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Paired Analyst Recommendations and Internet IPOs

Abstract

The paper investigates analyst recommendations for internet firms that went public during 1997-2000. Our contribution to the literature is that we match recommendations for the same firm issued by different investment banks that have published the recommendations in an interval around the same date. By examining paired recommendations all characteristics (observed but also unobserved) will be the same. The latter analyses offer empirical results that are different from analyses that do not control for the possibility that different types of investment banks issue recommendations for different firms. Furthermore, our empirical results provide evidence that an investment analyst recommendation is more favorable when the NASDAQ stock market is surging, the number of shares in the offering as percentage of the shares outstanding is greater and the analyst affiliation is from a co-lead manager.

Keywords: analyst recommendations, internet firms, initial public offerings
JEL codes: G14, M40

Paired Analyst Recommendations and Internet IPOs

1. Introduction

There is an increasing attention by academics as well as non-academics for the credibility and independence of financial analysts. They are alleged to be subject to conflicting interests: providing objective recommendations on stocks for their clients, on the one hand, and pursuing future investment banking business, on the other. First, the so-called Chinese Wall between the analysts and other employees of a financial institution was subject to fierce discussions. Then came the burst of the internet bubble in mid-2001 and the alleged overly optimistic recommendations that played a role. As a consequence, the New York Stock Exchange (NYSE) has changed Rule 472 and in a similar way, NASDAQ Rule 2711 has been changed. In addition, the New York Attorney General reached a Global Settlement in April 2003 between ten of the most prestigious investment banks¹ and regulators in the amount of \$ 1.4 billion. Among other things, parties involved agreed to separate research from investment banking to ensure that their research will be independent.

¹ These investment banks are Bear Stearns & Co., Credit Suisse First Boston, Deutsche Bank, Goldman Sachs, J.P. Morgan Chase & Co., Lehman Brothers, Merrill Lynch & Co., Morgan Stanley, Salomon Smith Barney, and UBS Warburg.

This study examines the recommendations of financial analysts with respect to internet IPOs during the years 1997-2000. When a firm goes public, two types of investment banks both mentioned in the IPO prospectus play a role: the lead manager and co-lead managers. Key for this paper is that for one specific firm all recommendations whether issued by a lead manager, a co-lead manager, an unaffiliated brokerage firm, a high or low prestige investment bank are examined by using matched pairs. By identifying the investment bank and the firm for which the recommendation is made, we control for different recommendations from different types of brokers for the same firm. Numerous papers have examined whether a specific type of investment bank's recommendation for the IPO firm is biased. This paper addresses the question whether this bias is caused by the type of investment bank in a novel way. The study presents not only cross-sectional comparisons in means, but also matched pairs analyses by comparing recommendations from different types of investment banks for the same firm. By doing so, we extend the existing literature on this topic. By examining paired recommendations all characteristics (observed but also unobserved) will be the same.

Because of the availability of appropriate data since a number of years research on analyst recommendations has rapidly grown. First, by using this data we are able to examine analyst recommendations from different types of investment banks for the same firm. Second, we have regressed analyst recommendations against firm-specific characteristics, and market sentiment, respectively, around the date that the recommendation is published. In addition, we have regressed analyst recommendations on IPO-specific variables, such as retained ownership of the single largest shareholder and shares offered in the IPO. By using a single branch of industry cross-sectional industry effects do not play a role in the analyses.

The remainder of the paper is organized as follows. Section two presents prior literature on financial analyst recommendations. Section three describes our data sample and their descriptive statistics. The fourth section presents analyst recommendations without accounting for analysts of different types of investment banks issuing recommendations for different firms. Section five presents recommendations of different analysts for the same firm around the same date. Section six contains

regression estimates of recommendations under a number of controls. The final section summarizes and concludes the paper.

2. Prior Literature

Intuitively, one would expect that financial analysts affiliated with an IPO firm are subject to conflicts of interests. A number of studies on analyst recommendations have examined this research question and compared the ratings of affiliated analysts to those of unaffiliated analysts. Michaely and Womack (1999) and Chen (2004) present empirical results that stock returns following lead analyst *Buy* recommendations are significantly lower than those following non-lead analyst *Buy* recommendations. Michaely and Womack investigate two categories of affiliation, lead underwriters and non-lead underwriters. For a sample of 391 IPO firms gone public in 1990 and 1991 the authors examine 241 *Buy* recommendations. However, neither study controls for the timing of the recommendations. Bradley, Jordan, and Ritter (2003) provide evidence that after controlling for the timing and number of analysts initiating, the presence or absence of the lead underwriter makes no difference. It is one of the first papers that investigates the stock market reaction to analyst initiations at the end of the quiet period, which begins on or before a firm files its preliminary registration with the SEC, and ends 25 calendar days after the IPO. In July 2002, the SEC changed this to 40 calendar days. Bradley *et al.* (2003) find that market reactions will be stronger when multiple banks simultaneously initiate coverage; abnormal returns are much larger when more than one analyst initiates. In addition, the authors find that the abnormal returns experienced by firms with coverage initiated are concentrated in the days before the quiet period expires. The pre-event run-up is more pronounced for firms that ultimately receive multiple initiations. The empirical results of Bradley *et al.* (2003) are consistent with both affiliated and unaffiliated analysts competing for future investment banking business. Bradley, Jordan, and Ritter (2007) report that recommendations at the end of the quiet period are fundamentally different from those during the subsequent eleven months from the

standpoint of market price and volume reactions. Second, affiliated underwriter upgrades and downgrades are associated with a greater market reaction than those from unaffiliated analysts, which is inconsistent with the market discounting recommendations from affiliated underwriters. Also, Bradley *et al.* (2007) provide evidence that having more deal managers does result in more analyst coverage immediately following the end of the quiet period. Furthermore, their findings suggest that firms going public may be under the illusion that they are paying for research at the time of the IPO, but within a short period of time after the quiet period other factors appear the more important determinants of analyst coverage. McNichols, O'Brien, and Pamukcu (2007) provide empirical results that investors tend to discount *Buy* recommendations of affiliated analysts. Their findings are consistent with Michaely and Womack (1999), but inconsistent with several other studies aforementioned. In contrast to Michaely and Womack, McNichols *et al.* (2007) do not see affiliated analyst recommendations earning lower abnormal buy-and-hold returns than unaffiliated at intervals of three, six or twelve months after the recommendations. The last three authors find that co-underwriters are similar to lead underwriters and different from unaffiliated analysts. McNichols *et al.* (2007) provide evidence that investment banks that are neither lead nor co-underwriters initiate coverage later, and issue less optimistic recommendations, than either underwriters or analysts employed at non-investment-bank firms. Furthermore, their year-by-year breakdown reveals no time trend in the results, and most years show no statistically significant difference between affiliated and unaffiliated analysts' abnormal returns. Prior to 1998 by comparing internet stocks with other IPO firm stocks, O'Brien and Tan (2007) find little evidence of differential analyst optimism by sector, and no evidence of internet stocks earning superior returns. Beginning in 1998, O'Brien and Tan (2007) show that analysts made higher recommendations for internet stocks than for other new issues. Bradley, Clarke, and Cooney (2007) show that in the early years of the 1990s affiliated underwriters provided more optimistic recommendations than unaffiliated analysts and their recommendations were discounted by the market. However, in the late 1990s, as research coverage became increasingly more important to issuing firms, both affiliated and unaffiliated analysts were equally optimistic and market reactions to recommendations were the same for these two groups. Bradley, Clarke, and

Cooney (2007) also find that the number of unaffiliated analysts following a stock is positively related to subsequent equity deals. Finally, the latter authors provide evidence that affiliated analysts reduce their coverage when they lose their underwriting mandate, or are otherwise demoted to a lower position in a follow-on offering. The empirical results are consistent with analysts, affiliated or unaffiliated, using their research services for investment banking purposes. Ljungqvist *et al.* (2007) find that analysts' recommendations relative to consensus are positively associated with investment banking relationships and brokerage pressure, but negatively associated with the presence of institutional investors in the firm being followed. This is especially true when there are more institutions holding larger blocks in the firm, and for firms whose institutional holdings are concentrated in the hands of the largest institutional investors.

Firm-specific characteristics are related to a firm's probability to survive. Survivorship plays an important role for internet firms. Hence, analyst recommendations should account for those characteristics. For instance, Demers and Joos (2007) develop an IPO failure prediction model that includes accounting and non-accounting information. The latter refers to variables, such as underwriter prestige, IPO proceeds, and IPO offer price. The authors report significant differences in failure models for non tech and high tech IPO firms. Botman, Van Giersbergen, and Van der Goot (2007) have used a Cox hazard model to examine the survival of internet IPOs. Botman *et al.* (2007) include in their model not only offering and IPO market characteristics, but also accounting information. Not only specific characteristics of internet firms, but also accounting and non-accounting information is relevant for an internet firm's survival time. Therefore, we have examined accounting as well as non-accounting information in this paper on analyst recommendations.

3. Sample Selection and Descriptive Statistics

Our data of internet IPOs comes from a number of sources: first, a sample of 527 internet-related offerings used by Loughran and Ritter (2003), who obtained their data by merging and amending

internet identifications of *Thomson Financial Securities Data*, *Dealogic* and *IPOmonitor.com*. Next, we matched this list against the firms marked as internet-related by our second source, www.edgar-online.com. IPOs documented by both sources are included in our initial sample, which contains 382 firms.

In order to be included in the final sample, firms have to meet two additional criteria. First, firms have to be listed at the NASDAQ stock exchange. Second, the final prospectus must be available at www.sec.gov, including annual accounts covering a full fiscal year. Furthermore, unit offerings and financial institutions are excluded from the sample as the characteristics of these IPOs differ significantly from other offerings. From our initial sample 13 firms have been dropped because these were issued at an exchange other than NASDAQ. Two firms are left out, as their final prospectuses were not available. For 31 firms the annual accounts accompanying the prospectus do not cover a full year. Finally, eight firms that were financial institutions are omitted. After the exclusion of those 54 firms, our final sample consists of 328 internet offerings. One remarkable feature of internet firms is their short lives: our sample of 328 internet IPOs contains 122 non-surviving firms (Botman *et al.*, 2007). This results in an average life of 2.4 years or 28.8 months.

The analyst recommendations of the internet IPOs come from both Briefing.com and I/B/E/S of Thomson Financial. We have omitted the recommendations of the same investment bank that appeared more than once in our final sample. By using both databases of analyst recommendations aforementioned our sample of recommendations is as complete as possible. As reported by Bradley, Jordan and Ritter (2003), the various databases of analyst recommendations do not contain all recommendations issued for a specific firm.

Many variables used in our analysis (for instance, the names of the lead and co-lead manager, the number of risk factors, underwriter reputation, and the financial ratios) have been hand-collected from the final offering prospectuses of the issuing firms. The date of the first trading day has been obtained from www.edgar-online.com.

Table 1 presents descriptive statistics of the five types of recommendations. In line with other papers (for instance, Bradley, Jordan, and Ritter, 2003 and 2007) we use five categories (in parentheses the corresponding recommendation number) *Strong Buy (1)*, *Sub-Buy (2)*, *Attractive (3)*, *Hold-Neutral (4)* and *Sell (5)*. The lower the number, the more favorable the recommendation or rating. As can be seen in table 1, a majority of the recommendations, namely 89.55 percent, consists of *Strong Buy* and *Sub-Buy* ratings. On a total of 3,954 recommendations during the first year after IPO there are only eight *Sell* recommendations.

The number of ratings is not evenly distributed among the different types of investment banks. Co-lead managers with 1,299 ratings issue about twice as much recommendations as lead managers with 670 ratings. However, most recommendations (1,985 out of a total of 3,954) come from unaffiliated brokerage firms. On average, the number of recommendations per lead manager, co-lead manager and unaffiliated broker are 12, 16 and 11, respectively. Recommendations issued by high (low) prestigious investment banks are 60.4 (39.6) percent of the sample. The measure we use for investment bank reputation is based on the relative placement of underwriters in tombstone advertisements, as originally developed by Carter and Manaster (1990) and Carter, Dark and Singh (1998) and later updated by Loughran and Ritter (2003) for the period 1980 through 2000.

<Insert Table 1 about here>

Descriptive statistics of analyst recommendations by type of investment bank are in table 2. Because a chi-square can only be calculated for relatively large numbers of observations we have combined the *Hold-Neutral* and *Sell* ratings indicated by “4+5”. Except for the period 7 to 12 months after IPO the value of the Pearson chi-square is significant at the one percent level. This means that during the first six months after IPO the recommendations are dependent on the type of investment bank. Otherwise stated, during the first six months after IPO the recommendations from different types of investment banks are significantly different. Furthermore, it appears that a great majority of recommendations are *Strong Buy* and *Sub-Buy* recommendations regardless of the type of investment bank. However, table

2 provides evidence that for each period the ratings of unaffiliated investment banks are less favorable (smaller than expected number of *Strong Buy* and *Sub-Buy* recommendations) than those of the lead managers and co-lead managers. The latter phenomenon has disappeared during the period 7 to 12 months after IPO.

As can be seen in table 2, only for the period of 7 to 12 months after IPO the recommendations are independent from the type of investment bank: lead manager, co-lead manager, and unaffiliated brokers, respectively. For both other periods, the first three months, and 4 to 6 months after IPO, respectively, table 2 shows that the analyst recommendations are dependent on the type of investment bank. Furthermore, the greater the period after IPO, the smaller the percentage of recommendations from lead managers. Analyst recommendations from unaffiliated brokers appear to issue their recommendations six months after IPO mainly.

<Insert Table 2 about here>

Table 3 provides an overview of the analyst recommendations per year. As can be seen in table 3, the number of the recommendations is not evenly distributed across the years of IPO: 1999, 2000 or 2001. Because of the small number of observations the year 1998 is omitted. Except for 1999 the unaffiliated investment banks issue less *Strong Buy* and *Sub-Buy* recommendations than the other two types of investment banks. The number of recommendations from unaffiliated brokers in 2000 is more than twice the number of recommendations from the two other years. As can be seen in table 3, only for 2001 the Pearson chi-square is not significant. The latter indicates that for 2001 the recommendations can be considered largely similarly across the different types of investment banks. For 1999 and 2000 the analyst recommendations do appear dependent on the type of investment bank.

<Insert Table 3 about here>

As can be seen in table 4, the IPO prospectuses mention 31 (31) risk factors on average (median). The average number of risk factors is much higher than the 14 reported in Beatty and Welch (1996). The mean (median) number of shares offered without the green shoe is 19.2 (18.0) percent of the shares outstanding without the green shoe. The average (median) number of shares offered without the green shoe is 5.984 million (4.500 million). The largest single shareholder holds on average (median) 28.5 (21.9) percent of the shares outstanding after IPO. The non-logged average (median) net sales is \$18.311 (\$6.901) million. The average (median) underwriter fee paid by the internet firms is \$5.75 (\$4.480) million. The sum of the underwriter fees paid by the internet firms of our sample is \$1.9 billion (compared with the amount of \$ 1.4 billion of the Global Settlement in April 2003).

<Insert Table 4 about here>

4. Comparison of Means of Non-paired Firms

Table 5 presents t-tests of analyst recommendations comparing the means of the ratings by two types of investment banks at a time. We do not control for the possibility that different types of investment banks issue recommendations for different firms. All t-test are conducted for the three periods of time used earlier: the first three months after IPO, 4 to 6, and 7 to 12 months after IPO, respectively. As can be seen in panel A of table 5, the recommendations for the first three months of the co-lead manager are significantly more favorable than those of the lead manager and unaffiliated broker, respectively. The ratings of co-lead managers are 1.606, on average, followed by those of lead managers: 1.853, on average. Unaffiliated brokers issue the least favorable ratings of 1.750, on average. The recommendations of low prestige brokers are more favorable than those of high prestige brokers.

For the period of 4 to 6 months after IPO lead managers issue the best recommendations (on average 1.568), but these are not significant. Co-lead managers, low prestige brokers, and unaffiliated brokers, publish significantly less favorable recommendations. Note that for the 4 to 6 months period low prestigious brokers issue significantly less favorable ratings than high prestige ones.

As can be seen in panel A of table 5, for the 7 to 12 months after IPO lead managers issue more favorable recommendations than all other types of investment banks. Except for the difference between lead and co-lead managers none of the differences in recommendations are significant.

<Insert Table 5 about here>

A closer look at the data reveals that about 75% of the lead managers' recommendations labeled 3 (= *attractive*) is from one lead manager, Goldman Sachs. Recommendations labeled *attractive* from other types of investment banks are evenly distributed. During the first three months compared with panel A of table 5 there are in panel B no longer significant differences in means between lead and co-lead managers, and high and low prestige investment banks, respectively. Furthermore, after excluding the recommendations of Goldman Sachs during the first three months there is a significant difference between lead managers and unaffiliated investment banks. As can be seen in panel B of table 5, for the period of 7 to 12 months after IPO the more favorable recommendations of the lead manager compared to those of both the co-lead manager and the unaffiliated broker are more pronounced.

As can be seen in table 5 panel C that presents year-to-year recommendations, the differences of ratings between lead and co-lead managers are never significant. However, except for 2001 the analyst recommendations from co-lead managers and unaffiliated investment banks are significantly different: unaffiliated investment banks publish less favorable ratings (higher means). Furthermore, in 2000, the year before the burst of the internet bubble, the average rating for all types of investment banks compared to both other years is more favorable. The opposite holds for 2001 when not only the ratings from all types of investment banks are less favorable than for both other years examined, but

also 2001 is the only year for which the differences in means of the recommendations are never significantly different.

In sum, the findings presented in table 5 provide evidence that different types of investment banks issue different recommendations. As can be seen in panel A of table 5, the differences in means between lead and co-lead managers for the three periods after IPO are not directionally similar: during the first three months after IPO the co-lead managers issue more favorable recommendations than the lead managers, thereafter less favorable recommendations. In addition, the recommendations appear dependent on the year that these are published. Table 5 shows that the ratings are different across the three years examined: the average recommendation from the year 2000 is the best and that from 2001 is the worst.

5. Comparison of Means of paired Firms

To control for differences in recommendations caused by differences of firm-specific characteristics we have used a matched pairs analysis. By examining paired recommendations where the recommendation dates of the same internet firm are matched, all characteristics (observed but also unobserved) will be the same. The latter analysis provides a direct test for the relation between differences in recommendations across different types of investment banks. By doing so, we control for the possibility that the differences in recommendations between lead and co-lead managers, and unaffiliated brokers reported in table 5 are the result of investment analysts who analyze different firms, and, therefore, report different recommendations.

Since restricting the dates to be exactly the same would result in too little observations, we have analyzed paired recommendations within 6 calendar days. For instance, when comparing the recommendation of a lead manager to that of a co-lead manager for a particular IPO, we take the difference between the lead manager's recommendation and that of the matched co-lead manager within a specific time period (e.g. 3 days). If more than one recommendation for each type of

investment bank is observed, then we take the average recommendation. For robustness sake we have run analyses for each specific recommendation individually, also. The results are qualitatively similar (not reported).

Table 6 reports the matched pairs analyses with respect to the type of investment bank. Also, we compare the average recommendations for another classification, namely high prestigious versus low prestigious investment banks. As aforementioned, the recommendations refer to the same firm, but are published by different investment banks around the same date (within 7 calendar days before or after the date of the publication of the recommendation).

As can be seen in panel A of table 6, for the first three months after IPO we observe qualitatively similar findings compared to those of table 5 with the exception of the difference between high and low prestige investment banks: high prestige investment banks issue more favorable recommendations than their low prestige counterparts. For two more cases the findings of the matched pair analyses of panel A of table 6 are not equal to those of panel A of table 5. The first case is that during the 7 to 12 months period there are never significant differences between the recommendations of any type of investment bank. The second case is that during the 4 to 6 months period there are no significant differences between the recommendations of high and low prestige investment banks.

Following panel B of table 5, in panel B of table 6 we have omitted the recommendations from one lead manager, Goldman Sachs. As can be seen in panel B of table 6, opposite to panel A there is never a significant difference between the recommendations of high and low prestige investment banks. In addition, for all periods after IPO the differences between the recommendations of the lead and co-lead managers are qualitatively similar to those of panel A of table 7. Furthermore, for the first six months after IPO the recommendations of the lead manager are significantly more favorable than those of the unaffiliated broker; also, the lead manager's recommendation in panel B is more favorable than those in panel A. For the period of 7 to 12 months after IPO both panels A and B of table 6 present no significant differences in recommendations for all types of investment banks.

In sum, during the first three months after the IPO, the recommendations made by the co-lead managers are the most favorable followed by those made by the lead managers, while the

recommendations made by the unaffiliated are the most unfavorable. Between four and six months after the IPO, there is no significant difference between the recommendations made by the lead and co-lead managers although both type of managers are still more favorable than the unaffiliated. Six months after the IPO, there appears to be no differences between the recommendations of three types of investment banks considered.

6. Empirical Results using OLS regressions

To further examine analyst recommendations we have run a number of regressions. These are presented in table 7; the dependent variable in each regression is analyst recommendation. Again, the recommendations are numbered one (highest rating) to five (lowest rating); the lower the number, the better the recommendation. The methodology used is ordinary least squares regression. Because the dependent variable is ordinal and discrete we have also run ordered multi-logit regressions. The results of both types of regressions are qualitatively similar (not reported).

The regressions in table 7 are for three time periods after IPO: the first three months, 4 to 6, and 7 to 12 months after IPO, respectively. The analyst recommendations are regressed against the following key variables: dummies for the co-lead manager, the unaffiliated investment bank, and high prestigious investment bank. The other variables in the models presented are controls. The variable Largest Single Shareholder is a measure for the concentration of ownership. Only for the first three months after IPO it appears that the higher the latter variable the more favorable the recommendation. The Number of Risk Factors stands for *ex ante* firm-specific risk. In two cases (panels B and D, respectively) this variable is significant, but only for the period of 7 to 12 months after IPO. Net Sales per Employee indicates the productivity of a firm's employees. The latter variable is never significant. Financial risk is proxied by operational cash flow (OCF) scaled by current liabilities. As can be seen, except for two cases the relation between analyst recommendation and financial risk is significant, but not directionally similar for each case. Analyst recommendation is an increasing function of a firm's

net sales. The number of offered shares scaled by the number of shares placed and outstanding is an IPO characteristic. As can be seen in panel A of table 7 for the first six months after IPO, the analyst recommendation is a significant and decreasing function of the number of shares offered as a percentage of total shares after IPO: the higher this percentage, the better the recommendation. The return of the NASDAQ index of 30 days around the recommendation date is a proxy for the influence of the stock market sentiment on the analyst recommendation. Throughout the three periods examined there is a significant and positive relation between analyst recommendations and stock market sentiment: more favorable recommendations are significantly related to positive market changes for each of the three periods examined. Because we use dummies for both the co-lead manager and the unaffiliated investment bank, the coefficient of each dummy indicates the direction of the relation with the third type of investment bank, the lead manager. For the first three months the recommendations of the co-lead manager are significant and better (thus, having lower values) than those of the lead manager (table 7 panels A and B).

In addition, panel A of table 7 shows that for the first three months after IPO the recommendations from the co-lead managers are significantly more favorable than those of the lead manager. For the two periods thereafter the recommendations from the co-lead managers are less favorable than those of the lead manager. Except for one case the recommendations of the unaffiliated investment bank's ratings are significantly less favorable (thus, having higher values) than those of the lead manager. As can be seen in panel B of table 7, after excluding the recommendations of Goldman Sachs the empirical results provide evidence that the difference between the recommendations from lead managers and co-lead managers remains qualitatively similar. However, opposite to panel A the recommendations of the unaffiliated investment banks' ratings for the first three months are significantly less favorable than those of the lead manager. Omitting one of the other investment banks from the Global Settlement each at a time provide qualitatively similar findings as presented in panel A of table 7 (not reported).

As can be seen in panels C and D of table 7, high prestigious brokers issue less favorable recommendations than their low prestigious counterparts except for the first three months after IPO.

Excluding the recommendations of Goldman Sachs (panel D of table 7) provide empirical results that are largely similar to those of panel C of table 7.

7. Conclusions

This study examines analyst recommendations for internet firms that went public during 1997-2000. First, we compare the recommendations of investment banks involved in a firm's IPO, its lead and co-lead managers, and of unaffiliated investment banks. Second, we investigate the relation between analyst recommendations and the reputation of an investment bank, high and low prestigious investment banks, respectively. Finally, we control for differences in recommendations caused by differences in firm-specific characteristics; for the latter analysis we use a matched pair analysis. Our contribution to the literature is that we compare recommendations for the same firm issued by different investment banks in an interval of seven days around the date that the recommendation is published. By examining paired recommendations all firm-specific and IPO characteristics (observed but also unobserved) will be the same. The latter analysis provides a direct test for the relation between differences in recommendations across different types of investment banks. By using a single branch of industry cross-sectional industry effects do not play a role in the analyses.

Our findings provide evidence that a great majority of recommendations are *Strong Buy* and *Sub-Buy* recommendations. Furthermore, the type of investment bank does matter. For each of the three periods examined (the first three months after IPO, 4 to 6, and 7 to 12 months after IPO) the number of recommendations is increasing with the type of investment bank: lead managers issue the smallest number of recommendations, followed by co-lead managers. Unaffiliated brokers issue the greatest number of recommendations in the first year after IPO. However, the number of recommendations per lead manager, co-lead manager and unaffiliated broker are on average 12, 16 and 11, respectively. Furthermore, the empirical results provide evidence that analyst recommendations are dependent on the year that these are published. Except for the year 2001, the year of the burst of the internet bubble,

for each year examined the recommendations of the unaffiliated brokerage firms are less favorable compared to those of the lead and co-lead managers, respectively.

The outcome of the regressions shows that analyst recommendations are better when the number of shares offered as a percentage of total shares after IPO is higher. Also, stock market sentiment plays a strong role. Market sentiment, measured as the percentage change of the NASDAQ index around the date of the recommendation, is significantly related to the analyst recommendations: high recommendations go hand in hand with positive market changes for each of the three periods of time examined. This outcome is consistent with analyst recommendations following market movements rather than anticipating these. A closer look at the data reveals that the majority of the recommendations labeled 3 (= attractive) is from one lead manager, Goldman Sachs. This is consistent with anecdotal evidence that this high prestigious investment bank is keener to protect its reputational capital than other high prestigious investment banks.

In addition to the t-tests we have examined with the help of matched pairs analysis to which extent a recommendation is dependent on the type of investment bank, all else equal. When we compare the differences in recommendations of the matched pairs analyses with those of the non-matched pairs t-tests the empirical results for the first three months after IPO are qualitatively similar. Thereafter the empirical results of the two methodologies are different. As can be seen in panel A of table 7, except for one observation for the periods of 4 to 6 and 7 to 12 months after IPO, respectively, the matched pairs analyses show differences in recommendations between co-lead managers and the other types of investment banks: co-lead managers issue significantly more favorable recommendations than lead managers and unaffiliated brokers. There are no significant differences between the recommendations from the other types of investment banks. The latter findings are not only different from those of panel A of table 5, but also more robust across the different periods of time examined.

After omitting the recommendations of Goldman Sachs the differences in recommendations from high and low prestigious investment banks are never significant. Only for the first three months after IPO the differences between lead and co-lead managers, and unaffiliated investment banks are all significant. After the first three months after IPO the empirical results of the sample without Goldman

Sachs are qualitatively similar to those with Goldman Sachs. These findings are consistent 1) with lead managers supporting their 'own' internet IPOs during the first three months after IPO, 2) with an increased consensus of the investment analyst community for the period of 4 to 12 months after IPO with the exception of co-lead managers' analysts, and 3) with co-lead managers using favorable recommendations as a way for seeking a role as lead manager of future IPOs. It appears that with respect to point 1) one lead manager, Goldman Sachs, has behaved differently.

In sum, the empirical results provide evidence that an investment analyst recommendation is more favorable when the NASDAQ stock market is surging, the number of shares in the offering as percentage of the shares outstanding is greater, the percentage retained ownership of the largest single shareholder is larger, and the analyst affiliation is from a co-lead manager.

The matched pairs recommendations are more robust than the non-matched pairs t-tests. When we consider the matched pairs recommendations the empirical results show that throughout the first year after IPO the unaffiliated investment banks' recommendations are significantly less favorable than those of the co-lead managers. Only during the first three months after IPO the recommendations from lead and co-lead managers are significantly more favorable than those from unaffiliated brokers. After the first three months after IPO unaffiliated investment banks continue to issue significantly less favorable recommendations than the other types of investment banks in the study.

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Table 1 Descriptive Statistics of Analyst Recommendations and Type of Investment Banks within one year after IPO.

of Lead Managers = number of recommendations from a Lead Manager; **# of Co-Lead Managers** = number of recommendations from a Co-Lead Manager; **# of Unaffiliated Brokers** = number of recommendations from an Unaffiliated Investment Bank; **# of High Prestigious Brokers** = number of recommendations from a High Prestigious Investment Bank; **# of Low Prestigious Brokers** = number of recommendations from a Low Prestigious Investment Bank.

Recommendation	Frequency	Percent
Strong buy = 1	1,605	40.59
Sub-buy = 2	1,936	48.96
Attractive = 3	342	8.65
Hold-neutral = 4	63	1.59
Sell = 5	8	0.20
	3,954	100.00

Type of Investment Bank	Frequency	Percent
# of Lead Managers	670	16.94
# of Co-lead Managers	1,299	32.85
# of Unaffiliated Brokers	1,985	50.20
	3,954	100.00

Investment Bank Prestige	Frequency	Percent
# of High Prestigious Brokers	2,389	60.42
# of Low Prestigious Brokers	1,565	39.58
	3,954	100.00

Table 2 Descriptive Statistics of Analyst Recommendations by Type of Investment Bank and Number of Days after IPO (expected frequencies assuming independence shown in *italics*).

Lead Manager = recommendations from a Lead Manager; **Co-Lead Manager** = recommendations from a Co-Lead Manager; **Unaffiliated** = recommendations from an Unaffiliated Investment Bank. **4+5** is the sum of *Hold-neutral* and *Sell* recommendations.

Recommendations if days after IPO ≤ 3 months					
	1	2	3	4+5	Total
Lead manager	105	146	32	1	284
	<i>111</i>	<i>153</i>	<i>19</i>	<i>2</i>	
Co-lead manager	238	298	16	2	554
	<i>216</i>	<i>298</i>	<i>37</i>	<i>3</i>	
Unaffiliated	53	102	19	3	177
	<i>69</i>	<i>95</i>	<i>12</i>	<i>1</i>	
Total	396	546	67	6	1,015
Pearson Chi ² =	36.971		Asymp. Sig. (2-sided): 0.000		

Recommendations if days after IPO between 4-6 months					
	1	2	3	4+5	Total
Lead manager	62	55	8	0	125
	<i>48</i>	<i>63</i>	<i>12</i>	<i>3</i>	
Co-lead manager	89	118	6	4	217
	<i>83</i>	<i>109</i>	<i>20</i>	<i>6</i>	
Unaffiliated	122	185	52	15	374
	<i>143</i>	<i>187</i>	<i>34</i>	<i>10</i>	
Total	273	358	66	19	716
Pearson Chi ² =	35.75491		Asymp. Sig. (2-sided): 0.000		

Recommendations if days after IPO between 7-12 months					
	1	2	3	4+5	Total
Lead manager	120	118	20	3	261
	<i>110</i>	<i>121</i>	<i>25</i>	<i>5</i>	
Co-lead manager	211	254	48	15	528
	<i>222</i>	<i>245</i>	<i>50</i>	<i>11</i>	
Unaffiliated	605	660	141	28	1434
	<i>604</i>	<i>666</i>	<i>135</i>	<i>30</i>	
Total	936	1,032	209	46	2,223
Pearson Chi ² =	5.819		Asymp. Sig. (2-sided): 0.444		

Table 3 Descriptive Statistics of Analyst Recommendations within 1 year from IPO and Year of IPO (expected frequencies assuming independence shown in *italics*).

Lead Manager = recommendations from a Lead Manager; **Co-Lead Manager** = recommendations from a Co-Lead Manager; **Unaffiliated** = recommendations from an Unaffiliated Investment Bank.

Recommendations in year 1999					
	1	2	3	4+5	Total
Lead manager	69	96	25	1	191
	<i>62</i>	<i>107</i>	<i>18</i>	<i>4</i>	
Co-lead manager	140	230	19	3	392
	<i>127</i>	<i>220</i>	<i>37</i>	<i>8</i>	
Unaffiliated	112	227	50	15	404
	<i>131</i>	<i>226</i>	<i>38</i>	<i>8</i>	
Total	321	553	94	19	987
Pearson Chi ² =	32.876		Asymp. Sig. (2-sided)	0.000	

Recommendations in year 2000					
	1	2	3	4+5	Total
Lead manager	201	197	27	1	426
	<i>192</i>	<i>196</i>	<i>31</i>	<i>7</i>	
Co-lead manager	350	382	35	14	781
	<i>352</i>	<i>360</i>	<i>57</i>	<i>13</i>	
Unaffiliated	598	595	123	27	1,343
	<i>605</i>	<i>618</i>	<i>97</i>	<i>22</i>	
Total	1,149	1,174	185	42	2,550
Pearson Chi ² =	24.622		Asymp. Sig. (2-sided)	0.000	

Recommendations in year 2001					
	1	2	3	4+5	Total
Lead manager	15	22	8	2	47
	<i>15</i>	<i>24</i>	<i>8</i>	<i>1</i>	
Co-lead manager	40	50	16	4	110
	<i>34</i>	<i>55</i>	<i>18</i>	<i>3</i>	
Unaffiliated	56	107	34	4	201
	<i>62</i>	<i>101</i>	<i>33</i>	<i>6</i>	
Total	111	179	58	10	358
Pearson Chi ² =	4.016		Asymp. Sig. (2-sided)	0.675	

Table 4 Descriptive Statistics of the Variables in the Study.

of Risk Factors = Number of Risk Factors mentioned in IPO prospectus; **# of Shares Offered without Green Shoe (units)** = Number of Shares Offered not including the number of shares for the green shoe; **# of Total Shares after Offering without Green Shoe (units)** = Number of Shares placed and paid for after offering not including the number of shares for the green shoe; **# Shares Offered without Green Shoe (percentage)** = Number of Shares Offered not including the number of shares for the green shoe as percentage of the number of shares after offering; **Largest Single Shareholder (percentage)** = Number of shares held by other people than owners as percentage of the total number of shares outstanding after the offering; **Net Sales (million\$)** = Net sales reported in the IPO prospectus in million USD; **ln Net Sales per Employee** = log of a firm's Sales divided by its Number of Employees; **OCF / Current Liabilities** = A firm's operating cash flow divided by its current liabilities as mentioned in the IPO prospectus; **Offer-to-Book ratio** = Firm value at offer price scaled by Book value of equity; **Shares Offered / Total Shares (excl. Green Shoe)** = Number of Shares Offered without the Green Shoe as percentage of the Shares Outstanding after the offering without the Green Shoe; **Underwriter Fee (\$)** = Underwriter Fee in USD mentioned in the offering prospectus.

	Mean	Median	Minimum	Maximum	Standard Deviation	Number
# of Risk Factors (units)	31.442	31.000	11.000	50.000	6.433	328
Shares Offered without Green Shoe (percentage)	0.192	0.180	0.054	0.488	0.073	328
# of Shares offered without Green Shoe (units)	5,984,212	4,500,000	2,000,000	173,913,000	10,412,713	328
# of Total Shares after Offering without Green Shoe (units)	37,860,636	25,239,726	5,452,858	973,913,000	66,822,244	328
Largest single Shareholder (percentage)	0.285	0.219	0.060	0.902	0.180	328
Net Sales (million\$)	18.311	6.901	0.000	706.466	56.877	318
ln Net Sales per Employee	0.068	0.053	0.004	0.510	0.065	318
Operating Cash Flow / Current Liabilities	-1.458	-0.963	-13.451	1.135	1.710	328
Offer-to-Book ratio	498.020	31.469	-8,396.597	164,539.510	9,105.107	328
Underwriter Fee (\$)	5,750,433	4,480,000	1,050,000	75,478,242	5,468,048	328

Table 5 T-tests of Recommendations by one Type of Investment Bank compared with another Type of Investment Bank during different periods of time after IPO.

Lead Manager = recommendations from Lead Managers; **Co-Lead Manager** = recommendations from Co-Lead Managers; **Unaffiliated** = recommendations from Unaffiliated Investment Banks. **High Prestige** = recommendations from a High Prestigious Investment Bank; **Low Prestige** = recommendations from a Low Prestigious Investment Bank.

Panel A:

	1-3 months after IPO				4-6 months after IPO				7-12 months after IPO			
	mean	#	diff.	t-value	mean	#	diff.	t-value	mean	#	diff.	t-value
Lead manager	1.750	284	0.144 ***	3.285	1.568	125	-0.086	-1.236	1.640	261	-0.108 **	-1.998
Co-lead manager	1.606	554			1.654	217			1.748	528		
Lead manager	1.750	284	-0.103	-1.579	1.568	125	-0.325 ***	-4.219	1.640	261	-0.080	-1.633
Unaffiliated	1.853	177			1.893	374			1.720	1,434		
Co-lead manager	1.606	554	-0.247 ***	-4.725	1.654	217	-0.239 ***	-3.826	1.748	528	0.028	0.759
Unaffiliated	1.853	177			1.893	374			1.720	1,434		
High Prestige	1.740	524	0.105 ***	2.673	1.685	260	-0.125 **	-2.220	1.695	781	-0.034	-1.037
Low Prestige	1.635	491			1.809	456			1.729	1,442		

Panel B: Without Goldman Sachs

	1-3 months after IPO				4-6 months after IPO				7-12 months after IPO			
	mean	#	diff.	t-value	mean	#	diff.	t-value	mean	#	diff.	t-value
Lead manager	1.652	247	0.044	1.029	1.531	113	-0.123 *	-1.736	1.615	226	-0.133 **	-2.364
Co-lead manager	1.608	553			1.654	217			1.748	528		
Lead manager	1.652	247	-0.195 ***	-3.155	1.531	113	-0.356 ***	-4.497	1.615	226	-0.102 **	-1.985
Unaffiliated	1.847	176			1.887	371			1.717	1423		
Co-lead manager	1.608	553	-0.239 ***	-4.576	1.654	217	-0.232 ***	-3.749	1.748	528	0.031	0.818
Unaffiliated	1.847	176			1.887	371			1.717	1423		
High Prestige	1.689	485	0.053	1.391	1.661	245	-0.148 ***	-2.613	1.686	735	-0.043	-1.313
Low Prestige	1.635	491			1.809	456			1.729	1442		

Panel C (analyst recommendations within twelve months after IPO):

	Recommendations in 1999				Recommendations in 2000				Recommendations in 2001			
	mean	#	diff.	t-value	mean	#	diff.	t-value	mean	#	diff.	t-value
Lead manager	1.780	191	0.073	1.335	1.596	426	-0.036	-0.937	1.936	47	0.082	0.582
Co-lead manager	1.707	392			1.633	781			1.855	110		
Lead manager	1.780	191	0.073	1.335	1.596	426	-0.095**	-2.396	1.936	47	0.006	0.048
Unaffiliated	1.926	404			1.691	1,343			1.930	201		
Co-lead manager	1.707	392	-0.219***	-4.546	1.633	781	-0.058*	-1.833	1.855	110	-0.076	-0.850
Unaffiliated	1.926	404			1.691	1,343			1.930	201		
High Prestige	1.806	443	-0.008	-0.192	1.639	966	-0.030	-1.051	1.878	131	-0.047	-0.566
Low Prestige	1.814	544			1.669	1,584			1.925	227		

Table 6: Matched pair analysis. The recommendations are matched with respect to the date of the recommendation.

Differences in Recommendations for the same firm published by different investment banks around the same date (in an interval of 7 calendar days before and after the date of the publication of the recommendation). **Lead Manager** = recommendations from Lead Managers; **Co-Lead Manager** = recommendations from Co-Lead Managers; **Unaffiliated** = recommendations from Unaffiliated Investment Banks; **Low Prestige** = recommendations from Low Prestigious Investment Banks; **High Prestige** = recommendations from High Prestigious Investment Banks.

Panel A: All observations

	1-3 months after IPO				4-6 months after IPO				7-12 months after IPO			
	mean	#	diff.	t-value	mean	#	diff.	t-value	mean	#	diff.	t-value
Lead manager	1.809	423	0.196***	5.115	1.667	27	0.037	0.238	1.811	106	0.009	0.107
Co-lead manager	1.612				1.630				1.802			
Lead manager	1.811	53	-0.038	-0.299	1.600	55	-0.364***	-2.729	1.641	192	0.042	0.666
Unaffiliated	1.849				1.964				1.599			
Co-lead manager	1.600	100	-0.330***	-4.307	1.648	71	-0.380***	-3.144	1.685	485	-0.027	-0.612
Unaffiliated	1.930				2.028				1.711			
High Prestige	1.633	425	-0.111***	-2.787	1.903	124	0.105	1.146	1.691	821	0.037	1.151
Low Prestige	1.744				1.798				1.654			

Panel B: Without Goldman Sachs

	1-3 months after IPO				4-6 months after IPO				7-12 months after IPO			
	mean	#	diff.	t-value	mean	#	diff.	t-value	mean	#	diff.	t-value
Lead manager	1.697	353	0.085**	2.262	1.720	25	0.080	0.492	1.802	91	0.000	0.000
Co-lead manager	1.612				1.640				1.802			
Lead manager	1.628	43	-0.256**	-2.124	1.574	47	-0.255*	-2.009	1.642	162	0.074	1.115
Unaffiliated	1.884				1.830				1.568			
Co-lead manager	1.615	96	-0.292***	-3.796	1.647	68	-0.338***	-2.785	1.686	484	-0.027	-0.612
Unaffiliated	1.906				1.985				1.713			
High Prestige	1.643	387	-0.047	-1.188	1.886	114	0.079	0.853	1.693	787	0.048	1.506
Low Prestige	1.690				1.807				1.644			

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

Table 7 OLS Regressions with Analyst Recommendations as Dependent Variable.

Panel A: All observations

	1-3 months	4-6 months	7-12 months
Largest Single Shareholder	-0.393 *** -2.773	0.357 * 1.823	-0.054 -0.452
Ln Number of Risk Factors	-0.093 -0.881	-0.017 -0.110	0.144 1.542
Ln Net Sales per Employee	-0.094 -0.234	0.510 0.695	-0.348 -0.960
OCF / Current Liabilities	0.010 0.300	-0.087 * -1.791	0.060 ** 2.196
Ln Net Sales	0.039 1.002	0.062 1.152	0.059 * 1.926
Offered Shares / Total Shares	-1.364 *** -4.503	-1.283 *** -2.912	-0.086 -0.332
NASDAQ index	-0.122 *** -4.566	-0.163 *** -4.182	-0.149 *** -7.145
Dummy Co-lead Manager	-0.166 *** -3.717	0.055 0.694	0.107 * 1.955
Dummy Unaffiliated Investment Bank	0.065 1.105	0.278 *** 3.769	0.094 * 1.936
Constant	2.143 2.806	1.152 1.115	0.689 1.121
# of Observations	1,009	710	2,207
R-squared	0.079	0.083	0.033

Panel B: Without Goldman Sachs

	1-3 months	4-6 months	7-12 months
Largest Single Shareholder	-0.398 *** -2.888	0.348 * 1.779	-0.064 -0.535
Ln Number of Risk Factors	-0.095 -0.914	-0.006 -0.037	0.165 * 1.749
Ln Net Sales per Employee	-0.223 -0.573	0.547 0.751	-0.399 -1.099
OCF / Current Liabilities	0.008 0.257	-0.089 * -1.824	0.062 ** 2.233
Ln Net Sales	0.042 1.076	0.059 1.096	0.060 * 1.935
Offered Shares / Total Shares	-1.070 *** -3.632	-1.199 *** -2.735	-0.053 -0.203
NASDAQ index	-0.125 *** -4.782	-0.170 *** -4.347	-0.145 *** -6.898
Dummy Co-lead Manager	-0.076 * -1.681	0.079 0.967	0.113 ** 1.981
Dummy Unaffiliated Investment Bank	0.146 ** 2.511	0.294 *** 3.848	0.098 * 1.903
Constant	1.981 *** 2.643	1.152 1.113	0.579 0.932
# of Observations	970	695	2,161
R-squared	0.075	0.086	0.033

Panel C: All observations

	1-3 months	4-6 months	7-12 months
Largest Single Shareholder	-0.394 ***	0.336 *	-0.058
	-2.752	1.704	-0.485
Ln Number of Risk Factors	-0.101	0.008	0.142
	-0.939	0.051	1.525
Ln Net Sales per Employee	-0.013	0.378	-0.391
	-0.032	0.511	-1.079
OCF / Current Liabilities	0.003	-0.102 **	0.060 **
	0.079	-2.075	2.199
Ln Net Sales	0.045	0.064	0.061 **
	1.129	1.191	1.972
Offered Shares / Total Shares	-1.280 ***	-1.406 ***	-0.107
	-4.123	-3.151	-0.415
NASDAQ index	-0.120 ***	-0.181 ***	-0.148 ***
	-4.404	-4.650	-7.113
Dummy High Prestigious Broker	0.045	-0.147 ***	-0.045
	1.141	-2.626	-1.389
Constant	1.933 **	1.326	0.774
	2.505	1.274	1.260
# of Observations	1,009	710	2,207
R-squared	0.057	0.064	0.032

Panel D: Without Goldman Sachs

	1-3 months	4-6 months	7-12 months
Largest Single Shareholder	-0.399 ***	0.328 *	-0.069
	-2.862	1.667	-0.573
Ln Number of Risk Factors	-0.104	0.021	0.163 *
	-0.991	0.138	1.732
Ln Net Sales per Employee	-0.182	0.437	-0.440
	-0.464	0.596	-1.213
OCF / Current Liabilities	-0.003	-0.103 **	0.063 **
	-0.099	-2.088	2.268
Ln Net Sales	0.052	0.067	0.063 **
	1.338	1.247	2.033
Offered Shares / Total Shares	-1.074 ***	-1.344 ***	-0.081
	-3.581	-3.033	-0.311
NASDAQ index	-0.128 ***	-0.191 ***	-0.145 ***
	-4.855	-4.881	-6.901
Dummy High Prestigious Broker	-0.002	-0.164 ***	-0.049
	-0.051	-2.919	-1.495
Constant	1.809 **	1.246	0.648
	2.394	1.197	1.042
# of Observations	970	695	2,161
R-squared	0.056	0.069	0.032

OLS Regressions with Analyst Recommendations as Dependent Variable for 328 internet IPOs that went public during the years 1997-2000 on the NASDAQ stock exchange. Because we use dummies for both the co-lead manager and the unaffiliated investment bank, the coefficients of both types of investment banks indicate the direction of the relation with the third type of investment bank, the lead manager.

Largest Single Shareholder = Number of shares held by other people than owners as percentage of the total number of shares outstanding after the offering; **Number of Risk Factors** = Number of risk factors mentioned in IPO prospectus; **Ln Net Sales per Employee** = Log of a firm's Sales divided by its Number of Employees; **OCF / Current Liabilities** = A firm's operating cash flow divided by its current liabilities as mentioned in the IPO prospectus; **Ln Net Sales (million\$)** = Log of a firm's net sales reported in the IPO prospectus in million USD; **Shares Offered / Total Shares (excl. Green Shoe)** = Number of Shares Offered without the Green Shoe as percentage of the Shares Outstanding after the offering without the Green Shoe; **NASDAQ index** = Percentage change of the NASDAQ index around the date that the recommendation is published; **Dummy Co-lead Manager** = Dummy with a value of 1 for a Co-Lead Manager, otherwise 0; **Dummy Unaffiliated Investment Bank** = Dummy with a value of 1 for an Unaffiliated Investment Bank, otherwise 0; **Dummy High Prestigious Broker** = Dummy with a value of 1 for a High Prestigious Investment Bank, otherwise 0.