The Role of the Media in Initial Public Offerings*

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March, 2008

We document that a simple count of news articles mentioning a company's name during the filing period before an initial public offering (IPO) is significantly related to both the price revision and the initial return for that company's stock. Conditioned on a positive offer price revision from the midpoint of the initial filing range, one extra piece of media coverage during the filing period for an IPO is associated with about two percentage points greater underpricing. The fact that price revisions during the offering period are significantly related to media coverage indicates that underwriters are aware of any information that media coverage either provides or proxies for. Yet media coverage is still significantly related to initial returns, but only when the price revision is positive. Thus it appears that underwriters fully adjust for media coverage when the offer price is revised downwards but only partially adjust when the offer price is revised upwards. We find that the positive relationship between media coverage and underpricing is stronger when ex ante uncertainty is greater, and fail to find any relationship between positive media coverage and IPO firms' long run under-performance. We argue that media attention - a consensus of media's opinion on the stock - is a good proxy for investor demand. Our findings are thus consistent with information production theories of underpricing.

* We would like to thank Sugato Bhattacharya, Henry Blodget, Francesca Cornelli, Lynn Cowan, Sudipto Dasgupta, John Fitzgibbon, Fangjian Fu, Paul Gao, Kai Li, Alexander Ljungqvist, Joe Nocera, Jay Ritter, Sabatino (Dino) Silveri, Xuan Tian and seminar participants at Southwestern University of Finance and Economics, Hong Kong University of Science and Technology, Peking University, Tsinghua University, National University of Singapore, Singapore Management University, National Technological University of Singapore, University of Notre Dame, Chinese University of Hong Kong, , City University of Hong Kong, the 2007 China International Conference in Finance (Chengdu, China), the Second International Conference on Asia-Pacific Financial Markets (Seoul, Korea). All errors are, of course, our own.

1. Introduction

Information flows are a key factor driving asset pricing patterns. Stock prices are based on forecasts of future performance, and optimal forecasts require weighing both hard and soft information about the company, the industry and the overall economy. Given the many factors that must be weighed, it is difficult to find a quantifiable measure of the market's consensus at any one time, or of how that consensus changes over time. One possibility, however, is media attention, since financial journalists are professionals that attempt to reflect and report (and perhaps shape) this consensus. Thus it is not surprising that so much attention recently has been given to the role of the media and its affect on financial markets[1]. This paper seeks to add to this growing literature by examining the role of media coverage in the most uncertain cases, when companies are still largely unknown and thus a consensus has only begun to form – for initial public offerings or IPOs.

A quantifiable measure of information acquisition has many potential uses in the study of IPOs. Under the book building method for initial public offerings (IPOs), several key aspects of the process are unobservable. The underwriter markets the offering to a select group of investors through road shows and then collects non-binding indications of interest from those investors, before setting the final offer price. Book building models beginning with Benveniste and Spindt (1989) and Benveniste and Wilhelm (1990) argue that the underwriter's control of both price and allocations may be used to induce investors to reveal their private information. This was extended by Sherman and Titman (2002) and Sherman (2000), who showed that the process could also be used to induce investors to first produce costly private information[2]. These explanations focus on asymmetric information and the difficulties with establishing an appropriate value for new, highly speculative shares in an untried company.

The ideal way to test information acquisition models is to directly investigate the book-building bid and allocation data. Unfortunately, the data are not publicly available. Outsiders are not able to observe the reports of investors[3] and in general cannot even observe how the final shares are allocated[4]. Thus it is difficult to test the full implications of various book building models.

In this study, we test information acquisition models using a new measure: media attention before the IPO day. Central to information acquisition models is the idea that,

[1] See, for example, Bharracharya, Galpin, Ray and Yu (2007), Cook, Kieschnick and Van Ness (2006), Demers and Lewellen (2003), Engelberg (2007), Fang and Peress (2008), Schmitz (2007), Tetlock (2007), and Tetlock, Saar-Tsechansky and Macskassy (2007).
[2] See Ljungqvist (2004) for a survey of IPO underpricing.
[3] Key exceptions are Cornelli and Goldreich (2001 and 2003) and Jenkinson and Jones (2004), which use proprietary datasets to observe actual orders and allocations for samples of European bookbuilding IPOs.
[4] An exception to this is Aggarwal (2003), who found that relatively little first day trading volume for US IPOs is due to flipping.

by going through the book building process, issuers are attempting to attract the attention of "the market". Issuers ultimately hope to convince investors to believe in and follow the stock, but it is not generally possible to purchase the *approval* of the market. What may be possible, however, is to purchase the market's *attention*, which is a necessary prerequisite for obtaining approval. Expected underpricing, as part of a well structured process, may induce investors to come to the road show, devote time to getting to know this particular company, and seriously consider the offering.

One indicator of whether the issuer will be able to attract the attention of the market is whether it can attract the attention of the media. Media attention, like analyst attention, is ultimately driven by the current and expected future attention of investors, customers and the market in general. Both analysts and the media want to cover companies for which there exists demand for such coverage (reporters want to write about companies that are 'newsworthy'). Of course, both analysts and the media use their judgment in forecasting what will attract such demand in the future. Moreover, both help to shape such demand through their choices, in part through economies of scale in information production, lowering the marginal cost of information acquisition for the general public.

When an investment bank sets the offer price for a book building IPO, it cannot observe analyst attention (at least not in the US, due to restrictions on the initiation of analyst coverage). Nevertheless, the investment bank can observe two other indications of likely market attention: direct feedback from investors during the book building process, and the attention that the company has so far managed to attract from the media. Our measure of media attention is the number of articles mentioning the company from the day after the filing date to the day before the offering date. This measure, like feedback from investors during book building, is observable by the time the offer price is set but not when the initial filing range is chosen.

Both investor demand during the road show and the number of articles mentioning the company are the aggregations of the opinions of many individuals, each of whom is trying to forecast in part what demand will be for the offering, and for the shares on the aftermarket. Moreover, there appears to be much 'leakage' or discussion among various market participants, mainly through conduits such as analysts and reporters. Thus we would expect the consensus opinions of the two groups to be highly correlated, making media coverage a good proxy for the unobservable (by outsiders) direct feedback from investors. Making use of this proxy allows us to test for predictions of the information production model, for example regarding measures of uncertainty.

To obtain the media coverage variable, we search the Factiva database by IPO company names from the filing date to the issue date. We then count the number of articles reported in the major business media resources prior to the offering dates. We find that media coverage is significantly related to offer price revisions (from the midpoint of the initial filing range to the final offer price). Offer prices are revised by a greater amount in either direction (i.e. both positive and negative price revisions end up being more extreme) when media attention is greater.

Media, as a proxy for demand, is also significantly and asymmetrically related to IPO underpricing. When the price revision is positive, more media coverage relates to larger underpricing, but there is no relation when the price revision is negative. This result is both statistically and economically significant, with one extra piece of media coverage leading to a two percentage point increase in underpricing when the price revision is positive. Combining our results on price revisions and initial returns, it appears that underwriters fully adjust for media attention when revising the offer price downwards but only partially adjust for media attention when revising the price upwards.

One natural question is whether media coverage captures something else, such as investor sentiment. We test for predictions of information production theories that do not come from either Ljungqvist, Nanda and Singh's (2006) investor sentiment model or Loughran and Ritter's (2004) prospect theory model. The positive relation between media coverage and underpricing is stronger when ex-ante uncertainty is greater, which is consistent with the information production theory. Moreover, we show that media coverage is not related to IPOs' long run underperformance, ruling out the investor sentiment explanation.

Past research beginning with Mitchell and Mulherin (1994) and extended by Tetlock (2007) and Tetlock, Saar-Tsechansky and Macskassy (2007) has examined the link between media attention and stock market prices. Tetlock (2007) finds that negative language in a popular Wall Street Journal column predicts temporary pressure on overall stock prices followed by a reversal, consistent with the column's tone leading to sentiment investor trading in the market. However Tetlock, Saar-Tsechansky and Macskassy (2007) analyse firm-specific news stories and find that the tone of those stories captures hard-to-quantify soft information about a firm's fundamental value, which is quickly incorporated into stock prices. Consistent with the latter paper, we examine firm-specific media coverage and find that it predicts aftermarket prices for IPOs.

Bhattacharya, Galpin, Ray and Yu (2007) examine aftermarket trading prices for IPOs during the internet bubble, concluding that media coverage cannot explain the difference in risk-adjusted aftermarket returns for internet and non-internet IPOs during this period. Cook, Kieschnick and Van Ness (CKV, 2006) were the first to examine media coverage before IPOs, linking that coverage with underpricing. They assume that media coverage is a proxy for the underwriter's marketing behavior. We offer both a new interpretation of media coverage and new evidence on its relationship with IPO pricing and initial returns.

We also add to the overall understanding of book building, a surprisingly complex process that has become dominant around the world[5]. Our findings complement those of Hanley and Hoberg (2007) regarding the substantial asymmetries in the price setting process. Adjustments made by the underwriter in response to reports from investors appear to be complicated and path-dependent, and this process deserves additional study.

[5] Jagannathan and Sherman (2006) show that the book building method was rare outside North America in the early 1990s but was the most common single method by the end of that decade.

In summary, using a new measure for investors' interest in IPOs, we provide supporting evidence for information production models of underpricing. The rest of the paper is organized as follows. Section 2 discusses the role of media attention, while Section 3 introduces the data set and the variables used in the sample. Section 4 explores the role of media coverage in price revisions, while Section 5 establishes the relation between the media coverage and underpricing. Section 6 investigates possible alternative explanations for this relation and Section 7 concludes.

2. The role of media attention

With both investor feedback during the road show and media attention, what we have are many signals from many different people, reflecting each person's estimate of demand for the shares. If they expect demand to be high, then investors will want to buy the stock and reporters will want to write about it (and later, analysts will want to cover it). There will, in general, be a strong correlation between the two sets of opinions, making media attention a good proxy for investor demand.

To understand how to interpret the role of media coverage in the IPO process, we should first consider the incentives of journalists when writing about a company. Media sources compete to attract readers (and hence advertising revenues). Thus their goal is not to be "fair" about covering all companies equally, regardless of demand from their readership. They try to identify stories that will be of interest to their readers, which often includes companies that are doing better or worse than expected, or companies that, in the judgment of the reporter, are likely to outperform or underperform in the future. Editors expect their reporters to cover the stocks that later end up to have attracted attention, and thus reporters are expected to be able to not just passively reflect past interest, but to predict future demand. The better they are at that, the happier their editors will be.

They use their own judgment in these forecasts, but they also talk to many others on Wall Street. According to John Fitzgibbon, founder of the IPO investment newsletter the IPO SCOOP, there are "no secrets on Wall Street", because "Wall Street is just one big gossip"[6]. Mr. Fitzgibbon rates IPOs before they begin to trade, first getting the opinions of many different people in the securities industry including investors that may have attended the road show as well as other investors, traders, analysts, rating services, etc. There are other IPO analysts that also rate IPOs, including Francis Gaskins, Ben Holmes, and Scott Sweet.

Lynn Cowan, who writes the Wall Street Journal IPO Outlook column, reviews every S-1 filing and forms her own opinion, but then she checks the opinions of all four of these IPO analysts, to see if they agree. Roughly 80% of the time (by her estimate[7]), there is general agreement between these four analysts and herself. When there is not, she tries to

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[6] Telephone interview with Ann Sherman, Thursday Sept. 27, 2007.
[7] Telephone interview with Ann Sherman, August 3, 2007.

find out why. Ms. Cowan also talks to many other sources. She then gives the most coverage to IPOs that she or others expect to be the most interesting.

In other words, there appears to be leakage in all directions. Once a reporter decides to write an article on a company, she generally will get opinions from various investors, and thus the final article will convey the opinions of both the journalist and some investors. Once the article is published, it may draw the attention of even more investors to the company. And both media coverage and investor demand are likely to be influenced by ratings from IPO analysts, who in turn are in part reflecting investor opinions. After all, forecasting the future of any company is difficult and subjective, and IPOs are young, speculative companies with no price history. Investors, journalists and analysts all eventually form their own opinions, but they naturally take into account the opinions and forecasts of others. By looking at overall media coverage, we can get an idea of the consensus that has developed among investors regarding the offering. Thus, media attention is a good proxy for the feedback from investors during the road show.

This brings up the question of whether the underwriter could not, much more cheaply, skip the road shows and the rewards for regular investors, and simply monitor media attention for a few weeks before setting the price. First, this would be risky, since there is no way to guarantee that the media will discover every company that deserves attention. Sherman (2005) shows that a key advantage of book building, relative to other issue methods, is that the underwriter coordinates the entry of investors. The underwriter can essentially bribe investors (via underpricing) to come to the road show and seriously consider the offering, thus guaranteeing that the offer is not overlooked. Offerings may still fail, of course, because investors may consider the offering and decide against it, but at least they will have listened to the managers' pitch and given the offering some thought.

This coordination also helps to solve the problem that investors prefer to evaluate stocks that at least a reasonable number of other investors will also become familiar with. Even if an investor identifies an undervalued stock, trying to take advantage of that undervaluation is risky if the stock has no liquidity. Buying a sufficiently large stake in an illiquid, overlooked stock is likely to drive the price up, and the investor may then have to wait a very long time for the market to recognize the misvaluation, since others are not monitoring the stock. The underwriter may be able to overcome this coordination problem, reducing the chance that a stock will end up in "the Orphanage"[8], by giving many investors an incentive to become familiar with the stock during the IPO. But a

[8] An Orphan stock is one that does not trade actively, has no analyst coverage and has no following among institutional investors. Such a company continues to bear all of the ongoing costs of being public (costs that are even higher since the passage of Sarbanes-Oxley) but has few of the benefits – it cannot do a follow-on offering or use its stock as 'currency' for an acquisition, its stock price is not a good benchmark for various stakeholders that want to monitor the health of the company, and corporate insiders cannot exit by selling their shares at a reasonable price. A company that is likely to end up in the Orphanage after going public is generally better off staying private. See Rau, Mola and Khorana (2007) on the effects of the loss of analyst coverage.

company that has not overcome this coordination problem between investors might easily be overlooked by journalists as well, and issuers are unlikely to want to run such a risk[9].

More importantly, although issuers may be tempted to try to save money by relying on media feedback alone to price their shares, they still ultimately need to attract investors. Media attention, like analyst coverage, is a means to an end, where the end goal is to have serious long term investors buy, hold and follow the stock[10]. Institutional investors generally have a fiduciary obligation to examine stocks for themselves, beyond simply seeing the name mentioned in the Wall Street Journal. Having access to media and analyst reports substantially lowers the cost to investors of doing their own due diligence, but in the end, outside attention is no substitute for actual investor attention.

Our interpretation of media coverage differs from that of Cook, Kieschnick and Van Ness (CKV, 2006), who assume that the amount of media coverage is controlled by the underwriter and proxies for underwriter effort marketing the offering. CKV argue that, for a new, formerly private company, the issuer and underwriter are the only sources for information, and hence they interpret companies that do not receive media attention as those for which the underwriter chose not to provide such information, perhaps because the issuer didn't pay a high enough fee.

This interpretation would appear to violate quiet period regulations, however, which state that all communication is through the Prospectus. Managers play a key role in deciding what information is put into the Prospectus and are unlikely to choose to leave out information, thus jeopardizing their own IPO, simply because they have chosen not to pay the underwriter an extra-large fee. Hanley and Hoberg (2007) find that managers play an integral role in the book building process, particularly in choosing the level of management disclosure. Moreover, it seems unlikely that underwriters would fail to market any offering to the best of their abilities, because the success of each offering they handle directly affects their reputation. Last, interpreting media coverage as a proxy for the underwriter's marketing effort assumes that journalists are passive, following the (possibly illegal) instructions of investment bankers without using their own judgment, even though their choices will affect their own careers.

In short, we believe it is reasonable to assume that media coverage is a good proxy for investor demand and is thus positively related to private information revealed during the road show.

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9 In the words of Martin Manley, Chairman and CEO of Alibris, "Taking a company public is like getting a heart transplant: you only do it once and you need it to be done very, very well. It is not a decision driven by price." Alibris held an IPO auction through WR Hambrecht in May, 2004, but cancelled it after observing the bids. See Mr. Manley's blog, Jam Side Down, at http://www.martinmanley.com/ipo_diaries/.

10 Advantages that companies may hope to gain from having a long term following among investors and thus a liquid aftermarket include: ability to do future equity and debt offerings; allowing insiders to sell after the lockup expiration; use the shares as a 'currency' for acquisitions; and giving employees, customers and potential business partners a reasonable benchmark with which to monitor the health of the company

3. The data

3.1 Sample

We begin with all IPOs completed between January 1980 and December 2004 in the US, as reported in Thomson Financial's Securities Data Company (SDC) database. We exclude unit offers, closed-end funds, real estate investment trusts (REITs), American Depositary Receipts (ADRs), limited partnerships and firms with offer prices below $5. We further require the firms to be in the Center for Research in Security Prices (CRSP) and Compustat datasets in the issue year.

To determine the first day return, we use the first available closing price from CRSP if it is within 14 days of the offer date. Whenever the CRSP closing price is not available, we use the stock price one day after the offer, two day after the offer or one week after the offer, reported in SDC, whichever one is available. Our post IPO shares outstanding is from CRSP, or SDC if the CRSP data item is unavailable. Pre-IPO assets is from SDC, or Compustat (item 6) if the SDC data item is missing. Other variables such as share overhang, price revision percentage, offer size, etc. are from SDC. Rank of lead underwriter and internet and technology firm indicators are from Jay Ritter's website. The variable definitions are given in the Appendix.

The first column of Table 1 reports the summary statistics for the entire sample. We have a total of 3,627 completed IPOs. The sample size is slightly smaller than in other studies because we restrict the sample to be in the intersection of the SDC, CRSP and Compustat databases. The average first day return is around 20%. 41% of the sample firms revise their offer prices upwards from the midpoint of the initial filing range. The average price revision is 7.36% for an upward revision and -6.77% for a downward revision. On average, the IPO firms are 13 years old and there are 77 days from the filing day to the issue day. Technology firms and internet firms accounts for 38% of the sample and global offers account for 16%. 44% of the IPOs are backed by venture capitalists.

3.2 Construction of media coverage variable

We use Factiva to quantify the amount of media coverage. We restrict media sources to Dow Jones Newswire, Major News and Business Publications (U.S. and Canada), Press Release Wires (Business Wire, Business Wire Regulatory Disclosure, Canada Newswire and PR Newswire U.S.) and Reuters Newswires (Reuters News). We use the full company names as the search criteria but allow for common abbreviations such as “Co.”, “Corp.”, “Inc.”, “Ltd.” and “Grp.”. For each IPO company, the search window is from one day after the filing date to one day before the offering date. We count the number of articles from these media sources covering the IPO company during the window. Since the length of the window varies across firm, we standardize the media coverage measure into a per month measure and use it in all of our empirical analyses. For a robustness check, we construct another media coverage measure using the one month window before the issue day.

We do not attempt to categorize coverage as "good" or "bad". Such a categorization is done in Bhattacharya, Galpin, Ray and Yu (2007), which uses a human classification approach that would be too time-consuming for our sample size. Cook, Kieschnick and Van Ness (2006) attempt such a classification of “good” vs. “bad” coverage for a random subsample of 5,452 of their articles on IPOs, finding that “over 99% of these articles were non-negative, primarily descriptive stories”. Although journalists exercise judgment in deciding which companies to cover, their role generally is to report information and not to editorialize. Thus, we feel that the primary information for our purposes is the mere fact that a reporter felt that the company was newsworthy, not whether the tone of the article was positive or negative. In the end we get strong, robust results based on a simple, objective count of the number of articles, which seems to indicate that we have captured relevant information through our measure of media attention, in addition to the information already reflected in the price revision.

In Table 1 columns 2 to 4, we report sample summary statistic across different media coverage (CITES) groups. Each year we group the IPO firms into CITES tercile. Then, we pool all the years together for each CITES tercile and report sample means for each pooled tercile. Table 1 shows that first day return increases with media coverage, from around 15% for the low coverage group to 26% for the high coverage group. More media coverage is also associated with older firms, firms with larger pre IPO assets, larger offering size, greater upward price revision and more prestigious underwriters.

In Table 2, we report summary statistic for CITES. The mean is 2.9. Positive price revisions are associated with more CITES (3.4), while negative price revisions are associated with fewer CITES (2.4). The maximum CITES is 163.9, which is not an integer because of the standardization, and minimum CITES is 0. In all of our analyses from now on, we winsorize the CITES at the 99th percentile. About 17% of the observations have 0 hits, therefore the median is slightly lower than the mean.

4. Media coverage and price revision

If media coverage is a proxy for investor demand, then it should be positively related to the private information reported to the underwriter by investors. Hence all of the predictions of book building models regarding the relationship between reported investor demand and both price revision and underpricing will also lead to predictions regarding media attention. To test this, we will examine the relationship between media coverage and price revisions in this section, and between media coverage and underpricing in the next section.

At the time that the underwriter sets the final offer price for an IPO, the media attention that we measure is fully observable. The underwriter can use this, as well as the reported demand of investors (which is observable by the underwriter at the time, even though it is unobservable to us), to revise the offer price from the initial price range that was set before either media attention or reported investor demand were observed[11]. The underwriter will revise the price upwards when investors' demand is high and revise the price downwards when investors demand is low. This gives us the following hypothesis:

(H1): Information production theories predict that more media coverage relates to greater upward price revision when investor demand is unexpectedly high, and more media coverage relates to greater downward price revision when investor demand is unexpectedly low.

It is worth mentioning that other theories, such as investor sentiment, may generate similar predictions. We will discuss these alternative theories in section 6. This portion of our paper extends the work of Lowry and Schwert (2004), which examines price revisions in detail but does not explore the effects of media attention.

Our base measure is media coverage (CITES). Assuming that the media will cover stocks for which there is new information of any type, either good or bad, then more media coverage may imply strong demand and thus more upward price revision, or it may imply that demand is surprisingly weak, leading to more downward price revision. Because our media coverage variable doesn't tell us whether the coverage reflects positive or negative news, we will need other proxies to measure this. We use a dummy variable that is equal to one when the recent industry return has been positive, and zero otherwise (PIND_D). Then the coefficient for CITES will measure the effect of negative news and the sum of coefficients for CITES and for the interaction of CITES with PIND_D will measure the effect of positive news. The logic behind this measure is that if the recent industry return is positive, it's more likely the firm will have strong demand revealed.

A better proxy would be a dummy that is equal to one when price revision is positive and zero when it is negative (PREV_D). However, this involves using a dummy variable based on the outcome of the dependent variable that we are trying to explain. We will report results using this dummy variable in Table 4, as a robustness check.

We control for many factors through the following explanatory variables: rank of lead underwriter (RANK), logarithm of pre IPO asset (log(Asset)), logarithm of firm age (log(1+AGE)), logarithm of offer size (log(OFFSIZE)), technology firm or internet firm dummy (TECHINT), a venture backed indicator (VENT), a global issue indicator (GLOBAL), retained shares as proportion of total share offering (OVERHANG), dummies for whether the stock will be listed on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX) or the Nasdaq National Market System (NMS), and three time period dummies(90_D, BUBBLE_D, POSTBUBBLE_D). The time

[11] Note, however, that firm characteristics are observable before even the initial price range is set. Thus, if media attention is fully determined by firm characteristics such as the size of the offering, then there should be no relation between media attention and either price revision or underpricing, since firm characteristics are known before the setting of the initial price range and thus are presumably fully incorporated into that initial price range.

period dummies are inspired by Loughran and Ritter (2004), and cover the periods 1990-1998, 1999-2000 and 2001-2004.

Finally, we also measure market return, using the same variables as those in Lowry and Schwert (2004): the equally-weighted return from the filing day to the issue day for a portfolio of either technology or non-technology firms that have had their IPOs in the last year, but not in the last month (IPORET_FI); the same return but only when it is negative (IPORET_FI-) to capture asymmetry; and the same return for the interval of 30 days before the beginning of the filing period (IPORET_prior30).

Since some IPOs are clustered in time, their returns may not be independent of each other (see Schultz, 2003), which may cause the standard errors of the coefficients to be under-estimated. We adjust all of the standard errors to address this clustering problem over time. We also adjust for clustering by industry, since there could be industry patterns in terms of the level of media attention that a particular IPO is likely to attract.

4.1 Regression results

We find that media attention is significantly related to price revisions. When recent industry returns have been positive, more media coverage is related to more upward price revision, while when recent industry returns have been negative, more media attention is related to more downward price revision.

Regarding the relation between price revision and general market returns, our results are similar to but more extreme than those of Lowry and Schwert. There is essentially no price revision when the market return is positive, but there is a statistically and economically significant decrease in the offer price when the market return is negative.

These results are consistent with the idea of deliberate partial adjustment to public information. Underwriters (or perhaps investors) are aware of market shifts and consider them important, as evidenced by the fact that the offer price is significantly decreased in response to a negative market return. However there is no price revision in response to a positive market return. Underwriters and/or investors appear to underadjust for increases in market prices. Price revision is also significantly positively related to market returns for the 30 days before the beginning of the filing period, which indicates that the initial price range has not fully accounted for recent market conditions at the time that the first filing occurs.

4.2 Robustness checks

We also perform a series of robustness tests. In the third regression of Table 3 we delete all of the observations which have zero media coverage to make sure that the results are not solely driven by the firms with no media coverage. In the fourth regression, instead of three sub-period dummies, we include one dummy for each year, to better control the time trend. The results show little change from these controls.

In the fifth regression, we exclude the 1980s. Factiva's coverage was relatively limited at the beginning of the 1980s, with some sources such as Forbes, Fortune and Business Week not added until the mid- to late-1980s. It appears that coverage was essentially complete by the beginning of the 1990s. We see from Regression 5 of Table 3, however, that excluding the 1980s has little effect on our main results.

In the sixth regression, we exclude the IPOs completed during the internet bubble period to make sure the results are not solely driven by the internet bubble. The coefficient for CITES*PIND_D decreases in magnitude, but is still statistically significant.

We are already clustering by industry to adjust for possible industry patterns in media coverage of companies, but we add two regressions to try to further adjust for this. In the seventh regression, we adjust for industry fixed effects. In regression 8, we replace our measure of CITES with abnormal CITES, which is CITES adjusted by average monthly media coverage over a 6-month period ending at 6 months before the IPO filing date We skip the 6 months just before the IPO filing date because of the possibility that information leakage about the issue may occur before the official filing. These adjustments have little effect on our results.

In the last regression of Table 3, we add more control variables, including: days between filing day and the issue day (FDAYS), number of IPOs during last month (LAGN), the average first day return for all the IPOs completed last month (LAGHOT), and the average underpricing for all the firms in the same industry that completed their IPOs between the sample firm's filing day and issue day (HOTIPO). To check for asymmetries, we also include only the positive values for average underpricing of recent IPOs in the same industry (HOTIPO+). The inclusion of these extra control variables has little effect on our main results.

Finally, we examine alternative predictors of market and firm-specific conditions for the offering. Besides our original indicator PIND_D, we consider three alternatives – positive offer price revision (PREV_D), positive recent IPO return indicator (PHOTIPO_D) and positive market return indicator (PMKT_D). Of these, the market return is the least offering-specific, reflecting overall conditions recently without being at all related to the particular IPO in question. Offer price revision is the measure that is most closely related to firm specific information revealed during the offering process. If our interpretation of media coverage as a proxy for direct feedback from investors is the correct interpretation, then both media attention and price revision are proxies for the same underlying information. PREV_D would thus be an ideal proxy to measure the sign of the signals. However, PREV_D is a function of the dependent variable, and thus the results of using it need to be interpreted with care.

Last, we consider extreme cases in which price revision and market return have the opposite signs. If the offer price is revised upwards and the market return is negative, the conditional probability that the offer-specific signal (i.e. investor feedback on this particular offering, rather than general market trends) is positive is the largest among all the situations we discussed so far. The opposite situation, when the price is revised downwards but the market return is positive, suggests a negative offer-specific signal. We examine these extreme cases using a dummy that is one when the price revision is positive and the market return is negative and zero when the price revision is negative and the market return is positive (CITES*EXT_D).

Table 4 gives the results of these alternative proxies in the price revision regressions. Regression 2 of Table 4 is the replicate of regression 2 of Table 3. Regression 3 examines the interaction of media coverage with other IPO firms' initial return dummy, while regression 4 interacts media with the market returns dummy. In both cases, the interaction term coefficient is positive and significant, although the coefficient is slightly smaller than for the base case regression. In regression 3, the basic media coverage variable is not significant, while for regression 4 it is significant and negative, as for the other regressions.

The first regression of Table 4 shows the relation between media coverage and price revision separately for positive and negative price revisions (although the results must be interpreted with care because we are sorting based on the sign of the dependent variable). We find that, when the price is revised upwards from the midpoint of the initial range, it is increased more if the offering has received more media attention. Similarly, if the price is revised downwards, the decrease is greater if the offer has attracted more attention from the media.

In regression 5 of Table 4, which considers only the extreme cases, the coefficient for the interaction term is positive and highly significant, although again it must be recalled that these extreme cases are chosen based in part on the sign of the price revision, which is our dependent variable. Still, this regression shows that when the price revision has the opposite sign from the recent market returns, the absolute price revision is significantly larger for each extra piece of news coverage.

These results are both statistically and economically significant. One extra piece of media coverage generally leads to an additional 1.9% increase ($\approx$ 4.025 – 2.124) in the offer price when the price revision is positive, or to a 2.1% greater decrease when the price revision is negative. Our measure of media attention does not distinguish between 'positive' and 'negative' coverage, but it appears that the media are more interested in newsworthy stories, whether those stories are related to an increase or to a decrease in expectations. Those issuers that attract the least attention also tend to be those whose final offer price is adjusted the least, relative to the midpoint of the initial range.

Our findings regarding negative price revisions might possibly be explained, at least in part, by Hanley and Hoberg's (2007) results. Hanley and Hoberg use a unique methodology to examine strategic disclosures by IPO issuers during the filing period, finding that prospectus revisions in response to investor feedback occur primarily when the offer price is revised downwards. Of eight measures of changes in the information in the Prospectus, five matter in a very strong way in explaining downward revisions – all five significant at the 1% level – but only one (Use of Proceeds) out of eight explains upward revisions, and this is only significant at the 10% level.

When the offer price is revised downwards, we find that more media coverage is related to a greater negative price revision. In talking to journalists about what determines their coverage, we have been told that when a stock is considered especially newsworthy, journalists are likely to report each and every time that the company files a revision. In addition, some journalists monitor all revisions that are filed, and report the most newsworthy filings for even marginally interesting companies. If companies that are getting negative feedback during the road show tend to file more revisions, as shown by Hanley and Hoberg (2007), and if those that are facing the most trouble are most likely to reveal some negative surprises in those revisions (changes that are most likely to be considered newsworthy), this might explain our results for downward price revisions and media coverage.

5. Media coverage and underpricing

In the previous section, we found that the relationship between media coverage and price revision is consistent with the information production theory. In this section, we will examine the relationship between media coverage and underpricing. Book building models predict that underpricing will be concentrated in high demand offerings, in order to make it easier to induce truthful revelation of the investors' private information even when that information will be used to raise the offer price for high demand offerings[12]. We therefore form the following hypothesis:

(H2): Information production theories predict that more media coverage relates to greater underpricing when investor demand is relatively high, while the relationship between media coverage and underpricing should be much weaker, if it exists at all, for low-demand offerings.

We define demand to be relatively high when the offer price is revised upwards from the midpoint of the initial range and low when the offer price is revised downwards. The logic is that the private information of investors will be reflected in price revisions. Sherman and Titman (2002) show that underpricing may occur even for low-demand offerings in extreme cases, when excessively high levels of underpricing are needed to induce sufficient information collection. Even in those cases, however, underpricing

[12] It may appear that more media attention should mean a lower cost of information and thus lower underpricing. The problem with this approach is with the idea that *high* media attention is a signal but that *low* media attention means that one has not received any information. All IPOs receive a media 'signal': companies that have failed to attract media attention have (ex post) received a 'bad' signal, since their inability to excite journalists indicates that they are also unlikely to excite investors.

should be substantially greater (and more closely tied to other factors) for high demand offerings.

This brings up the question of whether we need an additional proxy for investor demand, when we already have price revision. The value of price revision as a proxy for investor feedback was first pointed out by Hanley (1993), who noted that Benveniste and Spindt's (1989) model of book building predicts partial adjustment to private information. Although price revision is the best single proxy for the private information of investors, Sherman and Titman (2002) show that it is constrained in various ways, and thus that there is room for a second proxy to more fully capture the feedback from investors. Price revisions will not perfectly reflect investor demand because the underwriter is optimizing across many dimensions when choosing the offer price and investor allocations. The underwriter sets the offer price in part to minimize excess returns to the uninformed, given the restrictions of the one price rule[13].

Sherman and Titman (2002) showed that when expected underpricing increases, it becomes optimal for the underwriter to concentrate more and more of the expected total return in hot offerings, where demand from informed investors is so high that relatively few shares need to be allocated to the uninformed[14]. Thus, particularly when expected underpricing is high (for example, due to uncertainty), most of the underpricing may be loaded into the very hottest offerings, because a skewed allocation approach is more efficient. Price revisions and the reported information of investors will not be perfectly (certainly not strictly linearly) related, making a second proxy useful. We include price revision as well as media attention in all of our return regressions and find that both are significant in explaining underpricing.

5.1 Univariate results

We begin the analysis by showing some univariate results. Each year, we sort firms into five groups based on media coverage (CITES). For each CITES quartile, we pool all the years together and calculate the average first day return. Panel 1 of Figure 1 shows that with average media coverage increasing from 0.3 in the lowest quartile to 18.5 in the highest quartile, the first day return also increases monotonically from slightly above 15% to 25%, an increase of 2/3.

We repeat the above practice twice in two sub-samples: the sub-sample with positive price revisions and the one with negative price revisions. Consistent with previous studies, Panels B and C show that positive price revisions are associated with much larger first day returns than negative price revisions. The more interesting result for us is that there is no monotonic relation between initial return and media coverage in the negative

[13] Benveniste and Wilhelm (1990), Busaba and Benveniste (1997), Sherman (2000), Sherman and Titman (2002) and Chen and Wilhelm (2005) have all analyzed the effects of the one price rule – the requirement that all IPO shares be sold at the same price. If shares are being underpriced to compensate informed investors, then the one price rule means that any uninformed investors who receive shares are also getting a positive expected return.

[14] See Section 7 of Sherman and Titman, particularly the discussion regarding Proposition 7.

revision group. In contrast, there is a strong positive relation between media coverage and underpricing in the positive price revision sub-sample.

5.2 Regression results

Table 5 reports the regression results of the effects of media coverage on IPO first day return. We control for RANK, TECHINT, log(ASSET), GLOBAL, VENT, log(1+AGE), log(OFFERSIZE), OVERHANG, 90_D, BUBBLE_D and POSTBUBBLE_D as we do in price revision regression. We also control for market returns, using the equally-weighted return for 15 trading days prior to the IPO day (IPORET) as used in Lowry and Schwert (2002). We again adjust our standard errors for clustering both over time and by industry.

In the first regression, we find that IPO underpricing increases significantly with media coverage. In the second regression, we interact CITES with a high demand dummy (PREV_D) to capture the asymmetry. The coefficient for CITES, which is now capturing the effect of media only when demand is low, is not significant. The coefficient for the effect of media attention when demand is strong (1.674+0.317) is significant. The results are consistent with Hypothesis 1. If media coverage, like price revision, is a noisy signal of the private information revealed by the informed investors, then it should be related to underpricing in order to compensate investors.

Note that we are not trying to argue that media coverage is a better proxy than price revision, since we believe that price revision is actually a less noisy proxy. Table 5 shows that a positive price revision is highly significant. From Regression (2) of Table 5, a one standard deviation larger offer price increase corresponds with a 29.6% higher initial return, while a one standard deviation lower price decrease corresponds with a 1.5% lower initial return.[15] But, as explained earlier, price revision alone will not perfectly reflect all information reported by investors (Sherman and Titman, 2002), leaving room for a second proxy. We interpret our results to be consistent with the argument that media coverage provides additional information, beyond price revision.

Media coverage is significant not only statistically but also economically. Conditioning on price revision being positive, a one standard deviation increase in CITES leads to 8.14% more underpricing.[16] Another way to think of our results is that one extra piece of media coverage is associated with around two percentage points greater underpricing.

Combining the results of Tables 4 and 5, it appears that underwriters fully adjust for media attention when revising the offer price downward but only partially adjust for media attention when revising the price upwards. This is exactly what the information

[15] 20%*(1.342+0.139)=29.6% where 20% is the standard deviation of positive offer price revision. 11%*0.139=1.53% where 11% is the standard deviation of negative offer price revision.

[16] 4.09*(1.674+0.317) = 4.09*(1.991) = 8.14% where 4.09 is the standard deviation of CITES, 1.674 is the coefficient of CITES*PREV_D and 0.317 is the coefficient for CITES. Thus, one extra piece of media attention leads to an extra (1.674+0.317) = 1.991 or about 2% underpricing.

production theories predict if, as we argue, media attention is a proxy for the private information reported by investors[17].

The coefficient for IPORET is positive and significant for all regressions in Table 5[18]. Since recent IPO returns are fully observable at the time that the final offer price is set, underwriters (or investors, when giving feedback) appear to underadjust for these recent returns.

In unreported regressions, we also examined whether our results are stable over the time periods examined in Loughran and Ritter (2004) on why underpricing has changed over time. We ran our price revision and return regressions separately for the periods 1980-89, 1990-98, 1999-2000, and 2001-2004 (where this last period extends one year beyond than that used in Loughran and Ritter). The price revision results were stable over these periods in terms of the media coverage variable. The main pattern for the return regressions was that the media measures were not statistically significant in the 1980s but have been significant since then.

Thus, media coverage appears to have been less important in the 1980s, at the same time that Loughran and Ritter showed that underpricing was lower, and media attention was more significant in the 1990s and afterwards, when underpricing levels were also higher. One interpretation of these results is that our first proxy for investor information - price revision - does a better job of capturing most investor information when the average level of underpricing is low. When underpricing is high, Sherman and Titman (2002) show that satisfying all of the binding pricing and allocation constraints is more complicated, and thus that price revision alone should be less able to capture all of the information reported by investors. This would predict that our second proxy - media attention – is more likely to be significant in periods when underpricing is higher, which is consistent with our findings. Another interpretation, of course, is simply that Factiva had less extensive coverage in the 1980s since many media sources were not added until the late 1980s. With fewer media sources, there would be less variation and our media measure would not as fully reflect the consensus.

5.3 Robustness checks

We also perform a series of robustness tests similar to those for our price revision regressions. Once again, regression 3 excludes observations with zero media coverage (CITES=0), regression 4 adds year dummies, regression 5 excludes the 1980s and regression 6 excludes the bubble period (years 1999-2000). Regression 7 adjusts for fixed industry effects, while regression 8 examines abnormal media attention. In regression 9, we add a number of additional control variables. The results are mainly robust for these tests. The coefficient is smaller when the bubble period is excluded but

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[17] It should be noted that, although we discuss this as if any adjustment is being done by the underwriter, the actual shaving or adjustment for media attention and other public information may be done by investors when submitting their optimal 'bid'.

[18] We test for an asymmetric relationship between increases and decreases in the market return by adding the variable IPORET+ in Regression 8 of Table 5, but it is not significant.

is still significant. The inclusion of the extra control variables has little effect on our main results, and most of the added variables are not significant. Industry returns have a positive effect on underpricing that is significant at the 5% level.

We also replicate all the regressions using media coverage during only the last month prior to the issue day as the explanatory variable. None of the results change. These results are omitted to save space.

Finally, as a last set of robustness checks, we examine alternative proxies for high demand. We have found asymmetric results by examining the media coverage measure separately for offerings with a positive rather than a negative price revision. Price revision is the measure that is most closely tied to the success and expected return of this particular offering, based largely on direct feedback from investors during the road show. Our interpretation of media coverage is as a proxy for this direct feedback from investors, as opposed to a reflection of overall market conditions. Thus we will also examine the interaction with other predictors of the return for this offering, ordered based on the closeness of their relation to the particular issue we're considering. If more distant proxies work as well as price revision, our interpretation of media coverage would be called into question.

We consider four different demand signals: price revision ($\triangle$P), market return (MKTRET), industry return (INDRET) and the same industry IPO firms' contemporaneous underpricing (HOTIPO). Of these, the market return is the least offering-specific, and price revision is the most offering-specific. In between are industry return and the return on other recent IPOs, since both are more specific than the overall market return but not as specific as the price revision for that particular IPO. We would expect the coefficients for the interaction terms of media attention with these proxies to be monotonically decreasing as we go from the closest measure ($\triangle$P), to the middle measures(INDRET and HOTIPO), to the most distant (MKTRET).

Last, we consider extreme cases in which price revision and market return move in opposite directions. Since these situations suggest the strongest firm specific signals, the spread of coefficients for CITES conditioned on these two situations should be the largest.

Table 6 reports the regressions results using different indicators to classify demand. The first regression of Table 6 is a duplicate of regression 2 of Table 5. The second regression uses contemporaneous industry return as the indicator, while regression 3 uses contemporaneous underpricing of same industry IPO firms as the indicator, where both indicators are combinations of general and firm-specific news. As predicted, these two regressions obtain smaller coefficients for the media interaction variable than the first regression. For the industry return regression, the CITES variable becomes significant.

The fourth regression uses general market returns as the signal. In this case, the signal variable is not significant, and the CITES variable is significant. The results are consistent with our interpretation of media coverage as proxying for firm-specific information, rather than general overall trends. The general market information reflected in media coverage is not associated with underpricing. In the last regression, we use the sub-sample where market movement and price revision are in opposite directions. The coefficient for CITES*EXT_D measures the asymmetric effect between positive private news versus negative private news. As predicted, it is the largest in all the regressions.

Overall, the results of both our return and price revision regressions indicate that underwriters fully adjust for media attention when revising the offer price downward but only partially adjust for media attention when revising the offer price upwards. This is consistent with the predictions of information production models such as Sherman and Titman (2002).

6. Alternative interpretations of media coverage

We have established that more media coverage relates to more offer price revision and more IPO underpricing, and that the relation between media coverage and IPO underpricing is asymmetric with respect to price revision directions. Conditioning on positive price revision, more media coverage is associated with greater underpricing. There is no relation between media coverage and underpricing when price revision is negative. We argue that media coverage proxies for the information generated during the pre-selling period, and that the results are consistent with the information production interpretation of underpricing in Sherman and Titman (2002). However, there are at least two other interpretations that are also potentially consistent with the documented results so far.

Any alternative explanation must also relate media coverage to offer price revision and the initial aftermarket price of the offering in some way. The most likely alternative connection is that more media coverage attracts the attention of sentiment investors, who are then more willing to buy the stock and to pay a higher price. If sentiment investors distinguish between good and bad coverage, and if we assume that those companies that attract a lot of attention but have a negative price revision must be getting bad coverage, then sentiment theory can explain the positive relation between media coverage and the absolute value of price revision. However, this argument, by itself, does not lead to a relation with initial returns. Media attention is observable at the time that the price is set, so the underwriter could increase the price of the shares when media coverage indicates that sentiment investors are willing to pay more for them. Thus, media coverage would be negatively related to long term performance but would not be related to the initial return.

But there are two existing theories that would link a sentiment-induced premium to greater underpricing. First, Ljungqvist, Nanda and Singh (2006) show that such a relation may result if sentiment investors have a downward-sloping demand curve, for example due to budget constraints. Underpricing is payment to initial investors for not flipping all of the shares, since selling too many of the shares too quickly would drive down the price. Their Proposition 5 predicts that stronger sentiment will lead to more underpricing, and to worse long term performance[19].

Second, if sentiment or something else causes the initial aftermarket price to be high when media coverage is high, then Loughran and Ritter's (2004) prospect theory/cronyism explanation would explain the partial adjustment to this expected increase even if media attention does not proxy for investors' private information. Loughran and Ritter (2002) offer an alternate explanation of IPO underpricing based on prospect theory combined with cronyism, arguing that "issuers make a distinction between direct costs (spreads) and opportunity costs (money left on the table)" (p. 430)[20]. Underwriters may be able to take advantage of the fact that issuers weigh the opportunity cost of underpricing less heavily than the direct cost of higher fees, by shifting part of their compensation from fees to underpricing. The underwriter then allocates the underpriced shares to favored investors in exchange for some sort of 'kickback', perhaps through higher fees on future services[21]. Some empirical support for prospect theory can be found in Ljungqvist and Wilhelm (2005).

Testing either prospect theory or sentiment investor theory is not the main purpose of this study. Rather, we are more interested in explaining why the offer price only partially adjusts toward positive media coverage, and whether these theories explain the patterns related to media attention. Thus in this section we investigate what media coverage represents, and design tests to differentiate between the alternative explanations.

6.1 Media coverage and ex-ante uncertainty

If media attention is a good proxy for investor approval/market demand at the time that the IPO is priced, then it will be consistent with various patterns in the data that are predicted based on investor feedback in the road show. Sherman and Titman (2002) predict that 1) expected underpricing is greater when the cost of information is greater; and 2) when expected underpricing is greater, for example because of more uncertainty, we would generally also expect to see more skewed underpricing patterns, with more underpricing concentrated in the especially hot offerings. Media attention and price revision are our proxies for investor demand, and so we would expect to see initial returns higher: when uncertainty is greater; when there is more media attention; or when

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[19] Derrien (2005) also has a sentiment model of IPO underpricing, driven by aftermarket price support. Aftermarket price support is suboptimal for all agents in the model, however, so the model applies only to countries in which such price support is legally mandated. For a country such as the US in which aftermarket price support is voluntary, the Derrien model predicts zero underpricing and thus cannot explain our results.

[20] Edelen and Kadlec (2005) also predict partial adjustment of IPO prices to public information, in a model in which issuers prefer more underpricing when market returns are higher, in order to decrease the probability that the offering will fail. Their model does not seem to offer any predictions regarding the interaction of uncertainty and media attention, or long run returns.

[21] Prospect theory can explain underpricing only if the issuer's differential weighting for fees vs. opportunity costs is great enough to outweigh the costs to the underwriter of shifting compensation from fees to underpricing. The main cost of this shift is that there will be some leakage, with the underwriter unable to fully recover all of the benefits of underpricing that are officially given to investors.

the price is revised upwards by a larger amount from the midpoint of the initial range. More importantly for this section, we would expect the effects of more uncertainty to magnify the effects of more media attention or a larger price revision, but only for offers with a positive price revision (in other words, the interaction terms should be significant). The prediction is summarized in the following hypothesis.

(H3): The information production hypothesis predicts that, for offers that experience a positive price revision, the relations between underpricing and either media coverage or price revision is stronger when ex ante uncertainty is greater.

Prospect theory and sentiment investor models do not have the same predictions, because after controlling for the wealth increase of the managers or the media-induced sentiment reaction, there is no role for uncertainty to play. Thus this is a relatively clean test of the information production theory as an explanation for the role of media coverage.

To measure ex ante uncertainty, we use the proxies used in the previous literature. Ljungqvist's (2004) survey paper summarizes a list of popular proxies of ex ante uncertainty, including: age, measures of size, the industry the firm is from, offer size, use of proceeds, and aftermarket variables such as trading volume and volatility. We use four proxies out of the lists: logarithm of firm age, logarithm of pre-IPO assets, a technology firm or internet firm indicator, and logarithm of offer size. The logarithms of age, total assets and gross proceeds are all negatively related to uncertainty, while the technology firm or internet firm indicator is positively related to uncertainty.

We do not use the "use of proceeds" measure. Ljungqvist and Wilhelm (2003) argue that when use of proceeds is "operating expenses", the offering is more likely to be associated with more uncertainty. However, they define "operating expenses" through hand-collected data and there is no standard way to characterize the use of proceeds. We do not use aftermarket variables either, because these are ex post measures and it is hard to determine causality.

Table 7 reports the regression results with media coverage interacted with proxies of uncertainty. In Panel A, only the media interaction terms are included. As we pointed out in the introduction, however, price revision is a logical and well-established proxy for investor demand in the book building process. Thus, in Panel B we use price revision interaction terms rather than media interaction terms, interacting our measures of uncertainty with the price revision from the midpoint of the initial range, for those offerings that are revised upwards. In Panel C, we include both sets of interaction terms.

In Panel A of Table 7, the coefficients for all of the interaction terms between media attention and the uncertainty proxies have the predicted sign, and 3 of the 4 are significant at the 1% level. The interaction term that is not significant is for offer size. In Panel B, two of interaction terms are the predicted sign and are significant at the 1% level, one has the expected sign but is insignificant, and the term for offer size does not have the predicted sign and is not significant. In Panel C, with both media and price revision interaction terms, all of the media interaction terms have the predicted sign and are significant at either the 1% or 5% level, while 2 of the 4 price revision terms have the predicted sign and are significant at the 1% level. A third term is insignificant. The last term, for interaction between positive price revision and offer size, is significant at the 10% level but with the wrong sign.

Thus, the overall results are generally consistent with the predictions of the information production theory and with the idea that both media attention and offer price revision are proxies for the information reported to the underwriter by investors. The main exception to this among the interaction term results is for offer size. The offer size interaction with media is only significant with the predicted sign in Panel C, with both media and price revision interactions are included. The offer size interaction with price revision is also significant in this regression, but with the wrong sign.

Offer size is the most questionable of our uncertainty proxies. Habib and Ljungqvist (1998) show that underpricing is strictly decreasing in offer size even when holding uncertainty constant. Ljungqvist (2004) argues that "This clearly makes it (offer size) unsuitable as a proxy for valuation uncertainty." [22] Given the ambiguity of offer size as a proxy for uncertainty, we will focus more on the results using other proxies. For the other proxies, most of the results are significant at the 1% level, and all significant results have the predicted sign.

The results are consistent with the argument that the relation between positive media coverage and underpricing obtains because positive media coverage proxies for the information on firm value generated during the issuing process.

6.2 Media coverage and long run returns

Ljungqvist, Nanda and Singh's (2006) investor sentiment model predicts a positive relation between media coverage and underpricing, if the amount of media coverage proxies for investor sentiment. The investor sentiment story argues that the first day closing price may deviate from the firm's long run fundamental value because it is affected by some investors' irrational preferences, which might be influenced by media coverage. IPO firms' long run under-performance is commonly cited as supporting evidence of this story – if the first day closing price is higher than the fundamental value because of sentiment, the price will revert back to the true value over the long run, causing long run under-performance. This story predicts that more media coverage associates with more long run under-performance, because more media coverage reflects investor sentiment, and long run under-performance is a result of investor sentiment. The hypothesis follows:

[22] Ljungqvist (2004), page 15.

(H4): The Ljungqvist, Nanda and Singh (2006) investor sentiment hypothesis, or any other sentiment investor explanation for the relation between media coverage and the initial aftermarket price, predicts that more media coverage relates to more long run under-performance.

We measure the long run abnormal return of an IPO firm as the difference between the buy and hold raw return of an IPO firm and the return of a size and book-to-market matched benchmark portfolio. The return data are from the CRSP daily return file. We begin from the second day after the issue day and calculate the buy and hold return for each IPO firm for four periods: the 7th to the 12th months after IPO, the first year after IPO, the second year after IPO and the third year after IPO. We further construct 25 size and book-to-market portfolios as benchmark. At the end of each December, we group all the available non-issue firms that are traded on NYSE, AMEX or Nasdaq into 5 size portfolios and 5 book-to-market portfolios independently. Only NYSE firms are used in setting size breaking points. Non-issue firms are defined as firms with their IPOs at least 5 years ago. Therefore, the first 5 years observations after IPOs are excluded from the benchmark sample.

Size, also known as market value of equity, is measured as the end of the year price multiplied by share outstanding and book-to-market is the most recent available book value of equity (Compustat item 60 plus item 74) divided by year end market value of equity. We hold the 25 equal weighted size and book-to-market portfolios for one year and reform the portfolios at the end of each year. At the end of each year, we match each IPO firm with one size and book-to-market portfolio. The matching is repeated each year. For IPO firms, the first year market value of equity is measured as the first available value of market capital. We calculate the first year book-to-market ratio of IPO firms as per-share book value of equity after issuance (from SDC) divided by the first after-market closing price. If the book value of equity from SDC is unavailable we use the first year end book-to-market value as the value for the first year.

Table 8 panel A reports summary statistics for long run abnormal returns. The 7^{th} to 12th month, first year, second year and third year buy and hold return for IPO firms are all lower than the returns of the benchmark portfolios. The abnormal return are 8.8%, 8.9%, 14.8% and 13.3% respectively. Some studies (Kothari and Warner, 2005, among others) show that measures of long run abnormal returns suffer from certain statistical issues. Establishing the statistical significance of long run abnormal return of IPO firms is not the purpose of our study. We mainly focus on the cross sectional variation of the long run abnormal return. As long as the biases of the long run return measures do not vary in a systematic way with media coverage variable, our cross-sectional tests do not suffer from the above-mentioned statistically problem.

Panel B investigates whether the long run abnormal return relates to positive media coverage. Previous studies show that IPO long-run under-performance is positively related to underwriter's reputation (Carter, Dark and Singh (1998)) and whether the issue is backed by venture capitalists. We therefore control for lead underwriter rank and a dummy for venture backed issues. We also control through three time period dummies, two measures for the price revision, and total assets. In all four return windows, we fail to find that long run abnormal returns relate to media coverage.

Another possible explanation for the relationship between media coverage and underpricing and yet the lack of a relationship between media coverage and long term performance is as follows: Perhaps more media coverage makes the company worth more, for example through creating more awareness of the company as in Merton (1987). But if IPO pricing is done mechanically, through comparables or other rules of thumb, then the offer price will not reflect this added value from media attention, leading to greater underpricing. This explanation is consistent with what we have found on long term performance in this section. It does not, however, explain the relation between media coverage and measures of uncertainty.

To conclude, we fail to find supporting evidence for the investor sentiment hypothesis as an explanation for the relation between media coverage and underpricing. We do not claim that our evidence shows that investor sentiment does not exist. Rather, the results in this subsection suggest that the investor sentiment story is not likely to explain why there is a positive relationship between media coverage and underpricing.

7. Conclusion

In this study, we document that media coverage before an IPO significantly relates to the final offer price and to underpricing, in an asymmetrical way. Our measure of media attention is a simple count (based on a Factiva search, with duplicates excluded) of the number of times that the company's name is mentioned in major news and business publications during the filing period. This objective, quantifiable measure of information acquisition and dissemination can be replicated both for other countries and for other time periods. Using this measure, we find relationships that are both statistically and economically significant. When the offer price is revised upwards, one extra piece of media attention is related to a 1.9% greater offer price increase and to a 2.0% greater initial return. When the offer price is revised downwards, one extra piece of media attention is related to a 2.1% greater offer price decrease but is not related to any change in initial return.

There are three potential explanations for the relationship between media attention and underpricing: Sherman and Titman's (2002) information production theory, Ljungqvist, Nanda and Singh's (2006) investor sentiment theory and Loughran and Ritter's (2004) prospect theory. Our tests results are most consistent with Sherman and Titman's information production theory, interpreting media coverage as a proxy for the overall demand expressed by investors during the road show. We show that the positive relation between media coverage and underpricing is stronger when ex ante uncertainty is greater, as predicted by the information production theory.

In addition to explaining underpricing, media attention is an important variable when explaining IPO offer price revisions. More media coverage is related to a greater price adjustment in either direction. Our results on both price revision and initial returns imply that underwriters fully adjust for media attention when revising an offer price downwards, but only partially adjust for media attention when revising the offer price upwards. These results are consistent with the predictions of information production models.

Finally, we fail to find any relation between media coverage and IPO firms' long run performance. If media attention's relationship with underpricing was due to sentiment investors buying stocks that had received more publicity, we would expect the stock price to eventually revert, leading to a negative relation between media and long term performance. The lack of a relationship between media attention and long term returns is inconsistent with an investor sentiment explanation of the effect of media on underpricing.

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Appendix. Variable Definitions

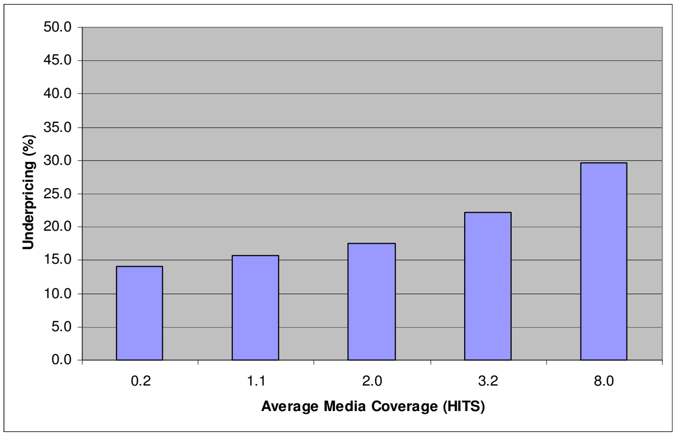
Variable Name	*Definition*
CITES	The number of media articles covering the IPO firm from one day after the filing date to one day before the offer date and then standardizing into per month method.
IR	The percentage change between IPO offer price and the first closing price from secondary market trading
OP	Offer price
△P	Percentage price revision, (offer price – midpoint of initial filing range)/midpoint of initial filing range
PREV_D	Equals one when △P is positive and zero otherwise
△P+	Equals △P when △P is positive and zero otherwise
△P-	Equals △P when △P is negative and zero otherwise
IPORET	Equal-weighted return for 15 trading days prior to the IPO day, for a portfolio of either technology firms or non-technology firms that have had IPOs in the last year, but not in the last month, in percent
IPORET+	Equals IPORET when IPORET is positive and zero otherwise
IPORET_FI	Equal-weighted return for a portfolio of either technology firms or non-technology firms that have had IPOs in the last year, but not in the last month, from filing day to issue day, in percent
IPORET_FI-	Equals IPORET_FI when IPORET_FI is negative and zero otherwise
IPORET_prior30	Equal-weighted return for a portfolio of either technology firms or non-technology firms that have had IPOs in the last year, but not in the last month, for 30 days prior to filing day, in percent
MKTRET	Equal-weighted market return on all CRSP stocks for 15 trading days prior to the IPO day, in percent
PMKT_D	Equals one if MKTRET is positive and zero otherwise
MKTRET+	Equals MKTRET when MKTRET is positive and zero otherwise
INDRET	Equal-weighted return of firms in the same industry for 15 trading days prior to the IPO day, in percentage; the industry classification is by Fama-French (1997) 49 industries
PIND_D	Equals one when INDRET is positive and zero otherwise
INDRET+	Equals INDRET when INDRET is positive and zero otherwise
HOTIPO	Average initial return of same-industry IPOs completed between the issue day and the offer day, in percentage
PHOTIPO_D	Equals one when HOTIPO is positive and zero otherwise
HOTIPO+	Equal HOTIPO when HOTIPO is positive and zero otherwise
EXT_D	Equal to 1 if PREV_D=1 and PMKT_D=0 and equal to 0 if PREV_D=0 and PMKT_D=1
RANK	Rank of lead underwriter, obtained from Jay Ritter's website

TECH	Equal to 1 if the firm is a technology firm, and 0 otherwise. Technology firms are as defined in Loughran and Ritter (2004)
INTERNET	Equal to 1 if the firm is an internet firm, and 0 otherwise. Internet firms are as defined in Loughran and Ritter (2004)
TECHINT	Equal to 1 if the firm is a technology or internet firm, and 0 otherwise
GLOBAL	Equal to 1 if the offering is a global offering, and 0 otherwise
VENT	Equal to 1 if the firm is venture capitalist-backed, and 0 otherwise
PURE	Equal to 1 if the offering is purely of primary shares, and 0 otherwise.
OVERHANG	(Pre-IPO shares - secondary shares offered)/(total shares offered)
Log(OFFSIZE)	The natural logarithm of the size of the offering, measured as offer price multiplied by the number of shares offered
ASSET	Total assets pre-IPO
Log(1+Age)	Age of issuer at IPO, from Loughran and Ritter (2004)
FDAYS	Days from filing day to offering day
Log(Asset)	The natural logarithm of pre-IPO assets
90_D	Equals one if the offering date falls between 1990 and 1998, and zero otherwise
BUBBLE_D	Equals one if the offering date falls between 1999 and 2000, and zero otherwise
POSTBUBBLE_D	Equals one if the offering date falls between 2001 and 2004, and zero otherwise
AMEX	Equals one if the IPO firm will be listed on the American Stock Exchange, and zero otherwise
NMS	Equals one if the IPO firm will be listed on the Nasdaq National Market System, and zero otherwise
NYSE	Equals one if the IPO firm will be listed on the New York Stock Exchange, and zero otherwise
LAGN	Total number of IPOs one month before the issue day
LAGHOT	Average initial return of all IPOs within one month prior to the issue day

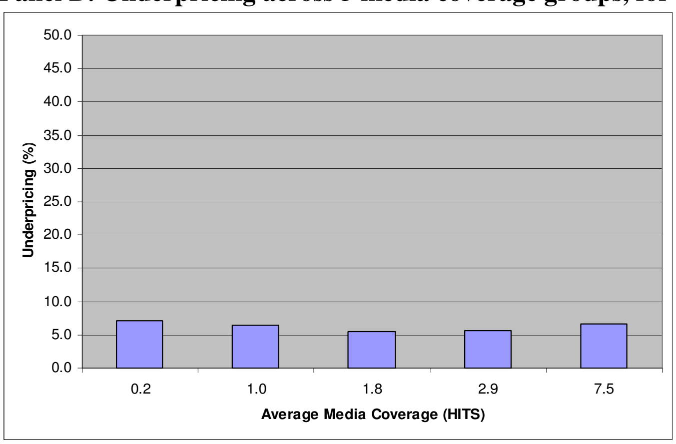
Figure 1 : Underpricing across different media coverage groups

Each year we sort sample IPO firms into five media coverage (CITES) groups. Average initial returns to IPO investors are reported across all the sample years (1980-2004) for each media coverage group. Panel A is based on the full sample. Panel B is based on the sub-sample with non-positive IPO price revisions. Panel C is based on the sub-sample with positive IPO price revisions.

Panel A: Underpricing across 5 media coverage groups



Panel B: Underpricing across 5 media coverage groups, for non-positive price revisions only



Panel C: Underpricing across 5 media coverage groups, for positive price revisions only

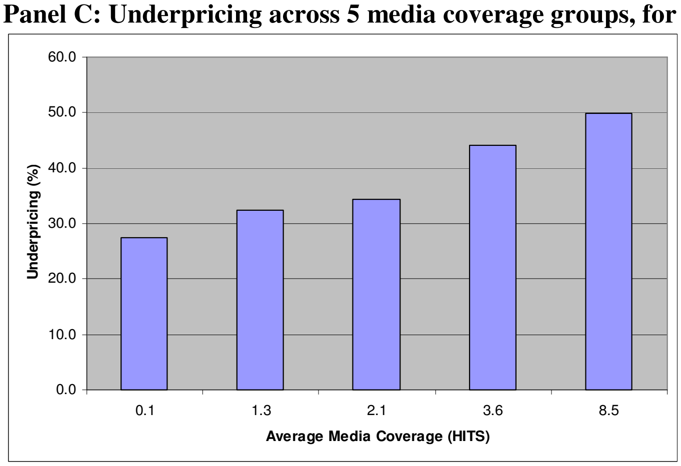


Table 1: Summary statistics

The sample includes the IPOs completed between January 1980 and December 2004 as reported in Thomson Financial's Securities Data Company (SDC) database. We exclude unit offers, closed-end funds, real estate investment trusts (REITs), American Depositary Receipts (ADRs), limited partnerships and offerings with prices below $5. We also require the firms to be covered by CRSP and COMPUSTAT in the issuing year. IPOs are partitioned into terciles within each year based on the media coverage they receive (CITES). Variable definitions are provided in the Appendix. ***, ** and * indicate significant difference between low CITES IPOs and high CITES IPOs for the variable of the same row at 1%, 5% and 10% levels, respectively.

Table 1: Summary statistics

	All IPOs	Low HITS IPOs	Medium HITS IPOs	High HITS IPOs	
Number of IPOs	3627	1201	1217	1209	
CITES	2.87	0.45	1.97	6.18	***
IR	19.77	14.63	18.50	26.15	***
OP	12.71	11.45	12.37	14.30	***
ΔP	0.59	-1.42	-0.95	4.14	***
PREV_D	0.41	0.34	0.41	0.49	***
ΔP+	7.36	5.26	6.27	10.54	***
ΔP-	-6.77	-6.68	-7.23	-6.41	
MKTRET	1.56	1.61	1.60	1.48	
PMKT_D	0.71	0.72	0.72	0.69	
IPORET	0.97	1.08	0.92	0.90	
PIPO_D	0.60	0.59	0.61	0.58	
INDRET	1.78	1.76	1.90	1.69	
PIND_D	0.67	0.67	0.68	0.65	
HOTIPO	25.88	30.37	22.43	24.90	
PHOTIPO_D	0.90	0.91	0.91	0.89	
TECH	0.36	0.30	0.37	0.42	***
INTERNET	0.07	0.04	0.06	0.10	***
TECHINT	0.38	0.31	0.38	0.44	***
GLOBAL	0.16	0.11	0.14	0.23	***
VENT	0.44	0.37	0.46	0.49	***
PURE	0.56	0.58	0.55	0.55	*
OVERHANG	3.18	2.87	2.99	3.69	***
OFFSIZE	63.42	39.65	52.35	98.18	***
ASSET	542.79	291.91	356.26	978.34	**
AGE	13.32	12.55	12.64	14.75	***
RANK	7.09	6.44	7.22	7.59	***
FDAYS	76.57	95.63	75.04	59.16	***

Table 2: Distributional information for media coverage for the whole sample and sub-samples based on filing price revision

The sample includes the initial public offerings completed between January 1980 and December 2004 as reported in Thomson Financial's Securities Data Company (SDC) database. We exclude unit offers, closed-end funds, real estate investment trusts (REITs), American Depositary Receipts (ADRs), limited partnerships and offerings with prices below $5. We also require the firms to be covered by CRSP and COMPUSTAT in the issuing year. An issue has had a positive (non-positive) price revision when the final offer price is higher (no higher) than the midpoint of initial filing range provided by SDC. The mean, standard deviation, minimum, maximum and different percentiles for media coverage (CITES) are provided for both the whole sample and the two sub-samples based on filing price revision.

					Percentiles									
	N	Mean	Std. Dev.	Max.	99th	95th	90th	75th	50th	25th	10th	5th	1st	Min.
All IPOs	3627	2.9	5.5	163.9	20.9	9.4	6.7	3.6	1.5	0.5	0.0	0.0	0.0	0.0
IPOs with positive price revision	1505	3.6	5.5	81.0	24.0	11.5	8.2	4.6	2.0	0.7	0.0	0.0	0.0	0.0
IPOs with negative price revision	2122	2.4	5.5	163.9	15.0	7.7	5.5	2.9	1.2	0.4	0.0	0.0	0.0	0.0

Table 3: Price revision with media coverage and public information

The dependent variable is △P. The sample includes the initial public offerings completed between January 1980 and December 2004 as reported in Thomson Financial's Securities Data Company (SDC) database. We exclude unit offers, closed-end funds, real estate investment trusts (REITs), American Depositary Receipts (ADRs), limited partnerships and offerings with prices below $5. We also require the firms to be covered by CRSP and COMPUSTAT in the issuing year. Regression 3 excludes observations with zero media coverage (CITES=0), regression 4 adds year dummies, regression 5 excludes observations in the 1980s and regression 6 excludes the bubble period (years 1999-2000). Regression 7 adjusts for fixed industry effects. In regression 8, CITES is measured as original CITES minus normal CITES, where normal CITES is (total media coverage during the past 12 months – total media coverage during the past 6 months)/6. Variable definitions are provided in the Appendix. Z-statistics are adjusted for two-way clustering both at day level and at industry level, where the industry is defined as in Fama-French (1997). ***, ** and * indicate that the estimated coefficient is significant at 1%, 5% and 10% levels, respectively.

	Regression 1		Regression 2		Regression 3		Regression 4		Regression 5	
	Coeff.	z-Stat	Coeff.	z-Stat	Coeff.	z-Stat	Coeff.	z-Stat	Coeff.	z-Stat
Constant	-18.227	-6.46 ***	-17.799	-9.47 ***	-22.445	-6.92 ***	-15.528	-5.03 ***	-23.418	-4.01 ***
CITES*PIND_D			1.141	7.24 ***	1.102	4.89 ***	1.165	5.46 ***	1.231	5.54 ***
CITES	0.381	1.89 *	-0.374	-2.47 **	-0.280	-2.09 **	-0.402	-3.18 ***	-0.471	-3.53 ***
RANK	-0.116	-0.95	-0.109	-0.97	-0.004	-0.03	-0.162	-1.38	0.029	0.17
log(ASSET)	-2.790	-3.66 ***	-2.774	-9.20 ***	-3.008	-4.10 ***	-2.783	-3.60 ***	-2.632	-3.03 ***
log(1+AGE)	-0.055	-0.16	-0.031	-0.09	0.163	0.45	-0.212	-0.62	-0.321	-0.74
log(OFFSIZE)	8.324	5.53 ***	8.096	14.11 ***	9.094	6.50 ***	8.236	5.55 ***	9.065	4.97 ***
TECHINT	3.442	1.75 *	3.387	4.43 ***	3.785	1.91 *	3.693	1.83 *	4.162	1.96 **
VENT	-0.286	-0.25	-0.193	-0.27	0.150	0.14	-0.622	-0.58	0.503	0.43
GLOBAL	2.918	1.86 *	3.021	2.87 ***	2.790	2.09 **	3.379	2.15 **	2.350	1.65 *
OVERHANG	0.945	3.43 ***	0.925	6.75 ***	0.942	2.76 ***	0.956	3.18 ***	1.112	3.22 ***
90_D	-1.431	-1.18	-1.366	-1.49	-2.188	-1.65				
BUBBLE_D	3.664	2.30 **	4.026	2.81 ***	3.098	1.99 **			3.858	3.80 ***
POSTBUBBLE_D	-3.424	-1.50	-3.505	-1.82 *	-4.796	-2.01 **			-3.389	-2.42 **
NYSE	-7.838	-3.22 ***	-7.749	-4.40 ***	-7.675	-3.02 ***	-7.356	-3.08 ***	-9.658	-3.99 ***
AMEX	-1.682	-1.50	-1.660	-1.22	-1.080	-0.74	-1.180	-1.00	-2.289	-1.14
NMS	-4.916	-3.66 ***	-4.975	-2.34 **	-5.114	-3.04 ***	-4.556	-3.36 ***	-6.846	-2.91 ***
IPORET_FI	0.023	0.71	0.020	1.66 *	0.020	0.68	0.019	0.63	0.018	0.66
IPORET_FI-	0.850	6.14 ***	0.776	13.33 ***	0.808	8.71 ***	0.821	6.44 ***	0.751	6.05 ***
IPORET_prior30	0.307	7.66 ***	0.283	10.17 ***	0.274	7.27 ***	0.291	8.03 ***	0.254	5.77 ***
year dummies							Controlled			
Number of observations	3100		3100		2604		3100		2427	
Adj. R^2	0.2775		0.2893		0.3142		0.2968		0.2903	

Table 3: (Continued)

	Regression 6			Regression 7			Regression 8			Regression 9		
	Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat	
Constant	-15.927	-8.51	***	-19.865	-10.10	***	-17.946	-6.37	***	-17.075	-4.71	***
CITES*PIND_D	1.031	5.19	***	1.334	8.39	***	1.017	2.93	***	1.319	6.34	***
CITES	-0.463	-2.97	***	-0.527	-3.41	***	-0.161	-1.03		-0.460	-2.67	***
RANK	-0.140	-1.46		-0.122	-1.09		-0.109	-0.89		-0.181	-1.01	
log(ASSET)	-2.543	-3.77	***	-3.619	-10.64	***	-2.747	-3.70	***	-2.550	-3.24	***
log(1+AGE)	0.201	0.77		-0.008	-0.02		-0.073	-0.22		0.068	0.19	
log(OFFSIZE)	7.480	7.09	***	9.798	16.31	***	8.085	5.63	***	8.334	5.60	***
TECHINT	3.305	1.94	*	3.174	2.44	***	3.473	1.78	*	1.663	0.98	*
VENT	-1.642	-1.81	*	0.239	0.32		-0.169	-0.15		-0.021	-0.02	
GLOBAL	-0.043	-0.02		3.541	3.32	***	3.031	2.00	**	3.394	1.97	**
OVERHANG	0.761	3.94	***	1.000	7.08	***	0.925	3.13	***	1.308	8.48	***
90_D	-0.405	-0.46		-3.193	-3.31	***	-1.288	-1.11		-0.780	-0.54	
BUBBLE_D				-0.397	-0.27		3.958	2.85	***	-6.632	-1.86	*
POSTBUBBLE_D	-2.008	-1.00		-9.392	-4.93	***	-3.078	-1.53		-4.431	-1.61	
NYSE	-5.473	-2.93	***	-8.455	-4.71	***	-7.705	-3.29	***	-8.110	-3.27	***
AMEX	-1.410	-1.27		-1.652	-1.19		-1.612	-1.43		-4.333	-2.44	***
NMS	-4.609	-3.68	***	-5.040	-2.33	**	-4.835	-3.48	***	-2.093	-1.30	
IPORET_FI	0.008	0.39		0.051	2.26	**	0.022	0.71		0.080	3.62	***
IPORET_FI-	0.753	12.22	***	1.511	9.15	***	0.795	6.48	***	0.530	4.09	***
IPORET_prior30	0.156	3.86	***	0.160	2.97	***	0.292	7.52	***	0.202	4.88	***
FDAYS										-0.032	-4.08	***
PURE										-1.998	-2.19	**
LAGN										-0.075	-1.96	**
LAGHOT										23.144	7.94	***
HOTIPO+										-0.012	-0.25	
HOTIPO										0.010	0.22	
Number of observations	2659			3141			3100			2486		
Adj. R^2	0.1976			0.2468			0.2856			0.343		

Table 4: Information signals and the association between media coverage and price revision

The dependent variable is △P. The sample is the same as in earlier tables. Regressions 1 through 4 use the full sample with available data. Regression 5 focuses on the sub-sample where file price revisions and market returns are of opposite signs, i.e. either (PREV_D=1 and PMKT_D=0) or (PREV_D=0 and PMKT_D=1). Z-statistics are adjusted for two-way clustering both at day and industry level, where the industry is defined as in Fama-French (1997). ***, ** and * indicate that the estimated coefficient is significant at 1%, 5% and 10% levels, respectively.

	Regression 1		Regression 2		Regression 3		Regression 4		Regression 5	
	Coeff.	z-Stat	Coeff.	z-Stat	Coeff.	z-Stat	Coeff.	z-Stat	Coeff.	z-Stat
Constant	-15.153	-6.44 ***	-17.799	-9.47 ***	-21.652	-6.90 ***	-18.063	-6.65 ***	-11.357	-5.27 ***
CITES*PREV_D	4.025	20.69 ***								
CITES*PIND_D			1.141	7.24 ***						
CITES*PHOTIPO_D					1.065	2.76 ***				
CITES*PMKT_D							1.020	3.51 ***		
CITES*EXT_D									3.630	24.40 ***
CITES	-2.124	-9.99 ***	-0.374	-2.47 **	-0.500	-1.52	-0.298	-3.10 ***	-1.261	-4.95 ***
RANK	-0.092	-1.01	-0.109	-0.97	-0.208	-1.11	-0.117	-0.99	-0.416	-3.73 ***
log(ASSET)	-1.969	-4.07 ***	-2.774	-9.20 ***	-2.669	-3.11 ***	-2.786	-3.66 ***	-1.030	-3.23 ***
log(1+AGE)	0.026	0.09	-0.031	-0.09	0.168	0.40	-0.040	-0.12	-0.457	-1.24
log(OFFSIZE)	6.750	6.28 ***	8.096	14.11 ***	9.413	5.25 ***	8.269	5.68 ***	4.774	4.78 ***
TECHINT	2.769	1.82 *	3.387	4.43 ***	3.034	1.53	3.387	1.69 *	1.661	1.28
VENT	-0.035	-0.04	-0.193	-0.27	-0.263	-0.19	-0.276	-0.24	-1.941	-2.04 **
GLOBAL	1.654	1.40	3.021	2.87 ***	2.948	1.65 *	2.800	1.90 *	1.100	0.85
OVERHANG	0.604	1.91 *	0.925	6.75 ***	1.296	7.36 ***	0.919	3.21 ***	0.587	2.63 ***
90_D	-1.897	-2.06 **	-1.366	-1.49	-2.738	-1.80 *	-1.466	-1.21	-3.095	-3.32 ***
BUBBLE_D	2.451	2.55 **	4.026	2.81 ***	2.291	0.98	3.989	2.70 ***	0.141	0.11
POSTBUBBLE_D	-1.381	-1.15	-3.505	-1.82 *	-5.394	-1.77 *	-4.060	-1.70 *	-4.570	-2.77 ***
NYSE	-5.381	-2.87 ***	-7.749	-4.40 ***	-9.057	-3.14 ***	-7.790	-3.24 ***	-3.873	-1.79 *
AMEX	-0.576	-0.61	-1.660	-1.22	-2.023	-1.32	-1.771	-1.55	-1.629	-1.25
NMS	-3.021	-2.32 **	-4.975	-2.34 **	-4.145	-2.49 **	-5.168	-3.77 ***	-2.238	-1.08
IPORET_FI	0.018	0.64	0.020	1.66 *	0.015	0.56	0.020	0.69	0.053	1.94 *
IPORET_FI-	0.543	5.28 ***	0.776	13.33 ***	0.904	6.43 ***	0.777	6.60 ***	0.115	0.79
IPORET_prior30	0.217	6.69 ***	0.283	10.17 ***	0.314	8.01 ***	0.287	7.58 ***	0.125	2.73 ***
Number of observations	3100		3100		2486		3100		1416	
Adj. R^2	0.4246		0.2893		0.3035		0.2867		0.3506	

Table 5: Media coverage, firm and deal characteristics and market conditions that predict IPO initial returns

The dependent variable is the initial return, IR. The sample includes the initial public offerings completed between January 1980 and December 2004 as reported in Thomson Financial's Securities Data Company (SDC) database. We exclude unit offers, closed-end funds, real estate investment trusts (REITs), American Depositary Receipts (ADRs), limited partnerships and offerings with prices below $5. We also require the firms to be covered by CRSP and COMPUSTAT in the issuing year. Regression 3 excludes observations with zero media coverage (CITES=0), regression 4 adds year dummies, regression 5 excludes observations in the 1980s and regression 6 excludes the bubble period (years 1999-2000). Regression 7 adjusts for fixed industry effects. In regression 8, CITES is measured as original CITES minus normal CITES, where normal CITES is (total media coverage during the past 12 months – total media coverage during the past 6 months)/6. Variable definitions are provided in the Appendix. Z-statistics are adjusted for two-way clustering both at day level and at industry level, where the industry is defined as in Fama-French (1997). ***, ** and * indicate that the estimated coefficient is significant at 1%, 5% and 10% levels, respectively.

	Regression 1			Regression 2			Regression 3			Regression 4			Regression 5		
	Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat	
Constant	9.895	4.22	***	9.987	4.08	***	8.558	2.84	***	8.053	2.47	**	11.70	2.96	***
CITES*PREV_D				1.674	3.42	***	1.386	2.66	***	1.633	3.48	***	1.79	3.30	***
CITES	1.335	4.05	***	0.317	1.21		0.417	1.48		0.402	1.54		0.30	0.95	
ΔP+	1.342	16.36	***	1.342	14.29	***	1.436	14.81	***	1.362	13.18	***	1.35	13.32	***
ΔP	0.226	6.38	***	0.139	2.88	***	0.134	2.42	**	0.129	2.31	**	0.13	2.30	**
IPORET	0.532	4.51	***	0.499	4.50	***	0.471	4.26	***	0.418	4.02	***	0.49	4.10	***
RANK	0.092	0.86		0.090	0.84		0.071	0.61		0.125	1.12		0.24	1.59	
log(ASSET)	-1.380	-1.95	**	-1.279	-1.85	*	-1.104	-1.47		-1.392	-2.03	**	-1.10	-1.55	
log(1+AGE)	-1.121	-2.93	***	-1.097	-2.76	***	-1.063	-2.60	***	-0.956	-2.46	**	-1.03	-2.10	**
log(OFFSIZE)	-2.561	-2.40	**	-2.511	-2.32	**	-2.655	-2.13	**	-2.399	-2.21	**	-2.84	-2.28	**
TECHINT	1.279	0.62		1.334	0.66		1.510	0.71		0.970	0.48		1.53	0.65	
VENT	0.938	0.68		1.042	0.79		1.372	0.92		1.312	0.98		1.50	1.06	
GLOBAL	4.308	2.48	**	4.084	2.47	**	3.572	2.11	**	4.182	2.23	**	3.33	2.10	**
OVERHANG	1.394	3.27	***	1.344	2.89	***	1.420	2.60	***	1.361	2.70	***	1.49	2.61	**
90_D	3.446	2.96	***	3.193	2.71	***	3.293	2.34	**						
BUBBLE_D	25.781	9.58	***	25.834	9.29	***	26.759	8.61	***				22.13	8.55	***
POSTBUBBLE_D	2.263	0.69		3.206	1.11		3.154	0.95					-0.04	-0.02	
year dummies										Controlled					
Number of observations	3143			3143			2641			3143			2468		
Adj. R^2	0.5499			0.5542			0.5674			0.5561			0.5536		

Table 5 (*Continued*)

	Regression 6			Regression 7			Regression 8			Regression 9		
	Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat	
Constant	9.114	7.25	***	9.345	3.27	***	9.483	3.50	***	8.157	2.24	**
CITES*PREV_D	0.938	2.34	**	1.648	5.47	***	1.883	6.37	***	1.985	3.44	***
CITES	-0.041	-0.47		0.344	1.31		0.144	0.77		0.296	0.80	
ΔP+	0.501	4.81	***	1.349	17.07	***	1.348	17.20	***	1.283	17.07	***
ΔP	0.243	9.81	***	0.119	2.00	**	0.148	2.56	**	0.130	2.39	**
IPORET	0.449	5.81	***	0.509	6.48	***	0.499	6.39	***	0.593	3.17	***
RANK	0.028	0.32		0.042	0.23		0.095	0.51		0.186	1.04	
log(ASSET)	-1.788	-2.98	***	-1.700	-2.96	***	-1.224	-2.40	**	-0.971	-1.61	
log(1+AGE)	-0.842	-3.44	***	-1.281	-2.18	**	-1.160	-2.05	**	-0.936	-2.19	**
log(OFFSIZE)	0.403	0.52		-1.776	-1.77	*	-2.287	-2.43	**	-2.245	-1.79	*
TECHINT	2.676	2.35	**	0.205	0.09		1.555	1.22		-0.761	-0.46	
VENT	-0.628	-0.75		1.949	1.56		1.213	1.02		1.406	0.99	
GLOBAL	1.113	0.59		4.197	2.36	**	4.484	2.56	**	4.797	2.19	**
OVERHANG	1.027	6.33	***	1.446	6.07	***	1.397	6.01	***	1.791	4.98	***
90_D	4.092	6.25	***	3.121	2.05	**	3.043	2.06	**	3.986	2.30	**
BUBBLE_D				25.738	10.98	***	26.529	11.71	***	20.642	5.82	***
POSTBUBBLE_D	3.836	2.38	**	3.018	0.96		4.162	1.37		1.506	0.37	
FDAYS										-0.006	-0.91	
PURE										0.142	0.15	
LAGN										0.002	0.09	
LAGHOT										5.964	1.86	*
AMEX										-2.335	-0.72	
NMS										-0.268	-0.13	
NYSE										-3.569	-1.30	
IPORET+										0.350	0.71	
MKTRET+										-1.222	-0.71	
MKTRET										-1.915	-1.42	
INDRET+										0.362	0.65	
INDRET										1.048	2.39	**
HOTIPO+										-0.095	-1.86	*
HOTIPO										0.095	1.87	*
Number of observations	2690			3143			3143			2525		
Adj. R^2	0.3730			0.5562			0.5521			0.5703		

Table 6: Information signals and the association between media coverage and IPO initial returns

The dependent variable is the initial return, IR. The sample is the same as in earlier tables. Regressions 1 through 4 use the full sample with available data. Regression 5 focuses on the sub-sample where file price revisions and market returns are of opposite signs, i.e. either (PREV_D=1 and PMKT_D=0) or (PREV_D=0 and PMKT_D=1). Variable definitions are provided in the Appendix. Z-statistics are adjusted for two-ways clustering both at day level and at industry level, where the industry is defined as in Fama-French (1997). ***, ** and * indicate that the estimated coefficient is significant at 1%, 5% and 10% levels, respectively.

	Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat	
Constant	9.987	4.08	***	10.249	4.29	***	7.151	3.25	***	9.793	4.15	***	0.831	0.15	
CITES*PREV_D	1.674	3.42	***												
CITES*PIND_D				0.841	3.26	***									
CITES*PHOTIPO_D							1.249	4.52	***						
CITES*PMKT_D										-0.732	-1.43				
CITES*EXT_D													2.132	1.93	*
CITES	0.317	1.21		0.784	2.48	**	0.428	1.28		1.818	3.27	***	0.107	0.43	
ΔP+	1.342	14.29	***	1.333	16.04	***	1.335	18.14	***	1.348	16.42	***	1.723	5.30	***
ΔP	0.139	2.88	***	0.225	6.08	***	0.209	5.03	***	0.227	6.52	***	0.164	4.59	***
IPORET	0.499	4.50	***	0.421	3.60	***	0.613	5.08	***	0.627	4.86	***	0.543	4.36	***
RANK	0.090	0.84		0.100	0.95		0.130	0.76		0.093	0.85		0.107	0.55	
log(ASSET)	-1.279	-1.85	*	-1.402	-1.99	**	-1.153	-1.58		-1.358	-1.93	*	-0.826	-1.51	
log(1+AGE)	-1.097	-2.76	***	-1.123	-2.92	***	-0.858	-2.10	**	-1.116	-2.95	***	-1.135	-2.69	***
log(OFFSIZE)	-2.511	-2.32	**	-2.661	-2.48	**	-2.583	-2.10	**	-2.579	-2.41	**	-0.521	-0.61	
TECHINT	1.334	0.66		1.329	0.65		0.506	0.23		1.236	0.60		0.815	0.60	
VENT	1.042	0.79		1.035	0.77		1.087	0.76		0.904	0.67		0.486	0.46	
GLOBAL	4.084	2.47	**	4.442	2.61	***	4.590	2.03	**	4.328	2.39	**	-2.260	-0.92	
OVERHANG	1.344	2.89	***	1.393	3.15	***	1.795	5.07	***	1.400	3.37	***	2.409	2.48	**
90_D	3.193	2.71	***	3.511	3.10	***	3.418	1.81	*	3.471	3.01	***	4.604	4.87	***
BUBBLE_D	25.834	9.29	***	26.181	9.81	***	25.275	7.92	***	25.448	9.25	***	17.736	7.30	***
POSTBUBBLE_D	3.206	1.11		2.487	0.85		-2.276	-0.58		2.408	0.73		4.919	1.67	*
Number of observations	3143			3143			3143			3143			1438		
Adj. R^2	0.5542			0.5510			0.5564			0.5507			0.4987		

Table 7: Ex ante uncertainty and the association between media coverage and IPO initial returns

The dependent variable is the initial return, IR. The sample is the same as in earlier tables. The regressions use the full sample with available data. Variable definitions are provided in the Appendix. Z-statistics are adjusted for two-way clustering both at day level and at industry level, where the industry is defined as in Fama-French (1997). ***, ** and * indicate that the estimated coefficient is significant at 1%, 5% and 10% levels, respectively.

Panel A – Media interaction terms

	Regression 1			Regression2			Regression 3			Regression 4		
	Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat	
Constant	6.179	2.42	**	6.742	3.61	***	9.811	4.36	***	9.118	4.83	***
CITES*PREV_D*log(1+AGE)	-1.254	-6.62	***									
CITES*PREV_D*log(ASSET)				-0.539	-3.98	***						
CITES*PREV_D*TECHINT							2.623	5.36	***			
CITES*PREV_D*log(OFFSIZE)										-0.210	-0.46	
CITES*PREV_D	4.332	6.45	***	4.123	6.48	***	0.215	0.58		2.621	1.46	
CITES	0.225	0.87		0.186	0.77		0.206	0.81		0.295	1.23	
ΔP+	1.307	14.20	***	1.332	13.32	***	1.267	13.21	***	1.350	15.34	***
ΔP	0.138	3.01	***	0.121	2.74	***	0.159	3.60	***	0.130	3.15	***
IPORET	0.514	4.80	***	0.504	4.83	***	0.477	4.33	***	0.500	4.61	***
RANK	0.056	0.51		0.008	0.07		0.066	0.59		0.069	0.59	
log(ASSET)	-1.218	-1.83	*	-0.462	-0.69		-1.246	-1.88	*	-1.246	-1.81	*
log(1+AGE)	0.457	1.06		-0.986	-2.60	***	-0.866	-2.59	***	-1.083	-2.77	***
log(OFFSIZE)	-2.144	-2.08	**	-2.283	-2.31	**	-1.922	-1.80	*	-2.271	-2.21	**
TECHINT	0.895	0.47		0.947	0.54		-1.867	-1.01		1.250	0.66	
VENT	0.896	0.70		0.854	0.63		1.099	0.87		0.957	0.67	
GLOBAL	3.767	2.40	**	3.956	2.33	**	3.887	2.37	**	4.086	2.47	**
OVERHANG	1.382	3.48	***	1.493	4.31	***	1.345	3.43	***	1.378	3.32	***
90_D	2.926	2.55	**	2.895	2.66	***	2.859	2.53	**	3.095	2.84	***
BUBBLE_D	25.283	9.27	***	24.991	9.17	***	24.682	8.94	***	25.747	9.16	***
POSTBUBBLE_D	3.105	1.17		3.514	1.25		3.577	1.28		3.214	1.11	
Number of observations	3143			3143			3143			3143		
Adj. R^2	0.562			0.560			0.561			0.554		

Table 7 (*Continued*)

Panel B – Price revision interaction terms

	Regression 1			Regression2			Regression 3			Regression 4		
	Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat	
Constant	5.356	1.71	*	9.635	3.64	***	11.864	5.49	***	14.768	4.32	***
ΔP+*log(AGE)	-0.472	-5.90	***									
ΔP+*log(TA)				-0.022	-0.22							
ΔP+*TECHINT							0.792	4.93	***			
ΔP+*log(OFFSIZE)										0.312	1.54	
CITES*PREV_D	1.917	3.99	***	1.710	4.16	***	1.870	3.77	***	1.535	3.13	***
CITES	0.172	0.67		0.299	1.19		0.153	0.59		0.344	1.26	
ΔP+	2.096	11.52	***	1.422	4.54	***	0.615	3.27	***	-0.073	-0.08	
ΔP	0.163	3.61	***	0.136	3.29	***	0.203	4.72	***	0.216	5.15	***
IPORET	0.571	4.86	***	0.499	4.54	***	0.453	3.94	***	0.493	4.00	***
RANK	0.091	0.79		0.084	0.77		0.045	0.37		0.164	1.52	
log(ASSET)	-1.558	-2.21	**	-1.137	-1.62		-1.547	-2.14	**	-1.567	-2.28	**
log(1+AGE)	1.321	2.04	**	-1.116	-3.17	***	-0.980	-2.53	**	-0.954	-2.59	***
log(OFFSIZE)	-2.013	-1.82	*	-2.534	-2.35	**	-1.706	-1.49		-3.632	-2.77	***
TECHINT	1.233	0.64		1.322	0.67		-3.345	-1.52		1.486	0.78	
VENT	0.925	0.74		1.034	0.78		1.243	0.99		1.372	0.95	
GLOBAL	3.486	2.36	**	4.160	2.64	***	3.656	2.15	**	3.592	2.23	**
OVERHANG	1.344	2.88	***	1.352	2.89	***	1.318	2.82	***	1.324	2.94	***
90_D	3.300	3.11	***	3.151	2.98	***	3.377	3.00	***	3.996	4.65	***
BUBBLE_D	25.809	9.36	***	25.828	9.32	***	25.100	9.42	***	26.066	9.52	***
POSTBUBBLE_D	3.369	1.24		3.227	1.12		3.150	1.13		3.738	1.31	
Number of observations	3143			3143			3143			3143		
Adj. R^2	0.5656			0.5542			0.5643			0.5613		

Table 7 (*Continued*)

Panel C – Both media and price revision interaction terms

	Regression 1			Regression2			Regression 3			Regression 4		
	Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat	
CITES*PREV_D*log(1+AGE)	-0.653	-5.06	***									
CITES*PREV_D*log(ASSET)				-0.624	-4.85	***						
CITES*PREV_D*TECHINT							1.575	3.30	***			
CITES*PREV_D*log(OFFSIZE)										-0.870	-2.42	**
ΔP+*log(AGE)	-0.377	-4.33	***									
ΔP+*log(TA)				0.062	0.56							
ΔP+*TECHINT							0.620	3.66	***			
ΔP+*log(OFFSIZE)										0.404	1.92	*
CITES*PREV_D	3.253	5.46	***	4.410	6.85	***	0.951	2.85	***	5.408	3.49	***
CITES	0.153	0.60		0.215	0.89		0.122	0.47		0.262	1.02	
ΔP+	1.926	10.39	***	1.109	3.31	***	0.728	3.67	***	-0.457	-0.51	
ΔP	0.158	3.48	***	0.126	3.16	***	0.201	4.68	***	0.202	4.87	***
IPORET	0.565	4.93	***	0.503	4.67	***	0.449	3.96	***	0.498	4.08	***
RANK	0.073	0.63		0.014	0.12		0.040	0.33		0.098	0.86	
log(ASSET)	-1.470	-2.10	**	-0.725	-1.10		-1.469	-2.06	**	-1.516	-2.32	**
log(1+AGE)	1.645	2.46	**	-0.914	-3.06	***	-0.867	-2.50	**	-0.858	-2.64	***
log(OFFSIZE)	-1.922	-1.80	*	-2.185	-2.25	**	-1.527	-1.35		-2.965	-2.61	***
TECHINT	1.025	0.55		0.919	0.52		-4.250	-1.97	**	1.184	0.67	
VENT	0.873	0.70		0.844	0.62		1.233	1.00		1.121	0.75	
GLOBAL	3.441	2.32	**	3.725	2.25	**	3.631	2.17	**	3.455	2.05	**
OVERHANG	1.364	3.19	***	1.493	4.55	***	1.325	3.14	***	1.461	4.47	***
90_D	3.140	2.94	***	2.965	2.94	***	3.136	2.77	***	3.825	4.53	***
BUBBLE_D	25.526	9.30	***	24.873	8.79	***	24.568	9.11	***	25.775	9.20	***
POSTBUBBLE_D	3.284	1.25		3.505	1.23		3.385	1.24		3.928	1.37	
Number of observations	3143			3143			3143			3143		
Adj. R^2	0.5670			0.5602			0.5663			0.5641		

Table 8: Media coverage and IPO long run returns

The dependent variable is long run returns. The sample is the same as in earlier tables. Variable definitions are provided in the Appendix. Panel A reports the mean raw returns for IPO companies, the mean raw returns for benchmark portfolios matched to the IPO companies based on size and book-to-market ratio and the mean differences between IPO companies returns and those of the benchmark portfolios. Long run returns are measured over four windows: the seventh to the twelfth month post IPO, the first year post IPO, the second year post IPO and the third year post IPO. The IPO adjusted returns are significantly different from zero at 1% for all the four windows. Panel B reports the regression results of IPO adjusted returns on media coverage and deal and firm characteristics. Z-statistics are adjusted for two-ways clustering both at day level and at industry level, where the industry is defined as in Fama-French (1997). ***, ** and * indicate that the estimated coefficient is significant at 1%, 5% and 10% levels, respectively.

Panel A

	Months 7~12	**Year 1**	**Year 2**	**Year 3**
IPO raw return	1.9	10.5	10.4	12.7
Benchmark return	10.6	19.4	25.3	26.0
IPO adjusted return	-8.8	-8.9	-14.8	-13.3

Panel B

	Months 7~12			**Year 1**			**Year 2**			**Year 3**		
	Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat		Coeff.	z-Stat	
Constant	-18.75	-7.75	***	-33.74	-8.06	***	-50.48	-8.68	***	-38.27	-8.99	***
CITES*PREV_D	-0.37	-0.94		-0.39	-0.94		-0.07	-0.11		-0.69	-0.62	
CITES	0.41	1.56		0.66	0.89		0.79	0.69		1.00	1.06	
ΔP+	-0.24	-2.65	**	-0.17	-1.15		0.46	2.32	**	0.02	0.06	
ΔP	0.18	1.76	*	0.09	0.58		-0.41	-2.69	***	-0.02	-0.04	
RANK	-0.22	-0.78		0.37	1.14		1.74	4.41	***	1.57	2.79	***
VENT	7.38	4.20	***	9.35	2.33	**	15.75	4.19	***	14.67	4.39	***
log(ASSET)	3.59	9.31	***	5.30	6.49	***	4.86	5.25	***	3.44	3.86	***
90_D	-1.79	-0.97		0.81	0.24		-0.30	-0.04		-8.33	-1.61	
BUBBLE_D	-19.83	-4.01	***	-10.97	-1.57		-41.27	-3.83	***	-14.86	-2.21	**
POSTBUBBLE_D	-2.42	-0.89		-10.01	-2.07	**	-7.71	-1.57		-8.18	-1.25	
Number of observations	3496			3498			3448			3001		
Adj. R^2	0.0281			0.0116			0.026			0.128		