z*-statistic equals –2.8 for the overall sample), implying that firms with greater analyst coverage issue debt less frequently. This result holds in the overall sample and across all size groups, although it is not significant at conventional levels for the largest size group (*z*-statistics range from -4.9 to -1.5 for size group regressions). Results are also significant when fixed effects or random effects are included. The results from bootstrapping the two-stage estimation also indicate a similar negative relationship between the predicted number of analysts and the probability of debt issues. Of the other control variables, size (the log of the book value of assets) and the market-to-book ratio are consistently significant across all subsamples (the first variable has a positive effect, the second negative). For smaller firms, the issuance of debt is positively related with age, tangibility, and the Z-score, while equity issuance is more likely when the stock is actively traded (i.e., the coefficient on share turnover is negative). For larger firms, the return on assets (ROA) and the dividend ratio have a positive effect on the probability of debt issues.

We want to ensure that our results are not driven by a misspecification related to stock prices and performance. In particular, to make sure that we adequately address potential non-linearities in the effect of past performance on issuance decisions, we divide firms into ten groups based on the compounded monthly stock return in the past three years. For the results reported in Table IV and all subsequent regressions,[19] we include 10 spline variables with nodes corresponding to the deciles of the distribution of past returns. However, the coefficient estimates for the individual splines are not reported in the tables.

As additional untabulated checks, we repeat this procedure with past ROA and the market-to-book ratio. Finally, we partition our overall sample into three subsamples based either on past returns or on past ROA and reestimate our model. Our results (not tabulated) still hold in all cases and we find that the general pattern holds in each of the subgroups.

Thus, it appears unlikely that our results are driven by nonlinearities in the relation between performance, the market-to-book ratio, and firms' financing decisions.

B. The Likelihood of Large versus Small Equity Issues

As we argue in Section I, we expect that firms facing greater information asymmetry will issue equity less frequently. However, the inability to issue equity as regularly as they would choose in the absence of information asymmetry might cause these firms to have debt ratios that are higher than the unconstrained optimum level. As a result, we predict that when market conditions are good and these firms do issue equity, they should issue a large amount. Moreover, these firms may anticipate being constrained from issuing equity in the future, and thus issue in larger amounts when market conditions are more favorable. Finally, because of greater information asymmetry, the stock prices of these firms are more likely to be driven by sentiment and diverge further upwards from fundamental value when market conditions are generally more favorable. Thus, these firms might exploit these windows of opportunity by issuing more equity.

Insert Figure 2 here.

Figure 2 provides preliminary evidence in support of our hypothesis. For every size category, the proportion of small equity issues (between 1% and 10% of the book value of assets) to large issues (more than 10% of the book value of assets) is higher for firms with above-median numbers of analysts (the "more analysts" subgroup) than for those with below-median numbers of analysts (the "fewer analysts" subgroup). Moreover, the median size of equity issues is also higher for firms followed by fewer analysts than for those followed by more analysts.[20]

To test our hypothesis more formally, we estimate a polytomous Logit model in which the dependent variable, y, takes a value of one if a firm issues net debt in a given year (greater than 1% of the book value of assets), a value of two if the firm makes a "large" issue of equity (greater than 10% of the book value of assets), and a value of three if the firm makes a "small" issue of equity (greater than 1% but less than 10% of the book value of assets). We choose small equity issues as the base category.[21] We then estimate the following equations (after normalization):

$$\frac{\Pr[y=1]}{\Pr[y=3]} = e^{X\beta^{(1)}} \quad \text{and} \quad \frac{\Pr[y=2]}{\Pr[y=3]} = e^{X\beta^{(2)}}. \tag{2}$$

Here, $X \equiv (C, NbrAnal)$, where C is a vector of pre-determined variables (detailed in Appendix B). If firms followed by more analysts are likely to make less frequent issues of debt as well as large equity issues relative to small equity issues, then the coefficient of $NbrAnal$ (instrumented by the number of analysts lagged by three periods, or by the predicted value of the one-period lagged number of analysts) will be negative in both equations.

Table V reports the estimation results. In column I, *NbrAnal* is lagged three periods; in column II, *NbrAnal* is replaced by the predicted number of analysts lagged one period, and we report the coefficient estimates and the 95% confidence based on 500 bootstrap replications of the two-step process resampled from the actual data set. In the interest of space, we report only the results that correspond to the probability of large equity issues relative to small equity issues.[22] The unreported results for the probability of debt issues relative to small equity issues are similar to those in Table IV.

Insert Table V here.

The results in Table V indicate that, relative to the base case of small equity issues, a higher number of analysts lowers the probability of large equity issues. The coefficient on the number of analysts is negative and the t-statistic is -4.4 for large equity issues ($y = 2$) in the overall sample.[23] Since we control for past equity issuance, the negative effect of the number of analysts on large equity issues is not due to the fact that firms with higher analyst coverage have made larger equity issues recently.[24]

C. Analyst Coverage, Price Run-ups, and Equity Issuance

In Section I, we argue that both market timing behavior and dynamic adverse selection considerations could imply that stock price run-ups are positively associated with the size of equity issuance. Further, this positive relationship is likely to be stronger for firms subject to greater information asymmetry. To test this prediction, we regress the size of the equity issue (conditional on there being an equity issue) on the past year's stock returns, controlling for different firm characteristics. We expect that past returns should have a positive effect on issuance size. We then introduce an interaction between past returns and the number of analysts. We expect that the interaction should have a negative effect (i.e., the effect should not be as strong for well-covered firms). Specifically, we estimate:

$$Esize = \alpha + \beta_1 PSTKRTN + \beta_2 PSTKRTN \times NbrAnal + \gamma C + \varepsilon \,, \qquad (3)$$

where *Esize* denotes the size of the net equity issue, scaled either by the book value or the market value of assets, *PSTKRTN* denotes the stock return over the past two years, and *C* denotes a set of pre-determined control variables. We expect that the β_1 coefficient is positive and the β_2 coefficient is negative.

Insert Table VI here.

In Table VI, we report the results of estimating equation (3), in which we regress the size of equity issues scaled by either the book value of assets (columns I and II) or the market value of assets (columns III and IV) on the control variables plus the compounded monthly stock return over the past two years, as well as the latter's interaction with either the number of analysts lagged three periods, or the predicted value of the one-period lagged number of analysts. To ensure that the interaction term does not pick up a non linearity in the relation between past performance and the issue size, we introduce additional square and cubic terms for past stock returns. Stock returns have a positive effect on the size of the equity issuance while the interaction with the number of analysts has a negative effect in both tables (*t*-statistics of -5.1 and -4.2, respectively). This is consistent with the idea that firms followed by fewer analysts are more likely to be influenced by market conditions, making larger equity issues when market conditions are good. By splitting stock returns further into positive and negative returns, we find (results not tabulated) that the effect comes entirely from the positive stock return years. The number of analysts itself has a significant negative coefficient, consistent with the idea that firms followed by more analysts will make smaller but more frequent issues.[25] This result is robust to using random or firm fixed effects (not tabulated).

Since the firm's decision to issue equity is an endogenous choice, and equation (3) is estimated only over the firm-years in which an equity issue decision is observed, the results reported in Table VI could be biased because of a well-known endogeneity problem. To address this issue, we reestimate equation (3) as part of a Heckman selection model. We posit that firms will issue equity if

$$\gamma Z + u > 0\,, \tag{4}$$

where Z is a vector of pre-determined firm-specific variables and u is a standard normal variate. We allow for the possibility that u and ε in equation (3) are correlated; if the correlation coefficient is non zero, standard regression techniques applied to equation (3) result in biased estimates. Heckman's maximum likelihood estimation provides consistent, asymptotically efficient parameter estimates.[26]

The vector Z includes variables that are likely to affect the firm's requirement for external funds, as well as those that affect the choice of equity vis-à-vis debt financing. These variables consist of proxies for the firm's investment needs (in the current period as well as in the next two years), proxies for internally available funds, variables that are relevant for the determination of its cash holding targets, and variables that are relevant for the determination of its debt capacity. Appendix B gives a complete list of all the variables that the vector Z includes. Table VII reports the results. Again, the dependent variable is the size of net equity issues scaled by the book (market) value of assets in column I (column II). The qualitative results are very similar to those in Table VI. The past stock return has a significant positive coefficient in both tables, and the interaction of the past stock return and the number of analysts lagged three periods has a significant negative effect in both tables as well (*t*-statistics of -7.0 and -3.7, respectively).

Insert Table VII here.

D. External Finance-Weighted Market-to-Book Ratio and Market Timing

In this section, we provide further evidence that the financing choices of firms covered by fewer analysts are affected more by temporary conditions that prevail in the market.

We consider an "external finance weighted-average" market-to-book ratio as in BW (2002). For each firm-year, we define the timing measure *BW5MBA* as:

$$BW5MBA_t = \sum_{s=t-6}^{t-1} \frac{Disu_s + Eisu_s}{\sum_{r=t-6}^{t-1}(Disu_r + Eisu_r)} (MBA)_s \,, \tag{5}$$

where $Disu_s$ and $Eisu_s$ denote, respectively, the net debt and equity issued at time *s*.[27] The market-to-book ratio (*MBA*) is the ratio of the market value of assets to the book value of assets. BW (2002) argue that if firms issued equity rather than debt when market conditions were better in the past (as measured by the market-to-book ratio), then a past external finance weighted-average market-to-book ratio will have a negative effect on the current debt ratio. Recent work (see Hovakimian (2005)) questions whether the negative effect of the BW market-to-book ratio really shows the persistent effect of market timing on capital structure. In particular, it has been suggested that the BW market-to-book ratio contains information about future growth opportunities that is not contained in the current market-to-book ratio. However, this interpretation of the BW market-to-book ratio does not preclude a market timing interpretation of a negative effect of the variable on the debt ratio. Hovakimian (2005) points out, for example, that firms may want to issue equity and build up debt capacity when market conditions are good (which also indicates promising growth opportunities for the future) in order to ensure that they can avoid issuing equity later under less favorable market conditions.

We examine both the effect of analyst coverage at *t*-5 and BW's weighted market-to-book ratio measured from *t*-5 to *t* on the change in the debt ratio over the same period. We introduce an interaction between BW's weighted market-to-book ratio averaged over the five-year period from *t*-5 to *t* (*BW5MBA*) and the number of analysts. We predict that, since better covered firms suffer less from information asymmetry, they are likely to have weaker incentives to time the market. This could be because their shares are less likely to be truly overvalued, because they are able to tap the equity markets more regularly and hence remain closer to an optimal capital structure on average, or because they are less likely to be misvalued in the future when they need to finance promising projects. Hence, the external finance weighted-average market-to-book ratio over the last five years should have a weaker negative effect on the change in the debt ratio of firms with higher coverage. This implies that the coefficient of the interaction term (β_4) should be positive in the following regression equation:

$$\begin{aligned} TDM_t - TDM_{t-5} &= \alpha + \beta_1 NbrAnal_{t-5} + \beta_2 (NbrAnal_t - NbrAnal_{t-5}) + \beta_3 (BW5MBA) \\ &+ \beta_4 (BW5MBA \times NbrAnal_{t-5}) + \gamma (Changes\ in\ Other\ Control\ Variables) + \varepsilon_t . \end{aligned} \quad (6)$$

The market leverage ratio (*TDM*) is defined as the ratio of the book value of total debt to the quasi-market value of assets (total assets minus book value of equity plus market value of equity).[28] Following standard practice, we drop observations for which this ratio is greater than one for individual firm-year observations (see Shyam-Sunder and Myers (1999), Frank and Goyal (2003a, 2003b) and Hovakimian, Opler, and Titman (2002)).

In Table VIII, we report the results from estimating equation (6). While the control variables (detailed in Appendix B) are standard in capital structure regressions, here they are in changes over five years. In particular, we compute the cumulative raw stock return by compounding monthly returns from year *t*-5 to *t*, and included it in the regression in the form of 10 spline variables. The *Sum of External Financing,* the firm's aggregate financing deficit scaled by the book value of assets at *t*-5, is included because the change in the debt ratio is likely to be related to the firms' aggregate external financing requirement over the five-year period. Since the dependent variable is the change in the debt ratio over the five-year period, in this particular regression we do not additionally control for the net equity issues scaled by assets over the same period. Tradeoff theory suggests that the change in the debt ratio will also be related to whether or not the firm is above or below the target at *t*-5. Deviation from the target leverage ratio at *t*-5 is proxied by the difference between the actual leverage ratio and the estimated target from Table AI at *t*-5.

Insert Table VIII here.

The number of analysts lagged five periods ($NbrAnal_{t-5}$) has a significantly negative effect on the change in the leverage ratio. The change in the number of analysts following the firm from *t*-5 to *t* ($NbrAnal_t$ - $NbrAnal_{t-5}$) also has a significant and negative coefficient. These results suggest that firms followed by more analysts issue more equity, consistent with our earlier results. The BW timing variable has a significantly negative impact, consistent with the idea of market timing; however, its interaction with the number of analysts lagged five periods is positive, indicating that firms followed by more analysts have weaker incentives to time the market. To address concerns about nonlinearity in the relation between *BW5MBA* and the change in debt ratio, we include in our regressions squared and cubic terms of *BW5MBA*. We also replicate the tests for the three size groups separately and find consistent results.[29]

E. Robustness Checks

E.1. The Coverage-Driven Overvaluation Hypothesis

As we mention in Section I, a series of papers point out conflicts of interest between the investment banking and security analysis functions. Analysts may hold back negative information to attract investing banking business or higher trading commission, or they may "hype up" certain stocks and cause stock prices to diverge upwards from their fundamental value, in the process increasing their chances of attracting investment banking business. Although we do control for simultaneity between analyst coverage and equity issuance, such overvaluation could still conceivably explain our results. For example, our results indicate that firms with higher coverage are *less* likely to exploit a window of opportunity by making larger issues. It is possible that firms that enjoy higher coverage are consistently overvalued and, thus, are able to tap the equity markets regularly.

The results in Table IV, and the summary statistics reported in Figure 2, indicate that the impact of greater analyst following on firms' financing behavior is present for all firm size groups, including firms with book value of assets less than 70 million (Group 1). For this size group, the mean number of analysts is slightly above one, and the median, the 75th percentile, and the 90th percentile are, respectively, zero, two, and three. Thus, it seems unlikely that the financing behavior of these firms is explained by overvaluation driven by analysts clamoring for their investment banking business; however, the difference in coverage for these firms could still be significant from the point of view of reducing information asymmetry. To strengthen this argument, we revisit our results in Tables V, VI, and VIII by focusing on the smallest size group. Consistent with lower information asymmetry being associated with higher analyst coverage, we find in Table IX that while small firms time their equity issues, the timing behavior is less pronounced for firms that enjoy greater coverage. The results also show that the coefficients on the number of analysts in column I, its interaction with the past year's stock returns (*PSTKRTN*) in column II, and its interaction with *BW5MBA* in column III are much larger for the smallest size group than for the overall sample.

The fact that our results are actually stronger for the smallest size group of firms is useful in the interpretation of recent evidence. As we note in the introduction, one of the implications of the Pecking Order Hypothesis is that, because of information asymmetry, firms will prefer debt financing over equity. However, as Rajan and Zingales (1995), Fama and French (2002), and Frank and Goyal (2003b) note, small firms, supposedly subject to greater information asymmetry than large firms, use much more equity financing than large firms. Our results reaffirm that the apparent inconsistency of the financing behavior of firms with the POH is not a rejection of the relevance of information asymmetry; rather, it is a challenge to a specific theory of financing choice. Indeed, the financing behavior of small firms is consistent with information asymmetry being of first-order importance for these firms; in fact, the impact of information intermediaries, if anything, is the strongest for the smallest size group.

Insert Table IX here.

E.2. Nonlinearities in the Impact of Analyst Coverage

Finally, the linear functional form in the specifications that we estimate above assumes a constant marginal impact for each additional analyst. However, one would perhaps expect that the benefit of increasing the coverage from zero to one should be greater than the benefit of going from 10 to 11 analysts. To examine whether this issue affects our conclusions, in Table X we report the results of our main specifications using the log of one plus the number of analysts (instead of the raw coverage). In addition, we add a dummy variable that takes the value of one if the firm is not covered by any analyst. To facilitate comparison with

Table IX, the results are reported both for the smallest size group as well as the overall sample. Our results are essentially unchanged. In particular, they remain stronger for the smallest size group than for the overall sample.

Insert Table X here.

IV. Conclusions

We empirically investigate how information asymmetry affects firms' financing choices. We argue that the number of analysts following a firm is negatively correlated with the extent of information asymmetry the firm faces, either because analysts directly reduce information asymmetry, or because analysts are attracted to firms that are more transparent and for which information gathering costs are lower. We argue that both market timing behavior aimed at exploiting the information asymmetry, as well as financing behavior in the context of dynamic adverse selection models, have testable implications regarding the financing choices of firms that are subject to greater information asymmetry.

Our tests show that firms that are covered by more analysts are more likely to issue equity as opposed to debt. Moreover, firms that have greater analyst coverage depend less on favorable market conditions for their equity issuance decisions. Specifically, we find that the tendency for firms to make larger issues of equity when their stock returns are more favorable is less pronounced for firms that are followed by more analysts. We also find a comparable pattern for debt issuance, but the magnitude of the effect of the number of analysts is both economically and statistically less significant. In addition, more analyst coverage decreases the likelihood of a debt issue or a large equity issue. Finally, the debt ratios of firms followed by more analysts are less affected by the Baker and Wurgler (2002) measure of market timing. All these results hold under different specifications that are designed to minimize the risk that endogeneity between analyst coverage and financing decisions biases our results. The results also hold after controlling for (possibly nonlinear) effects of past performance.

Our results also hold when we partition the sample of firms into three size groups based on size, and are especially strong, both economically and statistically, for the smallest size group (book value of assets less than 70 million, mean number of analysts one). The fact that these results hold and, if anything, are the strongest for the smallest firms further supports the view that information asymmetry affects firms financing choices.

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Figure 1. Analyst following and target adjustment. Data are collected from *Industrial Compustat, CRSP,* and *I/B/E/S* for the years 1985 to 2000. The overall sample is evenly stratified into three size groups based on the book value of assets at the beginning of the fiscal year. Firms are further classified into "fewer" or "more" analyst groups if the number of analysts is below or above the median value of the distribution for each size group. The number of analysts equals the maximum number of analysts making annual earnings forecasts in any month over a 12 month period that ends three years earlier. Panel A presents the mean positive and negative deviations from the target leverage ratio. Panel B tracks the mean deviation from the target leverage ratio following large deviations. A large positive deviation is defined as a deviation above the 75th percentile of the distribution of positive deviations. A large negative deviation is defined as a deviation below the 25th percentile of the distribution of negative deviations. A deviation is defined as the actual leverage ratio less the estimated leverage ratio. The target leverage ratio is estimated separately for each size group (results are in Table AI). The results in the figure are not sensitive to the inclusion of the number of analysts in the leverage regression. Panel C depicts the fraction of firms that issue equity from two years before to three years after a positive equity shock. Firms are defined as issuing equity when the net equity issued divided by the book value of assets exceeds 5%. A positive equity shock corresponds to an annual stock return at least one standard deviation above the firm-specific mean.

Panel A: Mean deviation from target

Panel B: Mean deviation from target following large deviations

Panel C: Fraction of firms that issue equity around positive equity shocks

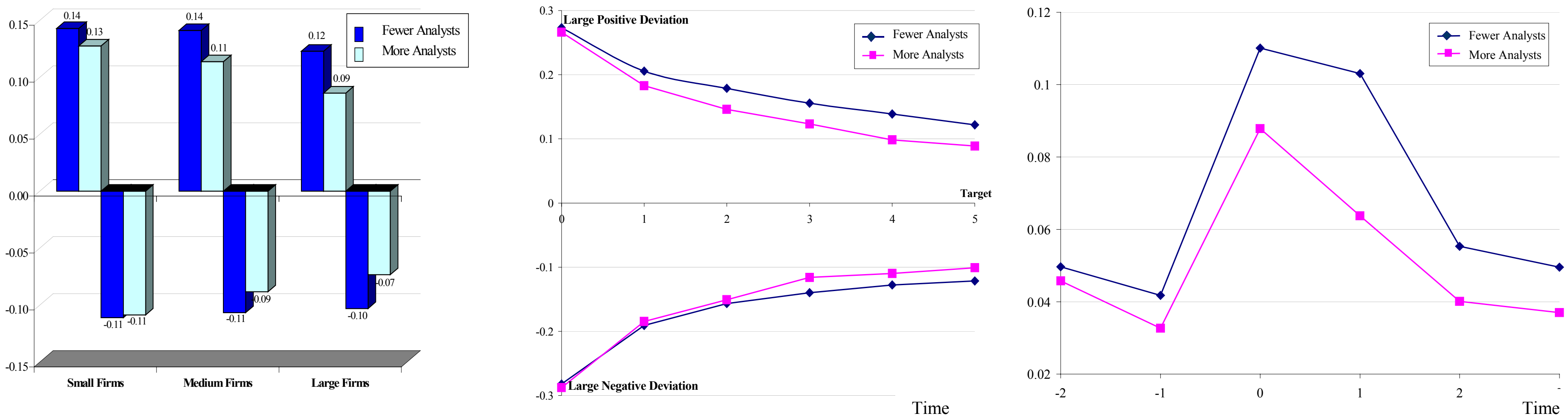

Figure 2. Relative frequency of debt and equity issues. Data are collected from *Industrial Compustat*, *CRSP* and *I/B/E/S* for the years 1985 to 2000. The overall sample is evenly partitioned into three size groups according to the book value of assets at the beginning of the fiscal year. Firms are further classified into "fewer" or "more" analyst groups if the number of analysts is below or above the median value of the distribution for each size group. The number of analysts equals the maximum number of analysts that make annual earnings forecasts in any month over a twelve-month period that ends three years prior to the issue decision. All issue years are classified into one of three categories. "Debt issues" corresponds to issue years in which the net debt issued exceeds 1% of the book value of assets and the net equity issued is below 1% of assets. "Small equity issues" corresponds to issue years in which the net equity issued lies between 1% and 10% of book value of assets and the net debt issued is lower than 1% of assets. "Large equity issues" corresponds to issue years in which the net equity issued exceeds 10% of assets and the net debt issued is lower than 1% of assets. Net debt issued is long-term debt issuance minus long-term debt reduction plus the current portion of long-term debt. Net equity issued is the sale of common stock minus the purchase of common stock. Panel A reports the relative frequency of equity issuance to debt issuance, defined as (Total number of small equity issues + Total number of large equity issues) / Total number of debt issues). Panel B presents the relative frequency of large equity issuance to small equity issuance. Panel C reports the median size of equity issues, defined as net equity issued divided by book value of assets at the beginning of the fiscal year.

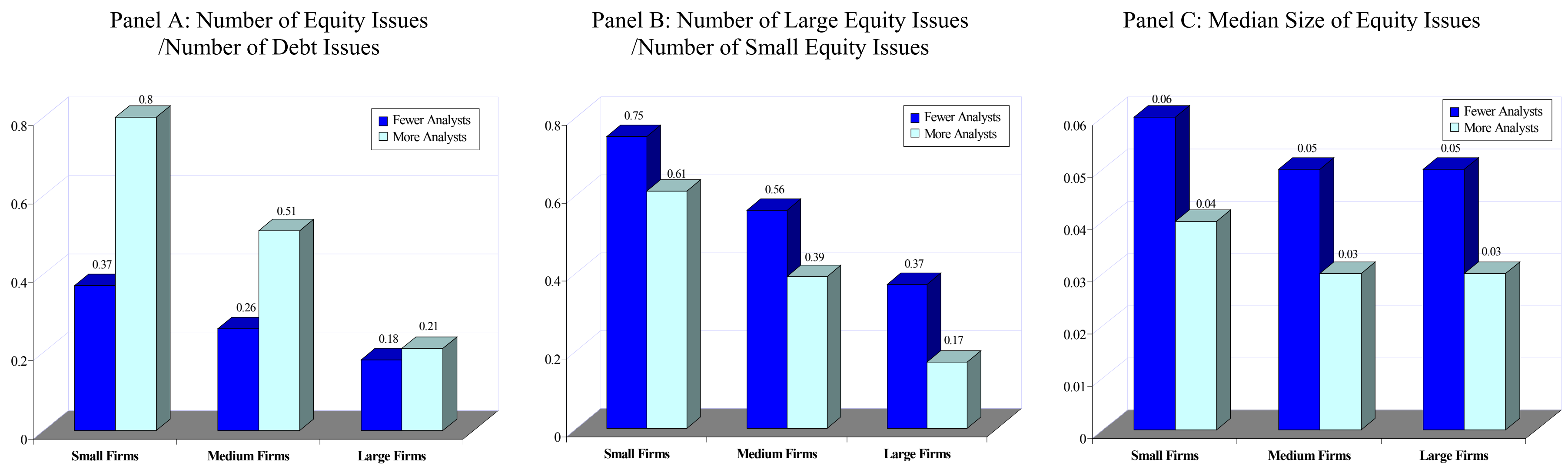

Table I
Summary Statistics

Data are collected from *Industrial Compustat*, *CRSP,* and *I/B/E/S* for the years 1985 to 2000. The overall sample is evenly partitioned into three size groups according to the book value of assets at the beginning of the fiscal year. In Panel A, *Age* is the number of years since the firm entered the database. *Total Assets* is Compustat item number 6. *Market Capitalization* equals the number of shares outstanding multiplied by the closing stock price at the end of the fiscal year. *Book Leverage* is the ratio of total debt (debt in current liabilities + long-term debt) to *Total Assets*. *Market Leverage* is the total debt divided by (total assets - book equity + market capitalization). *Market-to-book Ratio* is defined as (total assets - book equity + market capitalization)/ total assets. *Return on Assets* is income before depreciation and amortization divided by book value of assets. *Debt Rating* is a dummy variable that equals one if either senior or subordinated debt is rated by Standard & Poor's, and zero otherwise. *Number of Analysts* (*NbrAnal*) is the maximum number of analysts that make annual earnings forecasts any month over a 12 month period. In Panel B, firms are defined as issuing debt or equity when the issue size exceeds 5%. Issue size is the net amount issued deflated by the book value of assets at the beginning of the fiscal year. Dollar figures are in millions.

		Overall Sample	Group 1 (Small)	Group 2 (Medium)	Group 3 (Large)
Panel A: Summary statistics on firm-specific variables					
Age	Mean	18.2	14.0	17.3	23.2
	Median	17	12	16	25
Total Assets	Mean	1,804.2	37.2	207.6	5,168.1
	Median	177.4	31.6	176.5	1,633.1
	Standard Deviation	7,140.5	25.5	135.7	11,660.8
Market Capitalization	Mean	1,618.9	41.3	207.6	4,588.7
	Median	117.6	21.9	176.5	1,165.1
	Standard Deviation	9,092.2	64.9	336.9	13,830.1
Book Leverage	Mean	0.247	0.223	0.242	0.276
	Median	0.228	0.187	0.216	0.261
	Standard Deviation	0.192	0.201	0.201	0.169
Market Leverage	Mean	0.207	0.189	0.206	0.223
	Median	0.169	0.141	0.164	0.191
	Standard Deviation	0.179	0.182	0.188	0.168
Return on Assets	Mean	0.111	0.072	0.118	0.144
	Median	0.126	0.099	0.127	0.144
	Standard Deviation	0.133	0.174	0.119	0.078
Market-to-book Ratio	Mean	1.566	1.572	1.537	1.590
	Median	1.266	1.219	1.236	1.333
	Standard Deviation	0.991	1.097	0.943	0.937
Debt Rating	Mean	0.264	0.010	0.127	0.654
	Median	0	0	0	1
	Percentage of firms being rated	26.4%	1.0%	12.7%	65.4%
Number of Analysts (*NbrAnal*)	Mean	6.54	1.10	4.49	14.02
	Median	3	0	3	13
	Standard Deviation	8.432	1.782	4.556	9.9
	Percentage of firms being covered	72.9%	44.0%	80.8%	93.9%
Panel B: Summary statistics on debt/equity issues					
Total Number of Debt Issues		9,894	3,232	3,251	3,411
Total Number of Equity Issues		3,497	1,665	1,061	753
Median Size of Debt Issues		12.8%	15.6%	13.4%	10.4%
Median Size of Equity Issues		16.6%	22.4%	17.2%	10.3%
Number of Firm-years		35,697	11,897	11,902	11,898

Table II

Correlation Coefficients among Key Variables

Data are collected from *Industrial Compustat*, *CRSP,* and *I/B/E/S* for the years 1985 to 2000. *Market Leverage* is the total debt divided by (total assets - book equity + market capitalization). *Market capitalization* equals the number of shares outstanding multiplied by the closing stock price at the end of the fiscal year. *Market-to-book Ratio* is defined as (market capitalization + book value of debt)/ total assets. *Return on Assets* is income before depreciation and amortization divided by book value of assets. *Debt Rating* is a dummy variable that equals one if either senior or subordinated debt is rated by Standard & Poor's, and zero otherwise. *Number of Analysts* (*NbrAnal*) is the maximum number of analysts that make annual earnings forecasts any month over a 12 month period. *Annual Stock Return* is the cumulative annual raw stock return obtained by compounding monthly returns in the past fiscal year. *Z-Score* is the unleveraged Altman [1968]'s Z-Score. *Share Turnover* is the median value of shares traded (volume) in a month divided by shares outstanding over a 12-month period. Pair-wise correlation coefficients among variables are reported. Correlation coefficients that are significant at the 1% level are marked with ***.

	Market Leverage	*Log* (*Assets*)	*Number of Analysts* (*NbrAnal*)	*Market-to-book Ratio*	*Annual Stock Return*	*Debt Rating*	*Return On Assets*	*Z-Score*	*Share Turnover*
Market Leverage	1.00								
Log (Assets)	0.07***	1.00							
Number of Analysts (NbrAnal)	-0.15***	0.72***	1.00						
Market-to-book Ratio	-0.43***	0.02	0.23***	1.00					
Annual Stock Return	-0.21***	0.01	0.02***	0.37***	1.00				
Debt Rating	0.18***	0.65***	0.54***	-0.01	-0.01	1.00			
Return on Assets	-0.14***	0.25***	0.23***	0.12***	0.19***	0.11***	1.00		
Z-Score	-0.22***	0.09***	0.08***	-0.06***	0.12***	-0.03***	0.66***	1.00	
Share Turnover	-0.15***	0.13***	0.20***	0.28***	0.16***	0.06***	-0.04***	-0.10***	1.00

Table III

Determinants of Analyst Following (First Stage of Instrumental Variable Regression, Estimated with a Negative Binomial Regression Model)

Data are collected from *Industrial Compustat*, *CRSP,* and *I/B/E/S* for the years 1985 to 2000. The overall sample is evenly partitioned into three size groups based on total assets. The dependent variable is *Number of Analysts* (*NbrAnal*), the maximum number of analysts that make annual earning forecasts any month over a 12 month period. *Age* is the number of years since the firm entered the database. *Industry Medians Number of Analysts* and *Industry Median Market Leverage* are computed by three-digit SIC code and by year. *S&P 500 Dummy* equals one if the firm is included the S&P 500. *NYSE* (*AMEX*) *Dummy* takes value of one if a firm's stock is traded on the NYSE (AMEX). *Herfindahl Index* is computed by summing squared market shares within each three-digit SIC industry. *Big Player Dummy* equals one if a firm's sale is above the 75th percentile of the distribution of the three-digit SIC industry. *Share Turnover* is the median value of shares traded in a month divided by shares outstanding over a twelve-month period. *Debt Rating* equals one if either senior or subordinated debt is rated by Standard & Poor's, and zero otherwise. *Return on Assets* is the income before depreciation and amortization divided by total assets. *Stock Return Volatility* is the standard deviation of daily stock returns calculated for each firm each year. *Stock Price* is the median of closing prices over a 12-month period. *Past Equity Issues* is the sum of equity issues in the past three years divided by total assets. *Expected Sales Growth* is sales next year deflated by current sales. All explanatory variables are lagged one period relative to the dependent variable (analyst coverage). Coefficients significant at the 10%, 5%, and 1% levels are respectively marked with *, **, and ***. Constant terms and year dummies are included in regressions but not reported. *z*-statistics in parentheses are calculated from heteroskedastic-consistent robust standard errors, which are also corrected for within-firm clustering.

Number of Analysts (*NbrAnal*)	Overall Sample		Group 1(Small)		Group 2 (Medium)		Group 3 (Large)	
	Coef.	*z*-stat.	Coef.	*z*-stat.	Coef.	*z*-stat.	Coef.	*z*-stat.
S&P 500 Dummy	0.210***	(6.0)	-	-	0.413***	(3.6)	0.301***	(8.7)
Industry Median Number of Analysts	0.022***	(4.1)	0.021	(1.0)	0.030***	(3.1)	0.013**	(2.5)
Log (*Age*)	-0.212***	(-10.5)	-0.523***	(-11.5)	-0.267***	(-10.0)	-0.038	(-1.6)
Log (*Sales*)	0.282***	(21.1)	0.267***	(8.9)	0.173***	(8.1)	0.144***	(8.4)
NYSE Dummy	0.398***	(11.2)	0.228***	(2.9)	0.190***	(4.8)	0.368***	(6.4)
AMEX Dummy	-0.386***	(-5.9)	-0.626***	(-7.6)	-0.384***	(-5.1)	-0.095	(-0.6)
Industry Median Market Leverage Ratio	-0.424***	(-4.7)	-1.301***	(-5.6)	-0.630***	(-4.5)	-0.370***	(-3.3)
Herfindahl Index	-0.527***	(-6.6)	-0.580***	(-3.3)	-0.273***	(-2.6)	-0.531***	(-4.7)
Big Player Dummy	0.249***	(9.1)	0.051	(0.6)	0.187***	(5.8)	0.171***	(4.9)
Debt Rating	0.215***	(7.8)	0.644***	(3.1)	0.134***	(2.9)	0.233***	(7.6)
Number of Industrial Segments	-0.022***	(-5.5)	-0.055***	(-3.8)	-0.023***	(-2.9)	-0.016***	(-3.9)
Return on Assets	0.081	(0.9)	-0.027	(0.2)	0.361**	(2.2)	0.132	(0.7)
Past Equity Issue	0.612***	(13.4)	0.421***	(7.2)	0.666***	(9.1)	0.479***	(5.5)
Market-to-book Ratio	0.184***	(17.0)	0.111***	(6.5)	0.189***	(10.6)	0.215***	(12.8)
Log (*Stock Price*)	0.253***	(10.5)	0.598***	(16.5)	0.147***	(4.1)	0.086**	(2.4)
Share Turnover	0.003***	(14.0)	0.003***	(9.8)	0.003***	(15.1)	0.001***	(4.2)
Stock Return Volatility	-10.914***	(-10.7)	-4.232***	(-3.3)	-11.62***	(-7.6)	-2.830	-(1.0)
Expected Sale Growth	0.006**	(2.2)	0.004*	(1.9)	-0.001	(0.1)	0.001	(0.1)
Pseudo-R^2/ Firm-years	0.17/35,697		0.14/11,897		0.10/11,902		0.09/11,898	

Table IV
Debt-equity Choices and Analyst Coverage (Logit Model)

Data are collected from *Industrial Compustat*, *CRSP,* and *I/B/E/S* for the years 1985 to 2000. The overall sample is evenly partitioned into three size groups based on total assets. The dependent variable, *Dissue*, equals one if debt is issued in year *t*, and zero if equity is issued. Firms are defined as issuing debt (equity) when the net debt (equity) issued divided by total assets exceeds 5%. Cases in which firms issue both debt and equity in a given fiscal year are omitted. *Number of Analysts* ($NbrAnal_{t-3}$) equals the maximum number of analysts that make annual earnings forecasts in any month over a 12 month period that ends three years prior to the issue decision. The other explanatory variables are pre-determined and defined in Appendix B. *Deviation from Target* is measured as the difference between the actual debt ratio lagged one period and an estimated target (estimation reported in Table AI). Ten spline variables for the compounded monthly stock return over the past three years are included in the regression (but not reported in the table), with the nodes of the splines corresponding to the deciles of the distribution of stock returns. Coefficients significant at the 10%, 5%, and 1% levels are respectively marked with *, **, and ***. Constant terms and year dummies are also included in the regressions but not reported. *z*-statistics in parentheses are calculated from heteroskedastic-consistent robust standard errors, which are also corrected for within-firm clustering. In the column "Two-Stage Bootstrap," *Number of Analysts* at *t*-1 is predicted based on the estimated model in Table III. Confidence intervals in square brackets are calculated from 500 bootstrap replications of the two-step estimation based on resampling from the data set with replacement of clusters.

Debt Issue Dummy (*Dissue*)	Overall Sample				Group 1(Small)		Group 2 (Medium)		Group 3 (Large)	
	Logit		Two-Stage Bootstrap		Logit		Logit		Logit	
	Coef.	*z*-stat.	Coef.	95% interval	Coef.	*z*-stat.	Coef.	*z*-stat.	Coef.	*z*-stat.
Number of Analysts ($NbrAnal_{t-3}$)	-0.017***	(-2.8)			-0.137***	(-4.9)	-0.062***	(-4.4)	-0.010	(-1.5)
Predicted Number of Analysts			-0.12	[-0.24, -0.01]						
Deviation from Target	0.245	(1.0)	-0.21	[-0.62,0.20]	1.375***	(3.4)	0.231	(0.5)	-1.524***	(-3.2)
Past Equity Issue	-1.117***	(-6.7)	-1.06	[-1.45,-0.75]	-0.786***	(-3.9)	-1.203***	(-3.6)	-1.587***	(-3.1)
Log (*Assets*)	0.137***	(4.4)	0.17	[0.08,0.25]	0.154**	(2.0)	0.287**	(2.5)	0.248***	(4.0)
Log (*Age*)	0.145**	(2.6)	0.11	[0.01,0.23]	0.221**	(2.5)	0.018	(0.2)	-0.083	(-1.0)
Tangibility	0.268*	(1.8)	0.19	[-0.11, 0.50]	0.595**	(2.3)	0.223	(0.8)	-0.487	(-1.6)
Return on Assets	1.084***	(3.1)	1.04	[0.36,1.84]	0.685	(1.6)	1.128	(1.6)	2.902***	(2.7)
Share Turnover	-0.002***	(-5.0)	-0.01	[-0.02,-0.001]	-0.003***	(-2.6)	-0.002***	(-2.6)	-0.004	(-0.8)
Market-to-book Ratio	-0.423***	(-10.9)	-0.42	[-0.50,-0.33]	-0.527***	(-8.0)	-0.501***	(-6.7)	-0.276***	(-3.5)
Asset Growth	0.154	(1.5)	0.15	[-0.07,0.36]	-0.048	(-0.3)	0.186	(0.9)	0.196	(0.8)
R&D Expenses / Sales	-0.005	(-0.5)	-0.01	[-0.58,0.57]	-0.003	(-0.6)	-0.044	(-0.2)	-4.880**	(-2.4)
R&D Dummy	0.217***	(3.5)	0.21	[0.08,0.35]	0.197*	(1.9)	0.204*	(1.9)	0.121	(0.9)
Dividend /Assets	17.11***	(2.7)	16.54	[4.10,29.02]	0.020	(0.0)	21.574***	(3.7)	24.610***	(4.3)
Z-Score	0.137***	(4.3)	0.14	[0.08,0.21]	0.131***	(3.4)	0.079	(1.4)	0.134	(1.5)
Stock Return Volatility	-0.315	(-0.2)	-2.29	[-5.63,1.43]	-0.395	(-0.2)	-13.99***	(-4.1)	-7.454	(-1.3)
Debt Rating	-0.131	(-1.4)	-0.15	[-0.32,0.04]	-0.873	(-1.5)	-0.214	(-1.4)	-0.223*	(-1.7)
Pseudo-R^2/ Firm-years	0.19/11,141				0.24/3,839		0.18/3,652		0.14/3,650	

Table V
Large and Small Issues: Multinomial Logit Regression

Data are collected from *Industrial Compustat*, *CRSP,* and *I/B/E/S* for the years 1985 to 2000. The estimated model is a maximum likelihood multinomial (polytomous) logistic model. The dependent variable *y* represents three categories of external financing. "*y=1*" (Debt issues) corresponds to issue years in which the net debt issued exceeds 1% of total assets and the net equity issued is below 1% of assets. "*y=2*" (Large equity issues) corresponds to firm-years in which the net equity issued exceeds 10% of assets and the net debt issued is lower than 1% of assets. "*y=3*" (Small equity issues) corresponds to firm-years in which the net equity issued lies between 1% and 10% of the book value of assets and the net debt issued is lower than 1% of assets. The base category is "*y=3*", small equity issues. Only the comparison between small and large equity issues is reported. *Number of Analysts* ($NbrAnal_{t-3}$) equals the maximum number of analysts that make annual earnings forecasts in any month over a 12 month period that ends three years prior to the issue decision. Other explanatory variables are measured at the beginning of the period and defined in Appendix B. Ten spline variables for the compounded monthly stock return over the past three years are included in the regression (but not reported in the table), with the nodes of the splines corresponding to the deciles of the distribution of stock returns. Coefficients significant at the 10%, 5%, and 1% levels are respectively marked with *, **, and ***. Constant terms and year dummies are also included in the regressions but not reported. *z*-statistics in parentheses are calculated from heteroskedastic-consistent robust standard errors, which are also corrected for within-firm clustering. In the column "Two-Stage Bootstrap," *Number of Analysts* at *t*-1 is predicted based on the estimated model in Table III. Confidence intervals in square brackets are calculated from 500 bootstrap replications of the two-step estimation based on resampling from the data set with replacement of clusters.

Debt, Small Equity, and Large Equity Issue Choices (*y*)	Probability of Large Equity Issues Relative to Small Equity Issues			
	Multinomial Logit		Two-Stage Bootstrap	
	Coef.	*z*-stat.	Coef.	95% interval
Number of Analysts ($NbrAnal_{t-3}$)	-0.039***	(-4.4)		
Predicted Number of Analysts			-0.197	[-0.293,-0.110]
Deviation from Target	1.477***	(4.5)	0.948	[0.444,1.495]
Past Equity Issue	0.703***	(4.7)	0.779	[-0.026,1.619]
Log (*Assets*)	-0.056	(-1.4)	-0.071	[-0.179,0.035]
Log (*Age*)	0.016	(0.2)	0.004	[-0.159,0.161]
Tangibility	1.681***	(8.2)	1.633	[1.068,2.171]
Return on Assets	-1.853***	(-5.2)	-1.832	[-3.889,0.044]
Share Turnover	-0.001	(-1.5)	-0.001	[-0.002,0.001]
Market-to-book Ratio	0.065**	(2.0)	0.097	[-0.049,0.259]
Asset Growth	0.245***	(2.0)	0.176	[-0.114,0.452]
R&D Expenses / Sales	-0.002***	(-3.1)	0.428	[-7.839,7.835]
R&D Dummy	0.336***	(3.9)	0.389	[-0.085,0.819]
Dividend /Assets	-16.63**	(-2.1)	-16.41	[-30.88,-1.29]
Z-Score	-0.098***	(-3.5)	-0.061	[-0.209,0.077]
Stock Return Volatility	3.027*	(1.9)	-0.279	[-3.944,3.132]
Debt Rating	0.283**	(2.1)	0.194	[-0.128,0.499]
Pseudo-R^2/ Firm-years	0.20/16,786			

Table VI
Size of Equity Issue, Price Run-ups, and Analyst following

Data are collected from *Industrial Compustat*, *CRSP,* and *I/B/E/S* for the years 1985 to 2000. The dependent variable (*Esize*) is the size of the net equity issue, scaled by book value of assets in columns I and II and by the market value of assets in column III and IV. Regressions include issue years in which the net equity issued exceeds 1% of the book value of assets. Net equity issued is the sale of common stock minus the purchase of common stock. *Number of Analysts* ($NbrAnal_{t-3}$) equals the maximum number of analysts that make annual earnings forecasts in any month over a 12-month period that ends three years prior to the issue decision. *Return on Assets* is the earning before depreciation and amortization divided by total assets. *Market-to-book ratio* is defined as (market value of equity + book value of debt)/ book value of assets. *Past Stock Return* (*PSTKRTN*) is the compounded monthly stock return over the past 24-month period. Constant term and year dummies are included in regressions, but not reported. In columns I and III, coefficients that are significant at 10%, 5%, and 1% levels are respectively marked with *, **, and ***, and the *t*-statistics in parentheses are calculated from heteroskedastic-consistent robust standard errors, which are also corrected for within-firm clustering. In columns II and IV, *Number of Analysts* at *t*-1 is predicted based on the estimated model in Table III. Confidence intervals in square brackets are calculated from 500 bootstrap replications of the two-step estimation based on resampling from the data set with replacement of clusters.

Size of Net Equity Issue (*Esize*)	*Esize* = Net Equity Issue / Book Value of Assets				*Esize* = Net Equity Issue / Market Value of Assets			
	(I) OLS		(II) Two-Stage Bootstrap		(III) OLS		(IV) Two-Stage Bootstrap	
	Coef.	*t*-stat.	Coef.	95% interval	Coef.	*t*-stat.	Coef.	95% interval
Past Stock Return (*PSTKRTN*)	0.037***	(11.6)	0.036	[0.030,0.043]	0.015***	(11.0)	0.014	[0.011,0.017]
Number of Analysts ($NbrAnal_{t-3}$)	-0.003***	(-8.3)			-0.002***	(-10.7)		
$NbrAnal_{t-3}$ × *PSTKRTN*	-0.002***	(-5.1)			-0.001***	(-4.2)		
Predicted Number of Analysts			-0.019	[-0.025,-0.014]			-0.011	[-0.014, -0.009]
Predicted Number of Analysts × PSTKRTN			-0.005	[-0.008, -0.002]			-0.001	[-0.018, -0.0002]
Return on Assets	-0.432***	(-19.4)	-0.394	[-0.439, -0.349]	-0.159***	(-17.8)	-0.141	[-0.160,-0.122]
Market-to-book Ratio	0.034***	(12.5)	0.039	[0.034, 0.045]	-0.008***	(-9.0)	-0.006	[-0.007,-0.004]
Log (*Assets*)	0.014	(0.7)	0.006	[-0.010, 0.022]	0.004	(0.4)	0.001	[-0.008, 0.010]
(*Past Stock Return*)^2	0.001***	(3.7)	0.0008	[0.0002,0.0015]	0.001***	(3.1)	0.0002	[-0.001,0.0012]
(*Past Stock Return*)^3	-0.0001***	(-3.9)	-0.0001	[-0.0002, 0]	-0.0001***	(-3.3)	-0.0002	[-0.0004, 0]
R^2/ Firm-years	0.25/7,250				0.14/7,250			

Table VII
Size of Equity Issue, Price Run-ups, and Analyst Following (Heckman Selection Model)

Data are collected from *Industrial Compustat*, *CRSP,* and *I/B/E/S* for the years 1985 to 2000. The dependent variable (*Esize*) is the size of net equity issue, scaled by book value of assets in column I and the market value of assets in column II. Net equity issued is the sale of common stock minus the purchase of common stock. In the regression equation of Panel A, the size of net equity issue (*Esize*) is regressed on explanatory variables that include *Number of Analysts* ($NbrAnal_{t-3}$). This latter variable is the maximum number of analysts that make annual earnings forecasts in any month over a 12-month period that ends three years prior to the issue decision. Other explanatory variables are: *Return on Assets* (earnings before depreciation and amortization divided by total assets), *Market-to-book Ratio* ((market value of equity + book value of debt)/ book value of assets), *Past Stock Return* (*PSTKRTN*) (the compounded monthly stock return over the past 24-month period), and the interaction term between $NbrAnal_{t-3}$ and *PSTKRTN*. The variables of the selection equation in Panel B are defined in Appendix B. The constant term and year dummies are included in both the regression equation and the selection equation, but not reported. Coefficients that are significant at the 10%, 5%, and 1% levels are respectively marked with *, **, and ***. *t*-statistics in parentheses are calculated from heteroskedastic-consistent robust standard errors, which are also corrected for within-firm clustering.

Size of Net Equity Issue (*Esize*)	(I) *Esize* = Net Equity Issue / Book Value of Assets		(II) *Esize* = Net Equity Issue / Market Value of Assets	
	Coef.	*t*-stat.	Coef.	*t*-stat.
Panel A: Regression Equation				
Past Stock Return (*PSTKRTN*)	0.028***	(7.4)	0.013***	(7.2)
Number of Analysts ($NbrAnal_{t-3}$)	-0.0003	(-0.5)	-0.001***	(-4.3)
$NbrAnal_{t-3}$ × *PSTKRTN*	-0.002***	(-7.0)	-0.001***	(-3.7)
Return on Assets	-0.342***	(-6.8)	-0.069***	(-3.2)
Market-to-book Ratio	-0.013**	(-2.0)	-0.023**	(-9.1)
Log (*Assets*)	0.001**	(2.1)	-0.001	(-0.1)
(*Past Stock Return*)^2	0.001	(0.5)	-0.001	(-1.6)
(*Past Stock Return*)^3	-0.0001	(-0.6)	0.0001	(1.0)
Panel B: Selection Equation				
Projected Current Investment	-0.003	(-0.6)	0.003	(0.4)
Cash Balance	0.318***	(4.0)	0.184**	(2.2)
Projected Current Cash Flow	-0.0008***	(-8.3)	-0.0008***	(-5.6)
Industry Equity Issue	1.30***	(9.6)	1.592***	(11.6)
Log (*Asset*)	-0.007	(-0.8)	-0.004	(-0.5)
Anticipated Future Investment	0.827***	(10.0)	0.745***	(9.9)
Anticipated Future Cash Flow	-0.296***	(-3.8)	-0.245***	(-3.7)
Earning Volatility	0.057*	(1.6)	0.047**	(2.0)
Dividend Payer Dummy	-0.216***	(-7.8)	-0.241***	(-8.9)
Z-Score	-0.129***	(-11.2)	-0.138***	(-13.4)
R&D Expenses / Sales	-0.0002	(-0.2)	-0.001	(-1.0)
R&D Dummy	-0.040*	(-1.9)	-0.007	(-0.3)
Market-to-book Ratio	0.293***	(17.4)	0.064***	(5.0)
New Working Capital	-0.394***	(-4.3)	-0.559***	(-5.8)
Market Leverage Ratio	-0.072	(-1.0)	-0.034	(-0.5)
Tangibility	0.003	(0.1)	0.001	(0.1)
Log (*Age*)	-0.126***	(-6.3)	-0.153***	(-7.2)
Debt Rating Dummy	-0.013	(-0.5)	-0.007	(-0.4)
Firm-years	30,523		30,523	

Table VIII
Five-year Changes in Leverage and Analyst Coverage

Data are collected from *Industrial Compustat*, *CRSP,* and *I/B/E/S* for the years 1985 to 2000. The dependent variable (TDM_t - TDM_{t-5}) is the change in market debt ratio from *t*-5 to t. Baker and Wurgler's "external finance weighted-average" market-to-book ratio (*BW5MBA*) is calculated from *t*-5 to *t*. *Sum of External Financing* is the sum of net debt issues and net equity issues from *t*-5 to *t*, scaled by the book value of assets at *t*-5. The number of analysts (*NbrAnal*) equals the maximum number of analysts that make annual earnings forecasts in any month over a twelve-month period. *Deviation from Target* is the difference between the actual debt ratio and an estimated target (estimation reported in Table AI). Ten spline variables for the compounded monthly stock return over the past three years are included in the regression (but not reported in the table), with the nodes of the splines corresponding to the deciles of the distribution of stock returns. Coefficients significant at 10%, 5%, and 1% levels are respectively marked with *, **, and ***. Constant terms and year dummies are also included in the regressions but not reported. *z*-statistics in parentheses are calculated from heteroskedastic-consistent robust standard errors, which are also corrected for within-firm clustering. In the column "Two-Stage Bootstrap", *Number of Analysts* at *t*-1 is predicted based on the estimated model in Table III. Confidence intervals in square brackets are calculated from 500 bootstrap replications of the two-step estimation based on resampling from the data set with replacement of clusters.

Five-year Changes in Leverage (TDM_t - TDM_{t-5})	(I) OLS		(II) Two-Stage Bootstrap	
	Coef.	*t*-stat.	Coef.	95% interval
$NbrAnal_{t-5}$	-0.003***	(-9.2)		
$NbrAnal_t$ - $NbrAnal_{t-5}$	-0.004***	(-8.1)		
BW5MBA	-0.043***	(-4.9)	-0.039	[-0.072,-0.007]
$NbrAnal_{t-5}$ × *BW5MBA*	0.001***	(7.1)		
($NbrAnal_t$ - $NbrAnal_{t-5}$) × *BW5MBA*	0.0003**	(2.1)		
Predicted $NbrAnal_{t-5}$			-0.015	[-0.020,-0.009]
Predicted ($NbrAnal_t$ - $NbrAnal_{t-5}$)			-0.043	[-0.053,-0.032]
Predicted $NbrAnal_{t-5}$ × *BW5MBA*			0.005	[0.003,0.008]
Predicted ($NbrAnal_t$ - $NbrAnal_{t-5}$) × *BW5MBA*			0.016	[0.011,0.020]
Change in Assets	0.085***	(34.4)	0.084	[0.051, 0.064]
Sum of External Financing	0.016***	(5.3)	0.022	[0.018, 0.050]
Change in Market-to-book Ratio	-0.026***	(-21.6)	-0.031	[-0.035, -0.027]
Change in Return on Assets	0.015	(1.0)	0.009	[-0.047, 0.065]
Change in Tangibility	0.129***	(11.1)	0.127	[0.091,0.162]
Change in Z Score	-0.029***	(-14.1)	-0.031	[-0.038,-0.023]
Debt Rating Dummy at t-2	0.029***	(9.4)	0.027	[0.019,0.036]
Deviation from Target at t-5	-0.355***	(-36.3)	-0.342	[-0.369,-0.315]
$BW5MBA^2$	-0.001	(-0.1)	0.002	[-0.009,0.014]
$BW5MBA^3$	0.001	(1.2)	-0.001	[-0.001,0.001]
R^2/ Firm-years	0.43/33,203			

Table IX
Market Timing and Analyst Following for the Smallest Size Group of Firms

Data are collected from *Industrial Compustat*, *CRSP,* and *I/B/E/S* for the years 1985 to 2000. The overall sample is evenly partitioned into three size groups based on total assets. The table reports results corresponding to Table V, Table VI and Table VIII for the smallest size group of firms. The variables are defined in Tables V, VI, and VIII for columns I, II, and III, respectively. Coefficients significant at the 10%, 5%, and 1% levels are respectively marked with *, **, and ***. Constant terms and year dummies are also included in the regressions but not reported. *z*- and *t*-statistics in parentheses are calculated from heteroskedastic-consistent robust standard errors, which are also corrected for within-firm clustering.

I: Multinomial Logit regression - large equity issues relative to small equity issues			II: Size of equity issue, price run-up, and analyst following			III: Five-year changes in leverage, *BW5MBA,* and analyst coverage		
(Table V Regression)			(Table VI Regression)			(Table VIII Regression)		
Independent Variables	Coef.	*z*-stat.	Independent Variables	Coef.	*t*-stat.	Independent Variables	Coef.	*t*-stat.
$NbrAnal_{t-3}$	-0.069^{**}	(-2.1)	$NbrAnal_{t-3}$	-0.004	(-1.0)	$NbrAnal_{t-5}$	-0.018^{***}	(-7.5)
Deviation from Target	1.20^{***}	(2.7)	*PSTKRTN*	0.065^{**}	(2.4)	$NbrAnal_t - NbrAnal_{t-5}$	-0.020^{**}	(-9.1)
Past Equity Issue	0.81^{***}	(4.2)	$PSTKRTN \times NbrAnal_{t-3}$	-0.008^{*}	(-1.7)	$NbrAnal_{t-5} \times BW5MBA$	0.004^{***}	(5.2)
Log (Assets)	-0.051	(-0.5)	*Return on Assets*	-0.56^{***}	(-7.8)	$(NbrAnal_t - NbrAnal_{t-5}) \times BW5MBA$	0.004^{***}	(5.9)
Log (1+Age)	-0.08	(-0.7)	*Market-to-book Ratio*	0.074^{***}	(7.1)	*BW5MBA*	-0.018	(-1.5)
Tangibility	1.48^{***}	(4.5)	*Log (Assets)*	-0.003^{***}	(-4.8)	*Change in Assets*	0.084^{***}	(22.7)
Return on Assets	-1.53^{***}	(-3.5)	$PSTKRTN^2$	-0.004	(-1.2)	*Sum of External Financing*	0.003	(1.2)
Share Turnover	-0.001	(-0.7)	$PSTKRTN^3$	0.014	(1.0)	*Change in Market-to-book Ratio*	-0.019^{***}	(-13.0)
Market-to-book Ratio	0.15^{***}	(3.1)				*Change in Return on Assets*	-0.007	(-0.4)
Asset Growth	0.20	(1.1)				*Change in Tangibility*	0.172^{***}	(9.3)
R&D to Sales Ratio	-0.002^{**}	(-2.1)				*Change in Z Score*	-0.021^{***}	(-10.6)
R&D Dummy	0.52^{***}	(3.8)				*Debt Rating Dummy at t-2*	0.127^{***}	(4.8)
Dividend to Asset Ratio	-6.92	(-0.9)				*Deviation from Target at t-5*	-0.385^{***}	(-25.4)
Z Score	-0.086^{***}	(-2.7)				$BW5MBA^2$	-0.006	(-1.5)
Stock Return Volatility	0.43	(0.2)				$BW5MBA^3$	0.001^{**}	(2.1)
Debt Rating Dummy	0.92	(1.2)						
Pseudo-R^2/ Firm-years	0.24/5,325		R^2/ Firm-years	0.15/2,975		R^2/ Firm-years	0.43/10,911	

Table X
Nonlinearities in the Impact of Analyst Coverage

Data are collected from *Industrial Compustat*, *CRSP,* and *I/B/E/S* for the years 1985 to 2000. The overall sample is evenly partitioned into three size groups based on total assets. The table reports results corresponding to Table V, Table VI, and Table VIII for the smallest size group of firms and for the overall sample. The variables are defined in Tables V, VI, and VIII for columns I, II and III, respectively. *Number of Analysts* (*NbrAnal*) equals the maximum number of analysts that make annual earnings forecasts in any month over a 12-month period. *Coverage Dummy* equals one if the firm has no analyst following, and zero otherwise. Coefficients significant at the 10%, 5%, and 1% levels are respectively marked with *, **, and ***. *z-* and *t*-statistics are calculated from heteroskedastic-consistent robust standard errors, which are also corrected for within-firm clustering. Constant terms and year dummies are also included in the regressions but not reported.

I: Multinomial Logit regression - large equity issues relative to small equity issues			II: Size of equity issue, price run-up, and analyst following			III: Five-year changes in leverage, *BW5MBA,* and analyst coverage		
(Table V Regression)			(Table VI Regression)			(Table VIII Regression)		
Independent Variables	Small Firms	Overall Sample	Independent Variables	Small Firms	Overall Sample	Independent Variables	Small Firms	Overall Sample
Log (1+ $NbrAnal_{t-3}$)	-0.471^{***}	-0.334^{***}	*Log (1+ $NbrAnal_{t-3}$)*	-0.007	-0.022^{***}	*Log (1+ $NbrAnal_{t-5}$)*	-0.054^{***}	-0.020^{***}
Coverage Dummy	-0.345^{*}	-0.230^{*}	*Coverage Dummy*	0.009	-0.002	*Coverage Dummy*	-0.013^{*}	0.03
Deviation from Target	2.321^{***}	1.489^{***}	*PSTKRTN*	0.041^{***}	0.040^{***}	*BW5MBA*	-0.019	-0.037^{***}
Past Equity Issue	0.951^{***}	0.737^{***}	*Log (1+ $NbrAnal_{t-3}$) × PSTKRTN*	-0.016^{*}	-0.012^{***}	*Log (1+ $NbrAnal_{t}$) - Log (1+ $NbrAnal_{t-5}$)*	-0.051^{***}	-0.030^{***}
Log (Assets)	-0.046	-0.054	*Return on Assets*	-0.644^{***}	-0.618^{***}	*Log (1+ $NbrAnal_{t-5}$)× BW5MBA*	0.011^{***}	0.006^{***}
Log (1+Age)	-0.153	-0.006	*Market-to-book Ratio*	0.058^{***}	0.050^{***}	*[Log (1+ $NbrAnal_{t}$) - Log (1+ $NbrAnal_{t-5}$)] × BW5MBA*	0.010^{***}	0.004^{***}
Tangibility	1.355^{***}	1.658^{***}	*Log (Assets)*	-0.003^{***}	-0.024	*Change in Assets*	0.084^{***}	0.086^{***}
Return on Assets	-1.450^{***}	-1.800^{***}	*$PSTKRTN^2$*	0.001	0.001	*Sum of External Financing*	0.004	0.016^{***}
Share Turnover	-0.002	-0.004	*$PSTKRTN^3$*	-0.0001	-0.0001	*Change in Market-to-book Ratio*	-0.020^{***}	-0.026^{***}
Market-to-book Ratio	0.098^{**}	0.071^{**}				*Change in Return on Assets*	-0.008	0.016
Asset Growth	0.341^{*}	0.248^{**}				*Change in Tangibility*	0.171^{***}	0.127^{***}
R&D to Sales Ratio	-0.002^{***}	-0.002^{***}				*Change in Z Score*	-0.021^{***}	-0.029^{***}
R&D Dummy	0.515^{***}	0.346^{***}				*Debt Rating Dummy at t-2*	0.128^{***}	0.032^{***}
Dividend to Asset Ratio	-9.146	-17.58^{**}				*Deviation from Target at t-5*	-0.385^{***}	-0.356^{***}
Z Score	-0.120^{***}	-0.094^{***}				*$BW5MBA^2$*	-0.006	-0.003
Stock Return Volatility	1.544	1.622				*$BW5MBA^3$*	0.001^{**}	0.001
Debt Rating Dummy	0.812	0.237^{*}						
Pseudo-R^2/ Firm-years	0.24/5,325	0.20/16,786	R^2/ Firm-years	0.16/2,975	0.25/7,250	R^2/ Firm-years	0.43/10,911	0.43/33,203

Appendix A: A Model Overvalued Equity Issuance

We outline a model of equity issuance in which the firm's manager issue overvalued equity to maximize the objectives of the firm's long-term shareholders. The model is similar in spirit to those of Stein (1996), Baker, Stein, and Wurgler (2003), Baker, Ruback, and Wurgler (2004), and Shleifer and Vishny (2003), in which the firm's managers issue overvalued equity to maximize the objectives of the firm's long-term shareholders. As in these papers, we assume that the market underreacts to the news of an equity issuance.

We model the equity issue decision of a firm as follows. The firm has capital in place in the amount *K*, and the "true"' value of capital in place is *qK*, where *q* is known only to the managers of the firm. The current market value of the capital in place is *QK*. The firm is known to have a project whose net present value per dollar of investment is *v*, up to a maximum amount *I* invested in the project. If the firm invests more than *I*, the net present value of the incremental amount invested is assumed to be negative. This latter assumption is a simple way to incorporate diminishing returns into the scale of investment.

At the time the firm issues equity, the optimal scale is not known to the firm. If the firm raises less than the optimal scale, then it will invest less than the optimal amount (implicitly, we therefore assume that it is prohibitively costly to access the equity market twice for the same project). On the other hand, there is a cost to raising too much equity. We assume that if the firm raises *E* and invests $I < E$, then a fraction γ of the amount (*E*-*I*) is lost permanently. For instance, even though their ex ante objective is to maximize shareholder value, managers may find it difficult ex post to refuse cross-subsidizing failing projects when they do not face a hard budget constraint.

We assume that the size of the equity issue does not convey any information to the market. In particular, the market does not revise downwards its valuation *QK* of the assets in place. However, the price at which new equity can be issued does incorporate the net present value of the new investment, as well as the expected costs associated with the wastage of excess funds raised.

Suppose that the optimal scale of investment *I* is distributed as a random variable with distribution function *F*(*I*). Then the market value of the firm after an equity issue *E* is given by

$$\begin{aligned} P^1(Q,K,v,E) &= QK + \text{Prob.}[I \geq E](1+v)E + \int_0^E \big((1+v)I + (1-\gamma)(E-I)\big)dF(I) \\ &= QK + E + v\left(E(1-F(E)) + \int_0^E IdF(I)\right) - \gamma\left(\int_0^E (E-I)dF(I)\right). \end{aligned} \quad \text{(A1)}$$

The firm has to issue a fraction α of its shares to raise *E*, where

$$\alpha = \frac{E}{P^1(Q,K,v,E)}. \quad \text{(A2)}$$

The value of the firm to its long-term shareholders is therefore

$$\begin{aligned} P^2(q,K,v,E) &= (1-\alpha)\left(qK + E + v\left(E(1-F(E)) + \int_0^E IdF(I)\right) - \gamma\int_0^E (E-I)dF(I)\right) \\ &= \left(qK + E + v\left(E(1-F(E)) + \int_0^E IdF(I)\right) - \gamma\int_0^E (E-I)dF(I)\right) - \rho E, \end{aligned} \quad \text{(A3)}$$

where

$$\rho = \frac{qK + E + v\left(E(1-F(E)) + \int_0^E IdF(I)\right) - \gamma\int_0^E (E-I)dF(I)}{QK + E + v\left(E(1-F(E)) + \int_0^E IdF(I)\right) - \gamma\int_0^E (E-I)dF(I)} \quad . \tag{A4}$$

For an overvalued firm, $Q > q$, hence $\rho < 1$. The objectives of the long-term shareholders are maximized if the firm chooses E to maximize $P^2(q,K,v,E)$. The first-order condition is

$$(1-\rho) + v(1-F(E)) - \gamma F(E) - \frac{E}{P^1}\frac{(Q-q)K}{P^1}\left(1 + v(1-F(E)) - \gamma F(E)\right) = 0. \tag{A5}$$

Now, holding Q fixed, a lower q implies more overvaluation and thus a lower ρ. If $E/P^1(Q,K,v,E)$ is sufficiently small, the effect of a lower q (higher overvaluation) is to increase the left-hand side of equation (A5). Since the objective function must be locally concave at an optimum, this in turn implies that E will be higher. Hence we have the following result:

PROPOSITION A1: (*i*) *Holding q,K, and v unchanged, a firm with a higher Q will make a larger equity issue.* (*ii*) *Holding Q,K, and v unchanged, a firm with a lower q will make a larger equity issue.*

Part (i) of the Proposition can be interpreted as saying that ceteris paribus, a firm with a higher price run-up will make a larger equity issue. Part (ii), on the other hand, says that given similar price run-ups, firms with greater divergence between market value and fundamental value (lower q in relation to Q) will issue more equity. In this paper, we argue that this is likely to be the case if there are fewer analysts covering the firm. As a result, such firms will issue more equity, after controlling for Q or price run-ups.

AN EXAMPLE: We assume the following parameter values: $q=1$, $v=0.3$, $\gamma=0.5$, and $K=5$. $F(I)$ is uniform on the unit interval.

The following table gives the optimum issue size E as a proportion of the firm's capital in place, qK.

Q	1	1.5	2	2.5
E/qK	0.075	0.146	0.184	0.20

Appendix B: Variable Definitions

Variables	Definitions
Panel A: Control Variables in Tables IV – X	
Past Equity Issue	Sum of the past three years' equity issued from *t*-4 to *t*-1 scaled by total assets at *t*-4.
Sum of External Financing	Sum of net debt issues and net equity issues from *t*-5 to *t*, scaled by the book value of assets at *t*-5.
Log (Assets)	Log of total assets.
Age	The number of years since the firm entered the data set.
Tangibility	Ratio of net plants, property and equipment to assets.
Return on Assets	Ratio of operating income before depreciation and amortization to total assets.
Share Turnover	Median value of monthly shares traded (volume) divided by shares outstanding over a 12-month period.
Market-to-book Ratio	(Total assets + market value of equity – book value of equity) / total assets.
Asset Growth	Change in total assets divided by beginning-of-period total assets.
R&D Expenses / Sales	Research and development expenses scaled by total sales.
R&D Dummy	Dummy variable: 1 if research and development expense is missing, 0 otherwise.
Dividend /Assets	Ratio of dividends to total assets.
Z-Score	(3.3 × pretax income + sales + 1.4 × retained earnings + 1.2 × (current assets - current liabilities)) / total assets.
Stock Return Volatility	Standard deviation of the daily stock return calculated for each firm for each year.
Debt Rating	Dummy variable: 1 if the firm has a debt rating assigned by Standard & Poor's, 0 otherwise.
Coverage Dummy	Dummy variable: 1 if the firm has no analyst following, 0 otherwise.
Panel B: Variables in the Selection Equation of Table VII	
Projected Current Investment	Average investment growth rate over the previous three years multiplied by the previous year's investment.
Cash Balance	Sum of cash and marketable securities divided by total assets.
Projected Current Cash Flow	Average cash flow growth rate over the previous three years multiplied by the previous year's cash flows.
Industry Equity Issue	Proportion of firms issuing equity in the industry (two-digit SIC code).
Anticipated Future Investment	Average of actual investment to total asset ratios over the next two years.
Anticipated Future Cash Flow	Average of actual cash flows to total asset ratios over the next two years.
Earning Volatility	Historical standard deviation (using available data during the previous 10 years) of the ratio of EBITDA to total assets.
Dividend Payer Dummy	Dummy Variable: 1 if company paid dividends, 0 otherwise.
New Working Capital	(Other current assets – (total current liabilities - short term debt)) / total assets.
Market Leverage Ratio	Total debt / (total assets + market value of equity – book value of equity).

Table AI
Estimation of the Target Leverage Ratios

Data are collected from *Industrial Compustat*, *CRSP,* and *I/B/E/S* for the years 1985 to 2000. The overall sample is evenly partitioned into three size groups based on total assets. The dependent variable - *Market Leverage* (*TDM*) is the total debt divided by (total assets - book equity + market capitalization). *Number of Analysts* (*$NbrAnal_{t-3}$*) equals the maximum number of analysts that make annual earnings forecasts in any month over a 12-month period that ends three years before the leverage ratio is observed. All other explanatory variables are lagged one period relative to the dependent variable (*TDM*). The median industry leverage ratio is defined as the median of the ratio of total debt to market value of assets by three-digit SIC code and by year. Coefficients significant at the 10%, 5%, and 1% levels are respectively marked with *, **, and ***. The stock return spline variables, constant terms, and year dummies are included in regressions but not reported. *t*-statistics in parentheses are calculated from heteroskedastic-consistent robust standard errors, which are also corrected for within-firm clustering.

Market Leverage Ratio (TDM)	Overall Sample		Group 1 (Small)		Group 2		Group 3 (Large)	
	OLS		OLS		OLS		OLS	
	Coef.	*t*-stat.	Coef.	*t*-stat.	Coef.	*t*-stat.	Coef.	t-stat.
Number of Analysts (*$NbrAnal_{t-3}$*)	-0.006***	(-17.1)	-0.017***	(-13.1)	-0.007***	(-10.9)	-0.004***	(-10.2)
Log (Assets)	0.019***	(9.6)	0.036***	(7.9)	0.025***	(4.7)	0.017***	(4.3)
Log (Age)	-0.016***	(-5.4)	-0.008	(-1.5)	-0.017***	(-3.6)	-0.027***	(-5.8)
Tangibility	0.050***	(5.3)	0.076***	(4.5)	0.050***	(3.3)	0.012	(0.8)
Industry Median Debt Ratio	0.456***	(29.9)	0.487***	(19.7)	0.473***	(20.5)	0.340***	(13.9)
Return on Assets	0.080***	(5.2)	0.053***	(2.8)	0.059**	(2.1)	0.002	(0.0)
Share Turnover	-0.001*	(-1.7)	-0.001**	(-2.0)	-0.001***	(-3.6)	0.001	(0.6)
Market-to-book Ratio	-0.042***	(-25.7)	-0.028***	(-13.5)	-0.042***	(-15.1)	-0.040***	(-11.1)
Asset Growth	0.051***	(12.2)	0.033***	(5.1)	0.064***	(9.1)	0.039***	(5.3)
R&D Expenses / Sales	-0.001**	(-2.5)	-0.001***	(-3.2)	0.001	(0.2)	-0.143**	(-3.0)
R&D Dummy	0.014***	(3.9)	0.015**	(2.2)	0.007	(1.2)	0.005	(0.9)
Dividend to Asset Ratio	-0.232***	(-4.4)	-0.349***	(-4.4)	-0.170**	(-2.1)	0.013	(0.2)
Z Score	-0.017***	(-11.4)	0.010***	(-5.5)	-0.022***	(-8.2)	-0.034***	(-10.5)
Stock Return Volatility	0.789***	(8.0)	0.726***	(6.2)	1.222***	(5.5)	1.144***	(3.2)
Debt Rating Dummy	0.061***	(13.3)	0.175***	(6.4)	0.098***	(12.3)	0.037***	(6.5)
R^2/ Firm-years	0.39/35,592		0.33/11,860		0.43/11,868		0.47/11,864	

Footnotes

[1] Rajan and Zingales (1995) and Fama and French (2002) make a similar point.

[2] See, for example, Marsh (1982), Asquith and Mullins (1986), Jung, Kim, and Stulz (1996) or Hovakimian, Opler, and Titman (2002)

[3] In a recent paper, Gomes and Phillips (2005) examine firms' financing choices based on a comprehensive database that covers both public and private issues of equity, straight debt, and convertibles. They find that measures of adverse selection correlate negatively with the likelihood of public issuance of a security that is more information sensitive; however, for private issues, the opposite is true, suggesting that private issues benefit from information production.

[4] Several papers also find that equity issuers show signs of aggressive earnings management prior to equity issuance (Teoh, Welch, and Wong, (1998a, 1998b)), and that earnings deteriorate after equity issuance (Jain and Kini (1994), Loughran and Ritter (1997)). To the extent that at times the market is misled into associating inflated earnings with high valuation, this might create opportunities for equity issuance.

[5] Almazan, Suarez, and Titman (2003) advance a related idea, arguing that some firms are followed by fewer analysts because they are reluctant to being scrutinized. These firms issue equity less frequently; however, if they do issue equity, opening themselves up to increased scrutiny, they should issue a large amount of equity to avoid being scrutinized in the future. The authors point out that following Enron's bankruptcy, because the rest of the merchant energy firms received considerable scrutiny from analysts, journalists, and regulators, it was difficult for these firms to remain opaque and they therefore chose to issue equity.

[6] Halov and Heider (2004) argue that greater information asymmetry could affect the pricing of risky debt as well as equity. Since small firms are riskier, the more significant mispricing could well be associated with debt rather than equity. This might explain why small firms stay away from debt.

[7] In this model, the firm does not know the optimal scale of investment at the time it issues equity. Issuing too much equity is costly because, if the scale of investment is less than the amount raised, a

fraction of the surplus funds is likely to be wasted. For instance, even though their ex ante objective is to maximize shareholder value, managers may find it difficult ex post to refuse cross-subsidizing failing projects when they do not face a hard budget constraint.

[8] In a recent paper, Gilchrist, Himmelberg, and Huberman (2005) develop a model in which dispersion of investors' beliefs about fundamental value leads to a bubble in the absence of short-selling constraints. In this model, the equity issuer, facing a negatively sloped demand curve, essentially acts as a monopolist and optimally chooses the amount of equity to be issued. An increase in the dispersion of investors' valuations magnifies the bubble and leads to higher equity issuance and investment. Gilchrist, Himmelberg, and Huberman (2005) find that in a panel VAR setting, investment, Tobin's Q, and equity issues respond positively to innovations in their firm-level proxy for the dispersion of investors' opinions (the standard deviation of analysts' forecast dispersion).

[9] Baker, Ruback, and Wurgler (2004) outline a model of firms' investment and financing decisions when the equity is mispriced. They argue that "In Stein (1996) and Baker, Stein, and Wurgler (2003) …There *is* an optimal capital structure, or at least an upper bound on debt capacity. The benefits of issuing or repurchasing equity in response to mispricing are balanced against the reduction in fundamental value that arises from too much (or possibly too little) leverage."

[10] Deviation is defined as the actual leverage ratio less an estimated target leverage ratio. We report the target leverage ratio estimation in Table AI, where we regress the leverage ratio on a set of variables that have been shown in prior literature to influence capital structure (e.g., Frank and Goyal (2003a)). The target leverage ratio is the predicted leverage ratio from this leverage regression. The results in the figure are not sensitive to the inclusion of the number of analysts in the leverage regression.

[11] Alternatively, one could assume that firms can accumulate projects. The subsequent discussion remains almost the same under this alternative assumption.

[12] If the scale of the project is sufficiently large, firms might issue equity even if they are undervalued at a given point of time. This might cause the relationship between stock price run-ups and the size of equity issues to be nonlinear.

[13] The sample period is constrained by the availability of the analyst coverage variable. To address a potential endogeneity problem associated with the number of analysts that cover a firm, we use the number of analysts lagged three or five periods in our regressions. Thus, the starting point of our sample period is set at 1985.

[14] We also delete a small number of firms that reported format codes 4, 6 (undefined Compustat code), and 5 (Canadian). As a robustness check, we drop firms involved in large asset sales and significant mergers (identified by Compustat footnote code AB). The results are essentially the same.

[15] Note that because a firm's book value of assets may change over time, the same firm can belong to different size groups over the period it is present in the sample.

[16] We continue to use the untransformed number of analysts as our main independent variable due to econometric issues in our specifications that control for endogeneity of analyst coverage. In particular, if we were to use a log-transformed variable, we would then have non-linear transformation of a count variable as our dependent variable in the first stage of our two stage procedures. In this case, standard count data techniques are not directly applicable. We explain these procedures further in Section II.C.

[17] Following Baker and Wurgler (2002), we also define equity and debt issues using balance sheet data. This makes little difference to any of the results that follow.

[18] The effect of the number of analysts in the Logit models we consider is robust to alternative ways of defining debt and equity issues. As in Chang and Dasgupta (2003), we replicate our tests using a 1% cutoff for the issue size (the financing deficit is larger than 1% of total assets) instead of the 5% cutoff, and define the dependent variable to equal one if the size of the debt issue exceeds one-third of the deficit, and zero otherwise. We also model the equity issuance decision in the same way – that is, the dependent variable equals one if the net equity issues/deficit exceeds one-third, and zero otherwise. Finally, we drop all cases of dual issues in the range between one-third and two-thirds of the deficit, and only focus on those issue decisions in which either the debt or equity issue exceeds two-thirds of the deficit. The effect of the number of analysts on the issuance decision is similar across all specifications.

[19] The only exceptions are Tables VI and VII, in which stock return is an explanatory variable. In these tables, we include higher-order terms that involve stock returns to control for potential nonlinearities.

[20] Notice that the median sizes of equity issues in Panel C are lower than those we report in Table I because here we use the 1% cutoff for defining equity issues.

[21] More specifically, the dependent variable is *y,* which represents the following three categories of external financing: "*y=1*" (Debt issues) corresponds to issue years in which the net debt issued exceeds 1% of the book value of assets and the net equity issued is below 1% of assets, "*y=2*" (Large equity issues) corresponds to firm-years in which the net equity issued exceeds 10% of assets and the net debt issued is lower than 1% of assets, and "*y=3*" (Small equity issues) consists of firm-years in which the net equity issued lies between 1% and 10% of the book value of assets and the net debt issued is lower than 1% of assets. We choose "*y=3*", that is, small equity issues, as the base category. Since we do not want to lose small issues, we choose a 1% cutoff for debt or equity issues. However, our results are similar if we choose a 5% cutoff and define small equity issues to be those between 5% and 15% of the book value of assets.

[22] To save space, we only report results for the overall sample. Our results for the individual size groups are similar. In Section III.E, we discuss our results for the smallest size group, which is of special interest, and we report results for the smallest size group separately in Table IX.

[23] Our results are robust to including random effects. However, the inclusion of firm fixed effects causes a number of observations to be dropped if the firm dummy predicts the debt-equity issuance decision perfectly. This causes a drop in the significance.

[24] We also consider an analogous polytomous Logit model in which the base category is small debt issues, and we examine firms' incentives to choose between large and small debt issues. Using an alternative specification in which the baseline is the issuance of a small amount of debt, we find that the number of equity analysts reduces the likelihood of issuing large amounts of debt relative to smaller amounts. This implies that firms followed by fewer analysts have a greater incentive to time their debt issues as well, compared to firms followed by more analysts. However, consistent with the

smaller information asymmetry associated with debt issuance, the effect is about half of the effect on equity in the overall sample (not tabulated) and the statistical significance is much lower.

[25] We obtain a somewhat similar pattern (not tabulated) for debt issuance. However, the magnitude of the coefficient for *NbrAnal*, *PSTKRTN,* or the interaction of the two variables is about half or one-third compared to the equity issue case. This result is not surprising given that debt is less affected by information asymmetry.

[26] Using a two-step estimator yields similar results.

[27] Following Baker and Wurgler (2002), we set the minimum weight (sum of the net debt issued and the net equity issued) to zero and drop firm-year observations in which *BW5MBA* exceeds 10.0.

[28] As a robustness check, we define the leverage ratio in terms of the book value (i.e., book value of total debt divided by book value of assets). Our main results still hold.

[29] Our results are robust to including random or firm fixed effects. We do not report these results in a table.