Management Science

Publication details, including instructions for authors and subscription information:
http://pubsonline.informs.org

The Long-Run Role of the Media: Evidence from Initial Public Offerings

Laura Xiaolei Liu, Ann E. Sherman, Yong Zhang

To cite this article:
Laura Xiaolei Liu, Ann E. Sherman, Yong Zhang (2014) The Long-Run Role of the Media: Evidence from Initial Public Offerings. Management Science 60(8):1945-1964. http://dx.doi.org/10.1287/mnsc.2013.1851

MANAGEMENT SCIENCE
Vol. 60, No. 8, August 2014, pp. 1945–1964
ISSN 0025-1909 (print) | ISSN 1526-5501 (online)

http://dx.doi.org/10.1287/mnsc.2013.1851

The Long-Run Role of the Media: Evidence from Initial Public Offerings

Laura Xiaolei Liu
School of Business and Management, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong, laura.xiaolei.liu@ust.hk
Ann E. Sherman
Department of Finance, DePaul University, Chicago, Illinois 60604, ann.sherman@depaul.edu
Yong Zhang
School of Accounting and Finance, Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, yong.zhang@polyu.edu.hk

The unique characteristics of the U.S. initial public offering (IPO) process, particularly the strict quiet period regulations, allow us to explore the effects of media coverage when the coverage does not contain genuine news (i.e., hard information that was previously unknown). We show that a simple, objective measure of pre-IPO media coverage is positively related to the stock's long-term value, liquidity, analyst coverage, and institutional investor ownership. Our results are robust to additional controls for size, to using abnormal or excess media, and to an instrumental variable approach. We also find that pre-IPO media coverage is negatively related to future expected returns, measured by the implied cost of capital. In all, we find a long-term role for media coverage, consistent with Merton's attention or investor recognition hypothesis.

Keywords: finance; corporate finance; securities; financial institutions; markets; initial public offerings; media coverage
History: Received June 13, 2012; accepted September 6, 2013, by Brad Barber, finance. Published online in *Articles in Advance* March 14, 2014.

1. Introduction

Traditional asset-pricing theory would argue that media coverage should not affect asset prices unless it provides genuine news in the sense of new hard information that had not previously been available. Yet some recent studies[1] seem to suggest that media coverage may be significantly related to asset prices even when it does not reveal hard, breaking news. The nature of media coverage is difficult to determine, however, in part because it is hard to find settings that offer clean distinctions between hard and soft information revelation.

Initial public offerings (IPOs) offer a unique and useful setting in which to isolate this issue. Firms that have filed for an IPO in the United States are relatively uniform in the sense that they are all undergoing a major, potentially newsworthy event and are all attempting to attract the attention of the market, subject to U.S. quiet period restrictions. An IPO is typically the time in a company's life when the most hard information is revealed, all at once and in one standardized, publicly available form—through the prospectus. U.S. regulations are designed to level the playing field in terms of information about the offering, and thus issuers face substantial penalties if they reveal hard information in any way other than through putting it in the prospectus, where all investors have easy access to it (particularly since 1996, from which time all filings with the Securities and Exchange Commission (SEC) by U.S. companies have been posted online through the Edgar website).[2] Thus, when a company is in its filing period for an IPO, media coverage is unlikely to contain any "genuine news" in the sense of new, factual information.

Da et al. (2011) measure the effect of retail investor attention on IPOs through a unique indicator of self-directed investor research—Google searches of firms during their IPO filing periods. They find that high levels of such searches are related both to higher initial returns and to more long-term underperformance. In other words, they find a short-term role that is later

[1] For example, Tetlock (2007), Tetlock et al. (2008), Fang and Peress (2009), and Tetlock (2011).

[2] Such quiet period restrictions on nonprospectus communications are relatively unique to U.S. IPOs—we do not know of similar restrictions for any other country. It should also be noted that the U.S. restrictions are much stronger, and more strictly enforced, for IPOs than for seasoned equity or debt registrations. See Appendix A for more information on U.S. quiet period regulations.

reversed. As the authors point out, Google searches are more likely to reflect retail rather than institutional investor attention. In this paper, we use media coverage as our measure of attention, thus possibly measuring a different type of attention from a different group of investors, and our focus is mainly on determining whether there is a long-term role for investor attention in IPOs.

Long-term effects are more likely to arise from the type of attention (also known as investor recognition) modeled by Merton (1987). The Merton (1987) attention model predicts that stocks that receive more attention should have lower rates of return and thus higher valuation. If investors only consider stocks with which they have a certain level of familiarity, then having more investors paying attention to the stock effectively shifts out the demand curve.[3] Media coverage may cause this shift in the demand curve, or it may simply reflect the shift.[4] The Merton (1987) model is extended by Van Nieuwerburgh and Veldkamp (2009), who assume that substantial attention/information acquisition has a cost. In analyzing home bias, they show that individuals should be more willing to continue to pay attention to stocks with which they are already familiar. Thus, firms that attract attention while going public should continue to receive attention, motivating our examination of the long-term effects of pre-IPO attention.

In this paper, we use a straightforward, objective count to measure the amount of pre-IPO media attention each company receives, for U.S. IPOs from 1980 through 2004. To obtain our media coverage variable, we search the Factiva database by IPO company name for the month before the issue date, counting the number of articles in major business media sources that refer to the company. We find that analyst coverage, the number of institutional investors, liquidity, and firm value are all related to our measure of pre-IPO media coverage in the three years following the IPO. Our robustness tests include using size decile dummies to control for a nonlinear relationship between media coverage and size, and using abnormal or excess media, which is the difference between average media per month during the filing period and average media per month from 12 to 7 months earlier, to control for unobserved long-run firm characteristics that may be related to media coverage and attention. The results hold.

[3] Gao and Ritter (2010) explore ways that issuers can shift out their demand curve in a seasoned equity offering, finding evidence for a large, transitory shift from fully marketed offerings.

[4] Papers arguing that media simply reflects existing opinions include Baum and Powell (1995) and Elsbach (1994). Arguments that media plays a more active role can be found in Fombrun (1996), Hoffman and Ocasio (2001), Kosicki (1993), McCombs et al. (1997), and Golan and Wanta (2001).

In addition, we take an instrumental variable (IV) approach to address the issue of endogeneity that may arise from any remaining correlated omitted variable or reverse causality. Our instrument is a count of the special news reports broadcast on the three U.S. television networks (ABC, NBC, and CBS), as recorded by the Vanderbilt University TV News Archives, during the same days that media coverage of the IPO firm is measured. In general, these news reports were about exogenous events that drew attention away from any new firms that were trying to attract a following. For example, regular television programming was interrupted by many specials in 1981 because of the Iran hostages, the assassination of Anwar Sadat, and the attempted assassinations of the Pope and Ronald Reagan; in 1986 because of the Challenger explosion and the Pan Am Flight 73 hijacking; in 1989 because of the Oliver North trial verdict and the San Francisco earthquake; and in 1991 because of the Gulf War, the Clarence Thomas hearings, and the Soviet Union coup attempt. Consistent with unexpected breaking news events drawing attention away from IPO firms, more special news reports in the month before an offering date lead to significantly less media coverage for the IPO firms in our sample. When we use such special news reports as an instrument for media coverage, our results remain unchanged, thus mitigating endogeneity concerns.

We measure the impact of pre-IPO media coverage on a firm's cost of capital by estimating expected returns through accounting-based valuation models that make use of the information implied in contemporaneous stock price and analyst forecast data. This approach has been used in Pastor et al. (2008), Hail and Leuz (2009), Chen et al. (2013), Tang et al. (2014), and Mao and Wei (2014a, b). We find that pre-IPO media coverage is negatively related to a stock's expected return one, two, and three years after its IPO, and these results are robust to using abnormal media, size dummies, or an instrumental variable approach.

For a cross section of larger stocks, Fang and Peress (2009) find that stocks that do not receive media attention pay a higher return than stocks that receive substantial coverage. We show that attention affects other variables in addition to returns, and find return results for smaller firms, using a broader measure of media coverage that is likely to result in fewer firms being measured as having received zero coverage. More importantly, we are able to test the Merton (1987) model in a setting that more completely rules out alternatives, thanks to three key advantages of our data set and approach: the IPO quiet period restrictions, our instrumental variable analysis, and our focus on broader long-term effects. These allow us to rule out several alternative explanations of the data.

The first possible alternate explanation for the negative relationship between media coverage and returns is that there is genuine news in media coverage. Bad news travels more slowly, as shown by Hong et al. (2000) in their study of the momentum effect. Thus, when media coverage contains genuine news, companies with positive news may see their stock prices rise quickly, whereas companies with negative news may see negative returns over the next few months, potentially generating a negative relationship between media coverage one month and stock returns over the following month or more. A second possibility is that media coverage may be manipulated by the firm itself. Ahern and Sosyura (2014) provide evidence of this during merger negotiations by examining firm-initiated press releases that are distributed through newswire services. A third possibility is that media coverage may attract sentiment investors, producing a short-term increase and a later reversal in the stock price. None of these alternatives can explain our results because we are looking at the long-term effects of media coverage on both returns and other measures of attention, and we are examining them for media coverage generated during the quiet period, a period that does not include firm–initiated press releases or contain genuine news. Moreover, our instrumental variable results are further evidence that our measure is capturing true attention, and the results reflect causal effects.

This paper contributes to the rapidly expanding area of research on the roles of attention, marketing, and media coverage.[5] Tetlock et al. (2008) find that, for specific stocks, media coverage may capture otherwise hard to quantify measures of a firm's fundamentals, and that this additional information is quickly incorporated into stock prices (see also Schmitz 2007, Tetlock 2010). Dougal et al. (2012) use exogenous rotation in which columnist writes the *Wall Street Journal*'s Abreast of the Market column to show that the columnists have a causal effect on short-term stock price movements independent of the hard news content in the column. Engelberg and Parsons (2011) use differences in local media coverage to identify a causal impact of media coverage on investor trading. Barber and Odean (2008) offer evidence that attention influences individual investor purchase decisions. Grullon et al. (2004) examine advertising expenditures, finding evidence that investors' familiarity with a firm affects its value and cost of financing. Bodnaruk and Ostberg (2009) find evidence of the Merton (1987) attention effect using Swedish data that allow them to observe investors' entire portfolios. Our contribution is to examine the long-run role of media in a setting that allows a relatively clean separation between soft and hard information.

Related to the media literature is the work on analyst coverage. Just as Fang and Peress (2009) find that firms with less media coverage have higher required rates of return, Kelly and Ljungqvist (2007) find that firms that experience an exogenous reduction in analyst coverage have higher required rates of return, as well as less efficient pricing and lower liquidity. This and other work on analyst coverage indicates that there is value to maintaining the attention of investors, as modeled by Merton (1987).[6] We contribute to this literature by showing that firms with high media coverage before their IPO have significantly higher expected analyst coverage up to three years after their IPO, as well as more institutional investors, more liquidity, and a higher value based on fundamentals.

In short, using a simple, objective measure of media coverage, we show that pre-IPO media coverage is related to persistent, long-term effects as predicted by the attention theory. The rest of this paper is organized as follows. Section 2 introduces the data set and the variables used in the sample. In §3, we test various implications of the attention theory for the role of media, whereas §4 confirms these results through instrumental variable analysis. Section 5 explores the relationship between pre-IPO media coverage and long-run expected returns, and §6 concludes.

2. The Data

2.1. Sample

We begin with all IPOs completed between January 1980 and December 2004 in the United States, 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 data sets in the issue year.

Pre-IPO assets are from SDC, or Compustat if the SDC data item is missing. Accounting data are from Compustat; stock return and turnover data are from CRSP. The Carter–Manaster rank of lead underwriter

[5] Two of the earliest papers on this subject are Berry and Howe (1994) and Mitchell and Mulherin (1994), both of which find a relationship between public information and trading volume. Bhattacharya et al. (2009) 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. Demers and Lewellen (2003) also examine the marketing of Internet stocks.

[6] Other such work on analyst coverage includes Kecskes and Womack (2008), Khorana et al. (2013), and Hong and Kacperczyk (2010).

Table 1 Summary Statistics

	Mean	Median	SD	P10	P90
MEDIA	3.008	1.000	4.513	0.000	8.000
ABMEDIA	2.140	1.151	3.004	0.000	5.455
SPECIALS	11.908	9.000	12.878	0.000	30.000
log(*ASSET*)	2.363	2.142	1.667	0.556	4.551
RANK	7.086	8.100	3.156	4.100	9.100
log(*AGE* + 1)	2.137	2.079	1.015	1.099	3.466
VC	0.442	0.000	0.497	0.000	1.000
NASDAQ	0.761	1.000	0.427	0.000	1.000
AMEX	0.034	0.000	0.180	0.000	0.000
N_ANALYST	2.166	0.000	3.401	0.000	6.000
N_INST	29.636	18.000	34.552	2.000	70.000
log(*TURNOVER*)	1.690	1.711	0.928	0.521	2.842
log(*P/EBIT*)	2.313	2.205	0.996	1.174	3.578

Notes. This table reports the mean, median, standard deviation, and 10th and 90th percentiles of the main variables used in the study. The sample includes U.S. IPOs completed between January 1980 and December 2004 as reported in Thomson Financial's SDC database. We require the firms to be covered by CRSP and Compustat in the issuing year and exclude unit offers, closed-end funds, REITs, ADRs, limited partnerships, and offerings with prices below \$5. Variable definitions are in Appendix C. The variables are winsorized at the 99th and 1st percentiles unless the natural logarithms are used.

is from Jay Ritter's website (http://bear.warrington.ufl.edu/ritter/ipodata.htm). We divide all of the dollar amount variables, such as assets, by the consumer price index to control for inflation. The consumer price index, which takes the value of 100% in year 1972, was obtained from the Federal Reserve Bank of St. Louis. Variables are winsorized at the 99th and 1st percentiles to mitigate the influence of outliners, with the exception of variables for which we use the logarithms. Detailed variable definitions are given in Appendix C.

Table 1 reports summary statistics for the main variables used in the study. We have a total of 3,601 completed IPOs.[7] The sample size is smaller than that in some other studies because we restrict the sample to the intersection of the SDC, CRSP, and Compustat databases. The IPO firms have a median age of 7.0 years and median assets of \$8.5 million. Forty-four percent of the IPOs are backed by venture capitalists (VCs).

2.2. Construction of the Media Coverage Variable

We use Factiva to quantify the amount of media coverage, restricting the media sources to Dow Jones Newswire, major news and business publications (United States 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 the last 30 days up to one day before the offering date, counting the number of articles that mention the IPO company during this window.[8]

We do not attempt to categorize media articles as either "good" or "bad." Such categorizations are done in Bhattacharya et al. (2009) and Kaniel et al. (2007), both of which use human classification approaches that would be too time consuming for our sample size. Cook et al. (2006) perform such a classification of positive versus negative 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" (p. 44). Given their results, it is unlikely that categorizing our stories would significantly affect our results.

Journalists exercise their judgment primarily by deciding which companies to cover. Their role, once they have chosen to report on a stock, 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. A somewhat similar argument is made by Das et al. (2006), who argue that an analyst's decision of whether or not to cover a stock may be a better indicator of the analyst's opinion of the stock than the analyst's specific recommendation or earnings forecast.

We also do not attempt to categorize whether the article is primarily about the IPO company or is instead about the industry or another stock, with only a brief mention of the IPO company at the end. Such categorizations are done by Chan (2003) and Fang and Peress (2009), who all examine secondary market trading rather than IPOs. Barber and Odean (2008), on the other hand, use a simple count similar to ours. Vega (2006) uses a count of the number of days a particular firm is mentioned in at least one news story. Ahern and Sosyura (2014) use counts that include reprints or highly similar articles, whereas we exclude duplicates.[9]

Although there are many benefits to a more detailed weighting of the primary focus of each article, we feel that a simple count is more relevant

[7] We adjust our standard errors for clustering by industry, which in some cases results in a smaller number of observations being reported. The number of observations is also lowered in some cases due to some observations missing for certain variables.

[8] We also have data on total media mentions from one day after the filing date to one day before the offering date, standardized into a per-month measure. This alternate window is used for unreported robustness checks, and the tenor of the results remain unchanged.

[9] Ahern and Sosyura (2014) look at firm manipulation of press coverage, and thus one main focus of theirs is on newswire articles that "typically report firm press releases with no additional analysis" (p. 250). Thus, they feel that counting duplicates helps to measure breadth of coverage rather than "unique news events." Our data, due to quiet period restrictions, do not include either unique news events or firm-generated press releases.

for our specific purposes, in examining IPOs. If brief announcements of all upcoming IPOs were routine, then such mentions would not lead to variations between the firms in our sample, and thus would not affect our results. However, in practice only some stocks receive even those brief mentions at the ends of articles about other companies, suggesting that even brief mentions are selected by journalists, who have an incentive to focus on the more newsworthy offerings.[10] By simply counting every mention of a company's name without judging either whether the article is positive or negative or whether it is mainly about that particular company, we are able to construct a simple, objective measure that, in the end, leads to robust results that are both statistically and economically significant.

The first row of Table 1 reports summary statistics for the media coverage (*MEDIA*) variable, our count of the number of articles mentioning the company one month before the offering day. The media variable has some extreme values, with a maximum value of 253 while the 90th percentile is only 8. We winsorize *MEDIA* at the 99th percentile. After winsorizing, the mean of *MEDIA* is 3.01, with a median of 1 and standard deviation of 4.51. About 33% of the observations received no media coverage.[11]

3. Measures of Attention

We will focus our analysis on tests that help us to determine whether pre-IPO media coverage plays a lasting role, for example, through long-run investor attention as in Merton (1987). In Merton's (1987) model, investors make rational decisions within their choice set, but their choice set includes only companies of which they are aware, i.e., companies that have caught their attention. Van Nieuwerburgh and Veldkamp (2009) extend this, showing that individuals should continue to pay attention to stocks with which they are already familiar. Companies that have the attention of many investors should thus have a higher market value and lower cost of capital—their demand curve is permanently shifted upward. Our tests in this section focus on whether pre-IPO media coverage is related to various measures of investor attention and total firm value. In a later section, we will explore the effect of pre-IPO media coverage on the firm's required return.

[10] Again, because these firms are in their IPO quiet period, our count does not include routine press releases put out by the company itself.

[11] Fang and Peress (2009), focusing on stories of major relevance for the company in one of four main newspapers, also find that coverage is skewed, with more than one-fourth of NYSE stocks and one-half of NASDAQ stocks not receiving media coverage in a typical year.

3.1. The Persistence of Attention

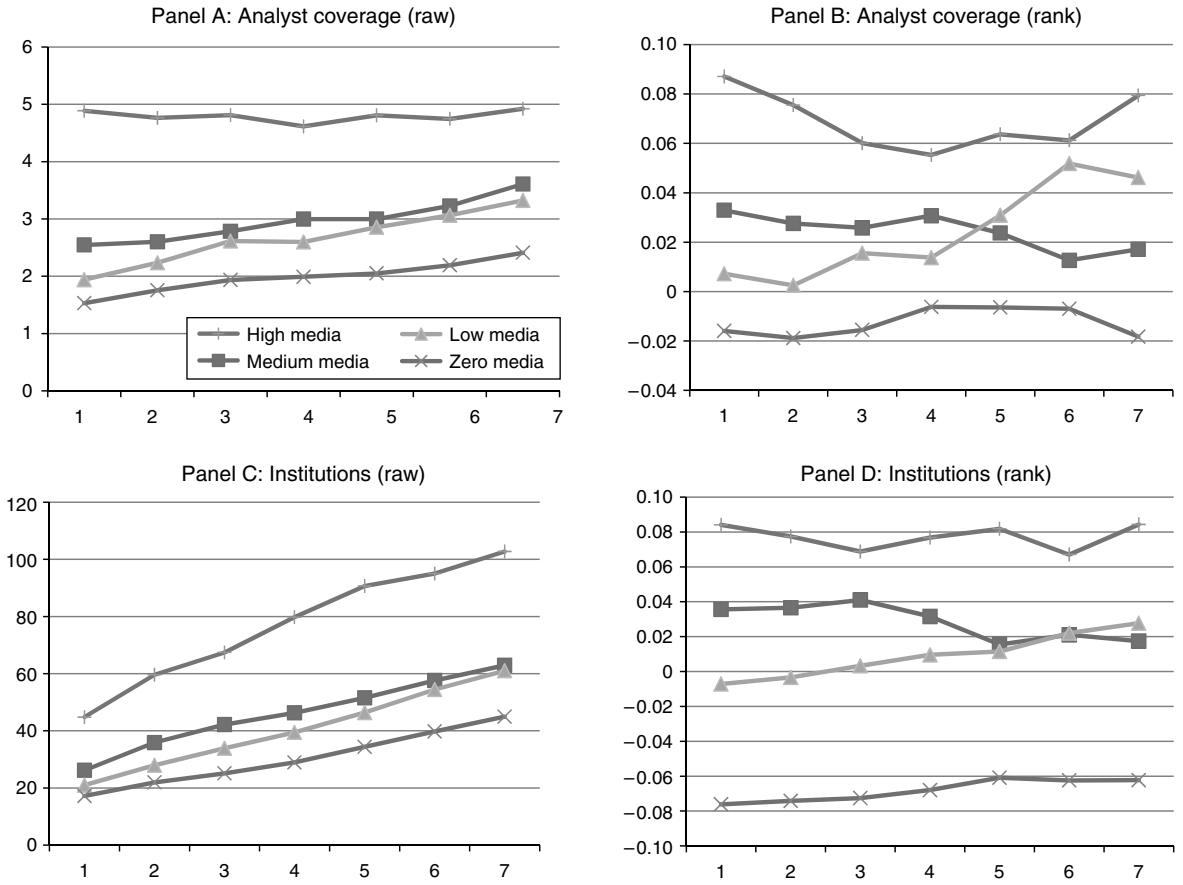
To measure post-IPO attention, we first examine the following three proxies: number of analysts who cover the stock, number of institutional investors who hold the stock, and aftermarket liquidity. A survey conducted by Bushee and Miller (2012) shows that investor relations professionals believe that attracting buy-side (institutional) investors, attracting analysts, and increasing media awareness are important ways to increase a firm's visibility. Both analyst coverage and institutional holdings are widely used in the literature as proxies for attention or investor recognition. (e.g., Brennan et al. 1993, Grullon et al. 2004, Hou and Moskowitz 2005). Thus, we explore whether firms with more pre-IPO media coverage have more analysts following and more institutional investors holding the stocks for several years after the IPO, as well as whether the stocks are more liquid.

Our analyst coverage data is from Institutional Brokers Estimate System (I/B/E/S). Analyst coverage is defined as the number of analysts providing earnings forecasts for a given year following the IPO issue date. The analyst variable starts at 1994, to allow for reasonable I/B/E/S coverage. The number of institutional investors is taken from Compact Disclosure. It measures the number of institutions that hold the stocks at the end of the relevant fiscal year. We require the first fiscal year end to be no earlier than the end of the second month after the IPO. We start at the end of the second rather than the first month after the IPO to avoid the immediate aftermath of the IPO.

We measure liquidity using the logarithm of turnover ratio. Using CRSP monthly data, turnover ratio is constructed as the monthly trading volume divided by total share outstanding, averaged over event year. Following Gao and Ritter (2010), we adjust the trading volume of NASDAQ to make it comparable with those reported in the New York Stock Exchange (NYSE) and American Stock Exchange (AMEX). In particular, for months prior to February 2010, we divide NASDAQ volume by 2; for February 2001 to December 2001, we divide NASDAQ volume by 1.8; for 2002 and 2003, we divide it by 1.6. No adjustment is made after 2003.

We begin our analysis with univariate tests. We first sort IPO firms into four groups according to their pre-IPO media coverage one month before their offer date. All firms with zero media coverage are classified as zero media. Firms with positive media coverage are split into three portfolios with an equal number of firms in each, which we denote low media, medium media, and high media. For each of the subsequent seven years after the IPO, we construct rank variables for each IPO company based on two key measures: analyst coverage and number of institutional investors. Results are shown in Figure 1. Panels A

Figure 1 Persistence of Attention



Notes. We form IPO firms into four groups based on their media coverage (high media, medium media, low media, and zero media) during the month before the IPO offer day and measure their analyst coverage and number of institutional owners for up to seven years after the IPO. Raw measures (panels A and C) are the raw numbers of analysts or institutions without adjustments. Rank measures (panels B and D) show the rank of IPO firms against all IPOs issued within a one-year centered window. The rank measures are standardized so that they have a lower (upper) bound of −0.5 (+0.5).

and C of Figure 1 use raw numbers of analysts and institutions, whereas panels B and D use the relative ranks of the IPO firms. The ranks are relative to all IPOs issued within a 360-day window centered around the issue date of the IPO of interest, and then standardized to have an upper (lower) bound of 0.5 (−0.5).

Several features of the graphs are worth discussing. First, there exists large cross-sectional dispersion in media coverage. Untabulated results indicate that the average values of media coverage are 1.0, 2.8, and 9.7 media articles per month for the low media, medium media, and high media IPOs, respectively. Second, consistent with the idea that firms that receive more media coverage also receive more attention after the IPO, analyst coverage and the number of institutional investors increase monotonically from the zero media IPO companies to the high media IPO companies. Third and most important, the attention measures are highly persistent. Even at the seventh year after the IPO, zero media firms have the lowest numbers of analysts and institutional investors, whereas high media firms have the highest numbers.

Our univariate results are consistent with those reported in Fang and Peress (2009), who show that a significant fraction of stocks with no media coverage in a given month continue to have no media coverage in the next month, whereas about half of the stocks with high coverage continue to have high coverage the next month. Whereas they show a monthly positive autocorrelation of media measure, our tests focus on longer horizons. Our results show that attention, as proxied for by media, persists years into the future.

Next, we extend the univariate analysis by implementing regression tests that control for the impact of other variables that may also affect analyst coverage, liquidity and institutional following. In Table 2, we regress the number of analysts following (*N_ANALYST*) on pre-IPO media coverage (*MEDIA*) at years 1, 2, and 3 following the IPO, after controlling for other variables. For consistency, we use the same set of control variables for all regressions: the pre-IPO size of the company (log(*ASSET*)), the rank of the underwriter (*RANK*), the age of the company (log(1 + *AGE*)), whether the firm was backed by

Table 2 Analyst Following with Media Coverage

	(1) Year 1	(2) Year 2	(3) Year 3	(4) Year 1	(5) Year 2	(6) Year 3
MEDIA	0.278***	0.260***	0.250***	0.387***	0.413***	0.358***
	(0.016)	(0.021)	(0.028)	(0.046)	(0.048)	(0.059)
$MEDIA^2$				−0.006**	−0.008***	−0.006**
				(0.002)	(0.002)	(0.003)
Log(*ASSET*)	0.403***	0.430***	0.447***	0.389***	0.410***	0.433***
	(0.043)	(0.054)	(0.063)	(0.042)	(0.051)	(0.063)
RANK	0.039*	0.043	0.028	0.035	0.037	0.023
	(0.023)	(0.028)	(0.020)	(0.022)	(0.028)	(0.020)
log(1 + *AGE*)	−0.315***	−0.391***	−0.290***	−0.308***	−0.380***	−0.283***
	(0.073)	(0.097)	(0.096)	(0.071)	(0.095)	(0.094)
VC	0.407***	0.621***	0.509***	0.362***	0.560***	0.458***
	(0.137)	(0.160)	(0.170)	(0.126)	(0.153)	(0.159)
NASDAQ	0.580***	0.675***	0.630***	0.575***	0.664***	0.626***
	(0.146)	(0.193)	(0.225)	(0.142)	(0.188)	(0.222)
AMEX	−0.647***	−0.440**	−0.596***	−0.668***	−0.470**	−0.620***
	(0.165)	(0.189)	(0.216)	(0.167)	(0.194)	(0.219)
N	3,138	2,905	2,568	3,138	2,905	2,568
R^2	0.26	0.19	0.16	0.27	0.20	0.16

Notes. The dependent variables are the number of analysts following the stock (*N_ANALYST*) at the first, second, and third year ends after the IPO. Reported in parentheses are standard errors, which are adjusted for clustering by industry measured by four-digit SIC codes. Variable definitions are in Appendix C.
*, **, and *** indicate that the estimated coefficients are significant at the 10%, 5%, and 1% levels, respectively.

venture capitalists before the IPO (*VC*), and dummies for whether the IPO firm will be listed on NASDAQ or AMEX. We use these standard IPO control variables to control for firm characteristics that may influence media coverage and attention. Larger firms may be more likely to attract attention from investors and the media, whereas older firms have had more time to attract attention. The involvement of either a venture capitalist or a top-ranked underwriter may influence media coverage decisions, as might the exchange on which the firm plans to be listed. Standard errors are adjusted for clustering by industry, where industry is measured through four-digit Standard Industrial Classification (SIC) codes.

The key result from Table 2 is that media remains significantly related to the number of analysts covering the stock in each of three years after the IPO. As for control variables, the age of the firm at its IPO is negatively related to the number of analysts over all three years, perhaps because firms that are able to go public at a younger age tend to be more exciting firms. Pre-IPO firm size, venture capital backing, and NASDAQ listing are positively related to analyst coverage over all three years.[12]

The relationship between media and attention may be nonlinear. If a firm is covered in only one article, that one article may have a large marginal effect, whereas one extra article on a firm that has already received substantial coverage may have less effect because most of the people who read the article may have previously seen the other coverage. To explore the possibility that the media effect is nonlinear, we add the square of our media measure ($MEDIA^2$) in regressions (4)–(6) of Table 2. Media is still positive and significant at the 1% level, whereas the media-squared term is significantly negative, implying that the marginal effect of attention is decreasing when media coverage becomes large. The coefficients suggest that the turning point is large, well beyond the main distribution of our media coverage numbers.[13] This indicates that the coefficient on media coverage remains positive in our data range, even though the marginal effect decreases when media coverage gets larger.

In unreported results, we also explore analyst forecast optimism, as measured by the difference between earnings forecasts and realized earnings, to see if the additional analyst coverage is a sign either of sentiment on the part of analysts or of successful promotion of the stock, independent of the underlying quality. There is no significant relationship between pre-IPO media coverage and later analyst forecast optimism, which implies that the higher level of analyst coverage after the IPO is due to investor attention.

In Table 3, we explore the relationship between pre-IPO media coverage and the number of institutional

[12] In unreported tests, we added filing period interval as a control variable to adjust for differences in the length of the quiet period. Results are consistent.

[13] For example, the turning point of the estimated quadratic function for year 1 is where media takes a value of approximately 32, calculated as $0.387/(0.006 * 2)$.

Table 3 Number of Institutional Investors with Media Coverage

	(1) Year 1	(2) Year 2	(3) Year 3	(4) Year 1	(5) Year 2	(6) Year 3
MEDIA	1.556***	1.657***	1.666***	2.126***	2.802***	2.183***
	(0.140)	(0.199)	(0.219)	(0.237)	(0.389)	(0.416)
$MEDIA^2$				−0.030**	−0.060***	−0.028
				(0.014)	(0.022)	(0.025)
log(*ASSET*)	6.328***	8.598***	9.389***	6.259***	8.456***	9.323***
	(0.587)	(0.621)	(0.638)	(0.590)	(0.631)	(0.640)
RANK	0.676***	0.837***	0.949***	0.657***	0.796***	0.932***
	(0.151)	(0.175)	(0.248)	(0.149)	(0.169)	(0.245)
log(1 + *AGE*)	−0.402	−0.616	−0.611	−0.364	−0.538	−0.567
	(0.495)	(0.759)	(0.823)	(0.493)	(0.750)	(0.819)
VC	6.532***	10.404***	12.562***	6.296***	9.928***	12.343***
	(0.954)	(1.381)	(1.458)	(0.960)	(1.344)	(1.435)
NASDAQ	−2.679**	−3.381**	−7.667***	−2.703**	−3.443**	−7.688***
	(1.233)	(1.559)	(2.086)	(1.212)	(1.515)	(2.072)
AMEX	−11.019***	−13.187***	−18.477***	−11.118***	−13.418***	−18.582***
	(1.289)	(1.911)	(2.348)	(1.295)	(1.915)	(2.364)
N	3,173	3,092	2,792	3,173	3,092	2,792
R^2	0.34	0.29	0.26	0.34	0.29	0.26

Notes. The dependent variables are the numbers of institutional investors holding the stocks (*N_INST*) at the first, second, and third fiscal year ends after the IPO. Reported in parentheses are standard errors, which are adjusted for clustering by industry measured by four-digit SIC codes. Variable definitions are in Appendix C.

*, **, and *** indicate that the estimated coefficients are significant at the 10%, 5%, and 1% levels, respectively.

investors in years 1, 2, and 3 after the IPO, using the same control variables as in Table 2. Media coverage is positive and significant for all three years, consistent with Merton's (1987) attention model, where companies that attract more attention at the time of the IPO continue to receive more attention from institutional investors over time. Once again, the media-squared term is negative, indicating diminishing effects of additional media coverage at high levels. Size, underwriter rank, and venture capital backing are all positively related to the number of institutional investors, whereas either a NASDAQ or AMEX listing are negatively related.

In addition to being statistically significant, our results are meaningful in terms of magnitude. When a company attracts three or more pieces of pre-IPO media coverage, which would put it in roughly the top third of our sample, it receives an average of 206% more analyst coverage and 126.6% more institutional investors in its first year after the IPO, relative to a company in roughly the bottom third of our sample in terms of media (with zero coverage).

Next we examine the relationship between pre-IPO media coverage and subsequent liquidity. In Table 4, we measure liquidity through turnover—the natural logarithm of average monthly shares traded as a percentage of total shares outstanding, measured over the first, second, and third years after the IPO. The control variables are the same as in Tables 2 and 3. Media coverage is positive and significant for all three years, whereas media squared is negative. The only consistently significant control variable is for venture capital backing, which is positively related to liquidity. Thus, the results for all of our proxies for investor attention are consistent with pre-IPO media coverage being related to long-term attention.

3.2. Long-Term Value

In this section, we explore the relationship between pre-IPO media coverage and the long-term value of the stock. According to Merton's (1987) attention theory, companies that receive a higher level of attention from investors will have a higher value, for a given level of performance, not only at the time of the IPO, but also in the long run. If media is related to attention, those companies that attract more pre-IPO media coverage will have their demand curve shifted upward permanently and therefore have higher long-term market values.

We measure long-term value following the approach used by Kim and Ritter (1999) and Purnanandam and Swaminathan (2004), looking at price relative to earnings before interest and taxes (EBIT). More specifically, we use the natural logarithm of the price-to-EBIT ratio measured at the first, second, and third fiscal year ends after the IPO to measure the value of the firm. In addition, we examine the difference between the firm's (logged) ratio and the natural logarithm of the median ratio of firms in the same industry at the same fiscal year end. Using industry median ratio as a benchmark of the firm value, the second measure controls for the

Table 4 Liquidity Measures with Media Coverage

	(1) Year 1	(2) Year 2	(3) Year 3	(4) Year 1	(5) Year 2	(6) Year 3
MEDIA	0.035***	0.031***	0.026***	0.070***	0.063***	0.056***
	(0.003)	(0.004)	(0.005)	(0.008)	(0.009)	(0.010)
$MEDIA^2$				−0.002***	−0.002***	−0.002***
				(0.000)	(0.000)	(0.000)
log(*ASSET*)	−0.005	0.024	0.040***	−0.010	0.020	0.036**
	(0.013)	(0.014)	(0.014)	(0.013)	(0.014)	(0.014)
RANK	0.012**	0.017**	0.005	0.011*	0.016**	0.004
	(0.006)	(0.008)	(0.007)	(0.006)	(0.007)	(0.007)
log(1 + *AGE*)	−0.029*	−0.054***	−0.056**	−0.027*	−0.052***	−0.054**
	(0.017)	(0.019)	(0.022)	(0.016)	(0.019)	(0.022)
VC	0.313***	0.477***	0.589***	0.299***	0.464***	0.576***
	(0.042)	(0.046)	(0.043)	(0.042)	(0.045)	(0.042)
NASDAQ	0.119**	0.101*	0.089	0.117**	0.099*	0.088
	(0.046)	(0.052)	(0.065)	(0.046)	(0.052)	(0.065)
AMEX	−0.010	−0.122	−0.430***	−0.016	−0.128	−0.436***
	(0.099)	(0.095)	(0.138)	(0.099)	(0.096)	(0.138)
N	3,173	3,091	2,790	3,173	3,091	2,790
R^2	0.11	0.12	0.12	0.12	0.13	0.12

Notes. The dependent variables are the natural logarithms of the turnover ratio (log(*TURNOVER*)) over the first, second, and third years after the IPO. Standard errors are in parentheses, adjusted for clustering by industry measured by four-digit SIC codes. Variable definitions are in Appendix C.

*, **, and *** indicate that the estimated coefficients are significant at the 10%, 5%, and 1% levels, respectively.

cross-industry variation of firm value. Our industry classification is as defined in Fama and French (1997).

The results are reported in Table 5, with price-to-EBIT ratio as the dependent variable in panel A and the difference between price-to-EBIT ratios for the firm and the industry in panel B. We explore the relationship between these long-term valuation ratios and pre-IPO media coverage (*MEDIA*) after using the same control variables as in §3.1: log(*ASSETS*), *RANK*, log(1 + *AGE*), *VC*, and dummies for *NASDAQ* and *AMEX*. The standard errors are adjusted for clustering by industry as measured by four-digit SIC codes.

MEDIA is positively related to the future valuation ratio measured either as a raw ratio or compared to the industry median ratio, over all three years, at the 1% level. However, when we add the media-squared term, our results are consistent but not as strong—the squared term is only marginally significant, and the *MEDIA* coefficients themselves are significant at the 1% level only in the first year after the IPO, with significance at the 5% level in years 2 and 3 for the raw ratio and only marginal significance in year 3 relative to the industry median. Overall, our results support the argument that media, as a proxy for investors' attention, reflects a permanent upward shift of the demand curve and thus is related to a firm's long-term value.

3.3. Robustness Checks Using Size Dummies and Abnormal Media Coverage

A concern in our regressions is that we may not have fully controlled for the various factors that drive media coverage of IPOs. Journalists that we have talked to have said that a key determinant of coverage is size.[14] Although we include pre-IPO firm size (the log of total assets) as a control variable, it is possible that this does not adequately capture the full effect, particularly if the relationship is not linear. Thus, in this section we add two additional sets of regressions to our analysis, and in the next section we take an instrumental variable approach. Our first step is to add size rank dummies to our regressions, to better adjust for any nonlinear effects of size. We sort the IPO firms into deciles based on total assets and then, instead of using size as a control variable, we add dummies for 9 of the 10 deciles, as a nonlinear way of further adjusting for the effects of size. The signs for the coefficients for these size dummies are consistent with the size variables, which we omit in the table to save space. Also, instead of reporting each event year regression separately, we pool all three year together to save space. Event year dummies are added to the regressions, with the coefficients not reported.

Next, we replace our media measure with excess or abnormal media coverage (*ABMEDIA*), which is the difference between average media coverage per month during the filing period and average media coverage per month over a control period extending from 12 months to 6 months before the IPO filing month. We use the average media coverage

[14] The objectives of journalists are discussed in more detail in Appendix B.

Table 5 Long-Run Valuation with Media Coverage and Price Revision

	(1) Year 1	(2) Year 2	(3) Year 3	(4) Year 1	(5) Year 2	(6) Year 3
			Panel A: Price-to-EBIT ratios			
MEDIA	0.041***	0.038***	0.041***	0.075***	0.056**	0.054**
	(0.008)	(0.013)	(0.012)	(0.018)	(0.028)	(0.024)
$MEDIA^2$				−0.002**	−0.001	−0.001
				(0.001)	(0.001)	(0.001)
log(*ASSET*)	−0.262***	−0.215***	−0.194***	−0.266***	−0.217***	−0.196***
	(0.030)	(0.028)	(0.025)	(0.030)	(0.030)	(0.026)
RANK	0.028***	0.020***	0.007	0.026***	0.019***	0.007
	(0.007)	(0.007)	(0.008)	(0.006)	(0.007)	(0.008)
log(1 + *AGE*)	−0.125***	−0.048**	−0.018	−0.124***	−0.047**	−0.018
	(0.020)	(0.021)	(0.024)	(0.020)	(0.021)	(0.024)
VC	0.345***	0.425***	0.407***	0.336***	0.419***	0.402***
	(0.041)	(0.056)	(0.065)	(0.040)	(0.053)	(0.061)
NASDAQ	0.035	0.048	0.096	0.036	0.049	0.097
	(0.049)	(0.063)	(0.068)	(0.048)	(0.063)	(0.069)
AMEX	−0.453***	−0.418***	−0.351**	−0.461***	−0.420***	−0.353**
	(0.098)	(0.107)	(0.145)	(0.098)	(0.107)	(0.145)
N	2,318	2,043	1,814	2,318	2,043	1,814
R^2	0.25	0.20	0.17	0.25	0.20	0.17
			Panel B: Industry-adjusted price-to-EBIT ratios			
MEDIA	0.032***	0.027***	0.029***	0.054***	0.037	0.038*
	(0.007)	(0.010)	(0.011)	(0.015)	(0.023)	(0.019)
$MEDIA^2$				−0.001*	−0.001	−0.000
				(0.001)	(0.001)	(0.001)
log(*ASSET*)	−0.212***	−0.176***	−0.152***	−0.214***	−0.177***	−0.153***
	(0.022)	(0.020)	(0.019)	(0.022)	(0.021)	(0.020)
RANK	0.023***	0.017**	0.005	0.022***	0.017**	0.005
	(0.006)	(0.007)	(0.008)	(0.006)	(0.007)	(0.008)
log(1 + *AGE*)	−0.119***	−0.046**	−0.026	−0.119***	−0.046**	−0.025
	(0.018)	(0.020)	(0.021)	(0.018)	(0.020)	(0.021)
VC	0.204***	0.244***	0.239***	0.198***	0.241***	0.235***
	(0.035)	(0.045)	(0.053)	(0.035)	(0.042)	(0.051)
NASDAQ	−0.005	0.016	0.069	−0.004	0.017	0.070
	(0.038)	(0.047)	(0.054)	(0.038)	(0.048)	(0.054)
AMEX	−0.354***	−0.307***	−0.227*	−0.360***	−0.308***	−0.228*
	(0.087)	(0.098)	(0.135)	(0.087)	(0.098)	(0.135)
N	2,318	2,043	1,814	2,318	2,043	1,814
R^2	0.19	0.14	0.11	0.20	0.14	0.11

Notes. The dependent variables are the natural logarithms of price-to-EBIT ratios of the IPO firms. Panel A uses raw valuation ratios (log(*P*/*EBIT*)), whereas panel B uses the ratio relative to the industry median ratios (log(*P*/*EBIT*) − log($P/EBIT_{ind}$)). Industry classification is as defined in Fama and French (1997). Firms with negative ratios are not considered. Reported in parentheses are standard errors, which are adjusted for clustering by industry measured by four-digit SIC codes. Variable definitions are in Appendix C.

*, **, and *** indicate that the estimated coefficients are significant at the 10%, 5%, and 1% levels, respectively.

over the entire IPO filing period, rather than the total over only the last month, to better match the control period. Large firms or those with well-known brand names would have been more likely to receive media coverage during our control period as well as during the IPO filing period, so this is another way to control for size or other firm characteristics that directly lead to higher media coverage. As is shown in Table 1, *MEDIA* averages 3.01 mentions in the last month before the IPO whereas *ABMEDIA* averages 2.14 mentions per month.[15] Thus, the IPO filing period is a time when many firms appear to first attract attention, or to attract additional attention, based on this measure.

The results are shown in Table 6 for analyst coverage, institutional investors, liquidity, and firm value.

[15] *ABMEDIA* has a median of 1.151, slightly higher than the median of *MEDIA*, which is 1. If media coverage in the last month of the filling period is higher than the average monthly media coverage during the whole filing period, then *MEDIA* is higher than *ABMEDIA*. Otherwise, *ABMEDIA* may be larger than *MEDIA*. For example, among the 33% of firms that have no media coverage in the last month of the filing period, some have media coverage in the early months of the filing period, resulting in *MEDIA*, which takes a value of 0 in those cases, to be possibly smaller than *ABMEDIA*, which may be a positive number.

Table 6 Extra Size Controls and Abnormal Media Coverage

	N_ANALYST		*N_INST*		log(*TURNOVER*)		log(*P/EBIT*)		log(*P/EBIT*) − log($P/EBIT_{ind}$)	
MEDIA	0.273***		1.722***		0.031***		0.035***		0.026***	
	(0.018)		(0.188)		(0.003)		(0.010)		(0.009)	
ABMEDIA		0.292***		2.086***		0.031***		0.052***		0.044***
		(0.036)		(0.212)		(0.005)		(0.012)		(0.011)
log(*ASSET*)		0.526***		8.565***		0.031**		−0.212***		−0.174***
		(0.048)		(0.583)		(0.012)		(0.023)		(0.017)
RANK	0.051***	0.037*	1.074***	0.788***	0.012**	0.012*	0.022***	0.018***	0.018***	0.015**
	(0.019)	(0.022)	(0.144)	(0.157)	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)
log(1 + *AGE*)	−0.283***	−0.353***	0.395	−0.653	−0.046***	−0.050***	−0.071***	−0.067***	−0.069***	−0.067***
	(0.087)	(0.087)	(0.765)	(0.642)	(0.017)	(0.017)	(0.019)	(0.018)	(0.017)	(0.016)
VC	0.469***	0.631***	9.601***	10.398***	0.439***	0.473***	0.388***	0.393***	0.230***	0.228***
	(0.139)	(0.160)	(1.157)	(1.261)	(0.038)	(0.040)	(0.044)	(0.051)	(0.036)	(0.040)
NASDAQ	0.547***	0.663***	−4.864***	−4.246***	0.089*	0.109**	0.081	0.058	0.039	0.025
	(0.169)	(0.188)	(1.666)	(1.490)	(0.050)	(0.050)	(0.049)	(0.050)	(0.034)	(0.035)
AMEX	−0.616***	−0.573***	−13.986***	−14.028***	−0.193**	−0.179*	−0.380***	−0.411***	−0.279***	−0.301***
	(0.175)	(0.176)	(1.882)	(1.648)	(0.094)	(0.096)	(0.096)	(0.091)	(0.085)	(0.081)
log(*ASSET*) rank dummies	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
N	8,611	8,598	9,057	9,044	9,054	9,041	6,175	6,166	6,175	6,166
R^2	0.19	0.16	0.25	0.27	0.12	0.10	0.23	0.21	0.17	0.16

Notes. The dependent variables are number of analysts following, number of institutional investors, and the logarithms of the turnover ratio, valuation ratio, and industry-adjusted valuation ratio, respectively. The regressions are three-event-year pooled regressions. Event year dummies are added to the regressions, although the coefficients are omitted. For odd-numbered regressions, 9 out of 10 log(*ASSETS*) rank decile dummies are added, although the coefficients are not reported. Reported in parentheses are standard errors, which are adjusted for clustering by industry measured by four-digit SIC codes. Variable definitions are in Appendix C.

*, **, and *** indicate that the estimated coefficients are significant at the 10%, 5%, and 1% levels, respectively.

Pre-IPO media is positive and significant at the 1% level for all of the attention variables when we add size decile dummies, and abnormal media is also positive and significant at the 1% level.

4. Instrumental Variable Approach

Our analysis in the previous section shows a strong relationship between pre-IPO media coverage and various measures of attention and firm valuation over the following three years. However, any such analysis has to address the possibility of an omitted variable that may drive results, in this case by affecting both media coverage and the dependent variables. When there is an endogeneity issue, the ordinary least squares (OLS) coefficient estimates may be biased. In the previous section, we used size rank and abnormal media to try to address this issue. In this section we take an instrumental variable approach, using a measure of exogenous shifts in media coverage as our instrument.

4.1. Construction of Our Instrument

The instrument we adopt is the number of special reports measured over the same time period for which media coverage is measured. We collect the information on special reports from the Vanderbilt University Television News Archive, which has been recording and preserving footage of national evening news broadcasts and special reports since 1968.[16] Consistent with our media measure, we use a simple count of the number of special reports during a specific time period as a measure of major events that occurred, events that would shift overall attention away from a company going public.

We use only specials on one of three networks (ABC, NBC, or CBS), because they were active throughout our sample period, whereas CNN, Fox, CNBC, CSPAN, MTO, and MSNBC are excluded because they were not active and stable throughout the period. In addition, PBS is excluded because its specials were primarily *Frontline* documentaries rather than timely special reports of current news. We also exclude the ABC show *Nightline*, which aired only occasionally to cover major news early in our sample, but developed into a regular nightly show later in our sample.

As shown in Table 1, the average number of special news reports in the month before the IPOs in our sample is 11.9, well above the average of 3.0 media mentions of our IPO firms in the same time period. Some of these reports are in-depth coverage of longer-term issues rather than breaking news. For example,

[16] Erfle and McMillan (1990) use the Vanderbilt TV News Archive to measure political pressure on oil companies during the 1979 oil crisis via the amount of media coverage of domestic oil news on the nightly news programs of the three main U.S. television networks.

in 1989 NBC ran a two-part series on "Black Athletes: Fact or Fiction" on April 25, whereas ABC had a special on "America's Kids: Teaching Them To Think" on May 4. Although such one-off specials add some noise to our measure, a large number of reports in the same month reflects a major occurrence that drew repeated coverage from the three networks, such as the 1989 San Francisco earthquake, which resulted in 10 special reports on October 17, 3 on October 18, 1 on October 19, and 6 on October 20, for a total of 20 in just four days.

Another example of an event that attracted substantial media coverage was the Pan Am Flight 73 hijacking in Karachi, Pakistan, on September 5, 1986. There were 14 IPOs in our sample with filing dates before this date and issue dates within a month afterward. For this subsample, the average media coverage is 1, with maximum 3 and minimum 0, whereas the entire sample has a mean of 3. The subsample had 0 analysts following, an average of 5 institutional investors, a log(*TURNOVER*) of 1.41, and a $\log(P/EBIT) - \log(P/EBIT_{ind})$ (the P/EBIT ratio of the firm relative to the average for the industry) of 0.14 at the end of first year after the IPO, whereas the averages for the entire sample are 2.4 analysts following, 25 institutional investors, a log(*TURNOVER*) of 1.7, and a $\log(P/EBIT) - \log(P/EBIT_{ind})$ of 0.42. Thus, this subsample attracted less media coverage during their IPOs, with apparently lasting effects.

Our special reports measure needs to meet two requirements to be a valid instrument. First, the number of special reports in a given month should be correlated with the degree of media coverage of IPOs during that same time period. Second, the instrument must be otherwise uncorrelated to the dependent variables—the number of analysts, institutional investors, liquidity, and firm value one, two, or three years into the future. The long-term effects of the Pan Am hijacking might be expected if the firms doing their IPOs around September of 1986 happened to be, say, airlines and travel agencies, but there do not appear to be any direct links between the incident that attracted attention and the firms that happened to be going public at the time. An example of an IPO occurring around the time of the hijacking is Duramed Pharmaceuticals (ticker DRMD), a developer and manufacturer of generic drugs based in Cincinnati, Ohio, which filed for its IPO on August 22, 1986, and issued on September 23, 1986. Duramed had two media mentions, no subsequent analyst coverage, only four institutional investors, and a $\log(P/EBIT) - \log(P/EBIT_{ind})$ value of -0.26 at the end of first year after the IPO.

4.2. The Relevance and Exclusion Conditions

A plausible instrument needs to satisfy both the relevance condition and the exclusion condition (see Roberts and Whited 2012). The relevance condition requires the partial correlation between the instrument and the endogenous variable to be nonzero. Our instrument, the number of special news reports, measures the frequency of major newsworthy events. When a major newsworthy event occurs, it is likely to be covered heavily on the broadcast networks and in newspapers, which in turn reduces the newspaper and broadcast space available for other news items, including those involving IPO firms. Therefore, we expect the special news report variable to be negatively correlated with the media coverage received by IPO firms. The results in Table 7 confirm these expectations.[17] The relationship between special reports and pre-IPO media coverage is negative and statistically significant at the 1% level. The *F*-statistic for the Cragg–Donald weak identification test is 97.49 for the univariate test and 78.73 when adding other controls. These easily surpass the Stock and Yogo (2005) threshold for two-stage least squares (2SLS) with only one instrument, which is 16.38 for 5% significance level (i.e., $K_2 = 1$; see Table 5.2, p. 101).

To satisfy the exclusion condition, an instrument variable needs to be correlated with neither the error term in the structural function nor any omitted correlated variable; in other words, the only role that the instrument plays in influencing the dependent variables is through its effect on the endogenous variable. In our setting, special reports on occurrences such as the 1989 San Francisco earthquake or the 1999 Columbine High School shooting are random in nature and can be considered as exogenous shocks to investor attention through the news media. In addition, special reports are by construction not specific to the individual IPO firms. Although some special reports may be related to certain industries or firms and could increase media coverage of such firms or industries, it is not the case on average, as indicated by the significantly negative relationship between special reports and media coverage of IPO firms. Given the random and firm-unspecific nature of special reports, they are unlikely to directly affect individual IPO firms' future investor attention, liquidity, or valuation. Therefore, we feel that special reports are unlikely to affect our dependent variables through channels other than media coverage received by IPO firms.[18]

[17] We use all available observations in estimating this first-stage regression. The first-stage results differ slightly when we estimate 2SLS regressions together, as reported in Table 8, because the number of observations varies slightly across the dependent variables. However the results are qualitatively and quantitatively similar.

[18] It is possible that certain newsworthy events have macroeconomic implications, such as the Reagan–Gorbachev summit in November 1985 or the Jordan–Israel peace agreement signed in July 1994. However, such effects are likely economy-wide, and

Table 7 First-Stage and Reduced-Form Regressions

	First stage		Reduced form				
	MEDIA	*MEDIA*	*N_ANLYST*	*N_INST*	log(*TURNOVER*)	log(*P/EBIT*)	log(*P/EBIT*) − log($P/EBIT_{ind}$)
SPECIALS	−0.057***	−0.053***	−0.054***	−0.273***	−0.008***	−0.009***	−0.004***
	(0.008)	(0.006)	(0.007)	(0.039)	(0.001)	(0.002)	(0.001)
log(*ASSET*)		0.732***	0.587***	9.095***	0.036***	−0.202***	−0.161***
		(0.068)	(0.051)	(0.576)	(0.012)	(0.021)	(0.015)
RANK		0.107***	0.058**	0.964***	0.014**	0.021***	0.018***
		(0.028)	(0.023)	(0.173)	(0.006)	(0.007)	(0.006)
log(1 + *AGE*)		−0.218*	−0.348***	−0.685	−0.047***	−0.061***	−0.064***
		(0.120)	(0.099)	(0.731)	(0.018)	(0.018)	(0.017)
VC		1.191***	0.787***	11.478***	0.487***	0.413***	0.244***
		(0.223)	(0.178)	(1.313)	(0.040)	(0.054)	(0.042)
NASDAQ		0.010	0.494***	−5.034***	0.085*	0.020	0.002
		(0.265)	(0.191)	(1.613)	(0.051)	(0.048)	(0.034)
AMEX		−0.280	−0.592***	−14.304***	−0.180*	−0.414***	−0.307***
		(0.293)	(0.176)	(1.690)	(0.094)	(0.093)	(0.083)
Cragg–Donald	97.49	78.73					
N	3,597	3,173	8,611	9,057	9,054	6,175	6,175
R^2	0.03	0.11	0.14	0.25	0.10	0.21	0.15

Notes. The dependent variables of the first two regressions are the media coverage variable. For the right-hand panel, the dependent variables are number of analysts following, number of institutional investors, and the natural logarithms of turnover ratio, valuation ratio, and industry-adjusted valuation ratio, respectively. The regressions for the right-hand panel are three-event-year pooled regressions with event year dummies added as controls, although the coefficients are not reported. In parentheses are standard errors, which are adjusted for clustering by industry measured by four-digit SIC codes. Variable definitions are in Appendix C.

*, **, and *** indicate that the estimated coefficients are significant at the 10%, 5%, and 1% levels, respectively.

4.3. Instrumentation Results

Having established the strong impact of the instrument on media coverage, we turn to analyzing its effect over the next three years, first through the reduced-form correlation (see Bennedsen et al. 2007) between special news reports and our key dependent variables of interest. We pool all three years together in the regressions, with event year dummies added as controls. The results are presented in Table 7—we find a strong and negative correlation between special news reports (*SPECIALS*) and later analyst coverage, institutional investors, liquidity, and future firm value. The result that firms up to three years later have less analyst coverage, liquidity, etc., if their IPO occurred in the month of a major news event rather than a month or two earlier or later should be interpreted as strong evidence that lack of attention during an IPO has long-term effects.

Next we take a 2SLS approach to estimate the magnitude of the effect of pre-IPO media coverage. In the first stage, as reported in Table 7, we regress media on our control variables and our instrument. The first-stage regressions actually vary slightly based on the specific samples—we do not report all of them to save space, since they are very similar. The predicted values are then used in Table 8 to explain analyst coverage, institutional investors, etc., in the first through third years after the IPO. The reported coefficients and standard errors are from the joint estimations of the two stages. We saw in Table 7 that the instrument is significantly negatively related to media after controlling for other variables, with a high Cragg–Donald *F*-statistic, thus satisfying the relevance condition for a valid instrument. The second-stage regressions in Table 8 show that the instrumented media is strongly positively related to the dependent variables.

To summarize, our instrument is a daily measure of the number of special news reports that aired on the three networks (excluding ABC's *Nightline*) during our sample period. We aggregate the daily count to get the total number of special news reports during the month before the IPO or, in other words, during the same time period that we measure media coverage of our issuers. This instrument, with no direct effect on variables related to the IPO firms' futures, is shown to be significantly negatively related to the media coverage variable. All results remain unchanged with this instrument approach, further mitigating the endogeneity concern in our OLS analysis. We find that exogenous shifts in attention, as measured by our special news reports instrument, attract media attention away from IPOs during their filing period, with lasting effects that are consistent with the Merton (1987) attention model.

it is not clear how they would vary systematically across IPO firms. Nevertheless, we conduct an additional robustness analysis by excluding those special events on dates when the value-weighted market return is higher than 0.5% or lower than −0.4%; the two cutoff points are the 75th percentile and the 25th percentile of the daily return distribution of special news report dates. We obtain similar results using the alternative definition of special news reports.

Table 8 Second Stage of IV Regressions

	Panel A			Panel B			Panel C		
	N_ANLYST			*N_INST*			log(*TURNOVER*)		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
MEDIA	1.155***	1.105***	1.057***	4.409***	5.902***	5.969***	0.167***	0.168***	0.126***
	(0.120)	(0.136)	(0.173)	(0.602)	(0.915)	(1.163)	(0.024)	(0.029)	(0.034)
log(*ASSET*)	−0.281***	−0.207*	−0.198	4.118***	5.289***	6.104***	−0.107***	−0.083***	−0.036
	(0.102)	(0.113)	(0.152)	(0.628)	(0.815)	(0.985)	(0.021)	(0.025)	(0.028)
RANK	−0.063**	−0.047*	−0.059	0.348**	0.328*	0.529**	−0.003	0.001	−0.005
	(0.025)	(0.025)	(0.039)	(0.151)	(0.189)	(0.259)	(0.007)	(0.008)	(0.007)
log(1 + *AGE*)	−0.085	−0.223**	−0.142	0.347	0.502	0.253	0.005	−0.018	−0.036*
	(0.098)	(0.089)	(0.095)	(0.483)	(0.763)	(0.837)	(0.021)	(0.022)	(0.021)
VC	−0.643***	−0.340	−0.414	3.040***	5.273***	7.633***	0.152***	0.311***	0.474***
	(0.238)	(0.274)	(0.287)	(1.075)	(1.517)	(1.816)	(0.051)	(0.057)	(0.057)
NASDAQ	0.436*	0.612***	0.649**	−3.159***	−4.047**	−7.696***	0.097*	0.079	0.089
	(0.235)	(0.223)	(0.259)	(1.125)	(1.730)	(2.122)	(0.056)	(0.055)	(0.062)
AMEX	−0.367	−0.131	−0.343	−10.048***	−11.846***	−16.892***	0.035	−0.079	−0.393***
	(0.311)	(0.325)	(0.349)	(1.434)	(2.289)	(2.872)	(0.105)	(0.101)	(0.140)
N	3,138	2,905	2,568	3,173	3,092	2,792	3,173	3,091	2,790
R^2	0.18	0.13	0.11	0.29	0.26	0.24	0.09	0.11	0.12

	Panel D					
	log(*P/EBIT*)			log(*P/EBIT*) − log($P/EBIT_{ind}$)		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
MEDIA	0.332***	0.248***	0.221***	0.176***	0.089**	0.101*
	(0.068)	(0.066)	(0.070)	(0.048)	(0.045)	(0.053)
log(*ASSET*)	−0.500***	−0.394***	−0.340***	−0.330***	−0.228***	−0.210***
	(0.066)	(0.066)	(0.068)	(0.046)	(0.044)	(0.049)
RANK	0.001	0.005	−0.009	0.009	0.013*	−0.001
	(0.010)	(0.009)	(0.010)	(0.008)	(0.007)	(0.009)
log(1 + *AGE*)	−0.144***	−0.064**	−0.010	−0.129***	−0.051**	−0.022
	(0.031)	(0.027)	(0.026)	(0.022)	(0.021)	(0.021)
VC	0.245***	0.294***	0.282***	0.154***	0.206***	0.189***
	(0.061)	(0.064)	(0.071)	(0.044)	(0.047)	(0.057)
NASDAQ	0.166*	0.149*	0.185**	0.061	0.046	0.105*
	(0.085)	(0.085)	(0.084)	(0.054)	(0.053)	(0.061)
AMEX	−0.361***	−0.331**	−0.284*	−0.309***	−0.281***	−0.201
	(0.133)	(0.134)	(0.166)	(0.101)	(0.104)	(0.141)
N	2,318	2,043	1,814	2,318	2,043	1,814
R^2	0.25	0.20	0.15	0.18	0.13	0.10

Notes. This table reports the second stage of the IV regression, where the instrument variable is *SPECIALS*. The first stage of the IV regression is reported in the second regression of Table 7. The dependent variables are number of analysts following, number of institutional investors, and natural logarithms of turnover ratio, valuation ratio, and industry-adjusted valuation ratio, respectively. Reported in parentheses are standard errors, which are adjusted for clustering by industry measured by four-digit SIC codes. These standard errors are obtained from jointly estimating the two-stage regressions together. Variable definitions are in Appendix C.

*, **, and *** indicate that the estimated coefficients are significant at the 10%, 5%, and 1% levels, respectively.

5. Media Coverage and Expected Return

In this section, we explore the relationship between pre-IPO media coverage and the firm's long-run return performance. Merton's (1987) theory predicts that high attention relates to lower expected return. We estimate this effect by constructing an expected-return measure. Measuring the expected return is difficult—early studies use realized returns as proxies for expected return, but this approach has limitations. For example, realized returns may not converge to expected returns in finite samples (e.g., Elton 1999). To obtain unbiased estimates of expected returns from realized returns therefore requires fairly long time series (Stulz 1999). Moreover, expected-return estimates from realized returns may have large measurement errors due to noise in estimating factor loadings and factor risk premiums (e.g., Fama and French 1997).

We adopt an alternative method to estimate the expected return, employing accounting-based valuation models to construct the ex ante required rate

of return implied in contemporaneous stock price and analyst forecast data. This approach has been used in recent studies including Pastor et al. (2008), Hail and Leuz (2009), Chen et al. (2013), Tang et al. (2014), and Mao and Wei (2014a, b). Chen et al. (2013) have detailed discussions about the advantage of this implied cost of capital (ICC) measure, the assumptions behind this measure, and the comparisons of this measure with respect to other measures.

In this study, we adopt four implied cost of capital models that are commonly used in the literature (Gebhardt et al. 2001, Claus and Thomas 2001, Easton 2004, Ohlson and Juettner-Nauroth 2005). We take the median of the four estimations to mitigate the estimation errors of individual model. All four models are consistent with the discounted cash flow valuation model

$$P_t = \sum_{\tau=1}^{\infty} \frac{D_{t+\tau}}{(1+r)^{\tau}},$$

where P_t is current stock price, $D_{t+\tau}$ is expected future cash flow or dividend, and r is implied cost of capital, or expected return. The valuation models exploit basic accounting relations to derive future expected cash flows based on residual income or abnormal earnings. All four models use P_t as input and use analyst forecast data as approximations of future expected cash flow to solve for the implied cost of capital, r. The four models differ in terms of the use of analyst forecast data, the estimation of terminal growth rate, and the forecast horizon. Taking the median of the estimation from the four models is used by Hail and Leuz (2006), Chen et al. (2011), and Mao and Wei (2014a, b), among others.[19]

Each month, the semiannual ICC was estimated using contemporaneous stock prices and the most updated analyst forecast data. For comparison purposes, we also construct semiannual buy and hold realized returns. We multiply the estimated ICC and realized return by two to obtain annualized returns. The estimation is implemented each month from the 7th until the 42nd month after the IPO. We skip the first six months to avoid the effects of aftermarket price stabilization by underwriters (Ellis et al. 2000), lockup expiration (Field and Hanka 2001), or any possible short-term overpricing by sentiment investors.[20] A positive relationship between IPO media coverage and initial returns is documented by Pollock and Rindova (2003) and Cook et al. (2006).[21] Since we are interested in the long-run expected return rather than short-run pricing effects, we skip the first six months and use the stock prices starting from the seventh month after the IPO.

We construct the ICC measures as averages over each event year. We also construct the average ICC for the entire period from month 7 to month 42. The three year average ICC is 10.9% per annum with a standard deviation of 2.9%, while the contemporaneous realized return has a mean of 22.1% and standard deviation of 60.5%. The small standard deviation of the ICC compared to that of the realized return is well documented in the literature. Most of the variation in stock returns is driven by either cash flow news or discount rate news.

In Table 9, the first three columns report regressions of the expected-return measure on media coverage and controls over the first, second, and third years after the IPO. The media coverage is significantly negatively related to expected return, consistent with Merton's (1987) theory. The square of media is positive for the first two years, showing some evidence of decreasing marginal effects of media on expected return. The numbers of observations are smaller than those reported in previous tables because we require analyst forecast data to construct the expected-return measure. An untabulated test shows that media is insignificantly related to three year average realized return even in a univariate regression. Because of the large volatility of realized returns compared to expected returns, realized return may not be a good proxy for expected return, which is why we use an alternate measure of expected return to estimate the effects of pre-IPO media coverage on the required cost of capital.

Among control variables, firm size is negatively related to the expected return. The fact that large firms on average earn lower returns is a well-known return pattern, first documented in Banz (1981). Moreover, VC-backed firms have a lower expected return, consistent with venture capitalists being able to either select low risk firms or decrease their relative riskiness.

The media coefficient of around −0.20 implies that every extra piece of media coverage reduces the annual expected return by around 0.2%. To further

[19] We thank Mike Qinghao Mao for sharing with us the semiannual ICC data.

[20] Behavioral biases have been documented for retail IPO investors. See, for example, Dorn (2009), and Chiang et al. (2010, 2011). Da et al. (2011) offer evidence of self-directed (as opposed to media-driven) sentiment investor trading in IPOs. On the other hand, in a non-IPO setting, Kelley and Tetlock (2013) find evidence that many retail trades are informed. It is possible that some retail traders are rational and informed, whereas others are sentiment investors. Regarding media coverage and sentiment, Tetlock (2007) looks at the response to a popular *Wall Street Journal* column, finding that stock price reactions are consistent with the presence of noise and liquidity traders.

[21] Theoretical models that relate Merton's (1987) investor attention to IPO pricing include Sherman and Titman (2002) and Zhang (2004). Kecskes (2009) explores the effects of attention on IPOs empirically.

Table 9 Expected-Return Regressions

	OLS			Robust check		Reduced form	Second stage		
	(1) ICC year 1	(2) ICC year 2	(3) ICC year 3	(4) ICC	(5) ICC	(6) ICC	(7) ICC year 1	(8) ICC year 2	(9) ICC year 3
MEDIA	−0.226***	−0.189***	−0.202***	−0.098***			−0.966***	−0.746***	−0.665***
	(0.070)	(0.049)	(0.076)	(0.032)			(0.341)	(0.228)	(0.229)
$MEDIA^2$	0.009**	0.006**	0.006						
	(0.004)	(0.003)	(0.005)						
ABMEDIA					−0.073*				
					(0.041)				
SPECIALS						0.036***			
						(0.007)			
log(*ASSET*)	−0.242**	−0.139	−0.198*		−0.245***	−0.233***	0.589	0.467*	0.354
	(0.122)	(0.118)	(0.119)		(0.092)	(0.084)	(0.389)	(0.269)	(0.263)
RANK	−0.103*	−0.043	−0.043	−0.065*	−0.060	−0.072*	−0.067	−0.021	−0.022
	(0.058)	(0.041)	(0.037)	(0.036)	(0.038)	(0.037)	(0.061)	(0.040)	(0.039)
log(1 + *AGE*)	0.028	−0.128	−0.066	−0.069	−0.044	−0.042	−0.164	−0.242	−0.205
	(0.142)	(0.146)	(0.140)	(0.115)	(0.113)	(0.109)	(0.210)	(0.189)	(0.166)
VC	−0.497	−0.754***	−1.073***	−0.947***	−0.995***	−1.013***	−0.096	−0.328	−0.687*
	(0.303)	(0.232)	(0.355)	(0.209)	(0.220)	(0.223)	(0.412)	(0.367)	(0.393)
NASDAQ	−0.465	−0.145	−0.151	−0.178	−0.210	−0.061	−0.396	−0.180	−0.035
	(0.332)	(0.269)	(0.300)	(0.248)	(0.241)	(0.238)	(0.491)	(0.357)	(0.380)
AMEX	−0.034	0.151	1.803	0.777	0.767	0.861	−0.562	−0.372	1.380
	(0.812)	(0.635)	(1.132)	(0.749)	(0.757)	(0.748)	(1.022)	(0.688)	(1.116)
log(*ASSET*) rank dummies	No	No	No	Yes	No	No	No	No	No
N	724	902	833	938	935	938	724	902	833
R^2	0.03	0.03	0.04	0.05	0.05	0.07	0.05	0.04	0.05

Notes. The dependent variables measure expected return using the implied cost of capital. The ICC represents the average expected return over the first three years after the IPO, whereas ICC years 1, 2, and 3 represent the average expected return over the first, second, and third years, respectively, skipping the first six months. The first six regressions are OLS regressions, whereas the last three regressions are the second stage of IV regressions. Reported in parentheses are standard errors, which are adjusted for clustering by industry measured by four-digit SIC codes. These standard errors for the second-stage regressions are obtained from jointly estimating two-stage regressions altogether. Variable definitions are in Appendix C.

*, **, and *** indicate that the estimated coefficients are significant at the 10%, 5%, and 1% levels, respectively.

gauge the economic significance of media's impact on expected return, we group the sample into three subsamples with roughly equal numbers of observations, based on media coverage. The average expected return over three years after the IPO for the lowest media subsample, with zero media coverage, is 11.2%, whereas that for the highest media subsample, with three or more pieces of coverage, is 10.2%, a difference of 1.0% per annum. We argue that the impact of media on expected return is not only statically but also economically significant.

Regressions (4) and (5) of Table 9 confirm that our results are again robust both to adding size dummies and to using abnormal media. Instead of reporting each event year separately, we use the three year average ICC as the dependent variable to save space. The last columns of Table 9 give the instrumental variable results. The first-stage estimation results are very similar to those reported in previous tables and so are omitted to save space. Regression (6) is the reduced-form regression, showing that the three year average implied cost of capital is significantly related to our special reports instrument. Regression (7) to regression (9) show the second stage of the IV tests using ICC over event years 1, 2, and 3 as the dependent variables. The second-stage results confirm that the instrumented media measure is negatively related to the expected return, again at the 1% level. The negative relationship between media coverage and expected return is robust after controlling for the endogeneity problem.

6. Conclusion

In this study, we document that media coverage before an IPO significantly relates to long-term measures of investor attention and firm value. Our measure of media coverage is a simple count (based on a Factiva search) of the number of times that the company's name is mentioned in major news and business publications during the last month of the filing period, up to one day before the offering. This objective, quantifiable measure can be replicated both for other countries and for other time periods.

IPOs are a good setting in which to examine the long-run role of media coverage because they involve a relatively uniform beginning sample. These firms are

all attempting to attract attention, are all undergoing a major event that makes them potentially eligible for attention, and yet are all restricted (due to strict U.S. quiet period regulations for IPOs) in such a way that media coverage is extremely unlikely to contain new hard information not already revealed in the prospectus. In attempting to explain a relationship between media coverage and returns, the quiet period restrictions and our long-term focus allow us to rule out alternate explanations for such a relationship, such as the media coverage releasing genuine news or being driven by manipulation by the firm itself, or investor sentiment leading to a temporary mispricing.

Whereas other studies (Da et al. 2011 for IPOs, Fang and Peress 2009 for a cross section of already-public companies) have offered evidence of short-term attention effects, we provide evidence of a long-term role for pre-IPO media coverage. Merton (1987) argues that once investors become familiar with a company, they will continue to follow it and will consider investing in it even when they would not consider investing in other similar companies with which they are not familiar. Van Nieuwerburgh and Veldkamp (2009) find that individuals should be more willing to continue to pay attention to stocks with which they are already familiar. Thus, we would expect attention to be persistent. If the role of the media is related to investor attention as in Merton (1987), we would expect pre-IPO media coverage to be positively related to analyst coverage, liquidity, and institutional investor ownership in the years after the IPO, and to the long-term value of the company as measured by the price/EBIT ratio. Our results are consistent with these predictions. A company that attracts three or more pieces of media coverage, which puts it in roughly the top third of our sample, has, on average, 206% more analyst coverage and 126.6% more institutional investors than a company in the bottom third of our sample in terms of media coverage in its first year after the IPO.

The relationships between pre-IPO media coverage and subsequent analyst coverage, institutional investors, liquidity, and firm value are robust to adding nonlinear controls for size, to using abnormal or excess media, and to using an instrumental variable approach. Our instrument—the number of special news reports on the three main U.S. television networks in the last month before the IPO—is a measure of exogenous news that would leave less attention for companies going public. More special news reports during the month before the offering date are related to significantly less media coverage for the IPO firms in our sample, which is consistent with exogenous special events drawing attention away from IPO firms, and less media coverage in the last month before the IPO is related to less attention over the following three years.

Last, we estimate the impact of pre-IPO media coverage on a firm's future cost of capital by constructing an accounting-based measure of the implicit required return to the stock, using the expectations that are implied by contemporaneous stock price and analyst forecast data. This implied cost of capital for the three years after going public is negatively related to pre-IPO media coverage, and the results are robust to instrumentation and our other approaches. In terms of high versus low media coverage, the difference in expected future returns between the top and bottom thirds of our sample is 1.0% per annum, implying that differences in pre-IPO media coverage are economically as well as statistically significant.

These results contribute to the growing literature on the media in asset pricing. Hirshleifer et al. (2009) examine the competition for investor attention, showing that markets are slower to react to one firm's earnings announcement when there is more competing news as measured by other firms also making earnings announcements. Our instrumental variable analysis produces results for a broader range of competing news and shows that the effects may be long lasting, at least for firms that face large amounts of competing news in the crucial month just before their IPO. More research is needed on the broader effects of competing news and the competition for investor attention.

Acknowledgments

The authors thank department editor Brad Barber, an anonymous associate editor, an anonymous referee, Sugato Bhattacharya, Henry Blodget, Francesca Cornelli, Lynn Cowan, Sudipto Dasgupta, Werner DeBondt, Dan Deli, Sanjay Deshmukh, John Fitzgibbon, Fangjian Fu, Paul (Pengjie) Gao, Vidhan Goyal, John Griffin, Gerald Hoberg, Joonghyuk Kim, Kai Li, Yingying Li, Jose Liberti, Chen Lin, Alexander Ljungqvist, Mike Lemmon, Michelle Lowry, Mike Qinghao Mao, Kasper Meisner Nielsen, Joe Nocera, Jay Ritter, Mark Seasholes, Sabatino (Dino) Silveri, Bruno Solnik, Xuan Tian, Peng Wang, Cong Wang, Sean Lu Xun, and Shan Zhao, as well as 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 Illinois at Chicago, DePaul University, 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), the 2008 European Financial Management/Oxford University Symposium on IPOs (Oxford, United Kingdom), and the 2009 American Financial Association Meetings (San Francisco, California). All errors are the authors' responsibility.

Appendix A. The Quiet Period

Because U.S. regulations are designed to level the playing field in terms of information about an IPO, issuers are

required to put all material information about the company in the prospectus.[22] The issuer, its underwriter, and its lawyers spend many intensive weeks drafting and redrafting this comprehensive document to make sure that nothing material has been left out, since the issuer, underwriter, accountants, and lawyers are all liable for inaccuracies or omissions. Once the preliminary draft is filed with the SEC, the SEC then thoroughly reviews the document to make sure that nothing material has been omitted, frequently ordering the company to add more information or more risk factors.

During the "quiet period," the issuer is expected to communicate with potential investors only through the prospectus, which is available to all. If a report appeared in the media during the IPO filing period that contained substantial hard information about the issuer that was not already in the prospectus, then by definition the issuer would be guilty of omitting material information, leading the SEC to put the offering on hold while it required substantial redrafting plus the addition of new warnings and risk factors. For example, the PayPal IPO was nearly cancelled because of a much less serious potential violation regarding quiet period regulations—a PayPal executive answered an investor's question by referring that investor to the prospectus, but made the mistake of naming a specific page in the prospectus. Because a specific page number had been given, the SEC required a risk factor to be added, warning that the entire offering might be undone up to a year after it had been completed based on their final ruling regarding this possible quiet period violation.

Moreover, in 2004, the SEC forced both Google and Salesforce.com to postpone their IPOs because of potential quiet period violations. In the case of Google, the infamous Playboy interview of the founders had to be included in the prospectus. Both of these potential violations involved opinions or background information from company insiders, rather than specific hard information, and both resulted in substantial delays that endangered the success of their IPOs. If the SEC is this alert and proactive regarding minor infractions, it is unlikely that more major, substantive violations are occurring so frequently that such violations are driving our results. Moreover, if a violation somehow escaped the attention of the SEC before the offering, it would be ample grounds for a shareholder lawsuit later, yet we have not found evidence of such lawsuits. Thus, when a company is in its filing period for an IPO, media coverage is unlikely to contain any "genuine news" in the sense of new, factual information that was not already available in the prospectus.

Appendix B. The Motivations of Journalists

In any consideration of the effects of journalism and of why some companies receive media coverage while others do not, a key step is to examine the incentives of the journalists themselves. Media sources compete to attract readers, which allows them to attract advertising revenues. Their goal is not to be "fair" by covering all companies equally, regardless of demand from their readership. Editors expect their reporters to cover the companies that either have attracted or will attract the attention of the market. The better journalists are at predicting which stocks will attract attention, the happier their editors will be. Thus, although media coverage of IPOs does not contain new hard information, the very fact that a stock receives coverage indicates that journalists and/or their sources expect the stock to attract attention. This expectation on the part of "the market" may be a relevant form of soft information, according to Merton's (1987) theory.

Journalists use their own judgment in these forecasts, but they also talk to others on Wall Street. According to John Fitzgibbon (2007), founder of the IPO investment newsletter the IPO SCOOP, there are "no secrets on Wall Street," because "Wall Street is just one big gossip" Mr. Fitzgibbon rates IPOs before they begin to trade, first getting the opinions of various people in the securities industry such as investors that may have attended the road show as well as other investors, traders, analysts, rating services, etc.

In addition to Mr. Fitzgibbon, other independent IPO analysts (not affiliated with underwriters) include Francis Gaskins, Ben Holmes, and Scott Sweet. Lynn Cowan, who writes the *Wall Street Journal* column IPO Outlook, reviews every S-1 filing and forms her own opinions, but then she checks the opinions of all four of these independent IPO analysts to see if they agree. Roughly 80% of the time (by her estimate), there is general agreement between these four analysts and herself (Cowan 2007). When there is not, she tries to 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 newsworthy.

Thus, the professional interests of journalists would seem to indicate that media coverage will be more than mere noise.[23] Coverage may include some stocks purely because of short-term demand from retail investors who might be driven by sentiment, but it will also include stocks that sophisticated investors care about, or that journalists expect to do well in the future. Thus, pre-IPO media coverage may be related to the long-term value of the company, and, given the fixed costs of evaluating and interpreting ongoing information about the firm, companies that attract a high level of attention initially are more likely to continue to receive substantial attention in the future.

[22] The process is different for seasoned offerings by already-public companies. For such companies, much information has already been made public in quarterly and annual reports, and the company might be allowed to incorporate that material by reference. For an IPO, however, the prospectus needs to be complete and comprehensive, and quiet period regulations are much more strict.

[23] Cook et al. (2006) argue that variations in media coverage may be driven by the marketing efforts of investment banks, perhaps because some issuers pay higher fees in exchange for more promotion. However, the idea that variations in media coverage are due to variations in the underwriters' desire to promote each offering does not seem to match the incentives of the agents involved: journalists, who want to please their editors by covering stocks that are newsworthy; the issuers themselves, who want to attract attention whether or not they also choose to pay higher fees; and the investment bankers, who want every offering to succeed so that they can build their reputation and get the chance to manage more IPOs in the future (particularly given that fees are high for all U.S. IPOs). Moreover, direct marketing to journalists by underwriters, outside the prospectus, would violate the very strict quiet period regulations for U.S. IPOs.

Appendix C. Variable Definitions

Variable name	Definition
MEDIA	The number of media articles covering the IPO firm during the last month up to one day before the offer date
$MEDIA^2$	The square of our *MEDIA* measure
ABMEDIA	The difference of average monthly media coverage during the IPO filing period and average monthly media coverage measured from month $t-12$ until month $t-6$, where month t is the IPO filing month
SPECIALS	The number of special news reports on the three main U.S. television networks (ABC, NBC, and CBS; excluding ABC's *Nightline*, due to a shift away from special report status during the sample period), as recorded by the Vanderbilt University TV News Archives, during the last month up to one day before the offer date
N_ANALYST	Number of analysts following the stock of the firm, measured at the end the first, second, and third years after the IPO
N_INST	Number of institutional investors holding the stock of the firm, measured at the end of the first, second, and third years after the IPO
log(*TURNOVER*)	Natural logarithm of average monthly shares traded as a percentage of total shares outstanding, measured over the first, second, and third years after the IPO
log(*P*/*EBIT*)	Natural logarithm of an IPO firm's price-to-EBIT ratio, measured at the end of the first, second, and third fiscal years after the IPO
$\log(P/EBIT) - \log(P/EBIT_{ind})$	Natural logarithm of an IPO firm's price-to-EBIT ratio minus the median price-to-EBIT ratio of the same industry, measured at the end of the first, second, and third fiscal years after the IPO; industry classification is as defined in Fama and French (1997)
log(*ASSET*)	The natural logarithm of pre-IPO assets, adjusted for inflation
RANK	Carter–Manaster rank of lead underwriter, obtained from Jay Ritter's website
$\log(1+AGE)$	The natural logarithm of 1 plus age of issuer at IPO in years, obtained from Jay Ritter's website
VC	Equal to 1 if the firm is venture capitalist backed and 0 otherwise
NASDAQ	Equal to 1 if the IPO firm will be listed on the NASDAQ and 0 otherwise
AMEX	Equal to 1 if the IPO firm will be listed on the American Stock Exchange and 0 otherwise

References

Ahern KR, Sosyura D (2014) Who writes the news? Corporate press releases during merger negotiations. *J. Finance* 69(1):241–291.

Banz RW (1981) The relationship between return and market value of common stocks. *J. Financial Econom.* 9(1):3–18.

Barber B, Odean T (2008) All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors. *Rev. Financial Stud.* 21(2):785–818.

Baum J, Powell W (1995) Cultivating an institutional ecology of organizations: Comment on Hannan, Carroll, Dundon and Torres. *Amer. Sociol. Rev.* 60(4):529–538.

Bennedsen M, Nielsen KM, Pérez-González F, Wolfenzon D (2007) Inside the family firm: The role of families in succession decisions and performance. *Quart. J. Econom.* 122(2):647–691.

Berry TD, Howe KM (1994) Public information arrival. *J. Finance* 49(4):1331–1346.

Bhattacharya U, Galpin N, Ray R, Yu X (2009) The role of the media in the Internet IPO bubble. *J. Financial Quant. Anal.* 44(3): 657–682.

Bodnaruk A, Ostberg P (2009) Does investor recognition predict returns? *J. Financial Econom.* 91(2):208–226.

Brennan MJ, Jegadeesh N, Swaminathan B (1993) Investment analysis and the adjustment of stock prices to common information. *Rev. Financial Stud.* 6(4):799–824.

Bushee BJ, Miller GS (2012) Investor relations, firm visibility, and investor following. *Accounting Rev.* 87(3):867–897.

Chan W (2003) Stock price reaction to news and no-news: Drift and reversal after headlines. *J. Financial Econom.* 70(2):223–260.

Chen KC, Chen Z, Wei KCJ (2011) Agency costs of free cash flows and the effect of shareholder rights on the implied cost of capital. *J. Financial Quant. Anal.* 46(1):171–207.

Chen L, Da Z, Zhao X (2013) What drives stock price movements? *Rev. Financial Stud.* 26(4):841–876.

Chiang YM, Qian Y, Sherman A (2010) Endogenous entry and partial adjustment in IPO auctions: Are institutional investors better informed? *Rev. Financial Stud.* 23(3):1200–1230.

Chiang YM, Hirshleifer D, Qian Y, Sherman A (2011) Do investors learn from experience? Evidence from frequent IPO investors. *Rev. Financial Stud.* 24(5):1560–1589.

Claus J, Thomas J (2001) Equity premia as low as three percent? Evidence from analysts' earnings forecasts for domestic and international stock markets. *J. Finance* 56(5):1629–1666.

Cook D, Kieschnick R, Van Ness R (2006) On the marketing of IPOs. *J. Financial Econom.* 82(1):35–61.

Cowan L (2007) Telephone interview with Ann E. Sherman, August 3.

Da Z, Engelberg J, Gao P (2011) In search of attention. *J. Finance* 66(5):1461–1499.

Das S, Guo RJ, Zhang H (2006) Analysts' selective coverage and the long-term performance of newly public firms. *J. Finance* 61(3):1159–1185.

Demers E, Lewellen K (2003) The marketing role of IPOs: Evidence from Internet stocks. *J. Financial Econom.* 68(3):413–437.

Dorn D (2009) Does sentiment drive the retail demand for IPOs? *J. Financial Quant. Anal.* 44(1):85–108.

Dougal C, Engelberg J, Garcia D, Parsons C (2012) Journalists and the stock market. *Rev. Financial Stud.* 25(3):639–679.

Easton PD (2004) PE ratios, PEG ratios, and estimating the implied expected rate of return on equity capital. *Accounting Rev.* 79(1):73–95.

Ellis K, Michaely R, O'Hara M (2000) The accuracy of trade classification rules: Evidence from Nasdaq. *J. Financial Quant. Anal.* 35(4):529–551.

Elsbach KD (1994) Managing organizational legitimacy in the California cattle industry: The construction and effectiveness of verbal accounts. *Admin. Sci. Quart.* 39(1):57–88.

Elton EJ (1999) Expected return, realized return, and asset pricing tests. *J. Finance* 54(4):1199–1220.

Engelberg J, Parsons C (2011) The causal impact of media in financial markets. *J. Finance* 66(1):67–97.

Erfle S, McMillan H (1990) Media, political pressure, and the firm: The case of petroleum pricing in the late 1970s. *Quart. J. Econom.* 105(1):115–134.

Fama EF, French KR (1997) Industry costs of equity. *J. Financial Econom.* 43(2):153–193.

Fang LH, Peress J (2009) Media coverage and the cross-section of stock returns. *J. Finance* 64(5):2023–2052.

Field LC, Hanka G (2001) The expiration of IPO share lockups. *J. Finance* 56(2):471–500.

Fitzgibbon J (2007) Telephone interview with Ann E. Sherman, September 27.

Fombrun C (1996) *Reputation: Realizing Value from the Corporate Image* (Harvard Business Press, Boston).

Gao X, Ritter J (2010) The marketing of seasoned equity offerings. *J. Financial Econom.* 97(1):33–52.

Gebhardt WR, Lee CMC, Swaminathan B (2001) Toward an implied cost of capital. *J. Accounting Res.* 39(1):135–176.

Golan G, Wanta W (2001) Second-level agenda setting in the New Hampshire primary: A comparison of coverage in three newspapers and public perceptions of candidates. *Journalism Mass Comm. Quart.* 78(2):247–259.

Grullon G, Kanatas G, Weston JP (2004) Advertising, breadth of ownership and liquidity. *Rev. Financial Stud.* 17(2):439–461.

Hail L, Leuz C (2006) International differences in the cost of equity capital: Do legal institutions and securities regulation matter? *J. Accounting Res.* 44(3):485–531.

Hail L, Leuz C (2009) Cost of capital effects and changes in growth expectations around U.S. cross-listings. *J. Financial Econom.* 93(3):428–454.

Hirshleifer D, Lim SS, Teoh SH (2009) Driven to distraction: Extraneous events and underreaction to earnings news. *J. Finance* 64(5):2289–2325.

Hoffman A, Ocasio W (2001) Not all events are attended equally: Toward a middle-range theory of industry attention to external events. *Organ. Sci.* 12(4):415–434.

Hong H, Kacperczyk M (2010) Competition and bias. *Quart. J. Econom.* 125(4):1683–1725.

Hong H, Lim T, Stein JC (2000) Bad news travels slowly: Size, analyst coverage, and the profitability of momentum strategies. *J. Finance* 55(1):265–295.

Hou K, Moskowitz TJ (2005) Market frictions, price delay, and the cross-section of expected returns. *Rev. Financial Stud.* 18(3):981–1020.

Kaniel R, Starks L, Vasudevan V (2007) Headlines and bottom lines: Attention and learning effects from media coverage of mutual funds. Working paper, University of Rochester, Rochester, NY.

Kecskes A (2009) Initial public offerings: The origin of investor recognition? Working paper, Schulich School of Business, York University, Toronto.

Kecskes A, Womack K (2008) Adds and drops of coverage by equity research analysts. Working paper, Schulich School of Business, York University, Toronto.

Kelly B, Ljungqvist A (2007) The value of research. Working paper, Booth School of Business, University of Chicago, Chicago.

Kelley E, Tetlock P (2013) How wise are crowds? Insights from retail orders and stock returns. *J. Finance* 68(3):1229–1265.

Khorana A, Mola S, Rau PR (2013) Is there life after the complete loss of analyst coverage? *Accounting Rev.* 88(2):667–705.

Kim M, Ritter J (1999) Valuing IPOs. *J. Financial Econom.* 53(3):409–437.

Kosicki GM (1993) Problems and opportunities in agenda-setting research. *J. Comm.* 43(2):100–127.

Mao Q, Wei KC (2014a) Evaluating explanations to the accrual anomaly: Implications from stock return components. Working paper, Erasmus University, Rotterdam, The Netherlands.

Mao Q, Wei KC (2014b) Price and earnings momentum: An explanation using return decomposition. Working paper, Erasmus University, Rotterdam, The Netherlands.

McCombs M, Llamas JP, Lopez-Escobar E, Rey F (1997) Candidate images in special elections: Second-level agenda setting effects. *Journalism Mass Comm. Quart.* 74(4):703–717.

Merton RC (1987) A simple model of capital market equilibrium with incomplete information. *J. Finance* 42(3):483–510.

Mitchell M, Mulherin JH (1994) The impact of public information on the stock market. *J. Finance* 49(3):923–950.

Ohlson J, Juettner-Nauroth B (2005) Expected EPS and EPS growth as determinants of value. *Rev. Accounting Stud.* 10(2–3):349–365.

Pastor L, Sinha M, Swaminathan B (2008) Estimating the intertemporal risk-return tradeoff using the implied cost of capital. *J. Finance* 63(6):2859–2897.

Pollock T, Rindova VP (2003) Media legitimation effects in the market for initial public offerings. *Acad. Management J.* 46(5):631–642.

Purnanandam AK, Swaminathan B (2004) Are IPOs really underpriced? *Rev. Financial Stud.* 17(3):811–848.

Roberts MR, Whited T (2012) Endogeneity in empirical corporate finance. Constantinides G, Stulz R, Harris M, eds. *Handbook of the Economics of Finance*, Vol. 2 (Elsevier, Amsterdam).

Schmitz P (2007) Market and Individual Investors Reactions to Corporate News in the Media. Working paper, University of Mannheim, Mannheim, Germany.

Sherman A, Titman S (2002) Building the IPO order book: Underpricing and participation limits with costly information. *J. Financial Econom.* 65(1):3–29.

Stock JH, Yogo M (2005) Testing for weak instruments in linear IV regression. Andrews DWK, Stock JH, eds. *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg* (Cambridge University Press, Cambridge, UK), 80–108.

Stulz R (1999) Globalization, corporate finance, and the cost of capital. *J. Appl. Corporate Finance* 12(3):8–25.

Tang Y, Wu J, Zhang L (2014) Do anomalies exist *ex ante*? *Rev. Finance* 18(3):843–875.

Tetlock PC (2007) Giving content to investor sentiment: The role of media in the stock market. *J. Finance* 62(3):1139–1168.

Tetlock PC (2010) Does public financial news resolve asymmetric information? *Rev. Financial Stud.* 23(9):3520–3557.

Tetlock PC (2011) All the news that's fit to reprint: Do investors react to stale information? *Rev. Financial Stud.* 24(5):1481–1512.

Tetlock PC, Saar-Tsechansky M, Macskassy S (2008) More than words: Quantifying language to measure firms' fundamentals. *J. Finance* 63(3):1437–1467.

Van Nieuwerburgh S, Veldkamp L (2009) Information immobility and the home bias puzzle. *J. Finance* 64(3):1187–1215.

Vega C (2006) Stock price reaction to public and private information. *J. Financial Econom.* 82(1):103–133.

Zhang D (2004) Why do IPO underwriters allocate extra shares when they expect to buy them back? *J. Financial Quant. Anal.* 39(3):571–594.