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Beyond the hype: Understanding IPO (over)valuation

Zoran M. Filipović and Biljana Seistrajkova*

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Abstract

IPOs frequently exhibit substantial price gains, which tend to diminish over time. We examine this phenomenon by focusing on the behavior of sophisticated and well-informed market participants, specifically short sellers and stock analysts. Our findings suggest that first-day closing prices often exceed fundamental values, driven by attention and sentiment-fueled buying pressure. Short sellers exploit these valuation distortions, likely at the expense of optimistic individual investors. Subsequently, analysts issue relatively conservative initial stock recommendations, contributing to a long-term decline in stock prices. Overall, waiting for post-IPO enthusiasm to subside may help investors avoid the overvaluation inherent in newly listed stocks.

JEL Classification: G12; G14; G24; G41

Keywords: Initial public offerings; IPO underpricing; Short selling; Analysts recommendations; Investor attention; Media coverage

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1 Introduction

One of the most well-documented empirical phenomena in finance is the high first-day return of initial public offerings (IPOs), commonly referred to as *IPO underpricing*. Despite decades of scholarly attention, debate persists over the underlying factors that drive the price surge on IPO dates.

Numerous theories attempt to explain IPO underpricing, encompassing asymmetric information models, agency theories, institutional theories, and control theories (see, e.g., [Ljungqvist 2007](#)). Early studies predominantly attribute IPO underpricing to rational or intentional underpricing in the primary market, which then leads to a price surge in secondary market trading. However, such explanations fall short in accounting for the substantial variability of underpricing across time and struggle to reconcile high first-day returns with long-term post-IPO underperformance. More recent research offers an alternative perspective that addresses these issues, positing that buying pressures driven by heightened attention and individual investor optimism may contribute significantly to IPO underpricing (see, e.g., [Purnanandam and Swaminathan 2004](#); [Derrien 2005](#); [Ljungqvist et al. 2006](#); [Cornelli et al. 2006](#); [Da et al. 2011](#); [Loughran and McDonald 2013](#); [Liu et al. 2014b](#); [Bajo and Raimondo 2017](#); [Liu et al. 2023](#)).¹

To contribute to this debate, we first investigate whether the first-day closing price is a reliable indicator of a stock's true (intrinsic) value, specifically whether secondary market returns are excessive. Second, we examine the primary factor driving first-day returns: is it the mechanism for setting the offer price (offer underpricing) or the buying pressure from sentiment-driven investors in the secondary market (market overpricing)? Our analysis adopts a simple and straightforward methodology, focusing on the behavior of sophisticated market participants, particularly short sellers. The literature acknowledges that short sellers are informed investors who can identify market inefficiencies and strategically position themselves against them (see, e.g., [Senchack and Starks 1993](#); [Asquith et al. 2005](#); [Cohen et al. 2007](#);

¹This shift may stem from the fact that market efficiency and rationality were longstanding assumptions in finance research, with deviations such as IPO underpricing traditionally viewed as anomalies or puzzles.

Boehmer et al. 2008; Engelberg et al. 2012). Contrary to earlier beliefs, Edwards and Hanley (2010) provide evidence that short selling begins almost immediately upon the commencement of trading on the IPO date. To our knowledge, we are the first to utilize short interest as an investor-based measure of company overvaluation on the first trading day in the IPO context.² Furthermore, to strengthen our analysis, we examine the actions of another group of informed and sophisticated market participants: stock analysts. We assess their initial buy/sell recommendations and any subsequent changes.

Our findings suggest that higher first-day returns are related to significantly increased short selling, less favorable initial analyst recommendations, and a greater likelihood of future downgrades. Specifically, a one-standard-deviation increase in first-day returns is associated with a 2.48 percentage point increase in short selling volume (relative to shares offered) and a 0.135 notch lower analyst recommendation. Further, long-term buy-and-hold returns decline with both higher first-day returns and short selling volume, while they increase with favorable analyst recommendations. These findings suggest that first-day closing prices exceed their intrinsic value, indicating that the observed returns are excessive.

To investigate the drivers of secondary market returns, we first assess investor attention through IPO-related press coverage in the four weeks preceding the IPO. Our results indicate that higher press coverage corresponds with increased first-day returns, greater short selling, and poorer long-term returns. Analyst recommendations tend to be less favorable under high media coverage, and downgrade probability rises. These patterns support the conjecture that IPO underpricing reflects attention-driven investor optimism.³

Second, we estimate intrinsic stock value using comparable company analysis and decompose first-day returns into market overpricing and offer underpricing components. The

²Ben-David et al. (2015) adopt a similar approach, but in the context of M&As, positing that short interest can serve as a means to "poll" investors regarding potential misvaluation.

³Barber and Odean (2008) and Tetlock (2011) suggest that extensive media coverage generates attention-driven buying pressure among individual investors, implicitly assuming a rise in optimistic investor sentiment. Therefore, in this paper, we will use the terms "attention-driven" and "sentiment-driven" buying pressure interchangeably, as this distinction does not affect our conclusions.

market overpricing measure reflects the extent to which secondary market participants push prices above intrinsic value, while offer underpricing represents the relative difference between intrinsic value and the offer price. Although both components indicate significant overpricing compared to industry peers, market overpricing emerges as the primary predictor of higher short-selling activity, less favorable analyst recommendations, and an increased likelihood of downgrades (albeit with weaker significance for the latter two). Our findings suggest that the primary factor driving stock prices above their fundamental values on the IPO date is the buying pressure from sentiment-driven investors. The process of setting the offer price appears to play, at most, a secondary role in contributing to the surge in stock prices.

To address endogeneity issues and assert that excessively high IPO-day returns induce short sellers to take positions and prompt stock analysts to issue less favorable initial buy/sell recommendations, we employ an instrumental variable approach. Specifically, we use the number of special reports published in the four weeks preceding the IPO as our instrumental variable, following [Liu et al. 2014b](#). These special reports typically cover significant events (e.g., hurricanes, earthquakes, and shootings) that are likely to divert sentiment-driven investor attention away from the IPO company. On the other hand, short sellers are generally informed and sophisticated investors who tend to be less influenced by media coverage (as suggested by [Von Beschwitz et al. 2017](#)). Consequently, we posit that such reports are unlikely to affect short-selling volumes on the IPO date, except through sentiment-driven buying pressure, which is reflected in first-day returns. Similarly, we do not expect stock analysts – who are also informed and sophisticated market participants – to be directly influenced by the media, except through the attention-driven buying pressure from sentiment-driven investors. The instrumental variable results reassure us that the aforementioned relationship among first-day returns and short-selling volume, analyst recommendations, and long-term returns is indeed causal.

Numerous IPOs demonstrate the patterns we document and serve as excellent examples. For instance, when Pinterest Inc. went public on April 18, 2019, on the New York Stock Exchange, the offer price was set at \$19 by the lead underwriter, Citigroup Global Markets Inc., which was above the initial price range of \$15-\$17, indicating high demand. The Pinterest

IPO attracted significant media attention, with about 200 articles published in the four weeks preceding the offering, according to Factiva. On its first trading day, the share price closed at \$24.40, reflecting an initial return of 28.4%. Meanwhile, 13.9% of the offered shares were shorted that day, placing Pinterest’s IPO in the top quartile of heavily shorted IPOs. Analysts were not impressed either, with their median initial buy/sell recommendation being ”hold,” which is a notch below the sample average of ”buy.”

Our multiples valuation, based on industry peers, suggests an intrinsic (true) value of \$16.7, which falls within the initial range set by the underwriters. This implies that Pinterest was overpriced at the offer; however, its stock price further increased in the market, leading to even greater overvaluation on the first trading day. Within a year, Pinterest’s stock price fell to \$17.43 (as of April 20, 2020), representing a loss of approximately 30% from its first-day closing value.

In summary, we show that the closing prices of IPOs on their debut day typically exceed their intrinsic value, resulting in excessive first-day returns. Although various factors may influence IPO pricing in the primary market, our findings suggest that the primary drivers of first-day returns in the secondary market are attention- and sentiment-driven buying pressure. Sophisticated and well-informed investors recognize the inflated first-day returns and take short positions in these stocks, while stock analysts tend to issue less favorable initial recommendations for such IPOs. Ultimately, stock prices decline, resulting in lower long-term returns.

This paper contributes to the broader literature on the IPO underpricing puzzle and, more specifically, to the subset of research that seeks to reconcile the phenomenon of high initial returns with long-term stock underperformance.⁴ The notion that IPOs may be overpriced in the secondary market, initially proposed by Miller (1977), has gained traction over the years, largely due to the increased availability of data and advancements in behavioral theories concerning investor sentiment. For instance, Derrien (2005) analyze French IPOs utilizing a modified book-building process where a portion of the shares is allocated to individual investors,

⁴A comprehensive review of IPO underpricing theories can be found in Ljungqvist (2007) while a detailed discussion of the relevant literature is provided in Section 2.

and demonstrate that IPOs can be overpriced while still yielding positive initial returns. This outcome is attributed to strong demand from large individual investors, resulting in elevated IPO prices, significant initial returns, and poor long-run performance. In a similar vein, [Purnanandam and Swaminathan \(2004\)](#) find that IPOs are overvalued at the offer price based on valuations of listed industry peers. [Cornelli et al. \(2006\)](#) show that the optimistic sentiment of small retail investors, as indicated by stock prices in the grey market (a pre-IPO market dominated by small retail investors in Europe), drives the initial returns and leads to subsequent price reversals. Furthermore, [Ljungqvist et al. \(2006\)](#) model the IPO process and suggest that irrational investor sentiment contributes to higher first-day returns and long-term underperformance, with issuing firms capitalizing on this sentiment by pricing IPOs above their intrinsic value. Our study makes two key contributions to this literature. First, by examining the behavior of better informed and sophisticated market participants, such as short sellers and stock analysts, we provide solid evidence that IPO-day prices exceed their fundamental value. Second, by analyzing press coverage and using comparable company analysis, we demonstrate that the primary driver of first-day returns is the sentiment-driven buying pressure in the secondary market, while the pricing mechanism of the IPO offer plays a secondary role.

Historically, the principal explanation for deviations of IPO prices from fundamental values has been the restriction on short selling immediately following an IPO. However, [Edwards and Hanley \(2010\)](#) provide evidence that in the U.S., short selling begins almost immediately, occurring in 99.5% of IPOs from the start of trading, contrary to earlier assumptions. Moreover, [Boulton et al. \(2020\)](#) find that IPO underpricing is more pronounced in countries that either ban short selling or securities lending, or in markets where short selling is uncommon. They do not analyze transaction-level short selling data for IPOs. Our study further contributes to the literature on short sellers and IPOs by showing that short selling activity is associated with (a) higher first-day returns, (b) less favorable initial analyst stock recommendations, (c) a higher likelihood of analyst recommendation downgrades in the next reporting period, (d) lower long-term returns, and (e) increased pre-IPO press coverage, which serves as a proxy for sentiment-driven buying pressure.

Finally, our study contributes to the existing literature on the role of attention and media coverage in the context of IPOs. In addition to corroborating earlier findings that increased attention and media coverage are associated with higher first-day returns and subsequent long-term underperformance of IPOs (see [Da et al., 2011](#), [Liu et al., 2014a](#), and [Liu et al., 2023](#)), we provide novel evidence that greater pre-IPO press coverage (quantified by the number of published articles) is linked to the actions of more informed and sophisticated market participants who move contrary to sentiment-driven investors. Specifically, we find that higher pre-IPO press coverage is followed by increased short selling activity, less favorable initial buy/sell recommendations from analysts, and a higher likelihood of recommendation downgrades.

The remainder of the paper is structured as follows: [Section 2](#) provides a summary of the literature and develops the hypotheses and testable implications. [Section 3](#) offers a detailed discussion of the sample and methodology. In [Section 4](#), we present the results of the empirical analysis. In [Section 5](#), we apply an instrumental variable approach to address endogeneity issues. [Section 6](#) reports the robustness tests. Finally, [Section 7](#) concludes the paper.

2 Related research and hypotheses development

Underpricing refers to the practice of setting an IPO price below its intrinsic (true) value. If a newly listed stock ends its first trading day above the IPO offer price, it indicates that the stock was underpriced.

Since the early work by [Ibbotson \(1975\)](#), who documented the IPO underpricing puzzle, several theories have emerged to explain this phenomenon. A comprehensive review of these theories can be found in [Ljungqvist \(2007\)](#). Asymmetric information models suggest that underpricing arises due to information asymmetry between IPO participants, which creates frictions that influence pricing. Institutional theories examine factors such as litigation risks, banks' price stabilization efforts after trading begins, and tax considerations. Control theories propose that underpricing is a strategy to attract a favorable shareholder base and minimize in-

terference from external investors once the company goes public. More recent agency theories suggest that underpricing may result from conflicts of interest between underwriters and issuers (e.g., nepotism, as in [DeGeorge and Pratobevera, 2024](#)). All these theories argue that IPOs are indeed underpriced relative to the true value, resulting in issuers "leaving money on the table". However, the concept of underpricing, which assumes that the first-day closing price accurately reflects the stock's true value, remains inconsistent with the long-term stock underperformance that often follows the IPO (e.g. [Ritter, 1991](#)).

A theory for why IPOs are often underpriced and their long-term underperformance was first suggested by [Miller \(1977\)](#). He posits that the limitations on short selling right after an IPO lead to short-term pricing distortions, which are corrected over time as these limitations ease. However, [Edwards and Hanley \(2010\)](#) challenge this view, showing that in the U.S., short selling actually begins almost immediately, occurring in 99.5% of IPOs from the start of trading, contrary to earlier assumptions.

Due to the significant variation in underpricing over time and the difficulties in reconciling high first-day returns with long-term post-IPO stock underperformance, a new set of theories based on behavioral biases has emerged. These theories acknowledge that the first-day closing price and/or offer price can substantially differ from the stock's true value.

[Loughran and Ritter \(2002\)](#) propose a prospect theory model based on mental accounting, which assumes that managers in issuing firms are biased. On the other hand, more recent studies are based on the existence of *irrational* or *sentiment* investors. The difficulty in valuing young and opaque private companies that are being listed likely leads to overconfidence among investors who bid up the price of IPO shares beyond their true value.^{5,6}

[Derrien \(2005\)](#) models the impact of investor sentiment on IPO pricing, demonstrating that IPOs can be overpriced while still delivering positive first-day returns. The study concludes that the high demand from large individual investors drives up IPO prices, results in substantial

⁵The literature in cognitive psychology shows that people tend to be more overconfident about difficult rather than easy tasks (see [Griffin and Tversky, 1992](#)).

⁶We do not distinguish between overconfidence and overoptimism as it does not affect our conclusions.

first-day returns, and leads to long-term underperformance. [Purnanandam and Swaminathan \(2004\)](#) present evidence that IPO offer prices are frequently set higher than valuations based on industry peers. Similarly, [Ljungqvist et al. \(2006\)](#) find that underwriters and issuing firms capitalize on investor sentiment by pricing issues above their intrinsic value. In this scenario, investor sentiment, combined with short selling constraints, contributes to greater underpricing and an aftermarket trading price that exceeds the security's true value. In their cross-country study, [Boulton et al. \(2020\)](#) argue that the relation between investor sentiment and underpricing is positive and is exacerbated by short selling constraints. [Cornelli et al. \(2006\)](#) show that high prices in the grey market (the when-issued market that precedes European IPOs and is dominated by small retail investors) are followed by long-run price reversals. Furthermore, they provide evidence that institutional investors sell their shares when small investors are overoptimistic. According to [Ofek and Richardson \(2003\)](#), high initial returns occur when institutional investors sell IPO shares to retail investors on the first trading day, and that such high initial returns are followed by stock price reversals. In line with this view, [Aggarwal et al. \(2002\)](#) show that institutional investors achieve higher returns than retail investors in IPOs.

Recent studies explore the impact of sentiment on IPO underpricing using textual analysis methodologies. For instance, [Loughran and McDonald \(2013\)](#) study the sentiment in S-1 filings and find that the presence of uncertain, weak modal, and negative words is associated with higher first-day IPO returns. [Bajo and Raimondo \(2017\)](#) analyze the sentiment in news articles covering IPOs and report that a more positive tone increases demand for IPO shares, leading to higher first-day returns. More generally, [Da et al. \(2011\)](#), [Liu et al. \(2014a\)](#), [Liu et al. \(2014b\)](#), and [Liu et al. \(2023\)](#) provide evidence that attention and media coverage increase first-day returns and lead to subsequent long-run underperformance of IPO shares.

The studies mentioned above show that the nature of IPO underpricing is different from what has been traditionally believed, suggesting that investor attention and optimism play a significant role. This raises the question: Is the first-day closing price a reliable indicator of the stock's true value? Moreover, what actually drives the first-day returns—is it the mechanism of setting the offer price (offer underpricing) or the buying pressure from sentiment-driven

investors in the secondary market (market overpricing)?

To answer the questions and demonstrate that first-day closing prices exceed the fundamental value, we analyze the behavior of two sophisticated market participants (short sellers and stock analysts), pre-IPO press coverage, and conduct a comparable companies analysis. Although the primary goal of this study is not to measure shareholder overoptimism, the factors examined in relation to overpricing are consistent with sentiment-driven trading.

It is widely recognized that short sellers are informed and sophisticated investors who can identify market inefficiencies and strategically take positions against them (see, e.g., [Senchack and Starks, 1993](#); [Asquith et al., 2005](#); [Cohen et al., 2007](#); [Boehmer et al., 2008](#); [Engelberg et al., 2012](#)). [Ben-David et al. \(2015\)](#) use short interest as an investor-based measure of company overvaluation, explaining that it can be viewed as a way to "poll" investors about potential misvaluation. Recent research by [Boulton et al. \(2020\)](#) demonstrates that IPO underpricing tends to be more pronounced in countries where short selling or securities lending is prohibited or uncommon. Consequently, if first-day trading prices are excessively high relative to stock fundamentals, it is expected that short sellers will take short positions in such stocks. This leads to the prediction of a positive relationship between the level of first-day returns (i.e., underpricing) and short selling activity. Conversely, the relationship between long-term returns and short selling is anticipated to be negative, as trading activity is expected to align stock prices with their fundamental values over time.

Stock analysts, as sophisticated market participants, closely follow IPO companies and maintain strong connections with company management. This position allows them to have a better understanding of the stock's true value than the average shareholder, enabling them to issue high-quality stock recommendations. Accordingly, analyst recommendations should be lower for overvalued stocks, indicating a negative relationship between first-day returns and initial stock recommendations. Furthermore, high first-day returns are expected to predict a higher likelihood of stock recommendation downgrades. Since both stock analysts and short sellers are sophisticated market participants, their actions are likely to be correlated and consistent.

Specifically, if short sellers target overvalued stocks, this should correspond to lower initial stock recommendations and an increased likelihood of future recommendation downgrades.

The literature on stock analysts suggests that, on average, analysts tend to issue favorable buy/sell recommendations. For instance, [Loh and Stulz \(2011\)](#) indicate that recommendation levels are predominantly optimistic, with sell and underperform ratings representing only a small fraction of all recommendations in their sample. Similarly, [Ertimur et al. \(2011\)](#) argue that initiation recommendations are generally favorable, attributing this to conflicts of interest. Additionally, the literature notes that analysts are often reluctant to downgrade their buy/sell recommendations (see [Conrad et al., 2006](#)). This tendency toward favorable recommendations and the reluctance to issue downgrades complicate the identification in our analysis, making any significant findings regarding analyst recommendations particularly notable.

Aside from the actions of sophisticated investors, which can indirectly help identify overvalued stocks, a more direct indicator of the optimistic sentiment that drives stock prices above their fundamental values on the IPO date is press coverage. The IPO literature suggests that media coverage ([Liu et al., 2014a](#) and [Liu et al., 2023](#)), sentiment in the press ([Bajo and Raimondo, 2017](#)), and investor attention ([Da et al., 2011](#)) contribute to higher first-day returns and subsequently result in the long-term underperformance of IPO shares. More broadly, beyond the context of IPOs, the literature suggests that extensive media coverage generates attention-driven buying pressure not only among individual investors ([Barber and Odean, 2008](#); [Tetlock, 2011](#)) but also among professional investors ([Fang et al., 2014](#)). Additionally, [Von Beschwitz et al. \(2017\)](#) demonstrate that qualitative information in the media and increased attention to a stock drive higher trading activity among uninformed investors, which in turn leads to greater short seller activity. Based on this, we argue that increased media coverage heightens investor attention and sentiment-driven buying pressure, pushing IPO closing prices above their fundamental values. As a result, we expect higher press coverage to lead to more short selling, worse stock analyst recommendations, and weaker long-term returns.

Finally, valuations relative to industry peers can help identify overvalued IPOs. By

employing comparable company analysis (as in [Purnanandam and Swaminathan, 2004](#)), we can estimate a reasonable proxy for the company's true value. This allows us to determine the extent to which investor sentiment pushes the stock price above its true value in the market and how much the true value exceeds the offer price. In other words, we can decompose first-day returns into two components: market overpricing and offer underpricing. The behavior of sophisticated investors is expected to align with this decomposition—market overpricing (offer underpricing) should correspond to increased (decreased) short selling and lower (higher) initial stock recommendations from analysts. Furthermore, this decomposition helps clarify which of the two mechanisms is the primary driver of first-day returns (i.e., IPO underpricing).

3 Data

The sample of IPOs and their characteristics is collected from the Refinitiv Eikon database. Only U.S. issues of ordinary common shares with offer prices higher than five dollars are considered, excluding unit offerings, closed-end funds, real estate investment trusts (REIT), or American depository receipts (ADR). Companies that operate in regulated utilities (SIC code 4900-4999) or financial industry (SIC code 6000-6999) are excluded from the final sample. IPOs without prices available in the CRSP (Center for Research in Security Prices) or without financial statements available in the Compustat database are excluded from the final sample. Short sale data are obtained from the Financial Industry Regulatory Authority (FINRA), which became publicly available in September 2009. The final sample ends in December 2019 to avoid unexpected shocks like the COVID-19 pandemic. After merging the Refinitiv Eikon, FINRA, CRSP, and Compustat databases, the final sample consists of 848 IPOs. The internet IPO dummy is taken from Jay Ritter's webpage.⁷ Analysts' recommendations are retrieved from the I/B/E/S U.S. Recommendation database. Press coverage data and special reports are hand-collected from the Factiva database and the Vanderbilt Television News Archive, respectively.

⁷<https://site.warrington.ufl.edu/ritter/ipo-data/>

3.1 Main variables

The data from FINRA include the ticker, date, total short sale volume, and the reporting facility identifier (NASDAQ, NYSE, ADF – Alternative Display Facility, and Over-the-Counter Reporting Facility). To calculate daily volumes, we aggregate individual short sale transactions per day and per company, and define short selling interest for each IPO on the first trading day as:

$$SV_{\text{tot}}/SO = \frac{\text{Number of shares shorted}}{\text{Number of shares offered}} \quad (1)$$

The median recommendation refers to the initial median stock analyst recommendation available in the I/B/E/S database. Thomson Reuters calculates the median by converting each analyst’s recommendation into an integer based on its standardized recommendation scale and then computing the median as a real number. We use an inverted scale: 5 for Strong Buy, 4 for Buy, 3 for Hold, 2 for Underperform, and 1 for Sell. Additionally, we construct and use a dummy variable indicating whether there is a downgrade in the median recommendation in the next I/B/E/S reporting session.

Following the literature, we define the first-day return (also known as the “IPO underpricing”) as the relative difference between the first-day secondary market closing price and the offer price:

$$\text{First-day return} = \frac{\text{First-day closing price} - \text{Offer price}}{\text{Offer price}}. \quad (2)$$

In principle, a positive first-day return can result from two non-mutually exclusive factors: the offer price being set too low or the first-day closing market price being too high. To disentangle one from the other, we need a measure of the “true” value of the offering. A commonly used approach relies on comparing the company to similar publicly listed industry peers and their multiples. We identify the most similar industry peer and calculate the intrinsic (true) price of an IPO using the peer company’s price-to-sales (P/S) ratio. Alternative multiples based on EBITDA and net income are more restrictive and often result in a smaller sample, as these

measures are negative for multiple IPO companies.

To identify peer companies, we match each company from our sample with publicly listed firms in the same Fama-French 48 industry. We require that the total assets of these firms do not differ by more than 50% from the sample company. Among these comparable firms, we select the one with the closest asset size to the sample company. Alternative matching procedures are discussed in [Section 6](#).

After matching our sample with companies in the same industry, we compute the P/S ratio for the matching peers as follows:

$$\left(\frac{P}{S}\right)_{match} = \frac{Market\ price_{match} * Shares\ outstanding_{match}}{Prior\ fiscal\ year\ sales_{match}}, \quad (3)$$

where the market price is the closing stock price from CRSP for the peer on the IPO offer date. The intrinsic (true) value of an IPO company is computed by multiplying its prior year fiscal sales with the P/S ratio of the industry peer:

$$Intrinsic\ value = \left(\frac{P}{S}\right)_{match} * Sales_{-1}. \quad (4)$$

Then, the intrinsic share price of the IPO is calculated as:

$$Intrinsic\ price = \frac{Intrinsic\ value}{Shares\ outstanding}. \quad (5)$$

Finally, we use the calculated intrinsic share price of the IPO to decompose the first-day returns. The first component measures how much the market participants push the stock price above its true value on the first trading day. We call it *Market overpricing* and define it as follows:

$$Market\ overpricing = \frac{First-day\ closing\ price - Intrinsic\ price}{Offer\ price} \quad (6)$$

The second component is related to the pre-IPO mechanism of setting the offer price. We call it *Offer underpricing* and define it as the relative distance of the intrinsic price from the offer

price:

$$\text{Offer underpricing} = \frac{\text{Intrinsic price} - \text{Offer price}}{\text{Offer price}} \quad (7)$$

Figure 1 illustrates the graphical representation of the decomposition of first-day returns.

[Figure 1 ABOUT HERE]

In addition to the main variables described above, we include various control variables in our analysis, which are listed and defined in Table 1.

[Table 1 ABOUT HERE]

3.2 Summary statistics

Table 2 presents summary statistics. The first-day return in the sample is 17.3%, consistent with the numbers reported in the literature. A substantial price increase on the first trading day attracts keen attention from short sellers. As a result, 4.87% of the shares offered are shorted on the IPO offer day, on average. The 99th percentile of shares shorted is significantly higher, at 32.9%, with the maximum reaching 61.57%. The long-term returns are low on average, with a six-month BHAR of 0.65% (median -5.36%). The median stock analyst recommendation is 4.16 on average. Thomson Reuters calculates median recommendations by converting each analyst's recommendation into an integer according to its standardized recommendation scale, and then computing the median as a real number. We use an inverted scale: 5 for Strong Buy, 4 for Buy, 3 for Hold, 2 for Underperform, and 1 for Sell. Market overpricing and offer underpricing, the two components of the first-day returns, are on average 50.1% and -32.3%, respectively. These two measures suggest that IPOs are significantly overvalued relative to their industry peers, both by the market and at the offer price, consistent with findings by Purnanandam and Swaminathan (2004).⁸

⁸Purnanandam and Swaminathan (2004) show that in the sample of IPOs from 1980 to 1997, the median IPO is overvalued by about 14% to 50%, depending on the matching criteria, relative to its industry peers.

More than 18% of IPOs have their offer price set above the initial price range, and about 70% of underwriters purchase additional shares from the issuer following the IPO through an overallotment (“green shoe”) option. In our sample, the majority of IPOs are backed by venture capital funds (56.6%) and are listed on the Nasdaq stock exchange (63%). Nearly 10% of the IPOs are internet-related stocks.

[Table 2 ABOUT HERE]

4 Empirical results

4.1 Graphical evidence

The first step in our analysis is a visual examination of the relations we intend to explore more rigorously. As discussed in [Section 2](#), short sellers, who are considered sophisticated traders, are likely to target IPOs with substantial first-day gains, as these stocks are often overvalued by sentiment-driven investors. To examine this conjecture, we created a binned scatter plot showing short selling volume (standardized by the number of shares offered) against first-day returns. [Figure 2\(a\)](#) reveals a clear positive relationship between these two variables, confirming that short sellers target stocks that experience significant appreciation on their IPO date. This finding provides initial evidence against the hypothesis that the first-day closing price accurately reflects the true value of the stock.

[Figure 2 ABOUT HERE]

Stock analysts, as well-informed finance professionals who closely monitor IPO companies, tend to issue lower initial buy/sell recommendations for stocks that appear to be overvalued and, as a result, have high first-day returns. [Figure 2\(b\)](#) supports this view. The relationship

between initial analyst stock recommendations and first-day returns slopes downward, indicating that analysts also believe that high first-day returns are not indicative of underpriced IPOs but rather signal overvalued stocks with closing prices that exceed their fundamental values.

4.2 Short sellers and stock analysts

Preliminary graphical evidence suggests that the actions of sophisticated market participants, such as short sellers and stock analysts, challenge the notion that the first-day closing price accurately reflects the true value of a stock. However, a more rigorous analysis is necessary to evaluate this hypothesis.

Table 3 presents the results of cross-sectional regressions examining the relationship between short selling volume on the IPO date and first-day returns. Specifically, it reports the results of the following regression model:

$$\left(\frac{SV_{tot}}{SO}\right)_i = \alpha + \beta_1 * First\text{-}day\ return_i + \sum_n \beta_n CV_{n,i} + Ind\ FE + Year\ FE + \varepsilon_i, \quad (8)$$

where the dependent variable is the short selling volume on the IPO date, standardized by the number of shares offered, the first-day return is defined as the percentage change from the offer price to the closing price on the IPO date (i.e., IPO underpricing), and *CV* represents control variables. *Ind FE* and *Year FE* stand for industry and year fixed effects, respectively.

[Table 3 ABOUT HERE]

The coefficient for the first-day return, the main explanatory variable, is positive and highly significant across all three models: the univariate model both with and without fixed effects, and the multivariate model that includes control variables along with industry and year fixed effects. This effect is also economically meaningful. According to Model 3, a one-standard deviation increase in the first-day return results in an approximately 2.48 percentage

point increase in short selling volume. Additionally, first-day returns alone account for 28% of the variation in short selling activity within the sample (Model 1), with the explanatory power rising to 43% in the fully specified Model 3.

Internet IPOs and those backed by venture capital funds tend to experience higher levels of short selling activity. The coefficients for Nasdaq IPOs and those priced above the initial price range are close to statistical significance, suggesting, albeit cautiously, that these IPOs may be associated with higher short selling volumes. These findings are consistent with the notion that IPOs attracting optimistic sentiment-driven investors tend to be overvalued in the market, making them appealing targets for short sellers.⁹

Overall, the results support the hypothesis that short sellers target IPO stocks perceived as overvalued in the secondary market, taking positions against them.

Next, we investigate how stock analysts respond to IPO price movements and whether their recommendations are in line with short-selling activity. Table 4 presents the results of the regression analysis. In the first four models, we regress the initial median analyst recommendation on first-day returns and short-selling volume (standardized by the number of shares offered).¹⁰ The coefficients are negative and statistically significant across all four models. As anticipated, analysts issue lower initial buy/sell recommendations for IPOs with high first-day returns, suggesting that elevated first-day prices are seen as a signal of overvaluation. Moreover, the behavior of stock analysts appears to closely mirror that of short sellers. Increased short-selling volumes are related to lower initial stock recommendations, indicating that both short sellers and stock analysts agree that IPOs with high first-day returns are likely overvalued. The effect is not negligible—according to Model 2, a one-standard deviation increase in short-selling volume corresponds to approximately a 0.135 notch lower initial analyst recommendation.

⁹Internet IPOs typically involve companies that are well-known and popular. Venture capital funds invest in promising companies, serving as a potential certification for sentiment-driven investors. The Nasdaq, being a tech-focused exchange, attracts young companies with high growth potential, drawing in sentiment investors. IPOs priced above the initial price range reflect pre-IPO optimism about the company.

¹⁰Using mean recommendations produces qualitatively and quantitatively similar results.

[Table 4 ABOUT HERE]

Given the tendency to issue favorable recommendations (as discussed in [Section 2](#)), we investigate whether analysts are likely to downgrade their recommendations when issuing a new one. To test this, we conduct logit regressions using a dummy variable set to one if the next median recommendation is lower than the initial one.¹¹ The regression results are shown in columns 5-8. The positive and significant coefficients indicate that higher first-day returns and increased short selling activity are associated with a greater probability that analysts will downgrade their buy/sell recommendations in the following I/B/E/S reporting period. Given that analysts are generally hesitant to downgrade their recommendations, this finding is particularly noteworthy.

4.3 Buy-and-hold abnormal returns

Another indicator of overvaluation is the connection between long-term stock performance and variables such as short selling activity, first-day returns, and analyst recommendations. If closing prices exceed fundamental values, resulting in excessively high first-day returns, then short-selling activity, IPO-day returns, and analyst recommendations are likely to predict a decline in stock prices over the long term. The regression results presented in [Table 5](#) support this conjecture. A higher volume of short selling is associated with lower BHAR returns; specifically, an increase of one standard deviation in short selling volume corresponds to a 4.38 percentage point decrease in BHAR (Model 2), which is a substantial effect. The impact of first-day returns is somewhat weaker in both magnitude and significance, with a one standard deviation increase in first-day returns resulting in a 2.34 percentage point decrease in BHAR (Model 4). Additionally, BHAR is lower when initial analyst recommendations are less favorable; a downgrade of one notch in analyst recommendations (e.g., from "buy" to "hold") is associated with a 3.7 percentage point reduction in BHAR (Model 6).

¹¹The time gap between the initial and subsequent recommendations is approximately one month because I/B/E/S provides consensus recommendation data on a monthly basis.

[Table 5 ABOUT HERE]

4.4 Press coverage

We next analyze the impact of press coverage. As outlined in [Section 2](#), we hypothesize that greater pre-IPO press coverage amplifies investor attention and sentiment-driven buying pressure, ultimately resulting in overvaluation on the IPO date. To test this hypothesis, we hand collect the number of articles about each company reported in the Factiva database during the four weeks preceding the IPO date. We then regress our key variables of interest on the extent of press coverage, measured by the number of articles. The results are presented in [Table 6](#).

Statistically significant coefficients suggest that greater press coverage is associated with higher first-day returns and increased short selling volume (standardized by the number of shares offered). Moreover, analysts tend to issue less favorable initial buy/sell recommendations for companies that receive more press attention before their IPO and are more likely to downgrade their recommendations for such companies. Higher levels of press coverage are also linked to long-term post-IPO underperformance. The magnitude of these effects is economically significant: a one-standard deviation increase in press coverage corresponds to a 2.94 percentage point increase in first-day returns (Model 2), a 1.96 percentage point rise in short selling (Model 4), a 0.1-notch drop in analyst recommendations (Model 6), and a 2.7 percentage point decline in BHAR returns (Model 10).¹² The explanatory power of press coverage in the regression models is also substantial. Overall, the findings support the hypothesis that increased buying pressure from sentiment-driven investors causes the first-day closing prices to exceed their fundamental values.

[Table 6 ABOUT HERE]

¹²The study by [Bajo and Raimondo \(2017\)](#) shows that the impact of tone in press articles is influenced by the newspaper's reputation and the time lag between the article's publication date and the IPO date. However, we report and analyze changes in the average effect (i.e., the effect of additional articles published in newspapers with the average reputation).

4.5 Decomposition of first-day returns

Classical theories of "IPO underpricing" suggest that the offer price is set below the company's true value, resulting in a significant stock price increase on the first day of trading. However, our prior analysis, which employs indirect proxies for overvaluation, does not support this view. Instead, our findings indicate that the observed price behavior in the secondary market reflects overvaluation driven by buying pressure from sentiment-driven investors.

A direct test of IPO underpricing would involve comparing market prices to the fundamental value of the stock; however, the latter is inherently unobservable. An alternative approach is to estimate a reasonable proxy for the intrinsic value of the IPO firm. As detailed in [Section 3](#), we use a comparable company analysis to construct such a proxy, following the methodology of [Purnanandam and Swaminathan \(2004\)](#). This method allows us to compare the estimated intrinsic stock prices with both the first-day closing prices and the initial offer prices of the IPO. To facilitate this comparison, we decompose the first-day returns into two components: *market overpricing*, which captures the deviation of the first-day closing price from the intrinsic value, and *offer underpricing*, which measures the deviation of the IPO offer price from the intrinsic value.

The (unreported) t-tests reveal that both components are statistically different from zero. The evidence of market overpricing suggests that IPOs are substantially overvalued in the secondary market on their first trading day, likely due to buying pressure from sentiment-driven investors. Meanwhile, the negative value of offer underpricing indicates that the offer price is also set above the intrinsic value, aligning with findings from previous literature. These results are consistent with our earlier findings on short selling activity, stock analyst behavior, buy-and-hold abnormal returns (BHAR), and press coverage. Overall, they point to the overvaluation of IPOs in the secondary market on the listing day.

The results reported in [Table 7](#) support the market overpricing channel. The market overpricing component of first-day returns is significant and positively correlated with short

selling volume on the IPO date. While its coefficient is marginally insignificant in the regression for analyst recommendations, it suggests that overpriced IPOs tend to receive lower analyst recommendations on the listing date. Furthermore, the likelihood of analysts downgrading their initial recommendations increases with the level of market overpricing. In the BHAR regressions, although the coefficient is insignificant, it still points in a negative direction. In contrast, the effect of offer underpricing, which relates to the mechanism of setting the offer price, remains insignificant across all regressions.

[Table 7 ABOUT HERE]

In summary, the decomposition results suggest that the primary factor driving stock prices above their fundamental values on the IPO date is the buying pressure from sentiment-driven investors. The process of setting the offer price seems to play, at most, a secondary role in contributing to the stock price surge.

5 Instrumental variable analysis

Our previous analysis reveals a strong relation between first-day returns (driven by sentiment investor buying pressure) and the actions of short sellers and stock analysts, as well as long-term returns. However, since we lack a controlled experimental setting, we cannot conclusively claim that excessively high IPO-day returns lead short sellers to take positions or prompt stock analysts to issue less favorable initial buy/sell recommendations. To address potential endogeneity issues, in this section, we adopt an instrumental variable approach, using a measure of exogenous changes in investor attention as our instrument.

5.1 Instruments

Following [Liu et al. \(2014b\)](#), we use the number of special reports during the four weeks preceding the IPO as our instrumental variable.¹³ The data for these special reports is hand collected from the Vanderbilt Television News Archive, one of the most comprehensive collections of television news in the U.S. and globally. Special reports typically cover significant events that are likely to divert sentiment-driven investor attention away from the IPO company.¹⁴

We exclude PBS network from our analysis, as its specials are primarily Frontline documentaries rather than timely news reports on current events. Similarly, we exclude ABC's Nightline since it is a regular nightly program, not an extraordinary news event. Additionally, we omit specials that exceed 60 minutes in length, as these typically cover anticipated events – such as presidential inaugurations, national political conventions, or retrospectives on significant past events. In contrast, reports on unexpected high-impact events are generally much shorter. For instance, in our sample, specials covering hurricanes range from 2 to 57 minutes, while those addressing earthquakes vary between 8 and 60 minutes.¹⁵ During the four weeks preceding the IPO, the average number of special reports is 24, with a median of 22, as shown in [Table 2](#).

For an instrument to be valid, it must meet both the relevance condition and the exclusion condition. The relevance condition requires that the instrument is correlated with the endogenous variable, meaning the correlation must be significantly different from zero. In our case, the instrument captures the number of significant, attention-grabbing events that are exogenous to IPOs. These events likely divert the attention of individual and less sophisticated

¹³More precisely, we use the inverse hyperbolic sine transformation of the number of special reports because it can accommodate zeros. This method is preferred over the $\log(x+1)$ transformation, which may introduce bias, as it functions similarly to the logarithmic transformation but can also handle zero and negative values (see [Burbidge et al., 1988](#)).

¹⁴Using Structural Equation Modeling (SEM) techniques, we estimate a mediation model (see [Appendix A](#)) and demonstrate that such events indeed shift investor attention away from IPOs, both directly and indirectly (by reducing IPO-related press coverage).

¹⁵Our results remain consistent, both quantitatively and qualitatively, when using thresholds of 90, 120, or 150 minutes.

sentiment-driven investors, reducing buying pressure and consequently lowering first-day returns. Simultaneously, IPOs receive less media coverage, which diminishes press attention and reduces the likelihood that news articles will fuel investor sentiment and drive up buying pressure, further contributing to lower first-day returns. As shown in [Table 8](#), Regression 1, the correlation between our instrument and market returns on the IPO date is negative and significantly different from zero. The Cragg–Donald F-statistic for the weak identification test is 51.86, exceeding the Stock-Yogo critical value of 16.38 for two-stage least squares (2SLS) with a single instrument at a 5% bias threshold.

The exclusion condition in instrumental variable (IV) estimations requires that the instrument affects the dependent variable only through its effect on the endogenous explanatory variable and not through any other channels. As discussed by [Liu et al. \(2014b\)](#), special reports on significant events like hurricanes, earthquakes, and shootings are random in nature and can be considered exogenous to IPO firms, as they are not specific to any individual firm. Since short sellers are typically informed and sophisticated investors (e.g., [Senchack and Starks, 1993](#); [Asquith et al., 2005](#); [Cohen et al., 2007](#); [Boehmer et al., 2008](#); [Engelberg et al., 2012](#)), and tend to be less influenced by media (as suggested by [Von Beschwitz et al., 2017](#)), we believe that such reports are unlikely to affect short-selling volumes on the IPO date, except through sentiment-driven buying pressure, which is reflected in first-day returns. Similarly, we do not expect stock analysts, also informed and sophisticated market participants, to be directly influenced by the media, except through the attention-driven buying pressure from sentiment investors.

5.2 Results of the instrumental variable analysis

[Table 8](#) presents the results of the two-stage least squares (2SLS) instrumental variable regressions. The reported coefficients and p-values correspond to the joint estimation from both stages. In the first stage, we regress first-day returns (our endogenous variable) on the instrument, which measures the number of special reports, along with the control variables. While

the first-stage regressions vary slightly across the different samples, we do not report all variations to save space, as the results are very similar. The instrument's negative and significant coefficient, combined with a high Cragg-Donald F-statistic, indicates that it meets the relevance condition for a valid instrument (see Regression 1). Consistent with the OLS analysis, the second-stage regressions show that the instrumented first-day return is strongly positively related to short-selling volume on the IPO date (Regression 2). The coefficient for analyst recommendations is negative and significant (Regression 3), while the coefficient for long-term buy-and-hold returns is negative but marginally insignificant, with a p-value slightly exceeding the 10% threshold (Regression 5).

[Table 8 ABOUT HERE]

In summary, our results indicate that our previous conclusions remain unchanged when employing instrumental variable analysis. High first-day returns, driven by optimism and increased attention from sentiment-driven investors, lead to higher short-selling volume on the IPO date, less favorable stock analyst buy/sell recommendations, and poorer long-term returns. As discussed previously, we interpret this as evidence that IPO-date valuations exceed fundamental values, prompting informed and sophisticated market participants to act against this inefficiency.

6 Robustness

6.1 Matching procedure

The estimates derived from the comparable company analysis inherently depend on the selection of comparable firms. To address concerns that the matching process may not yield appropriate peer firms, we repeat the main analysis using three alternative matching procedures.

As explained in [Section 3](#), our primary matching method identifies peer companies by selecting listed firms from the same Fama-French 48 industry that have total assets within 50% of the IPO company, and then choosing the firm with the closest total assets. In the first alternative approach, we modify this procedure by calculating the median market price overpricing and the median offer price underpricing using all comparable companies that meet the 50% asset difference threshold, rather than selecting a single closest peer. The second alternative follows a procedure similar to that in [Purnanandam and Swaminathan \(2004\)](#). Here, we match companies by industry (using the Fama-French 48 classification) and then apply additional criteria: the peer firm's revenue must not differ by more than 50%, and its profitability (defined as EBITDA/Revenues) must not differ by more than 100%. Among the firms meeting these criteria, we select the one with the most similar revenue to the IPO company. In the third alternative, we further modify the previous procedure by calculating the median market price overpricing and the median offer price underpricing using all comparable companies that satisfy both the revenue and profitability thresholds, rather than choosing a single peer.

The results of these alternative matching procedures are presented in [Table 9](#). The findings show that market overpricing remains significant, whereas offer underpricing does not. We conclude that the results are consistent with those reported in the main analysis.

[[Table 9](#) ABOUT HERE]

6.2 Explanatory variables

Short selling volume and press coverage, two of our primary explanatory variables, exhibit skewed distributions with extreme values. Although all continuous variables have been winsorized in the main analysis, there is still a potential concern that these extremes, or the skewness of the distributions, could influence the results or introduce a nonlinear relationship with the dependent variables. To address this concern, we construct dummy variables equal to one for observations in the top quartile and use these in place of the continuous variables. [Table 10a](#)

and [Table 10b](#) present the main regression results with the dummy variables replacing the continuous ones. The findings suggest that our conclusions remain robust under these alternative specifications.

[[Table 10](#) ABOUT HERE]

6.3 Alternative instrument

Instrument selection is the crucial step in instrumental variable analysis. Without a valid instrument, IV estimates become unreliable and may offer no improvement over OLS estimates. The instrument we use in [Section 5](#)—the number of special reports on significant events exogenous to IPOs—has previously been employed by [Liu et al. \(2014b\)](#) in the same context. This gives us confidence in its validity.

As a viable alternative, we propose using the cumulative duration of all special reports in the four-week period preceding the IPO. While this alternative is correlated with our primary instrument and shares many of its characteristics, it addresses concerns about the heterogeneity of special reports, with longer ones likely being more salient and attention-grabbing. It also introduces an additional layer of exogeneity to IPO characteristics and our dependent variables by measuring the total duration of special reports, rather than simply counting them. The downside of this measure is that once a special report captures an investor’s attention, an additional minute in duration may not significantly matter. Thus, compared to the count of special reports, the duration measure may sacrifice some power in identifying attention but compensates by enhancing exogeneity.

[[Table 11](#) ABOUT HERE]

As expected, the results reported in [Table 11](#) are very similar to those in [Section 5](#), reaffirming the causality claims we made. The first stage shows that the instrument is significantly

and negatively related to the endogenous explanatory variable (first-day returns). Although somewhat weaker, the second-stage regressions remain consistent with the results in [Table 8](#). The instrumented first-day return leads to increased short selling, less favorable initial analyst recommendations, and lower long-term returns (with the coefficients for the latter two being close to statistical significance, as their p-values slightly exceed the 10% threshold). We conclude that our findings remain robust even when using this alternative instrument.

7 Conclusion

The persistent puzzle of IPO underpricing – why firms “leave money on the table” – has fascinated researchers for decades. While early work largely attributed this phenomenon to rational or intentional stock underpricing, more recent studies present an alternative view: overoptimistic noise traders, driven by attention and sentiment, significantly contribute to the first-day price surge. Given the IPO’s significance as a major corporate event, understanding the underlying causes of this price behavior is crucial.

To contribute to this discussion, we employed a straightforward yet robust approach to distinguish between under- and overpricing of IPO shares in the secondary market. We analyzed the behavior of sophisticated market participants, particularly short sellers, on the first day of trading. Additionally, we incorporated insights from stock analysts, examined press coverage, and applied comparable company analysis to estimate the intrinsic value of IPO firms.

Despite various factors that may influence IPO pricing in the primary market, our findings indicate that first-day returns in the secondary market are largely driven by attention and sentiment-fueled buying pressure, which pushes prices beyond fundamental values. Sophisticated investors, such as short sellers, respond quickly, capitalizing on these pricing inefficiencies, likely at the expense of overoptimistic individual investors.

In conclusion, individual investors should be cautious when participating in the IPO market, especially when pre-IPO sentiment and media coverage are high. Waiting for the initial hype to subside can help mitigate the risk of overpaying for newly listed shares. More broadly, improving financial literacy among retail investors could lower the incidence of such market anomalies and protect against significant losses. Although this paper does not explore the potential benefits of regulatory intervention, it is a topic that warrants further investigation in future research.

References

- Aggarwal, Reena, Nagpurnanand R Prabhala, and Manju Puri, 2002, Institutional allocation in initial public offerings: Empirical evidence, *The Journal of Finance* 57, 1421–1442.
- Asquith, Paul, Parag A Pathak, and Jay R Ritter, 2005, Short interest, institutional ownership, and stock returns, *Journal of Financial Economics* 78, 243–276.
- Bajo, Emanuele, and Carlo Raimondo, 2017, Media sentiment and IPO underpricing, *Journal of Corporate Finance* 46, 139–153.
- Barber, Brad M, and Terrance Odean, 2008, All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors, *The Review of Financial Studies* 21, 785–818.
- Ben-David, Itzhak, Michael S Drake, and Darren T Roulstone, 2015, Acquirer valuation and acquisition decisions: Identifying mispricing using short interest, *Journal of Financial and Quantitative Analysis* 50, 1–32.
- Boehmer, Ekkehart, Charles M Jones, and Xiaoyan Zhang, 2008, Which shorts are informed?, *The Journal of Finance* 63, 491–527.
- Boulton, Thomas J, Scott B Smart, and Chad J Zutter, 2020, Worldwide short selling regulations and IPO underpricing, *Journal of Corporate Finance* 62, 101596.
- Burbidge, John B, Lonnie Magee, and A Leslie Robb, 1988, Alternative transformations to handle extreme values of the dependent variable, *Journal of the American Statistical Association* 83, 123–127.
- Cohen, Lauren, Karl B Diether, and Christopher J Malloy, 2007, Supply and demand shifts in the shorting market, *The Journal of Finance* 62, 2061–2096.
- Conrad, Jennifer, Bradford Cornell, Wayne R Landsman, and Brian R Rountree, 2006, How do analyst recommendations respond to major news?, *Journal of Financial and Quantitative Analysis* 41, 25–49.
- Cornelli, Francesca, David Goldreich, and Alexander Ljungqvist, 2006, Investor sentiment and pre-IPO markets, *The Journal of Finance* 61, 1187–1216.
- Da, Zhi, Joseph Engelberg, and Pengjie Gao, 2011, In search of attention, *The Journal of Finance* 66, 1461–1499.
- Degeorge, François, and Giuseppe Pratobevera, 2024, Nepotism in IPOs: Consequences for issuers and investors, *Journal of Financial and Quantitative Analysis*, forthcoming .
- Derrien, Francois, 2005, IPO pricing in “hot” market conditions: who leaves money on the table?, *The Journal of Finance* 60, 487–521.

- Edwards, Amy K, and Kathleen Weiss Hanley, 2010, Short selling in initial public offerings, *Journal of Financial Economics* 98, 21–39.
- Engelberg, Joseph E, Adam V Reed, and Matthew C Ringgenberg, 2012, How are shorts informed?: Short sellers, news, and information processing, *Journal of Financial Economics* 105, 260–278.
- Ertimur, Yonca, Volkan Muslu, and Frank Zhang, 2011, Why are recommendations optimistic? Evidence from analysts’ coverage initiations, *Review of Accounting Studies* 16, 679–718.
- Fang, Lily H, Joel Peress, and Lu Zheng, 2014, Does media coverage of stocks affect mutual funds’ trading and performance?, *The Review of Financial Studies* 27, 3441–3466.
- Griffin, Dale, and Amos Tversky, 1992, The weighing of evidence and the determinants of confidence, *Cognitive psychology* 24, 411–435.
- Ibbotson, Roger G, 1975, Price performance of common stock new issues, *Journal of Financial Economics* 2, 235–272.
- Liu, Laura Xiaolei, Ruichang Lu, Ann E Sherman, and Yong Zhang, 2023, IPO underpricing and limited attention: Theory and evidence, *Journal of Banking & Finance* 154, 106932.
- Liu, Laura Xiaolei, Ann E Sherman, and Yong Zhang, 2014a, An attention model of IPO underpricing, with evidence on media coverage, *Working Paper* .
- Liu, Laura Xiaolei, Ann E Sherman, and Yong Zhang, 2014b, The long-run role of the media: Evidence from initial public offerings, *Management Science* 60, 1945–1964.
- Ljungqvist, Alexander, 2007, IPO underpricing, *Handbook of Empirical Corporate Finance* 375–422.
- Ljungqvist, Alexander, Vikram Nanda, and Rajdeep Singh, 2006, Hot markets, investor sentiment, and IPO pricing, *The Journal of Business* 79, 1667–1702.
- Loh, Roger K, and René M Stulz, 2011, When are analyst recommendation changes influential?, *The Review of Financial Studies* 24, 593–627.
- Loughran, Tim, and Bill McDonald, 2013, IPO first-day returns, offer price revisions, volatility, and form S-1 language, *Journal of Financial Economics* 109, 307–326.
- Loughran, Tim, and Jay R Ritter, 2002, Why don’t issuers get upset about leaving money on the table in IPOs?, *The Review of Financial Studies* 15, 413–444.
- Miller, Edward M, 1977, Risk, uncertainty, and divergence of opinion, *The Journal of Finance* 32, 1151–1168.
- Ofek, Eli, and Matthew Richardson, 2003, Dotcom mania: The rise and fall of internet stock prices, *The Journal of Finance* 58, 1113–1137.

- Purnanandam, Amiyatosh K, and Bhaskaran Swaminathan, 2004, Are IPOs really under-priced?, *The Review of Financial Studies* 17, 811–848.
- Ritter, Jay R, 1991, The long-run performance of initial public offerings, *The Journal of Finance* 46, 3–27.
- Senchack, Andrew J, and Laura T Starks, 1993, Short-sale restrictions and market reaction to short-interest announcements, *Journal of Financial and Quantitative Analysis* 28, 177–194.
- Simon, Herbert A, 1971, Designing organizations for an information-rich world, in Martin Greenberger, ed., *Computers, Communications, and the Public Interest*, 38–52 (John Hopkins Press).
- Tetlock, Paul C, 2011, All the news that's fit to reprint: Do investors react to stale information?, *The Review of Financial Studies* 24, 1481–1512.
- Von Beschwitz, Bastian, Oleg Chuprinin, and Massimo Massa, 2017, Why do short sellers like qualitative news?, *Journal of Financial and Quantitative Analysis* 52, 645–675.

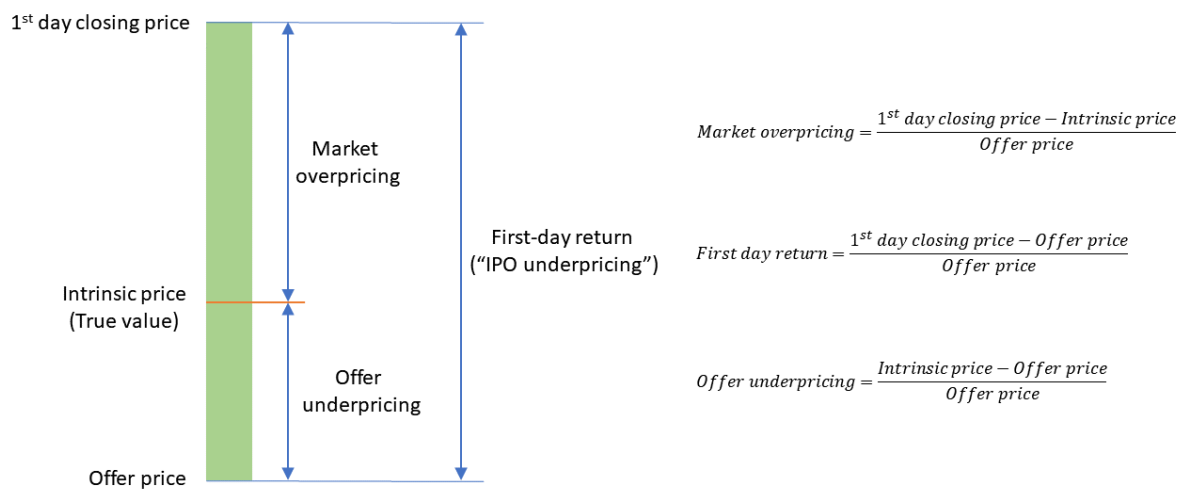
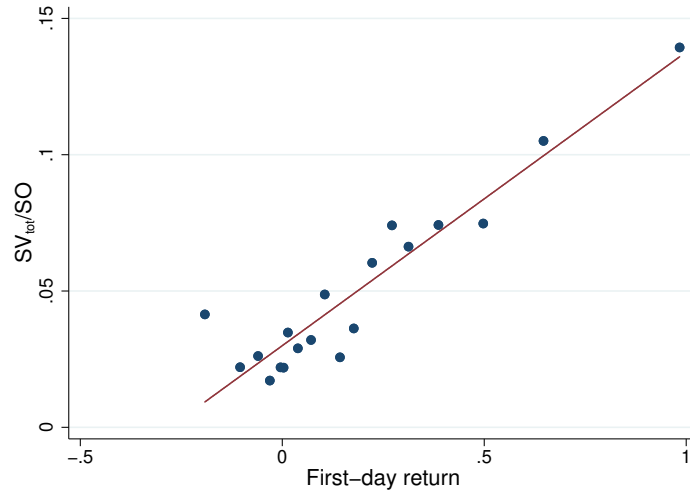
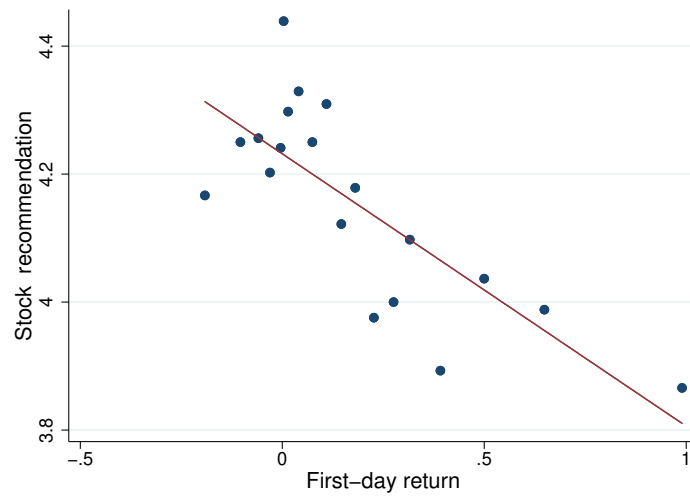


Figure 1: First-day return decomposition

This figure illustrates the decomposition of the IPO first-day return into two components: market overpricing and offer underpricing. Market overpricing is defined as the difference between the first-day closing market price and the intrinsic price of the stock, with the intrinsic value estimated based on a peer-matching approach as outlined in [Section 3](#). Offer underpricing is measured as the difference between the intrinsic value and the offer price. Both components are standardized by the offer price. The sum of these two components equals the first-day return.



(a) Short selling volume



(b) Initial median stock analyst recommendation

Figure 2: First-day returns, short selling and analyst recommendations

The relationship between short selling volume, standardized by the number of shares offered (SV_{tot}/SO), and IPO first-day returns is shown in panel (a). Panel (b) shows the relationship between initial median stock analyst recommendations and IPO first-day returns. Both first-day returns and SV_{tot}/SO are winsorized at the 1st and 99th percentiles. The sample consists of 848 IPOs in the United States from September 2009 to December 2019.

Table 1: Variable definitions and sources

This table defines the main variables used in the analysis. They are sourced directly from or constructed using Compustat, CRSP, Factiva, FINRA, I/B/E/S (Recommendations), Refinitiv Eikon, and Vanderbilt Television News Archive.

Variable	Definition
First-day Return	Relative difference between the first-day secondary market closing price and the offer price (also known as the "IPO underpricing"). Source: CRSP, Refinitiv Eikon
SV_{tot}/SO	The ratio of the total number of shares sold short to the number of shares offered in the IPO. Source: FINRA, Refinitiv Eikon
Median Recommendation	Median (consensus) initial analyst stock recommendation. Thomson Reuters calculates median recommendations by assigning to each contributing analyst's recommendation an integer based on the standardized Thomson Reuters recommendation scale and calculating a real number median. We construct and use the inversed scale as follows: 5. Strong Buy, 4. Buy, 3. Hold, 2. Underperform, 1. Sell. Source: I/B/E/S
Recommendation Downgraded	1 if the analyst median recommendation in the next reporting session is lower than the initial recommendation. Source: I/B/E/S
BHAR	Six-month buy-and-hold abnormal returns computed relative to the CRSP value-weighted market index. Source: CRSP
Press Coverage	The number of news articles about a company, published in English in the U.S., during the four weeks preceding the IPO date. We require that the company's name appears in the headline or lead paragraph, along with the terms "IPO" or "Initial Public Offering". Source: Factiva
Specials	The number of special news reports broadcast during the four weeks preceding the IPO date. We exclude specials that exceed 60 minutes in length and apply an inverse hyperbolic sine transformation to the final count to address the presence of zeros. Source: Vanderbilt Television News Archive
Market Overpricing	The difference between the closing price on the first trading day and the intrinsic value, scaled by the offer price. The intrinsic (true) value is determined using comparable companies, as explained in Section 3 . Source: CRSP, Compustat, Refinitiv Eikon
Offer Underpricing	The relative difference between the intrinsic value and the offer price of an IPO. The intrinsic (true) value is determined using comparable companies, as explained in Section 3 . Source: CRSP, Compustat, Refinitiv Eikon
<i>Control variables</i>	
Above Price Range	1 if the offer price is set above the initial price range. Source: Refinitiv Eikon
Internet IPO	1 if the company is classified as an internet firm at the time of its IPO, based on the classification used by Jay Ritter. Source: Jay Ritter's webpage
$\ln(\text{Gross Proceeds})$	Total funds raised by a company from investors through the sale of shares during its initial public offering. Source: Refinitiv Eikon

Table 1 – continued from previous page

Variable	Definition
ln(MV)	The natural logarithm of the company's market value at the offer price on the IPO date. Source: CRSP, Refinitiv Eikon
Nasdaq IPO	1 if the company is listed on the Nasdaq stock exchange. Source: Refinitiv Eikon
Overallotment	1 if an overallotment option (green shoe option) is exercised in the IPO. Source: Refinitiv Eikon
VC backed	1 if the company going public has received venture capital funding prior to its IPO. Source: Refinitiv Eikon

Table 2: Summary statistics

This table reports summary statistics for the main and control variables used in the analysis. The sample consists of 848 IPOs in the United States from September 2009 to December 2019. Sample size varies in some regressions due to incomplete data availability across all IPOs. We require IPO firm data to be accessible in Refinitiv Eikon, CRSP, and Compustat. We exclude deals with offer prices below five dollars, as well as unit offerings, closed-end funds, real estate investment trusts (REITs), and American depository receipts (ADRs). Companies in regulated utilities (SIC codes 4900-4999) and the financial industry (SIC codes 6000-6999) are also excluded. SV_{tot}/SO represents the ratio of the total number of shares sold short to the number of shares offered in the IPO. The first-day return is calculated as the relative difference between the first-day secondary market closing price and the offer price (commonly referred to as "IPO underpricing"). Detailed descriptions of additional variables are provided in [Table 1](#).

	Mean	Median	St. Dev.	p25	p75
First-day Return	0.173	0.0850	0.279	0	0.292
SV_{tot}/SO	0.0487	0.0304	0.0572	0.0142	0.0583
BHAR	0.00645	-0.0536	0.473	-0.295	0.201
Median Recommendation	4.157	4	0.603	4	4.500
Press Coverage	19.02	13	24.52	8	20
Specials	24.16	22	15.72	14	32
Market Overpricing	0.501	0.791	0.936	0.148	1.057
Offer Underpricing	-0.323	-0.692	0.879	-0.944	-0.0775
<i>Control variables</i>					
Market Cap. (mil.)	876.3	382.7	1655.8	196.9	823.3
Gross Proceeds (mil.)	205.7	100.8	329.0	65	193.8
Above Price Range	0.184	0	0.388	0	0
Internet IPO	0.0943	0	0.292	0	0
Nasdaq IPO	0.630	1	0.483	0	1
Overallotment	0.698	1	0.459	0	1
VC backed	0.566	1	0.496	0	1

Table 3: First-day returns and short selling

The table reports regression results where the dependent variable is short selling interest (SV_{tot}/SO) on the IPO date, defined as the number of shares shorted relative to the number of shares offered. The first-day return is calculated as the relative difference between the first-day closing price and the offer price. Gross Proceeds represent the total funds raised by the company through the sale of shares in the IPO. MV is the market value of the company based on the offer price on the IPO date. Above Price Range is a dummy variable set to 1 if the offer price is above the initial price range. Overallotment is a dummy variable set to 1 if an overallotment (green shoe) option is exercised in the IPO. Nasdaq IPO is a dummy variable set to 1 if the company is listed on the Nasdaq stock exchange. Internet IPO is a dummy variable set to 1 if the company is classified as an internet firm at the time of its IPO, based on the classification by Jay Ritter. VC backed is a dummy variable set to 1 if the company received venture capital funding prior to its IPO. The last two regressions include fixed effects for the IPO year and for the 48 Fama and French industries. The dependent variable and continuous control variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by industry and are robust to heteroskedasticity. P-values are reported in parentheses. Significance levels: * - 10%, ** - 5%, *** - 1%.

	SV_{tot}/SO		
	(1)	(2)	(3)
First-day Return	0.109*** (0.000)	0.097*** (0.000)	0.089*** (0.000)
ln(Gross Proceeds)			0.003 (0.541)
ln(MV)			-0.001 (0.823)
Above Price Range			0.009 (0.104)
Overallotment			-0.005 (0.272)
Nasdaq IPO			0.010 (0.171)
Internet IPO			0.026*** (0.000)
VC backed			0.011*** (0.005)
Constant	0.030*** (0.000)	-0.001 (0.750)	-0.012 (0.607)
Year FE	No	Yes	Yes
Industry FE	No	Yes	Yes
Adjusted R^2	0.28	0.40	0.43
Observations	848	848	848

Table 4: Analyst recommendations

The table reports regression results for analyst stock recommendations. The first four columns present OLS regressions, where the dependent variable is the median (consensus) initial analyst recommendation. The last four columns display logit regressions, where the dependent variable is a dummy variable equal to one if the median recommendation is downgraded in the following reporting period. Thomson Reuters calculates median recommendations by assigning an integer to each contributing analyst's recommendation based on its standardized scale and then computing a real number median. We use an inverse scale, defined as follows: 5 = Strong Buy, 4 = Buy, 3 = Hold, 2 = Underperform, 1 = Sell. Short selling interest (SV_{tot}/SO) is the number of shares shorted on the IPO date relative to the number of shares offered. The first-day return is calculated as the relative difference between the first-day closing price and the offer price. Descriptions of additional variables are provided in [Table 1](#). All regressions include fixed effects for the IPO year and the 48 Fama and French industries. Continuous control variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by industry and are robust to heteroskedasticity. P-values are reported in parentheses. Significance levels: * - 10%, ** - 5%, *** - 1%.

	Initial Median Recommendation				Recommendation Downgraded			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SV_{tot}/SO	-2.633*** (0.000)	-2.355*** (0.000)			6.078*** (0.001)	5.965** (0.011)		
First-day Return			-0.306** (0.021)	-0.217* (0.054)			1.397*** (0.000)	1.342*** (0.001)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.16	0.19	0.12	0.16				
Pseudo R^2					0.10	0.13	0.10	0.13
Observations	831	831	831	831	831	831	831	831

Table 5: Long-term returns

The table reports regression results where the dependent variable is the six-month buy-and-hold abnormal return (BHAR), calculated relative to the CRSP value-weighted market index. Short selling interest (SV_{tot}/SO) is the number of shares shorted on the IPO date relative to the number of shares offered. The first-day return is calculated as the relative difference between the first-day closing price and the offer price. Median Recommendation is the median (consensus) initial analyst recommendation for the IPO stock. Thomson Reuters calculates median recommendations by assigning an integer to each contributing analyst's recommendation based on its standardized scale and then computing a real number median. We use an inverse scale, defined as follows: 5 = Strong Buy, 4 = Buy, 3 = Hold, 2 = Underperform, 1 = Sell. Descriptions of additional variables are provided in Table 1. All regressions include fixed effects for the IPO year and the 48 Fama and French industries. The dependent variable and continuous control variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by industry and are robust to heteroskedasticity. P-values are reported in parentheses. Significance levels: * - 10%, ** - 5%, *** - 1%.

	BHAR					
	(1)	(2)	(3)	(4)	(5)	(6)
SV_{tot}/SO	-0.666*** (0.001)	-0.766*** (0.004)				
First-day Return			-0.020 (0.561)	-0.084* (0.099)		
Median Recommendation					0.043*** (0.006)	0.037** (0.032)
Controls	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.01	0.02	0.00	0.01	0.01	0.02
Observations	846	846	846	846	829	829

Table 6: Press coverage

The table reports the regression results from the analysis of the impact of press coverage on various IPO characteristics. Press Coverage is defined as the number of news articles about a company published in English in the U.S. during the four weeks preceding the IPO date. The first-day return is calculated as the relative difference between the first-day closing price and the offer price. Short selling interest (SV_{tot}/SO) is the number of shares shorted on the IPO date relative to the number of shares offered. Median Recommendation is the median (consensus) initial analyst recommendation for the IPO stock. Thomson Reuters calculates median recommendations by assigning an integer to each contributing analyst's recommendation based on its standardized scale and then computing a real number median. We use an inverse scale, defined as follows: 5 = Strong Buy, 4 = Buy, 3 = Hold, 2 = Underperform, 1 = Sell. Recommendation Downgraded is a dummy variable equal to one if the median recommendation is downgraded in the following reporting period. BHAR is the six-month buy-and-hold abnormal return calculated relative to the CRSP value-weighted market index. Descriptions of additional variables are provided in Table 1. All regressions include fixed effects for the IPO year and the 48 Fama and French industries. Continuous dependent variables and continuous control variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by industry and are robust to heteroskedasticity. P-values are reported in parentheses. Significance levels: * - 10%, ** - 5%, *** - 1%.

	First-day Return		SV_{tot}/SO		Median Recom.		Recom. Downgraded		BHAR	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Press Coverage	0.0020*** (0.000)	0.0012** (0.020)	0.0008*** (0.000)	0.0008*** (0.000)	-0.0059*** (0.000)	-0.0040*** (0.003)	0.0150*** (0.000)	0.0130** (0.016)	-0.0012** (0.045)	-0.0011*** (0.005)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.09	0.36	0.30	0.38	0.15	0.17			0.01	0.01
Pseudo R^2							0.11	0.13		
Observations	848	848	848	848	831	831	831	831	846	846

Table 7: Decomposition of first-day returns

The table reports the regression results from the analysis of the impact of Market Overpricing and Offer Underpricing on various IPO characteristics. Market Overpricing is the difference between the closing price on the first trading day and the intrinsic value, scaled by the offer price. Offer Underpricing is the relative difference between the intrinsic value and the offer price of an IPO. The intrinsic value is determined using comparable companies, as explained in Section 3. Short selling interest (SV_{tot}/SO) is the number of shares shorted on the IPO date relative to the number of shares offered. Median Recommendation is the median (consensus) initial analyst recommendation for the IPO stock. Thomson Reuters calculates median recommendations by assigning an integer to each contributing analyst's recommendation based on its standardized scale and then computing a real number median. We use an inverse scale, defined as follows: 5 = Strong Buy, 4 = Buy, 3 = Hold, 2 = Underperform, 1 = Sell. Recommendation Downgraded is a dummy variable equal to one if the median recommendation is downgraded in the following reporting period. BHAR is the six-month buy-and-hold abnormal return calculated relative to the CRSP value-weighted market index. Descriptions of additional variables are provided in Table 1. All regressions include fixed effects for the IPO year and the 48 Fama and French industries. Continuous dependent variables and continuous control variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by industry and are robust to heteroskedasticity. P-values are reported in parentheses. Significance levels: * - 10%, ** - 5%, *** - 1%.

	SV_{tot}/SO		Median Recom.		Recom. Downgraded		BHAR	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Market Overpricing	0.007*** (0.001)		-0.034 (0.121)		0.236* (0.089)		-0.005 (0.823)	
Offer Underpricing		-0.002 (0.176)		0.020 (0.295)		-0.123 (0.374)		0.002 (0.939)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.33	0.32	0.16	0.16			0.02	0.02
Pseudo R^2					0.14	0.14		
Observations	744	744	730	730	730	730	742	742

Table 8: Instrumental variable regressions

This table presents the results of 2SLS IV regressions, using *Specials* as the instrument. The first column reports the first stage of the IV regression, where the dependent variable is the first-day return. The results of the second stage regressions are shown in the next four columns, with dependent variables: short-selling interest, median initial analyst recommendation, a dummy variable indicating a recommendation downgrade, and BHAR. *Specials* is the number of special reports released during the four weeks preceding the IPO date. We exclude specials longer than 60 minutes and apply an inverse hyperbolic sine transformation to adjust for zero counts. The first-day return is calculated as the relative difference between the first-day closing price and the offer price. Short selling interest (SV_{tot}/SO) is the number of shares shorted on the IPO date relative to the number of shares offered. Median Recommendation is the median (consensus) initial analyst recommendation for the IPO stock. Thomson Reuters calculates median recommendations by assigning an integer to each contributing analyst's recommendation based on its standardized scale and then computing a real number median. We use an inverse scale, defined as follows: 5 = Strong Buy, 4 = Buy, 3 = Hold, 2 = Underperform, 1 = Sell. Recommendation Downgraded is a dummy variable equal to one if the median recommendation is downgraded in the following reporting period. BHAR is the six-month buy-and-hold abnormal return calculated relative to the CRSP value-weighted market index. Descriptions of additional variables are provided in Table 1. Continuous dependent variables and continuous control variables are winsorized at the 1st and 99th percentiles. Standard errors, robust to heteroskedasticity, are obtained from jointly estimating the two-stage regressions. P-values are reported in parentheses. Significance levels: * - 10%, ** - 5%, *** - 1%.

	First stage		Second stage		
	(1) First-day Return	(2) SV_{tot}/SO	(3) Median Recom.	(4) Recom. Downgraded	(5) BHAR
Specials	-0.016** (0.046)				
First-day Return		0.478** (0.012)	-2.667* (0.095)	-7.764 (0.153)	-2.668 (0.107)
ln(Gross Proceeds)	-0.014 (0.433)	0.011 (0.184)	-0.164** (0.014)	-0.131 (0.505)	-0.065 (0.242)
ln(MV)	0.014 (0.377)	-0.007 (0.286)	0.030 (0.583)	0.282 (0.104)	0.057 (0.255)
Above Price Range	0.271*** (0.000)	-0.089 (0.102)	0.447 (0.312)	2.130 (0.151)	0.653 (0.157)
Overallotment	0.203*** (0.000)	-0.084** (0.035)	0.570* (0.087)	1.809 (0.114)	0.673** (0.048)
Nasdaq IPO	0.029 (0.125)	-0.005 (0.633)	0.131* (0.096)	0.058 (0.834)	0.139* (0.079)
Internet IPO	0.047 (0.135)	0.017 (0.254)	-0.077 (0.530)	0.711* (0.064)	0.072 (0.546)
VC backed	0.060*** (0.001)	-0.021 (0.134)	0.218* (0.050)	0.527 (0.194)	0.170 (0.138)
Constant	-0.035 (0.549)	0.047* (0.077)	4.538*** (0.000)	-3.252*** (0.000)	-0.355 (0.136)
Observations	848	848	831	831	846
Adjusted R^2	0.33				
Cragg-Donald F-stat	51.86				

Table 9: Robustness – Alternative matching procedures

The table reports regression results from the analysis of the impact of Market Overpricing and Offer Underpricing on short selling interest, using three alternative methods to identify comparable companies. Market Overpricing is defined as the difference between the closing price on the first trading day and the intrinsic value, scaled by the offer price. Offer Underpricing is the relative difference between the intrinsic value and the offer price of an IPO. The intrinsic value is determined based on comparable companies within the same Fama-French 48 industry as the IPO company. In the first four regressions, we calculate the median Market Overpricing and median Offer Underpricing using all comparable companies that meet a 50% asset difference threshold, rather than selecting a single closest peer. For the next four regressions, we select a single comparable company with the closest revenue to the IPO company within a 50% range and a profitability (measured as EBITDA/Revenues) within a 100% range of that of the IPO company. In the final four regressions, we calculate the median Market Overpricing and median Offer Underpricing using all comparable companies that satisfy both the revenue and profitability criteria specified in the prior procedure. Descriptions of additional variables are provided in Table 1. All regressions include fixed effects for the IPO year and the 48 Fama and French industries. The dependent variable and continuous control variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by industry and are robust to heteroskedasticity. P-values are reported in parentheses. Significance levels: * - 10%, ** - 5%, *** - 1%.

	Assets + median				Sales & Profitability				Sales & Profitability + median			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Market Overpricing	0.015*** (0.000)	0.009*** (0.001)			0.013** (0.012)	0.005 (0.280)			0.016*** (0.000)	0.008** (0.012)		
Offer Underpricing			-0.005** (0.040)	0.000 (0.812)			-0.002 (0.501)	0.003 (0.374)			-0.005** (0.013)	0.002 (0.326)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.24	0.32	0.20	0.31	0.19	0.28	0.16	0.28	0.23	0.30	0.19	0.30
Observations	806	806	806	806	601	601	601	601	626	626	626	626

Table 10: Robustness – Alternative variables

The table summarizes robustness checks using alternative specifications for short selling interest and press coverage. Panel A presents regression results for analyst recommendations and BHAR when short selling interest is replaced with a dummy variable that equals one for observations in the top quartile. Panel B presents regression results from the analysis in Table 6, substituting press coverage with a dummy variable that equals one for observations in the top quartile. Descriptions of additional variables are provided in Table 1. All regressions include fixed effects for the IPO year and the 48 Fama and French industries. Continuous dependent variables and continuous control variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by industry and are robust to heteroskedasticity. P-values are reported in parentheses. Significance levels: * - 10%, ** - 5%, *** - 1%.

(a) Panel A: High short volume

	Median Recom.		Recom. Downgraded		BHAR	
	(1)	(2)	(3)	(4)	(5)	(6)
High Short Vol.	-0.238*** (0.000)	-0.184*** (0.000)	0.488** (0.045)	0.344 (0.194)	-0.086*** (0.007)	-0.097*** (0.007)
Controls	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.13	0.17			0.01	0.02
Pseudo R^2			0.09	0.12		
Observations	831	831	831	831	846	846

(b) Panel B: High press coverage

	First-day Return		SV_{tot}/SO		Median Recom.		Recom. Downgraded		BHAR	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
High Press Cov.	0.1350*** (0.000)	0.0467 (0.117)	0.0342*** (0.000)	0.0280*** (0.000)	-0.2909*** (0.000)	-0.1585*** (0.005)	1.0162*** (0.007)	0.6982*** (0.008)	-0.0439 (0.251)	-0.0428 (0.246)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.10	0.35	0.24	0.33	0.14	0.16			0.00	0.01
Pseudo R^2							0.10	0.12		
Observations	848	848	848	848	831	831	831	831	846	846

Table 11: Robustness – Alternative instrument

This table presents the results of 2SLS IV regressions, using *Specials (duration)* as the instrument. The first column reports the first stage of the IV regression, where the dependent variable is the first-day return. The results of the second stage regressions are shown in the next four columns, with dependent variables: short-selling interest, median initial analyst recommendation, a dummy variable indicating a recommendation downgrade, and BHAR. *Specials (duration)* is the cumulative duration expressed in hours of all special reports released during the four weeks preceding the IPO date. We exclude specials longer than 60 minutes. The first-day return is calculated as the relative difference between the first-day closing price and the offer price. Short selling interest (SV_{tot}/SO) is the number of shares shorted on the IPO date relative to the number of shares offered. Median Recommendation is the median (consensus) initial analyst recommendation for the IPO stock. Thomson Reuters calculates median recommendations by assigning an integer to each contributing analyst's recommendation based on its standardized scale and then computing a real number median. We use an inverse scale, defined as follows: 5 = Strong Buy, 4 = Buy, 3 = Hold, 2 = Underperform, 1 = Sell. Recommendation Downgraded is a dummy variable equal to one if the median recommendation is downgraded in the following reporting period. BHAR is the six-month buy-and-hold abnormal return calculated relative to the CRSP value-weighted market index. Descriptions of additional variables are provided in Table 1. Continuous dependent variables and continuous control variables are winsorized at the 1st and 99th percentiles. Standard errors, robust to heteroskedasticity, are obtained from jointly estimating the two-stage regressions. P-values are reported in parentheses. Significance levels: * - 10%, ** - 5%, *** - 1%.

	First stage		Second stage		
	(1) First-day Return	(2) SV_{tot}/SO	(3) Median Recom.	(4) Recom. Downgraded	(5) BHAR
Specials (duration)	-0.002* (0.095)				
First-day Return		0.397* (0.052)	-3.477 (0.133)	-10.863 (0.166)	-3.550 (0.125)
ln(Gross Proceeds)	-0.013 (0.457)	0.010 (0.166)	-0.172** (0.035)	-0.166 (0.492)	-0.075 (0.309)
ln(MV)	0.014 (0.385)	-0.006 (0.299)	0.041 (0.552)	0.320 (0.139)	0.069 (0.304)
Above Price Range	0.270*** (0.000)	-0.067 (0.236)	0.665 (0.292)	2.957 (0.165)	0.891 (0.161)
Overallotment	0.204*** (0.000)	-0.068 (0.112)	0.737 (0.130)	2.449 (0.136)	0.852* (0.073)
Nasdaq IPO	0.031 (0.104)	-0.002 (0.825)	0.157 (0.119)	0.159 (0.662)	0.169 (0.109)
Internet IPO	0.048 (0.124)	0.021 (0.151)	-0.041 (0.792)	0.857* (0.092)	0.112 (0.478)
VC backed	0.060*** (0.001)	-0.016 (0.250)	0.270* (0.075)	0.731 (0.194)	0.225 (0.141)
Constant	-0.072 (0.173)	0.038 (0.122)	4.453*** (0.000)	-3.574*** (0.002)	-0.449 (0.144)
Observations	848	848	831	831	846
Adjusted R^2	0.33				
Cragg–Donald F-stat	51.52				

Appendix

A Mediation model of investor attention

Over half a century ago, [Simon \(1971\)](#) said that attention is scarce because humans “*can attend to only one thing at a time*”. He further explained that information “*consumes the attention of its recipients. Hence, a wealth of information creates a poverty of attention*”.

In the context of IPOs, extensive and information-rich pre-IPO media coverage attracts (i.e., “consumes”) individual investor attention, resulting in buying pressure on IPO stocks (as in [Barber and Odean 2008](#) and [Tetlock 2011](#)). This mechanism implicitly assumes that increased attention heightens optimistic sentiment among investors. However, any distraction that has the potential to capture investor attention also “consumes” this limited resource, potentially diverting it from IPO events. Therefore, salient news about significant events, such as special news reports, presumably draw investor attention away from IPOs, leading to reduced buying pressure and lower first-day returns. This describes a direct impact of important news on IPO-date returns, as illustrated in [Figure A.1](#).

Alternatively, special news reports may occupy media space, reducing the coverage available for IPOs. As a result, the likelihood of investors learning about IPOs declines, thereby diminishing the buying pressure driven by media-induced attention and optimistic sentiment. Consequently, first-day returns decrease. This is the indirect impact of special news reports on IPO-date returns via reduced press coverage, as illustrated in the figure. While this model presumably describes well the attention patterns of individual investors, short sellers – being generally well-informed and sophisticated – tend to be less influenced by media coverage, as suggested by [Von Beschwitz et al. 2017](#).

The proposed mediation model, illustrating the impact of (individual) investor attention on first-day returns, can be formally specified as a SEM (Structural Equation Modeling) model as follows:

$$First\text{-}day\ return_i = \alpha_1 + \beta_{1,1}Specials_i + \sum_n \beta_{1,n}CV_{n,i} + \epsilon_{1,i} \quad (9)$$

$$Press\ coverage_i = \alpha_2 + \beta_{2,1}Specials_i + \sum_n \beta_{2,n}CV_{n,i} + \epsilon_{2,i} \quad (10)$$

$$First\text{-}day\ return_i = \alpha_3 + \beta_{3,1}Specials_i + \beta_{3,2}Press\ coverage_i + \sum_n \beta_{3,n}CV_{n,i} + \epsilon_{3,i} \quad (11)$$

[Table A.1](#) presents the results from estimating the proposed SEM mediation model. Our findings indicate that exogenous special news reports affect first-day returns both directly and

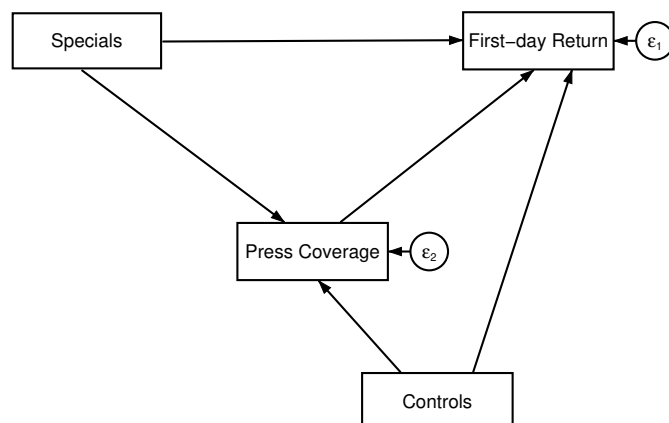


Figure A.1: SEM mediation model

This figure illustrates the SEM mediation model examining the impact of investor attention to media on first-day returns. Specials measures the volume of special news reports, serving as an exogenous shock to investor attention. Press coverage represents the number of articles covering the IPO in the four weeks preceding the IPO. First-day return is the relative difference between the IPO-day closing price and the offer price. Controls are control variables described in [Table 1](#).

indirectly through press coverage. Both the direct and indirect effects are significant, resulting in lower first-day returns, with the direct effect being substantially stronger. Additionally, the proposed mediation model demonstrates significantly higher explanatory power for first-day returns, with the overall R^2 of 0.58, compared to the OLS model in [Table 6](#), Regression 1, which has an R^2 of 0.36.

In summary, as shown by the SEM mediation model, the count of special news reports, which serves as a proxy for exogenous deviations in individual investor attention, is indeed a significant and important predictor of first-day returns. This finding reassures us that this variable meets the relevance condition and can be effectively used in the IV regressions in [Section 5](#).

Table A.1: SEM mediation model

This table presents the results of the estimation of the SEM mediation model examining the impact of investor attention to media on first-day returns. Specials is the number of special reports released during the four weeks preceding the IPO date. We exclude specials longer than 60 minutes and apply an inverse hyperbolic sine transformation to adjust for zero counts. Press Coverage is defined as the number of news articles about a company published in English in the U.S. during the four weeks preceding the IPO date. The first-day return is calculated as the relative difference between the first-day closing price and the offer price. Descriptions of additional variables are provided in Table 1. Continuous dependent variables and continuous control variables are winsorized at the 1st and 99th percentiles. Standard errors are robust to heteroskedasticity. P-values are reported in parentheses. Significance levels: * - 10%, ** - 5%, *** - 1%.

	Direct	Indirect	Total
Equation: Press Coverage			
Specials	-2.150** (0.016)		-2.150** (0.016)
Controls	Yes		Yes
Equation: First-day Return			
Press Coverage	0.001** (0.047)		0.001** (0.047)
Specials	-0.014* (0.085)	-0.002* (0.094)	-0.016** (0.045)
Controls	Yes	Yes	Yes
Observations	848		
Overall R^2	0.58		