Analysts' Selective Coverage and Subsequent Performance of Newly Public Firms

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ABSTRACT

This study examines the ability of financial analysts to forecast future firm performance, based on their selective coverage of newly public firms. We hypothesize that the decision by analysts to provide coverage contains information about their true underlying expectation of the future prospects of firms. We extract this underlying expectation, which is otherwise unobservable, by obtaining *residual analyst coverage* from a model of initial analyst following for newly public firms. Our results demonstrate that in the three years subsequent to initial coverage, IPOs with high residual coverage have significantly better return and operating performance than those with low residual coverage. This evidence is consistent with analysts' having superior predictive abilities and selectively providing coverage for firms about which their true expectations are favorable.

Analysts' Selective Coverage and the Subsequent Performance of Newly Public Firms

Whether or not analysts possess the ability to predict the future performance of firms is an important question for many investors relying on the advice of analysts. Evidence for this predictive ability to date is mostly based upon analysts' published forecasts and stock recommendations**.** On the one hand, Stickel (1995) and Womack (1996) find that positive (negative) changes in analysts' investment recommendations are accompanied by positive (negative) abnormal returns around the announcement date, while Barber et al. (2001) document a profitable trading strategy of purchasing (selling short) stocks with the most favorable (unfavorable) investment recommendations by analysts. These results are consistent with analysts' having predictive abilities. On the other hand, Chan et al. (2003) find that earnings growth forecasts reported by analysts are overly optimistic and not predictive of realized future earnings over long horizons. Rajan and Servaes (1997) report similar bias in long-term growth forecasts by analysts for newly public firms and document underperformance among firms with the highest projected long term growth rates. Additionally, Michaely and Womack (1999) and Dechow et al. (2000) document that recommendations and forecasts by underwriter analysts are optimistically biased. These results suggest that analysts over-estimate the future performance of firms.

In this paper, we revisit the question of whether analysts' opinions are predictive of the future performance of firms. In contrast to prior literature which examines the published forecasts and stock recommendations of analysts, we focus on their decision to provide coverage for a firm. We hypothesize that, in a market catering to investors and corporate clients alike, selective coverage results from economic disincentives for analysts to reveal unfavorable opinions. Consequently, o*bserved* coverage contains positive information about the expectations of analysts.

It is well known that analysts are reluctant to issue unfavorable opinions. On the one hand, issuing a non-favorable opinion may jeopardize not only the analysts' communication channels with the company, but also their ability to bring in investment banking business[1]. On the other hand, issuing overly optimistic opinions may tarnish the reputation of analysts and lead to greater career turnover[2]. Given these conflicting incentives, analysts tend to shy away from issuing any public opinions when their true expectations are unfavorable and are more likely to provide coverage for firms about which their true expectations are favorable. This results in the selective provision of research coverage. McNichols and O'Brien (1997) find empirical evidence consistent with such selective coverage by analysts. They document that the investment recommendations of analysts are more favorable for stocks for which they have just initiated coverage than for those with prior coverage, but find no evidence that analysts skew their recommendations toward favorable ratings at the start of coverage to win favor with management. Reports in the popular press are consistent with the notion that analysts' underlying expectation is a potential determinant in providing selective coverage of newly public firms: "The burgeoning IPO market makes it tough for analysts to follow every deal. ….With so many deals coming through, at some point analysts have to pick and choose, and they're gong to choose the companies with great long-term prospects.That's how their firms make money." (Finegan et al.,1996)[3].

Our inference is drawn from a sample of newly public firms. The new issue market is characterized by extreme uncertainty and information asymmetry and hence provides a powerful setting to investigate the forecasting abilities of analysts. In the IPO market, if analysts choose to follow firms about which their expectations are favorable and they share similar beliefs[4], then, *ceteris paribus*, firms whose prospects are deemed favorable by analysts will be followed by more analysts than firms whose prospects are deemed unfavorable. We therefore hypothesize that the number of analysts providing initial coverage contains information about their true expectations about future firm performance.

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[1] A recent WSJ article (Gasparino and Smith, 2002) exemplifies the conflict involved in the Wall Street research process: "In the late 1990s, Mr. Lay, the Enron Corp chief executive was unhappy that Mr. Olson had placed a "neutral" rating on Enron stock. Merrill Lynch was denied Enron investment banking business and the lucrative underwriting fees they provided."

[2] Mikhail et al. (1999) provide evidence that analysts are more likely to experience turnover if their forecast accuracy is lower than those of their peers.

[3] The decision of analysts to provide coverage is based upon long-term prospects, including prospects of generating future investment banking business. We thank the referee for pointing out this possibility.

[4] Specifically, analyst opinions about firm prospects could share a common component and be unbiased in the aggregate.

The total number of analysts following a firm is affected by many known determinants, other than their underlying expectations. Our focus is on the portion of analyst following that is driven by their underlying expectations. Hence, we develop a model of initial analyst following, in which the total number of analysts providing research coverage correlates with various firm and offering characteristics, such as firm size, the size of the underwriting team, the extent of underpricing, etc. (Bhushan, 1989; Rajan and Servaes, 1997; and Bradley et al., 2003). The residual from this model of analyst coverage, i.e. the *residual analyst coverage*, is used as a proxy for the underlying expectations of analysts. Essentially, the residual analyst coverage measures the *unexpected* number of analysts that will choose to follow a firm, relative to that predicted by known determinants. Larger (smaller) values of the residual therefore correspond to a higher (lower) unexpected analyst following, and, as we hypothesize, correspond to better (worse) aggregate true expectations of the analyst community about the firm's future performance[5].

If analysts possess the ability to select firms with good prospects, their *ex ante* favorable expectations about firms with high residual coverage should be confirmed by corresponding *ex post* superior performance. This constitutes our primary statistical test: *Residual analyst coverage* is positively correlated with future firm performance. We measure future firm performance using stock returns and operating performance over the subsequent three years. We find a significant positive correlation between residual coverage and post-coverage stock returns, which is robust to a variety of model specifications. Among three portfolios sorted by residual analyst coverage, the low residual coverage portfolio generates an annualized -6.66% and –8.00% buy-and-hold return in excess of portfolios matched by size and book-to-market ratio, in windows of 7^{th} -18^{th} and 7^{th} -42^{th} month subsequent to the IPO offerings, respectively. This compares to the corresponding abnormal annualized buy-and-hold returns of –2.91% and 0.71% generated from the high residual coverage portfolio. The differential performance between the two portfolios (with low and high residual coverage) is both statistically and economically significant. The correlation between the *residual analyst coverage* and post-coverage return is further corroborated by

[5] Our use of residual analyst coverage is similar to the one used in Hong et al. (2000). However, the residuals used in Hong et al. are obtained from a regression on firm size, whereas our residuals are from a model with many other known determinants of analyst coverage for IPO firms.

results from the time-series four-factor and Fama-MacBeth panel regression models. In a four-factor model, an estimated difference in intercepts between the low- and high- residual portfolios translates to sixty-four basis points per month in the 7^{th} - 42^{th} month subsequent to the IPO offerings, suggesting that IPO firms with low residual analyst coverage have significantly poorer post-coverage returns than those with high residual coverage. The statistically significant correlation between residual coverage and post-coverage returns persists in the Fama-MacBeth panel regressions after controlling for underwriter ranking (Carter et al., 1998), and venture capital backing (Brav and Gompers, 1997).

The proposition that analysts have the ability to select firms with superior future performance is further supported by our results on long-run operating performance. Our analysis is performed in the three fiscal years following the IPO issuance. We use both return on assets and cash return on assets as measures of a firm's operating performance. We find a monotonic increase in the median ratios across the three portfolios with low-, medium-, and high- residual analyst coverage. The differences in operating performances are significant in each of the three subsequent fiscal years we examine, and for both earnings and cash flow based ratios. Our findings are not sensitive to adjustments for industry-level performance.

Taken together, our results support the proposition that analysts possess the ability to predict future performance of newly public firms. Analysts are more likely to provide coverage for firms with favorable expectations. Hence, their selective coverage is predictive of subsequent return and operating performance.

Our study makes two contributions to the literature. First, it provides evidence of the superior predictive abilities of analysts in the IPO market. We use data on initial coverage by analysts and relate the underlying information to the subsequent performance of newly public firms. This represents a departure from the approach used in prior studies that examine newly public firms (Michaely and Womack, 1999; Rajan and Servaes, 1997) and equity offerings (Dechow et al., 2000), which make use of published analyst opinions. Data on analysts' recommendations and forecasts could potentially provide more accurate and detailed measures of analyst expectations, provided that *full and 'uncensored'* data are observable to researchers. However, if analysts with unfavorable expectations refrain from providing research coverage of firms, the resulting published analyst opinions could exhibit biases arising from such self-censoring. Our approach draws inferences from analyst coverage data, which circumvents this potential bias inherent in their published opinions and potentially uncovers their true expectations.

Second, our study adds to existing studies of the long-term performance of IPO firms. Ritter (1991) reports that IPOs have poor subsequent long-run returns, possibly due to mis-valuation at the time of going public. In this study, we document that the new variable, *residual analyst coverage*, significantly predicts the cross-sectional variation in post-IPO stock returns. Our results indicate that the new issue under-performance puzzle exists only among firms receiving meager coverage. This evidence is consistent with analysts' selectively covering firms that they view favorably. Our focus on longer term performance complements prior studies examining short-run returns of IPOs. For example, Bradley et al. (2003) document a positive correlation between the number of analysts providing research coverage and short-run returns, centered on the expiration date of the IPO 'quiet period'. Aggarwal et al. (2002), find that the number of analysts providing coverage is related to returns between the offering date of the IPO and the expiration of the lockup period.

The paper is organized as follows. Section I describes the sample selection procedure and the summary statistics on determinants of analyst following for IPO firms. Section II presents the model of initial analyst following and the estimation results. Sections III and IV examine post-coverage return and operating performance, respectively. Section V presents results from sensitivity analysis and Section VI concludes the paper.

I. Data and Summary Statistics

The data used in this study are constructed from multiple sources. First, a sample of 4,082 initial public offerings (IPOs) underwritten by firm-commitment contracts during the period 1986-2000 is obtained from the Global New Issue Database from Thomson Financial Data Corporation. We exclude unit offerings, ADRs, offerings of foreign corporations (F-1 filings), REITs, mutual funds filings, equity carveouts, filings of financial institutions (with SIC code between 6000 to 6999) and services companies (with SIC code greater than 8100) from the sample[6]. Information on the offerings (filing dates, filing price ranges, offer prices, and shares filed and sold to the public), first-day after-market returns, as well as underwriters (number and identity of book managers /co-managers), is obtained. The data are supplemented by the updated Carter and Manaster rankings of underwriters (Carter et al., 1998). Such rankings are mostly unavailable for small regional bankers with limited underwriting experience. A rank of zero is assigned, when no ranking information is available. Second, data on analyst coverage are obtained from 2003 Institutional Broker Estimate System (I/B/E/S) detail files. For IPO firms with coverage in I/B/E/S, we obtain information on the number of analysts providing one-year-ahead earnings forecasts within the first six months (180 calendar days) and record (within five years of issuance) the date when the first earnings forecast appears in I/B/E/S. Finally, price and return information on IPO stocks, as well as corresponding data for matching portfolios, are extracted from CRSP monthly tapes. Annual financial information is obtained from both active and research COMPUSTAT files.

B. Sample characteristics

Table 1 presents the yearly distribution of IPO sample firms. In our fifteen-year sample, 3,634 (89%) of the sample firms are followed by at least one analyst within five years of issuance, as of the end of calendar year 2003. In our sample, the coverage ratio increases in later years. While 73.7% of our sample of IPO firms are covered by I/B/E/S within five years of issuance in 1986, the coverage ratio increases to be above 85% after 1990 and above 95% in the years of 1999 and 2000. There is also a steady increase in the timeliness of analyst coverage in our sample period. While fewer than thirty percent of IPO firms received research coverage from at least one analyst in the first 180 days in 1986, the corresponding ratio increases to about 80% in the early 1990s, and to 90% in the years of 1999 and 2000.

[6]Our sample selection criterion is similar to most prior research on IPOs, which focus on industrial firms only. For example, Schultz (2003), Moonchul and Ritter (1999), Bradley, Jordan and Ritter (2003), Schrand and Verrecchia (2002), and Ljungqvist and Wilhelm (2003) all omit financial institutions. The principal rationales cited by prior researchers for the exclusion of financial insitutitions, which are equally applicable here, are as follows. First, as documented in Cornett and Tehranian (1994), banks sometimes involuntarily engage in equity offerings to meet the regulatory capital requirement, which potentially confounds the analysis. Second, it may be difficult to compare operating performance between industrial and financial firms, since financial institutions are often associated with high leverage ratios.

These coverage ratios in our sample of IPO firms are similar to those reported in other studies of IPOs. For example, Rajan and Servaes (1997) report I/B/E/S coverage ratios of 52% and 58% initiated in the first year of offerings for IPOs issued in 1986 and 1987 (January-June), respectively. These ratios are comparable to the coverage ratios of 59.4% (1986) and 52.3% (1987) reported in our sample. For IPOs issued during the period 1985-1997, Chen and Ritter (2000) report that 2,911 firms receive research coverage from at least one analyst within one year of going public for a sample of 3,203 IPOs with proceeds over $20 million (1997 purchasing power). Their result translates to a coverage ratio of 90.88%. We find a comparable coverage ratio of 91.09% (2,363 firms) within one year of issuance for a sample of 2,594 IPOs issued during 1986-1997 after excluding IPOs with proceeds less than $20 million from our sample. For recent IPOs issued in 1990s, our average coverage ratio of 84.39% for sample firms during 1994-1999 within six months of issuance is comparable to a ratio of 83.98% reported by Aggarwal et al (2002) on a chosen sample of 618 internet and non-internet IPOs issued in the same time period.

[Tables I & II about here]

Descriptive statistics on firm and offering characteristics are presented in Table II. The mean value for each variable is tabulated for the full sample. We measure the initial analyst coverage as the number of analysts providing one-year-ahead earnings forecasts in the first six months after the IPO offering. In our sample, there is an average of 2.46 analysts providing coverage within the first six months of IPO offerings. Because the initial number of analysts is the main variable of interest in our subsequent analysis, we partition the full sample into three portfolios with low-, medium-, and high-initial coverage. As can be seen from Table II, there is an average of 0.31, 2.46, and 5.27 analysts providing coverage in the first six months after issuance for IPO firms in those three subsamples.

Firm size is measured by the market value of equity, calculated on the 25th date after issuance (at the expiration of the quiet period) of each IPO firm. The average firm size in the full sample is $660 million. There is a monotonic increase in the average firm size ($360, $369 and $1,507 million, respectively) across the three subsamples with low-, medium-, and high- initial analyst coverage. This is consistent with the positive correlation between firm size and analyst following reported in Bhushan

(1989) and Hong, Lim, and Stein (2000).

Firms listed on the New York Stock Exchange (NYSE) or the Nasdaq are more likely to attract the attention of analysts and trigger initiation of analyst coverage. We use a binary variable, which is one, if an IPO is listed on NYSE or Nasdaq, to capture such an effect. For our full sample, 76% of the sample firms are listed on these two major trading venues. Partitioning by initial coverage shows that 93% of the sample firms in the portfolio with high initial coverage are listed on the two major trading venues. This percentage declines to 90% and 45% for the medium- and low- initial coverage portfolios, respectively.

Since analysts typically specialize in particular industries, we tabulate INDANALCNT, namely the number of analysts providing forecasts for seasoned firms in the same industry. We construct this variable by retrieving, from the I/B/E/S detail files, the number of distinct analysts providing one-year-ahead earnings forecasts in the month prior to the IPO offerings for seasoned firms with the same six-digit GICS code. This GICS industry classification is similar to that used in Bhojraj et al. (2003). Analysts may also be more likely to provide coverage for IPOs issued in a "hot" market. To capture the effect of the issuing activity in the new issue market, we obtain the variable INDOFFER, which is the number of IPOs issued in the same year and with the same six-digit GICS code as our sample IPOs. Both INDANALCNT and INDOFFER increase monotonically across the subsamples with low-, medium- and high- initial coverage. The results of univariate statistics indicate a statistically significant difference between the means of INDANALCNT and INDOFFER across portfolios with low- and high- initial coverage. This evidence suggests that IPOs from larger industries and IPOs issued in an active IPO market are likely to be followed by more analysts than otherwise.

Issuers of IPOs often cite analyst coverage as a major determinant of their choice of underwriters (Krigman et al., 2001). An investment bank is more likely to be high-ranked in the underwriting business, if it can provide effective analyst coverage for its clients. Analysts are also more likely to follow an unseasoned firm, if its quality is certified by a high-ranked underwriter. We use the Carter and Manaster (1990) (CMRANK) rankings to capture the underwriter's ability to provide either analyst coverage or quality certification. While the average ranking of the underwriter in our sample is 5.85, the average ranking is 4.04, 6.77 and 6.72, respectively, for the three subsamples with low-, medium-, and high- initial coverage. The difference in means of CMRANK is significant at the 1% level between portfolios with low- and high- initial coverage.

IPO firms may also attract more analyst following, if they produce higher first-day returns (Aggarwal et al., 2002; Rajan and Servas, 1997; Chen and Ritter, 2000; and Bradley et al., 2003) or are backed by venture capitalists (Bradley et al., 2003). Consistent with previous studies, the average first-day return is 12.96%, 17.85%, and 47.17% for the three subsamples of low-, medium-, and high- initial coverage. 44% of our sample IPO firms are backed by venture capitalists. There is a monotonic increase in this proportion across the three subsamples, as 24%, 49% and 59% of firms are venture-backed in subsamples with low-, medium-, and high- initial coverage. The results of univariate statistics indicate a statistically significant difference in the average IPO underpricing, as well as in percentage of venture-capital-backed offerings between portfolios with low- and high- initial coverage.

Each member in the underwriting team (book managers/ co-managers) may provide to IPO firms incremental access to analysts. We expect that the number of analysts providing initial coverage to be positively correlated with the number of book managers and co-managers. In our sample, the number of managers/co-managers varies, with an average of 1.02/1.59 managers/comanagers in the subsample with low coverage to 1.07/3.22 managers for firms in the subsample with high coverage. The differences in means of the numbers of managers /co-managers are significant at the 1% level between portfolios with low- and high- initial coverage.

Aggarwal et al. (2002) report that more analysts elect to provide coverage for firms operating in internet-related business in a sample of 618 firms completing IPOs between January 1994 and December 1999. We use a binary variable, which is one, if an IPO firm is operating in an internet-related business, to capture such an effect. For our full sample, 9% are internet-related firms. The percentage of internet firms is 24% for the portfolio with high initial coverage, and 2% for the portfolio with low initial coverage.

II. Model of Initial Analyst Following

Based on prior research and results from our summary statistics, we formulate a model of initial analyst following for IPO firms. The dependent variable in our regression model is the logarithm of (1+number of analysts providing research coverage within the first 180 days of IPO issuance). Our set of independent variables (Model One) includes the firm size (MKTCAP) , NYSE/Nasdaq indicator, logarithm of the number of analysts providing forecasts for firms in the same industry (INDANALCNT), logarithm of the number of contemporaneous offerings in the same industry (INDOFFER), underwriter ranking (CMRANK), the extent of IPO underpricing (UNDERPRC), venture-backing indicator, logarithm of total number of book managers and co-managers, as well as the internet firm indicator. The results from our regression analysis on the determinants of initial analyst coverage are reported in Table III.

[Table III about here]

Results from the multivariate model of initial analyst coverage (Model One) mostly corroborate our previous findings from the univariate analysis. We find a positive and significant correlation between firm size and the number of analysts providing initial coverage. The NYSE/Nasdaq indicator is also predictive of the number of analysts providing coverage for IPO firms.

The number of analysts providing forecasts for firms in the same industry (INDANALCNT) is significantly associated with the number of analysts providing initial coverage. Our results indicate that an IPO firm is likely to have coverage initiated by more analysts, when there are more analysts providing coverage for firms in the same industry. However, the coefficient of the logarithm of INDOFFER, which measures the issuing activity in IPO market, is not significant at conventional levels.

Our results further indicate that the number of analysts providing initial coverage is related to how the offerings are structured. Resource constraints, such as limited time and effort, may result in analysts' chosing to provide coverage only for a subset of IPO firms--- specifically, those that attract their attention. Underpricing, promotion by high-ranked bankers, operating in an internet-related business, and backing by venture capitalists, could create high visibility for IPO firms among analysts and result in more coverage from analysts. A large underwriting team provides the newly public firms wider access to the analyst community and could assist in eliciting more coverage. Consistent with our descriptive statistics, the coefficient estimates of underwriter ranking (CMRANK), venture capital indicator, internet firm indicator, as well as the total number of manager and co-managers, are positive and significant at the 1% level.

A more parsimonious model (Model Two) is formulated by excluding variables that are not statistically significant (at the 5% level) in Model One. There is no significant difference in coefficient estimates, the associated statistical significances, or the explanatory powers (adjusted R-squared) between the two models. We therefore use Model Two as the final model to predict the number of analysts providing initial coverage and use the residuals from this model as a proxy for analyst expectations on the future prospects of firms[7].

Based on the residuals from Model Two, firms are sorted into three portfolios of IPO firms, consisting of firms with below -33.3 (low), between 33.3 - 66.7 (medium), and above -66.7 percentile (high) residual coverage. If analysts have superior abilities to predict future performance and if they selectively choose firms about which their true expectations are favorable, then the portfolio with the highest (lowest) *residual analyst coverage* is expected to have the best (worst) subsequent performance.

We conduct two additional tests on the classification of sample firms by residual analyst coverage. First, since our sample includes IPOs issued in the "internet bubble" period, we examine whether the residual coverage is proxying for this time period effect. Specifically, we test the null hypothesis that there is no association between the years of the internet bubble period (1999 and 2000) and the portfolio ranking (low-, medium-, and high- residual coverage). Our results fail to reject the null hypothesis. Second, we test whether there are differences in firm and offering characteristics across the three portfolios, sorted by *residual analyst coverage*. Our results fail to reject the null hypothesis that the means of the variables used as determinants (in Model Two) are the same across the three portfolios. This is expected, since by construction, the residuals from a regression model are orthogonal to the

[7]The Spearman correlation coefficient is 99.99% (significant at the 1% level) between residuals generated by Model One and Model Two.

independent variables.

III. Post-Initial-Coverage Return Performance

We now examine the correlation between residual analyst coverage and the post-initial- coverage return performance of newly public firms. If analysts possess the ability to select firms with good prospects, their *ex ante* favorable expectations about firms with high residual coverage should be confirmed by corresponding *ex post* superior subsequent performance. We use various asset pricing specifications in testing the hypothesis that *residual analyst coverage* is positively correlated with subsequent firm performance.

Our hypothesis that there exists a positive correlation between *ex ante* analyst expectations (measured by *residual analyst coverage*) and subsequent stock performance does not dictate a particular window for the return measurement. We examine stock performance for both one-year and three-year return windows. As described in previous sections, the number of analysts providing initial coverage is measured within the first six months of IPO offerings. To minimize the potential problem arising from the endogeneity between analyst coverage and return performance, we choose non-overlapping windows of coverage initiation and return measurement. Specifically, our one-year return measurement window is between the 7th and 18th month, while our three-year return window is between the 7th and 42nd month after IPO issuance.

A positive correlation between analyst coverage and return performance in a short window may, however, be subject to alternative explanation, other than the analysts' superior predictive abilities. One possibility is that coverage by analysts could exert influence on subsequent stock returns by drawing the attention of investors to certain stocks. Possibly, such an effect of 'hyping' is short-term and has diminishing effects as the return measurement window lengthens. For longer return windows, markets presumably adjust prices such that any undue influence by analysts on stock returns is reversed shortly, possibly after reports of subsequent actual performance. Hence, in our view, an analysis using the three-year return window is more important in validating our hypothesis.

Inferences drawn from performance metrics are likely to depend upon the underlying asset pricing model employed, as well as on the method of return measurement. In the following subsections, we examine three alternative asset pricing approaches widely used in tests of long-run stock returns (Loughran and Ritter, 1995). First, we consider buy-and-hold abnormal returns, benchmarked against various broad market indices, an industry portfolio, as well as a portfolio matched by size and book-to-market. Second, we examine the abnormal performance of our IPO sample using the Fama-French and momentum time-series regressions. Finally, we adopt the Fama-MacBeth (1973) panel regression methodology to examine the differential returns among IPO firms. Results from all model specifications indicate that *residual analyst coverage* is positively correlated with subsequent firm performance. These results support our hypothesis that analysts possess the ability to select firms with good prospects.

A. *Post-Initial-Coverage Buy-and-Hold Annualized Abnormal Returns*

In this subsection, we consider buy-and-hold abnormal returns, compared with various benchmark portfolios. Using CRSP Nasdaq and Amex-NYSE monthly data, we record returns of IPO firms from the *7th* month, dating from the month of IPO offering, until the earliest of its month of delisting, the 18th month (one-year window) or 42th month (three-year window) after the offering, or December 2003[8]. For each firm, one-year and three-year buy-and-hold returns are calculated by compounding those monthly returns. The buy-and-hold abnormal returns are calculated as the return in excess of those from benchmark portfolios:

$$One-Year-BHAR_i = [\prod_{t=7}^{\min[18,delist]}(1+r_{it})] - \prod_{t=7}^{\min[18,delist]}(1+mr_{it})]$$

$$Three-Year-BHAR_i = [\prod_{t=7}^{\min[42,delist]}(1+r_{it})] - \prod_{t=7}^{\min[42,delist]}(1+mr_{it})]$$

where the index is one for the first month after IPO offering, min[18,delist]/min[42,delist] is the earliest of the 18th/42th month, the month of delisting, or December 2003. The term r_{it} is the return for firm *i* in

[8] We exclude returns of internet firms in the years 1999-2000 in this and all subsequent return analysis to eliminate the effect of the excessively speculative stock prices of internet stocks. Several extreme observations related to internet stocks are also eliminated.

the month of t, and mr_{it} is the contemporaneous return generated by the chosen benchmark portfolio. Annualized buy-and-hold abnormal returns are calculated as the ratio of the buy-and-hold abnormal returns over the number of equivalent year(s) used in compounding:

$$ABHAR_i = \frac{BHAR_i}{\text{number of equivalent year(s) used in compounding}}$$

We use CRSP equally-weighted and value-weighted indices, an industry portfolio, as well as a matching size- and book-to-market portfolio, as benchmarks. The industry portfolio consists of all seasoned firms with the same six-digit GICS code as that of each of our sample IPO firms with return data available from CRSP. The size- and book-to-market matching portfolio is constructed using the following procedure: Starting in January 1986, we form size-quintile breakpoints using NYSE firms only (Fama and French, 1992). Market value is obtained from CRSP by multiplying the number of shares outstanding with the stock price at the end of December of the preceding year, while book value is obtained from the annual COMPUSTAT file (data item 60). We create book-to-market quintiles using only NYSE firms and then form 25 size and book-to-market portfolios by intersecting the portfolios and allocating all NYSE, Amex, and Nasdaq firms (excluding IPO firms) into these portfolios. Such benchmark portfolios are reformed each year. An equally weighted return of all firms in a given portfolio is calculated and used as a benchmark return.[9] For IPO firms, we calculate the market value of equity in the year of issuance on the date of issuance. Book-to-market ratio for the IPO year is the value obtained by dividing per-share book value of equity after the offering (available from New Issue Database) by the first after-market closing price.

The sample average of the annualized buy-and-hold abnormal return against alternative benchmarks in the one-year and three-year measurement windows is presented in Table IV. Consistent

[9] Our benchmarks are different from those used in Rajan and Servaes (1997) and Dechow et al. (2000). Our benchmarks are motivated by recent findings that IPO firms no longer exhibit long-term under-performance after controlling for size and book-to-market (Brav et al., 2000). Another consideration is that analyst forecasts are systematically over-optimistic, with significantly more negative forecast errors for stocks with high book-to-market ratios (Dechow et al., 2000). By benchmarking our IPO sample with firms having similar book-to-market ratios, our results are less likely to be obscured by the systematic patterns exhibited in the broader set of publicly traded companies.

with prior research (Loughran and Ritter, 1995; Brav et al., 2000), IPO firms in our sample under-perform all of the commonly used indices. In annualized terms, firms in our sample generate an average excess return of -6.91% and -7.22%, compared to the CRSP equally-weighted, and CRSP value-weighed indices, respectively, over the one-year return measurements. Over the three-year return measurement period, the average excess annualized returns for our sample firms decrease to -3.66% and -4.17%, as compared to the CRSP equally-weighted, and CRSP value-weighed indices, respectivley.

For both return measurement windows, the underperformance narrows, when compared to the benchmark portfolio matched by industry, as well as size and book-to-market. For a one-year (three-year) return measure, the IPO sample under-performs the GICS industry matching benchmark portfolio by an average annualized return of 3.61% (2.62%). The abnormal returns in excess of size and book-to-market matching portfolios is -4.95% in the one-year measurement window. When measured over the three-year window, the negative excess return in excess of size and book-to-market matching portfolios is merely -3.04%, and is significant only at the 10% level. This is consistent with what is reported in Brav et al. (2000). Since IPO firms are mostly stocks with low book-to-market ratios, the low post-issuance return performance reflects a pervasive return pattern existing among a broader set of publicly traded companies (glamour stocks).

[Table IV about here]

Next, we examine the performance among IPO stocks grouped by residual analyst coverage. For the one-year return measure, the three portfolios with low-, medium-, and high- residual coverage generate significant negative returns (-7.85%, -7.29%, and -5.58%) in excess of CRSP equal-weighted indices, and (-8.27%, -7.93%, and -5.46%) in excess of CRSP value-weighted indices. On a one-year basis, firms in the three portfolios underperform slightly, compared to other firms in the same industry, but the negative returns in excess of the industry portfolios are not significant at conventional levels of significance. When compared to benchmark portfolio matched by size and book-to-market, only the portfolio with low residual coverage generates significantly negative excess return (-6.66%), while the excess returns of portfolios with medium- and high- residual coverage are no longer statistically significant.

Distinct differential performance among the three portfolios emerges, when we extend the return measurement window to three years. For the three-year return measure, only the portfolio with low residual coverage generates significant negative returns (-8.46% and -9.85%) in excess of CRSP equal-weighted and value-weighted indices. The negative returns in excess of CRSP equal-weighted and value-weighted indices are no longer significant for the portfolio with medium- and high- residual coverage. Similarly, when compared to the industry portfolios and matching size and book-to-market portfolios, the low residual coverage portfolio generates a -6.54% and -8.00% return in excess of the benchmarks, respectively. This compares to abnormal returns of 0.63% (industry-adjusted) and 0.71% (size- and book-to-market adjusted) generated from the high residual coverage portfolio. This differential performance between portfolios with low- and high- residual coverage is both statistically and economically significant.

B. Calendar Time Fama-French and Momentum Time Series Regression

We use a calendar Fama-French and momentum time-series regression approach in this subsection in examining whether initial residual coverage by analysts predicts post-coverage stock returns of IPO firms. We adopt the following factor regression model:

$$R_{pt} - R_{ft} = a + b[R_{mt} - R_{ft}] + sSMB_t + hHML_t + pPR12_t + \varepsilon_t$$

where R_{pt} is the equally-weighted returns of the portfolio of IPO firms in calendar month t; R_{mt} is the return of the value-weighted index of NYSE, Amex, and Nasdaq stock in month *t*; R_{ft} is the beginning-of-month three month T-bill yield in month *t*; SMB_t is the return of small firms minus the return on large firms in month *t*; HML_t is the return on high book-to-market stocks minus the return of low book-to-market stocks in month *t* (Fama and French, 1993), and PR12 is formed by taking the return of high momentum stocks less the return of low momentum stocks[10]. Fama and French (1993) argue that the three factors of R_m -R_{ft}, SMB_t, and HML_t capture systematic patterns in stock returns. Carhart (1997) extends the Fama-French model by including a fourth (momentum) factor (PR12) and reports an increase in explanatory power for the return of mutual funds. Intercepts in the three and four factor time series regressions are measures of average abnormal performance. In the following analysis, we report and describe results from the Fama-French and momentum factor regression analysis.[11]

For the one-year measure, the time-series observations of portfolio returns consist of the average returns of IPO firms within the window of the 7th to 18th month subsequent to the month of IPO offerings. Similarly, for the three-year measures, portfolio returns consist of average returns of IPO firms in the 7th to 42th month subsequent to the issuances. For the purpose of testing our hypothesis, we examine whether there are any significant differences in intercepts across the three portfolios with low-, medium- and high- residual coverage, since the intercept terms represent the excess return after controlling for the effect of risk factors.

For the one-year measure, there exists a monotonic increase in the intercept from the factor regression analysis across the three portfolios with low-, medium- and high- residual coverage (as tabulated in panel A of Table V). Specifically, the intercept terms are equivalent to excess monthly returns of -68, -18, and 32 basis points for the low-, medium-, and high- residual portfolios, respectively. To gauge the magnitude of the differential performance, we also examine the return performance of a zero-investment portfolio, that consists of longing the high-residual-coverage IPOs, while shorting low-residual-coverage IPOs, re-balanced monthly. As our result indicates, the estimated excess return from such a portfolio in a four-factor model is ninety-nine basis points per month. This suggests that IPO firms with low residual analyst coverage have significantly poorer post-coverage returns than those with high residual coverage in the 7th until the 18th month subsequent to the month of IPO offerings.

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[10]Detailed construction procedures of SMB, HML and PR12 factors can be found at Kenneth French's website at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html.

[11] Results from three-factor regression models, though not reported here, are similar.

The monotonic increase in the intercept terms across the three portfolios with low-, medium- and high- residual coverage persists in our three-year measures (as tabulated in panel B of Table V). Specifically, the intercept terms are equivalent to excess monthly returns of 27, 50, and 91 basis points for the low-, medium-, and high- residual portfolios, respectively. In the three-year measures, the positive excess return of the high-residual portfolio is significant at the 1% level. We report an estimated difference in intercepts between the low- and high- residual portfolios and associated *t*-statistics from a time series regression of a zero-investment portfolio of longing the high-residual and shorting the low-residual portfolio. As our result indicates, the estimated intercept translates into a return of sixty-four basis points per month. Thus, the three-year measure also confirms that IPO firms with low residual analyst coverage continue to have significantly poorer post-coverage returns than those with high residual coverage .

[Table V about here]

C. Fama-MacBeth Panel Regressions

In this subsection, we adopt the Fama-MacBeth (1973) panel regression methodology in examining the differential returns among IPO firms. An advantage of using the Fama-MacBeth specification is, as stated in Loughran and Ritter (1995), "to test whether there is a new issue effect above and beyond other determinants of the cross-sectional variation of returns during 1973 to 1992…" (p40). In this study, the Fama-MacBeth monthly cross-sectional regressions allow us to assess the robustness of the ability of residual analyst coverage to predict the subsequent performance of IPOs, after controlling for other determinants such as underwriter rankings and venture capital backings.

In each month during the available sample period, cross-sectional regressions are estimated on the universe of NYSE, Amex, and NASDAQ firms for which the book value of equity is available from COMPUSTAT. Returns for all firms with appropriate data are regressed on each firm's own size and book-to-market ratio, since these firm characteristics have been shown by Daniel and Titman (1997) to be better predictors of returns than Fama-French factors. Our model specification is similar to that used in Loughran and Ritter (1995). The regression includes a new-issue dummy (*ISSUE*), as well as a cross-product term of *ISSUE* with initial residual coverage (*RES)*:

$$r_{it} = a_0 + a_1 \ln MV_{it} + a_2 \ln(BV / MV)_{it} + a_3 ISSUE_{it} + a_4 \, \mathrm{Re}\, s * ISSUE_{it} + \varepsilon_{it}$$

where the independent variables of MV and BV/MV are the market value (in millions) of equity, and the ratio of the book value of equity over the market value of equity at the prior year's end.

The regression results of one-year and three-year measures are presented in Panel A and B in Table VI, respectively. Each column summarizes the results of monthly regressions. From the distribution of estimated coefficients, we calculate the average estimated coefficients, the corresponding *t* statistics, and the percentage of the coefficient estimates that are positive. The estimation results from both windows of return measurement are similar. Results from Model One show that the average estimated coefficient on residual analyst coverage is positive and highly significant (at the 1% level). This indicates a positive correlation between post-coverage returns and the residual analyst coverage. This result corroborates our findings in previous subsections. In Model Two, we include the cross product terms of the IPO indicator variable with underwriter rankings, as well as with the venture-backing indicator to control for the documented effects of such financial intermediaries in the new issue market (Brav and Gompers, 1997; Carter et al., 1998). Consistent with prior research, the estimated coefficients on venture-backing indicator and underwriter rankings are both positive and significant. The positive correlation between the residual coverage and post-coverage returns remains robust among various specifications, with the estimated coefficient of residual analyst significant at the 1% level in all models.

[Table VI about here]

To summarize, our results suggest that there exists a positive correlation between the residual coverage and future stock performance. This correlation is significant for both the one-year and three-year return windows and is robust to different asset pricing model specifications.

IV. Operating Performance Following Initiation of Coverage

We examine the operating performances in the three fiscal years subsequent to the IPO offering for the portfolios with low-, medium-, and high- residual coverage. The first fiscal year we examine is the year in which the beginning date is at least six months later than the month of IPO issuance. We examine two measures of operating performance. One is return on assets (ROA), computed by dividing operating income before depreciation by total assets. Teoh et al. (1998) report that the majority of IPO firms manipulate earnings upwards, making ROA a noisy measure of actual operating performance. To mitigate any potential bias resulting from earnings management, we also examine cash return on assets (cash ROA), which is operating cash flows scaled by total assets. Since operating performance measures may be skewed and mean values are sensitive to outliers (Jain and Kini, 1994), we use median values of ROA and cash ROA in the following analysis (as reported in Table VII)[12]. Also presented in Table VII are the ratios of ROA and cash ROA after adjustment for industry performance. Industry-adjusted ratios are obtained by subtracting from the raw value the median value of all firms (excluding our sample firms) with the same six-digit GICS code for a given fiscal year selected from the COMPUSTAT database. To ensure that our results are not susceptible to the presence of heavy-loss-generating internet IPOs, all performance measures in Table VII are tabulated (in parenthesis) for subsamples that exclude IPOs operating in internet-related businesses .

Results in Table VII indicate a monotonic increase in ROAs across the three portfolios. For the first year subsequent to IPO offerings, the median ROAs are respectively 2.13%, 4.29%, and 7.03% for the low-, medium- and high- residual portfolios. Such a pattern of monotonic increase also holds in the second and third year. The test statistics reject the hypothesis that the median values are the same across the low- and high- residual groups at the 1% level in each of the three years. We obtain similar results, when our comparison is conducted based on industry-adjusted ROAs. Our findings remain robust after

[12] We also find a monotonic increase in ROAs and cash ROAs across the portfolios with low-, medium-, and high-residuals in the mean values of (industry-adjusted) ROA and cash ROA. The means of ROA and cash ROA of the high-residual portfolio are significantly higher than those of the low-residual portfolio. We find similar results for sub-samples that exclude internet-related firms and also after winsorizing extreme observations.

the exclusion of internet IPOs.

[Table VII about here]

Similar inferences can be drawn from our results on cash ROAs. There is a monotonic increase in the median cash ROAs across the three portfolios with the low, median, and high residual coverage in each of the three years following the IPO issuance. The corresponding test statistics indicate that the difference in median between the low-residual and high-residual is significant at the 1% level in each of the three years. In sum, we find evidence that residual coverage is predictive of future operating performance. Our findings are robust to both adjustment for industry level performance and exclusion of internet-related IPOs.

V. Tests of Robustness

A. Subsequent equity offering

Recent evidence indicates that forecasts and recommendations by analysts are most optimistic for firms that are issuing securities (Bradshaw et al., 2003; Ljungqvist et al., 2004). Hence, it is possible that some analysts would elect to provide coverage around the time of IPO issuance, in anticipation of future investment banking business. A possible alternative explanation for our results is that the positive correlation between residual coverage and subsequent return performance (reported in section IV) may be largely driven by analysts' underlying incentives to solicit future banking business. To investigate this possibility, we adopt the following approach to control for the effect of future investment banking business on the provision of analyst coverage.

We construct an SEO indicator variable, with a value of one for firms that issue at least one secondary offering in the three years subsequent to their IPOs, and zero for others. This SEO indicator variable is then included in our model of selective coverage as one additional determinant of initial analyst coverage[13]. Estimation of the modified coverage model yields a positive and significant correlation between the SEO indicator and initial analyst coverage. The positive correlation is consistent

[13] By including an SEO indicator, we are implicitly assuming that analysts can predict a firm's decision to issue SEO with perfect precision. In practice, analysts could formulate only their expectation on whether an IPO firm is more likely to issue an SEO in the future.

with the possibility that analysts decide to provide coverage around the time of IPO offerings in anticipation of future banking business[14].

We then investigate, whether the significant positive correlation between residual coverage and subsequent performance persists after the inclusion of the SEO indicator in our coverage model. Thus, we re-examine the correlation between the residuals from the modified selective coverage model (with the SEO indicator) with subsequent stock returns. Our results indicate that the positive correlation between the residual analyst coverage and future stock returns persists, even after we control for subsequent equity issuance in our selective coverage model[15]. Thus, underlying incentives for analysts to solicit future banking business do not appear to diminish the explanatory power of residual coverage for subsequent returns.

B. IPOs with no analyst coverage

We also investigate whether 'no coverage' represents an additional piece of information that is predictive of post-IPO performance [16]. For this, we perform the following analyses:

First, we divide our sample firms into four groups: one group consisting of firms with no coverage and three groups of firms with coverage sorted by their residual coverage (low-, medium-, and high- residual coverage). We then construct three zero-investment portfolios using these four groups of IPOs: (i) portfolio one consisting of a long position on IPOs with high residual coverage and a short position on IPOs with no coverage, (ii) portfolio two consisting of a long position in IPOs with high residual coverage and a short position in IPOs with low residual coverage, and (iii) portfolio three consisting of a long position in IPOs with low residual coverage and a short position in IPOs with no

[14] On the other hand, there is also evidence that a firm's future decision to issue an SEO is not completely exogenous to market information revealed around or subsequent to IPO issuance. Jegadeesh et al. (1993) report evidence that if the market is better informed, then a high return on the IPO date implies that the issuer has underestimated the marginal return to the project. The issuer uses this information (market feedback) and increases the scale of the project by raising additional capital through seasoned offerings. Similarly, firms may receive positive feedback from investors/analysts from the IPO market (in the form of better return and good analyst coverage) and subsequently decide to issue SEOs to raise additional capital. Therefore, the positive correlation between SEO indicator and analyst coverage is also consistent with the hypothesis that firms with good analyst coverage are more likely to issue SEOs subsequently, since (good) market feedback leads to increases in future investment.

[15] These results, though not reported here for the sake of brevity, are avaialable from the authors on request.

[16] We thank the referee for this suggestion.

coverage. Our results in the three-year window indicate that the estimated excess return from the zero-investment portfolios one and two are both positive and significant. However, the zero-investment portfolio three generates no excess return. These results suggest that abnormal returns of firms with no coverage and those with low residual coverage are not statistically different.

Second, we also modify the Fama-Macbeth specification (presented in Table VI) for the three-year return analysis by adding an indicator variable (NOCOVER). The NOCOVER indicator takes on a value of one for firms receiving no coverage, and zero otherwise. Our results indicate that the NOCOVER indicator variable is not significant in predicting subsequent performance. Thus, ’no analyst coverage’ does not appear to have any incremental predictive ability over and above ‘residual analyst coverage’.

VI. Conclusion

In this paper, we model the decision by analysts to provide research coverage on firms issuing unseasoned shares during the period 1986-2000. We postulate that the *residuals*, obtained from our model with an extensive set of known determinants for the provision of initial analyst coverage, measure *ex ante* favorable expectations by analysts.

We report evidence that *residual analyst coverage* exhibits positive and significant correlation with subsequent stock returns. Specifically, over the three-year horizon subsequent to the IPO offerings, we find that the difference between the high- and low- residual coverage portfolios amounts to an annualized buy-and-hold return of 8.71%, in excess of portfolios matched by size and book-to-market ratio, and of 5.91% in excess of portfolios matched by industry. This positive correlation is corroborated by results from the time-series four-factor model, where the difference between the low- and high-residual portfolios translates to an average monthly return of sixty-four basis points. The differential performance between the two portfolios is both statistically and economically significant. The positive correlation persists in the Fama-MacBeth panel regressions, after controlling for underwriter ranking and venture capital backing.

Furthermore, the *residual analyst coverage* is positively correlated with measures of operating performance in each of the three subsequent years. We find a monotonic increase in the median performance ratios across the three portfolios with low-, medium-, and high- residual analyst coverage. These results suggest that the initial decision by analysts to provide coverage for a firm around the first public issuance is predictive of stock returns and operating performance in the following three years.

Overall, our results indicate that *ex ante* favorable expectations by analysts of firms with high residual coverage are confirmed by corresponding *ex post* superior performance. These results are consistent with the hypothesis that the expectation of future firm performance is one latent determinant of selective coverage. This suggests that investors can draw valuable inferences from analysts' decision to selectively follow certain firms.

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Table I
Yearly Distribution on the Sample of Initial Public Offerings
Filed with the SEC During the Period of 1986-2000

A sample of initial public offerings (IPOs) underwritten by firm-commitment contracts during the period of 1986–2000 is obtained from the New Issues Database of Thomson Financial Corporation. Unit offerings, ADRs, offerings of foreign corporations (F-1 filings), REITs, mutual funds filings, filings of financial institutions (with SIC code of 6000 to 6999), service companies (with SIC code greater than 8100), equity carveouts, and offerings with offer price less than three dollars are excluded from the sample. The data are further merged with the Institutional Brokers Estimate System (I/B/E/S) database to obtain information of analyst coverage of IPO firms. The number of IPO firms with I/B/E/S coverage initiated within the first six months (180 days), one year (360 days), two years (720 days), three years (1,080 days), and five years (1,800 days) from the offering dates is tabulated (percentage in parentheses) for each year. The number of offerings not covered by I/B/E/S within the first five years is also presented.

Year	Number of Industrial IPO Firms	Number of Offerings Based on Timing of first Coverage in I/B/E/S					Number of Offerings not Covered by I/B/E/S Within Five Years
		Within Six Months	Within One Year	Within Two Years	Within Three years	Within Five years	
1986	224	67	133	152	159	165	59
		(29.9%)	(59.4%)	(67.9%)	(71.0%)	(73.7%)	(26.3%)
1987	155	51	81	94	104	107	48
		(32.9%)	(52.3%)	(60.6%)	(67.1%)	(69.0%)	(31.0%)
1988	83	47	58	64	66	68	15
		(56.6%)	(69.9%)	(77.1%)	(79.5%)	(81.9%)	(18.1%)
1989	82	67	70	71	74	74	8
		(81.7%)	(85.4%)	(86.6%)	(90.2%)	(90.2%)	(9.8%)
1990	88	69	75	77	77	78	10
		(78.4%)	(85.2%)	(87.5%)	(87.5%)	(88.6%)	(11.4%)
1991	202	157	170	178	182	183	19
		(77.7%)	(84.2%)	(88.1%)	(90.1%)	(90.6%)	(9.4%)
1992	287	227	248	258	260	264	23
		(79.1%)	(86.4%)	(89.9%)	(90.6%)	(92.0%)	(8.0%)
1993	373	267	309	324	331	337	36
		(71.6%)	(82.8%)	(86.9%)	(88.7%)	(90.3%)	(9.7%)
1994	326	246	267	283	291	294	32
		(75.5%)	(81.9%)	(86.8%)	(89.3%)	(90.2%)	(9.8%)
1995	387	322	332	341	343	346	41
		(83.2%)	(85.8%)	(88.1%)	(88.6%)	(89.4%)	(10.6%)
1996	590	494	519	529	532	536	54
		(83.7%)	(88.0%)	(89.7%)	(90.2%)	(90.8%)	(9.2%)
1997	410	346	355	360	364	366	44
		(84.4%)	(86.6%)	(87.8%)	(88.8%)	(89.3%)	(10.7%)
1998	226	189	194	195	195	197	29
		(83.6%)	(85.8%)	(86.3%)	(86.3%)	(87.2%)	(12.8%)
1999	375	356	358	358	358	359	16
		(94.9%)	(95.5%)	(95.5%)	(95.5%)	(95.7%)	(4.3%)
2000	274	250	254	259	260	260	14
		(91.2%)	(92.7%)	(94.5%)	(94.9%)	(94.9%)	(5.1%)
Total	4,082	3,155	3,423	3,543	3,596	3,634	448
		(77.3%)	(83.9%)	(86.8%)	(88.1%)	(89.0%)	(11.0%)

Table II
Descriptive Statistics on the Sample of Initial Public Offerings
Filed with the SEC During the Period of 1986-2000

The sample of initial public offerings (IPOs) is as identified in Table I. The data are further merged with Institutional Brokers Estimate System (I/B/E/S), CRSP and COMPUSTAT databases to obtain information of analyst coverage, financial data, and return information on IPO firms, respectively. Initial analyst coverage is measured as the number of analysts providing one-year ahead earnings forecasts within the first 180 days of IPO offerings. Subsamples of IPO firms with low-, medium- and high-coverage consist of firms with below-33.3, between 33.3-66.7, and above-66.7 percentile initial coverage. MKTCAP is the market capitalization calculated at the end of the 25th date after issuance (at the expiration of the quiet period). NYSE/Nasdaq Indicator is a binary variable that is one, if the newly issued firm is listed on NYSE or Nasdaq, and zero otherwise. INDANALCNT is the number of analysts providing forecasts for seasond firms in the same industry (defined by the first six digits of the COMPUSTAT GICS codes) in the IPO month. INDOFFER is the number of IPO offerings from the same industry (defined by the first six digits of GICS codes) in the same year. CMRANK is the Carter and Manaster ranking for underwriters. UNDERPRC is extent of underpricing, based on the closing price in the first day of trading. Venture Backing Indicator is a variable taking the value of one, if an issue has venture capital backing and zero otherwise. Internet Firm Indicator is a variable taking the value of one, if the issuing firm is operating in internet-related business and zero otherwise. The number of book managers and the number of book co-managers are also tabulated. P-values are tabulated for the null hypothesis that the mean values of each variable of portfolios with low- and high- initial analyst coverage portfolios are the same.

Variable	Full Sample	Low Initial Analyst Coverage	Medium Initial Analyst Coverage	High Initial Analyst Coverage	P-value
Initial Analyst Coverage	2.46	0.31	2.46	5.27	0.00
MKTCAP (in millions)	660	360	369	1,507	0.00
NYSE/Nasdaq Indicator	0.76	0.45	0.90	0.93	0.00
INDANALCNT	92.07	74.44	92.86	110.14	0.00
INDOFFER	17.52	10.17	18.42	24.13	0.00
CMRANK	5.85	4.04	6.77	6.72	0.00
UNDERPRC	23.94%	12.96%	17.85%	47.17%	0.00
Venture Backing Indicator	0.44	0.24	0.49	0.59	0.00
Number of Book Managers	1.03	1.02	1.02	1.07	0.00
Number of Co-managers	2.33	1.59	2.38	3.22	0.00
Internet Firm Indicator (%)	9.00	2.00	6.00	24.00	0.00

Table III
Model of Initial Analyst Coverage of IPO Firms

The sample of initial public offerings (IPOs) is as identified in Table1. The dependent variable is the logarithm of (1+ initial analyst coverage). Initial analyst coverage is measured as the number of analysts providing one-year-ahead earnings forecasts within the first 180 days of IPO offerings. MKTCAP is the market capitalization calculated at the end of the 25th date after issuance (at the expiration of the quiet period). NYSE/NASDAQ Indicator is a binary variable that is one, if the newly issued firm is listed on NYSE or Nasdaq, and zero otherwise. INDANALCNT is the number of analysts providing forecasts for seasond firms in the same industry (categorized by the first six digits of the COMPUSTAT GICS code). INDOFFER is the number of IPO offerings with the same first 6-digit GICS codes issued in the same year. CMRANK is the Carter and Manaster ranking for underwriters. UNDERPRC is extent of underpricing, based on the closing price in the first day of trading. Venture Backing Indicator is a binary variable taking the value of one, if an issue has venture capital backing and zero otherwise. IPOMGRS is the total number of book managers and co-managers. Internet Firm Indicator is a binary variable taking the value of one, if the issuing firm is operating in internet-related business and zero otherwise. We use Model Two as the final model to predict the number of analysts providing initial coverage and use the residuals from this model in all our subsequent analysis. Coefficient estimates are reported in the table (with *t* statistics in parentheses). One, two and three asterisks indicate significance at the 10, 5, and 1 percent levels, respectively.

	Model One	Model Two
Intercept	-0.67***	-0.67***
	(-11.42)	(-11.47)
Log(MKTCAP)	0.08***	0.08***
	(9.46)	(9.46)
NYSE/Nasdaq Indicator	0.35***	0.35***
	(14.41)	(14.55)
Log(INDANALCNT)	0.03***	0.03***
	(2.62)	(2.73)
Log(INDOFFER)	0.02	-
	(0.26)	
CMRANK	0.02***	0.02***
	(9.42)	(9.43)
UNDERPRC	0.04**	0.04**
	(1.99)	(2.03)
Venture Backing Indicator	0.13***	0.13***
	(6.88)	(7.19)
Log(IPOMGRS)	0.64***	0.64***
	(17.77)	(17.80)
Internet Firm Indicator	0.13***	0.13***
	(3.86)	(4.02)
Adjusted R^2	52.69%	52.71%
No. of observations	2,699	2,699

Table IV
Post-Initial-Coverage Return Performance of IPO Firms
One- and Three-year Buy-and-Hold Annualized Abnormal Returns

The sample of initial public offerings (IPOs) is as identified in Table 1. Subsamples of IPO firms with low-, medium- and high- residaul coverage consist of firms with below-33.3, between 33.3-66.7, and above-66.7 percentile residual coverage. Residual coverage is the residual from the model of the logarithm of (1+ initial analyst coverage) on log(MKTCAP), NYSE/Nasadq indicator, logarithm of INDANALCNT, underwriter ranking, IPO underpricing, venture-backing indicator, logarithm of the number of IPO managers, and internet firm indicator (Model 2 of Table III). The period for return measurement is from 7th to 18th month (one year) and 7th to 42th month (three years) subsequent to IPO issuance. Returns of internet firms in the bubble market period (1999-2000) are excluded. If a firm is delisted before the 18th/42th month, its buy-and-hold return is compounded up to the delisting month. Annualized returns are calculated as the ratio of buy-and-hold returns over the number of equivalent year(s) used in compounding. Annualized returns based on the measurement window of one year and three years are tabulated in panel A and B, respectively. The annualized returns are compared against selected benchmarks. In row four of each panel, the GICS industry portfolio consists of all seasoned firms from the same industry as the IPO firm, with industries defined by the first six digits of GICS codes. In row five of each panel, the matching portfolios are generated by first forming size-quintile breakpoints using NYSE firms. The quintiles are split further into book-to-market quintiles on NYSE firms. The universe of non-IPO firms is allocated into the resulting twenty-five portfolios. Breakpoints are recalculated annually and equally-weighted portfolio returns are computed. Mean values of annualized returns are reported in the tables (with *t* statistics in parentheses). One, two and three asterisks indicate significance at the 10, 5, and 1 percent levels, respectively.

Panel A: One-year Annualized Buy-and-Hold Return				
Return	Full Sample	Low residual coverage	Medium residual coverage	High residual Coverage
Annualized returns	7.27%***	4.36%	8.38%**	9.07%***
	(3.71)	(1.27)	(2.46)	(2.71)
Annualized returns in excess of	-6.91%***	-7.85%**	-7.29%**	-5.58%*
CRSP equally weighted index	(-3.65)	(-2.37)	(-2.21)	(-1.73)
Annualized returns in excess of	-7.22%***	-8.27%**	-7.93%**	-5.46%*
CRSP value weighted Index	(-3.77)	(-2.47)	(-2.38)	(-1.67)
Annualized returns in excess of GICS	-3.61%***	-3.88%	-3.75%	-3.25%
industry portfolio	(-2.63)	(-1.22)	(-1.22)	(-1.06)
Annualized returns in excess of size and	-4.95%**	-6.66%**	-5.26%	-2.91%
book-to-market matching portfolio	(-2.02)	(-2.03)	(-1.60)	(-0.92)

Panel B: Three-year Annualized Buy-and-Hold Return				
Return	Full Sample	Low residual coverage	Medium residual coverage	High residual Coverage
Annualized returns	11.05%***	5.02%*	12.97%***	15.10%***
	(6.26)	(1.78)	(3.81)	(5.21)
Annualized returns in excess of	-3.66%**	-8.46%***	-1.97%	-0.58%
CRSP equally weighted index	(-2.13)	(-3.07)	(-0.60)	(-0.21)
Annualized returns in excess of	-4.17%**	-9.85%***	-2.63%	-0.10%
CRSP value weighted Index	(-2.38)	(-3.52)	(-0.77)	(-0.03)
Annualized returns in excess of GICS	-2.62%	-6.54%**	-2.00%	0.63%
industry Portfolio	(-1.58)	(-2.41)	(-0.63)	(0.23)
Annualized returns in excess of size and	-3.04%*	-8.00%***	-1.91%	0.71%
book-to-market matching portfolio	(-1.76)	(-2.88)	(-0.57)	(0.25)

Table V
Calendar Time Fama-French and Momentum Adjused Returns on Portfolios of IPOs Sorted by Residual Analyst Coverage

The sample of initial public offerings (IPOs) is as identified in Table1. Subsamples of IPO firms with low-, medium- and high- residual coverage consist of firms with below-33.3, between 33.3-66.7, and above-66.7 percentile residual coverage. Residual coverage is the residual from the model of the logarithm of (1+ initial analyst coverage) on log(MKTCAP), NYSE/Nasdaq indicator, logarithm of INDANALCNT, underwriter rankings, IPO underpricing, venture-backing indicator, logarithm of the number of IPO managers, and internet firm indicator (Model 2 of Table III). The period for return measurement is from 7th to 18th month (one year) and 7th to 42th month (three year) subsequent to IPO issuance. Returns of internet firms in the bubble market period (1999-2000) are excluded. R_{pt} is the equally-weighted returns of the portfolio of IPO firms in calendar month t. R_{mt} is the return on the value-weighted index of NYSE, AMEX, and NASDAQ stock in month *t*; R_{ft} is the beginning-of-month three month T-bill yield in month *t*; SMB_t is the return on small firms minus the return on large firms in month *t*, HML_t is the return on high book-to-market stocks minus the return on low book-to-market stocks in month *t* (Fama and French, 1993). PR12 is formed by taking the return on high-momentum stocks minus the return on low-momentum stocks. Returns of IPO firms are included in the portfolio returns only for the period from the 7th to 18th month (one-year) and from the 7th to 42th month (three-years) subsequent to IPO issuance. Panel A and B, respectively, present the one-year and three-year regression results of portfolios of low-, medium- and high- residual coverage. In the fourth row of each panel, we tabulated the results of the zero-investment portfolio, which consists of longing high-residual-coverage IPOs, while shorting low-residual-coverage IPOs, re-balanced monthly. Coefficient estimates are reported in the tables (with *t* statistics in parentheses). One, two and three asterisks indicate significance at the 10, 5, and 1 percent levels, respectively.

$$R_{pt} - R_{ft} = a + b[R_{mt} - R_{ft}] + sSMB_t + hHML_t + pPR12_t + \varepsilon_t$$

Panel A: One-year Time-series Four Factor Regression Analysis

	a	B	s	h	p	Adjusted R^2
Low residual coverage	-0.68*	1.18***	1.20***	-0.19	-0.35***	71.15%
	(-1.72)	(11.92)	(10.37)	(-1.35)	(-4.11)	
Medium residual coverage	-0.18	1.27***	1.14***	-0.37***	-0.52***	77.12%
	(-0.49)	(13.81)	(10.58)	(-2.71)	(-6.56)	
High residual coverage	0.32	1.21***	0.90***	-0.62***	-0.57***	83.63%
	(1.05)	(16.36)	(10.44)	(-5.73)	(-8.86)	
Zero-investment portfolio	0.99**	0.04	-0.29**	-0.43***	-0.22**	7.44%
	(2.39)	(0.34)	(-2.43)	(-2.82)	(-2.43)	

Panel B: Three-year Time-series Four Factor Regression Analysis

	a	B	s	h	p	Adjusted R^2
Low residual coverage	0.27	1.12***	1.04***	-0.25**	-0.68***	80.99%
	(0.92)	(15.76)	(12.29)	(-2.41)	(-11.32)	
Medium residual coverage	0.50	1.21***	1.22***	-0.21**	-0.56***	80.72%
	(1.60)	(15.99)	(13.57)	(-1.87)	(-8.76)	
High residual coverage	0.91***	1.27***	1.08***	-0.27***	-0.62***	85.86%
	(3.45)	(19.92)	(14.20)	(-2.85)	(-11.51)	
Zero-investment portfolio	0.64**	0.16**	0.04	-0.02	0.06	3.12%
	(2.41)	(2.41)	(0.55)	(-0.18)	(1.04)	

Table VI

Average Parameter Values from Monthly Cross-sectional Regression of Percentage Stock Returns on Size, Book-to-Market, and Residual Analyst Coverage on IPO firms, 1987-2000

The Universe is New York Stock Exchange (NYSE), American Stock Exchange (Amex), and Nasdaq firms for which the book value of equity is available from COMPUSTAT. MV and BV/MV are the market value (in millions) of equity and the ratio of the book value of equity to the market value of equity at the prior year end, respectively. ISSUE is the binary variable with value of one for IPO firms (as identified in Table 1) for the period from the 7th to 18th month (one year) and 7th to 42th month (three years) subsequent to IPO issuance, and zero otherwise. Returns of internet firms in the bubble market period (1999-2000) are excluded. Residual coverage is the residual from the model of the logarithm of (1+ initial analyst coverage) on log(MKTCAP), NYSE/Nasdaq indicator, logarithm of INDANALCNT, underwriter rankings, IPO underpricing, venture-backing indicator, logarithm of the number of IPO managers, and internet firm indicator (Model 2 of Table III). CMRANK is the Carter and Manaster ranking for underwriters. Venture Backing Indicator is a binary variable taking the value of one, if an issue has venture capital backing, and zero otherwise. The average parameter values are presented, with the *t* statistics (in parentheses) and the percentage of the coefficient estimates that are positive (in brackets). One, two and three asterisks indicate significance at the 10, 5, and 1 percent levels, respectively.

	One-year Monthly Returns		Three-year Monthly Returns	
	Model One	Model Two	Model One	Model Two
Intercept	2.01***	2.04***	2.24***	2.28***
	(3.24)	(3.30)	(3.86)	(3.92)
	[59.68%]	[59.14%]	[61.16%]	[60.68%]
Log(MV)	-0.13	-0.14*	-0.16**	-0.17**
	(-1.60)	(-1.69)	(-2.15)	(-2.24)
	[45.68%]	[46.24%]	[43.20%]	[44.18%]
Log(BV/MV)	0.28***	0.29***	0.27***	0.27***
	(2.83)	(2.98)	(2.91)	(3.10)
	[62.37%]	[62.90%]	[59.71%]	[60.68%]
ISSUE	0.16	-0.59***	0.20	-0.55***
	(0.83)	(-3.28)	(1.09)	(-3.36)
	[52.15%]	[41.94%]	[52.42%]	[41.75%]
Residcoverage* ISSUE	0.77***	0.73***	0.68***	0.64***
	(5.13)	(4.98)	(4.82)	(4.67)
	[62.90%]	[61.82%]	[62.14%]	[61.17%]
CMRANK*ISSUE	-	0.08***	-	0.07***
		(3.48)		(3.51)
		[63.44%]		[57.28%]
Venture backing*ISSUE	-	0.66**	-	0.75***
		(2.58)		(3.03)
		[52.99%]		[61.65%]
Avg. R^2	1.69%	1.81%	1.71%	1.84%
No. of Months	186	186	206	206

Table VII
Post-Initial-Coverage Operating Performance
of Portfolios of IPOs Sorted by Residual Analyst Coverage

The sample of initial public offerings (IPOs) is as identified in Table1. Subsamples of IPO firms with low-, medium- and high coverage consist of firms with below-33.3, between 33.3-66.7, and above-66.7 percentile residual coverage. Subsamples of IPO firms with low-, medium- and high- residual coverage consist of firms with below-33.3, between 33.3-66.7, and above-66.7 percentile residual coverage. Residual coverage is the residual from the model of the logarithm of (1+ initial analyst coverage) on log(MKTCAP), NYSE/NASDAQ indicator, logarithm of INDANALCNT, underwriter rankings, IPO underpricing, venture-backing indicator, logarithm of the number of IPO managers, and internet firm indicator (Model 2 of Table III). ROA is the ratio of operating income after depreciation (Compustat data item 178) over total assets (Compustat data item 6). Cash ROA is the ratio of operating cash flow (Compustat data item 308) over total assets. Industry-adjusted ratios are obtained by taking the difference between the raw values and the median value of all firms from the same industry (sample firms excluded) in the same fiscal year. Industries are defined by the first six digits of GICS codes. Median values for the full sample are reported, with median values after eliminating internet firms reported in parentheses. Year 1 is the first fiscal year with the beginning date of the fiscal year at least six months later than the month of IPO issuance. P-values of the null hypothesis that median values across the low-residual and high-residual groups are the same for the full sample are also presented, with p-values for the sample after eliminating internet firms reported in parentheses .

	ROA			Industry-adjusted ROA		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Low residual coverage	2.13%	2.14%	3.62%	-1.34%	-1.06%	-0.34%
	(3.30%)	(2.90%)	(4.08%)	(-1.30%)	(-1.03%)	(-0.41%)
Medium residual coverage	4.29%	3.10%	3.74%	1.47%	0.92%	1.10%
	(5.59%)	(4.17%)	(4.59%)	(1.05%)	(0.85%)	(1.04%)
High residual coverage	7.03%	6.33%	6.12%	2.97%	1.95%	1.67%
	(7.95%)	(7.17%)	(6.49%)	(3.06%)	(2.02%)	(1.54%)
P-value	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Cash ROA			Industry-adjusted Cash ROA		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Low residual coverage	0.74%	2.01%	2.84%	-2.18%	-1.84%	-1.07%
	(1.43%)	(2.54%)	(3.14%)	(-1.94%)	(-1.67%)	(-1.06%)
Medium residual coverage	1.92%	3.18%	4.38%	-0.69%	0.32%	0.23%
	(2.88%)	(3.51%)	(4.62%)	(-0.71%)	(0.12%)	(0.23%)
High residual coverage	4.56%	5.00%	6.26%	1.34%	1.30%	1.73%
	(5.12%)	(5.40%)	(6.51%)	(1.28%)	(1.29%)	(1.62%)
P-value	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)