Pre-IPO Analyst Coverage: Hype or Information Production?*

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Abstract

We find that analyst coverage and optimism for an IPO before it starts trading have positive impacts on both its offer price revision and first-day return. Pre-IPO analyst research is also positively associated with long-run returns. Analysts with connections to the underwriter are more likely to cover an IPO and provide more optimistic forecasts. The positive impact of pre-IPO analyst research on IPO pricing remains, however, if connected analysts are excluded. Unlike the U.S. and other markets, offer price revisions are negatively related to initial returns in China. Our findings have policy implications for regulations of primary market communications.

Keywords: Analysts, IPOs, Primary Market, Offer Price Revision, Underpricing, China

JEL classification: G14, G15, G18, G24

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1. Introduction

Initial public offerings (IPOs) are persistently underpriced around the world. An important reason for the persistent underpricing for both developing and developed markets is information asymmetry. Analysts are known to play an important role in producing and disseminating information in securities markets. In the U.S., pre-IPO coverage by affiliated analysts has generally been prohibited, and pre-IPO analyst coverage has been almost non-existent. In China, however, pre-IPO research by unaffiliated analysts is the norm. We use China's IPOs to address the question of whether primary market (pre-IPO) analyst research helps improve the pricing of IPOs.

Pre-IPO analyst research can either help or hinder IPO price discovery. On the one hand, analysts can produce information and hence help the IPO market function more efficiently. On the other hand, because IPOs are less well known, biased analyst research can also be used to hype a stock and mislead the public about the valuation of an IPO. This is an especial concern when retail investors are a large part of the investor population. Because of concerns about hyping IPOs, quiet period restrictions existed in the U.S. market until their abolition for most IPOs in the April 2012 JOBS (Jumpstart Our Business Startups) Act. These restrictions prohibited issuing firms and their underwriters from publishing opinions concerning valuation and from making forward-looking statements regarding earnings, revenues, and similar items that are not in the written prospectus. The quiet period for a U.S. IPO, which starts from the time a firm is "in registration", has varied from 25 to 40 calendar days after the IPO until recently.[1]

[1] For more details about the quiet period restrictions in the U.S., see NASD Rule 2711 and NYSE Rule 472. Note that the 40-day quiet period does not apply to "Emerging Growth Company" (EGC) IPOs after April 2012, when the JOBS Act was signed into law, abolishing quiet period restrictions for these IPOs. More information can be found at the Financial Industry Regulatory Authority, Inc. ("FINRA") website (see, e.g., http://www.finra.org/Industry/Regulation/RuleFilings/2012/P180831 and the links therein). The regulatory restrictions also apply to oral statements to the general public. Oral statements made to institutional investors are permissible. Note that quiet period restrictions in the U.S. do not prevent unaffiliated brokers, investment banks, and other research houses from publishing their research on an IPO. In September 2015, FINRA Rule 2215 became effective, reducing the quiet period to end 10 calendar days after the IPO, although analysts still typically wait until 25 days have elapsed

Whether quiet period restrictions provide the proper balance between information production and hype remains debatable. Indeed, the May 2012 Facebook IPO started a new round of debate about this regulation. During the days leading to the offering of Facebook shares, analysts at Facebook's underwriters, including Morgan Stanley, Goldman Sachs, and J.P. Morgan, cut revenue forecasts. They did not reveal this cut to the public, in compliance with the quiet period restrictions.[2] After the IPO, Facebook experienced price declines and individual investors lost a large amount of money, prior to the stock increasing to above its offer price a year later. Many argue that the quiet period restrictions could "provide institutional investors with an informational advantage over ordinary investors" and "inhibit price discovery in the IPO process".[3] As a response to such concerns, including inquiries from the U.S. Congress, as well as a part of the rulemaking for implementing the JOBS Act, the U.S. Securities and Exchange Commission (SEC) and FINRA have issued new rules governing communications during IPOs.[4] How to encourage and regulate information production, including analyst research, on IPOs in the primary market is still of importance, as it probably always has been.

It is challenging to evaluate the potential impact of pre-IPO analyst research in the U.S. market since to date few analysts publish their research before a firm's IPO. Note that, although the U.S. quiet period restrictions were lifted or relaxed in 2012 and 2015, industry practice continues to be that unaffiliated analysts generally do not initiate coverage, and affiliated analysts wait 25 days before initiating coverage, for IPOs in the U.S. It is beyond the scope of this paper, but we suspect that path dependency plays a role in such practices and changes will happen slowly. Pre-IPO research coverage, however, is very active for China's IPOs. For the 859

before initiating coverage.

[2] See Poornima Gupta and Alexei Oreskovic, "The numbers on the Facebook earnings revisions," Reuters (May 22, 2012). Note that many institutional clients were informed of the updated forecast via the phone in private, and this practice is legal.

[3] See page 17 of former SEC Chairman Mary Schapiro's letter to Congressman Darrell Issa on August 23, 2012.

[4] See https://www.sec.gov/spotlight/jobs-act.shtml for more information on the JOBS Act.

Chinese IPOs in our sample, the average number of brokers with an analyst covering a stock before its first trading day is 10.63, and it ranges from zero to 28 brokers. This active pre-IPO research coverage provides a unique opportunity for researchers to shed light on the role of analysts in the primary markets for arguably one of the most opaque security types – IPOs. More specifically, we try to answer some simple yet fundamental questions: Does primary market analyst research matter? If analysts indeed have significant influence over IPO pricing, do analysts' reputational concerns dominate? Do they do more good than harm? That is, do they produce useful information, or do they mostly just hype the stock?

We acquire detailed information on analyst research for 859 IPOs in the Chinese market from 2009 to 2012, a period during which the China Securities Regulatory Commission (CSRC, China's counterpart to the U.S. SEC) did not impose price caps on IPO offer prices. There are three key dates for an IPO in China: the file date, the offer date, and the listing date. The three dates refer to when the IPO application is filed with the CSRC, when the offer price and allocation are determined, and when the stock starts trading, respectively. Unlike IPOs in the U.S., for which there is typically only one evening between offering and listing/trading, there are typically a few days between the offer date and the listing date for China's IPOs. In order to differentiate the effects of analyst research on offer price and initial returns, we categorize pre-IPO analyst reports into pre- and post-offer date reports. We do not include reports issued after the listing date. It is likely that only the reports issued before the offer date affect the offer price, and the reports issued on or before the listing date can have an effect on initial returns. Accordingly, we construct measures of pre- and post-offer date analyst coverage and optimism, where coverage is measured using the number of brokers providing research, and optimism is computed as the negative of the scaled industry-adjusted P/E ratio based on earnings forecasts.

We use the negative of the scaled industry-adjusted P/E ratio since a more optimistic earnings forecast results in a lower P/E ratio. Unlike the U.S., for our sample period, the CSRC requires that IPO candidates have positive pre-IPO earnings, and it is rare for analysts to forecast negative earnings, allowing our use of P/E ratios.

We first examine how analyst coverage and optimism affect offer price revisions. The offer price revision, also known as the price adjustment, for an IPO is defined as the percentage change from the expected offer price to the final offer price. After controlling for firm and issue characteristics, we find that pre-offer date analyst coverage and optimism each have statistically significant positive impacts on offer price revisions. Our estimates indicate that an increase of 3.61 brokers (one standard deviation) covering a stock prior to the offer date is associated with a 9.85% increase in the offer price. For pre-offer date optimism, a one standard deviation increase (0.66) in the negative of the scaled industry-adjusted P/E ratio measure, reflecting a higher earnings forecast, is associated with a 65% higher offer price. All these estimates are statistically significant. Economically, these estimates suggest a substantial economic impact of analyst coverage on the offer price. For example, the 9.85% increase in offer price associated with coverage by 3.61 more analysts represents an increase of 84.1 million Chinese Yuan (equivalent to US$13.4 million based on the December 31st , 2012 exchange rate of 6.2855) in offer proceeds for an average IPO in our sample.

We also analyze the first-day return, measured from the offer price to the first-day market closing price. We use first-day return, underpricing, and initial return interchangeably in the paper. We find that the post-offer date number of analysts covering an IPO has an insignificant impact on initial returns. The coefficients on post-offer date optimism are positive and statistically significant in regressions with initial return as the dependent variable. Economically,

a one standard deviation increase in this optimism measure implies that the first-day return will be 5.5% higher (e.g., from 35.1%, which is the mean, to 40.6%).

An interesting and important result for IPOs in China is a negative relation between offer price revisions and initial returns. For IPOs in the U.S. and many other markets, an upward price revision is a reliable predictor of a higher first-day return. This empirical pattern is the well-known partial adjustment phenomenon (Hanley (1993), Loughran and Ritter (2002), Jenkinson, Morrison, and Wilhelm (2006), Kutsuna, Smith, and Smith (2009), and İnce (2014)). For the 859 IPOs in our sample, the offer price revision has a statistically significant negative effect on initial returns, suggesting that the offer price adjustment is more than complete in China.

Another ancillary but important empirical contribution of this paper is the construction of our measure for the expected offer price, which is often used as the starting point to infer information production in the primary market. For U.S. IPOs, the literature uses the mid-point of the file price as the expected offer price before the underwriter does the roadshow and collects information from investors.[5] In China, the issuing firm and its underwriter do not report such price ranges in their initial filings with the CSRC. Instead, an IPO prospectus in China contains detailed information on the proposed investment project(s) that the IPO proceeds will be used for. In other words, the proposed investments essentially provide an estimate of the proceeds that the issuing firm expects to raise for the IPO.[6] We then divide the proposed investments by the number of shares for the IPO to get the expected offer price. Because of the lack of file price ranges, it has been challenging to deal with price adjustments for Chinese IPOs. Our expected

[5] In recent years, most U.S. IPOs set a file price range on a Friday and begin their road show the following Monday with the offer price set in the middle of the next week, slightly less than two weeks after setting the file price range.

[6] The average offer price revision is 140%, which is greater than that for the U.S. These high offer price revisions partly result from higher offer prices, as the CSRC did not impose price caps. In addition, the elevated offer price revisions suggest that the estimate based on proposed investments is likely to be biased downwards due to path dependency and the process of obtaining government approval. However, we do not see reasons for this estimate to exhibit any cross-sectional patterns that would prevent this estimate from being a useful starting point to calculate offer price revisions.

offer price measure fills this important measurement gap.

The number of analysts covering an IPO and their earnings forecasts may be affected by how "hot" an IPO is expected to be, and potential omitted variable bias can arise if we fail to control for important variables predicting a hot IPO. In 2SLS regressions, we use two instrumental variables (IVs) for analyst coverage and two IVs for optimism. For analyst coverage, we define the lead coverage effect as the mean of the number of analysts covering the IPOs underwritten by the same lead underwriter during the last twelve months (LTM); and the industry coverage effect as the mean of the LTM coverage of the IPOs in the same industry. We construct the IVs for optimism in the same way by using the lead and industry-based LTM averages. IPO market cycles generally play an important role in IPO pricing (Ritter (1984) and Lowry and Schwert (2004)). IPO pricing also tends to have a strong underwriter fixed effect (Hoberg (2007)). Surprisingly, both lead and industry effects have little predictive power for analyst coverage and optimism. In the second-stage regressions, it is also the residual components of analyst coverage and optimism, not the predicted values, that have a significant impact on IPO price revisions and initial returns. These results are consistent with the fact that the price adjustments for Chinese IPOs are complete. The lack of predictive power of industry and lead effects on analyst research also suggests that it is unlikely that omitted factors drive both analyst coverage and IPO pricing. Furthermore, the complete adjustment of the offer price in response to an increase in analyst coverage results in the number of analysts not being positively related to initial returns in our sample. Thus, there is also no reverse causality problem resulting from high initial returns attracting more analyst coverage. Overall, these findings suggest that our OLS results are unlikely to suffer from significant endogeneity bias.

Our results suggest that pre-IPO analyst research has a significant influence on the

pricing of IPOs. But do analysts produce/disseminate useful information, or do they just aggregate public information and try to hype the stock? Furthermore, will the lead underwriter of an IPO use its connections to boost analyst coverage for its IPO? Will such connections result in more optimistic research? These issues are important to assess the tradeoff underlying potential regulations on pre-IPO analyst research because the goal of such regulations is to encourage information production but limit market manipulation. We shed light on these issues with three different sets of results.

First, we decompose analyst coverage and their earnings forecast optimism into a predicted component and a residual component. We use the same IVs as described in the 2SLS analysis for the decomposition. We argue that the residual components of either analyst coverage or optimism are more related to analysts' information production. We find that the significant impacts on IPO pricing for pre-IPO analyst research come from the residual components. This finding suggests that analysts do produce useful information in their pre-IPO research and analysts' impact of IPO pricing mainly comes from their information production.

Second, we calculate the one-, two-, and three-year buy-and-hold returns (BHRs) for IPOs in our sample starting from the end of the first month after trading started. We find that pre-IPO analyst research has predictive power for IPO long-run returns. The coefficients on pre-IPO, but post-offer date, analyst coverage are positive and statistically significant when it is used to predict the one- to three-year BHRs. The pre-offer date analyst coverage and optimism also have statistically significant predictive power for the three-year BHR. The market is unlikely to underreact to hype in the long-run. Thus, the positive relation between pre-IPO analyst coverage and long-run returns again suggests that the pre-IPO analyst research produces information.

Finally, we use cross-ownership among investment banks to examine how such cross-

ownership affects analyst coverage on IPOs. It is common for China's investment banks to have cross-ownership – one shareholder can own one investment bank while being a large shareholder of another investment bank. We call analysts who are affiliated with investment bank A *Relationship Analysts* for investment bank B if investment banks A and B have such cross-ownership. If hype is a concern for pre-IPO analyst coverage, it is more likely to happen with relationship analysts because quid pro quos can be more easily coordinated with connected banks. We indeed find that relationship analysts are more likely to cover an IPO underwritten by a connected investment bank before the offer date, and their coverage is more optimistic. The effects of analyst coverage on offer price revisions and initial returns remain reliably positive, however, even if we remove all research coverage from relationship analysts. This robustness test provides further support for the idea that pre-IPO analyst research is informational, although hype also is likely to exist.

Primary market information production is critical for the pricing of IPOs, and to the best of our knowledge, our paper is the first to examine comprehensively the impact of publicly available analyst research on IPO pricing in the primary market. The literature suggests that pre-IPO trading, which exists for some European and Asian markets and is largely driven by retail investors, can be informative (Löffler, Panther, and Theissen (2005), Aussenegg, Pichler, and Stomper (2006), Cornelli, Goldreich, and Ljungqvist (2006), Derrien and Kecskés (2007), Dorn (2009), and Chang, Chiang, Qian, and Ritter (2017)). Our paper provides the first comprehensive evidence on the role of analysts, arguably one of the most important information providers in financial markets, in the IPO market before they are priced and traded.

We provide important new evidence for the ongoing debate about information production for IPOs. The existing evidence on IPO analyst coverage only has an indirect connection to the

debate on such information production regulations because the existing research is based on activities in the aftermarket after the quiet period ends (see, e.g., Michaely and Womack (1999), Bradley, Jordan, and Ritter (2003, 2008), Cliff and Denis (2004), James and Karceski (2006), Degeorge, Derrien, and Womack (2007), and Liu and Ritter (2011)). Our research directly examines analyst behavior before a firm goes public.

The debate on IPO information production is far from being settled, and our evidence is relevant and helpful for understanding the information production issues beyond China's IPO market. Although there are still many institutional differences between China and developed markets such as the U.S., analysts in China are also affiliated with securities firms that engage in brokerage and investment banking services. Research analysts in China also try to balance their own reputational concerns against pressure to attract trading and investment banking business for their affiliated firms.[7] Our evidence for China's pre-IPO analyst research suggests that analysts' reputational concerns dominate and they produce useful information.

2. Data and Descriptive Statistics

2.1 Sample Construction

Our data are from the China Stock Market & Accounting Research (CSMAR) database and several other sources. We start with a sample of 885 IPOs from 2009 to 2012 from the CSMAR database. We choose the 2009-2012 sample period because until now, this period is the only period for China's IPOs during which the CSRC did not have a price/earnings ratio cap for the IPO offer price. The CSRC had used guidance and written rules or regulations to effectively

[7] Research is generally supported by investment banking and trading activities within a brokerage or investment banking firm. See, e.g., Cliff and Denis (2004), Irvine (2001), Jackson (2005), Niehaus and Zhang (2010), and Michaely and Womack (1999) for descriptions on how research is paid for and the resulting biases in research. Recently, European regulators have introduced restrictions on paying for research indirectly; MiFID II became effective on January 3, 2018.

limit the P/E ratio (based on the offer price) for IPOs to be below certain levels through 2008. IPOs were suspended beginning in October 2012. After IPO activity resumed in December 2013, the CSRC has been again using guidance to limit the P/E ratio of all IPOs to be below 23, resulting in extreme underpricing. During our sample period, from May 2012 to September 2012, the CSRC did restrict offer prices to be no more than 125% of the P/E ratio of comparable firms, a much less restrictive limit. It is not clear how many IPOs were affected by this window guidance, but it appears to have had a minimal effect on our empirical results.[8] It is important for the underwriter and the issuing firm of an IPO not to have a P/E ratio cap so that the offer price can reflect pre-IPO information production.

From the 885 IPOs, we exclude 11 financial institutions, 15 firms with shares already traded or being simultaneously listed on the Hong Kong Stock Exchange (H-Shares), and five exchange offers (exchange IPO shares for existing shares of another public company). The resulting sample consists of 859 IPOs, with five IPOs excluded for two reasons. To investigate the post-IPO performance of these firms, we also retrieve daily stock prices, the market index returns (value-weighted average total returns using all stocks listed on the Shanghai or Shenzhen stock exchanges), and accounting information from the CSMAR database.

One contribution of this paper for future research on China's IPOs is the construction of the expected offer price. For IPOs around the world where bookbuilding is used, the underwriters acquire information from investors and revise the offer price accordingly. The adjustment from the midpoint of the initial file price range to the final offer price is often used to measure such information acquisition (Hanley (1993)). For China's IPOs, an issuing firm and its underwriter(s)

[8] In addition to combing through published rules and regulations, we also have had numerous discussions with officials at the CSRC, investment bankers, and mutual fund managers. Different sources have confirmed that from 2009 to May 2012, there was no P/E cap on IPO pricing. Furthermore, the CSRC did not require the IPO offer price to be lower than the mean and/or median of bidding prices from investors, including mutual funds.

do not report any explicit price range in their filings with the CSRC before the road show, making it difficult to measure information production in the primary market. Our reading of the prospectuses, however, suggests that the issuing firm of an IPO always reports the proposed investment project(s) that the proceeds from the IPO will be used for. A detailed financing plan will be included if other sources of funding are used. Such investment proposals are approved by the appropriate government agencies before the IPO prospectus is presented to investors during the road show. The proposed investment amount from the IPO can thus be used as a reliable measure for the total expected proceeds. In addition, the maximum number of shares offered for the IPO also has to be approved by the CSRC. For all IPOs in our sample, the maximum approved number of shares has been the final number of shares offered. We thus manually search both the preliminary and final prospectuses for each IPO and retrieve the proposed investment amount and the approved maximum number of shares for each IPO. We use the ratio of the two figures as a measure of the expected offer price.[9]

Data on analyst research coverage are also from the CSMAR database. We only include research reports that are issued no later than the listing date of an IPO. After excluding reports with a missing report date or identity of the broker, we have 8,863 reports covering 848 IPOs. These reports are issued by at least 88 different brokers.[10] Earnings forecasts are the most common item in these reports. Note that firms eligible for going public in China are required to have continuous positive earnings before the IPO.[11] In contrast, Loughran and McDonald (2013) report that only 37% of the firms in their U.S. IPO sample have positive earnings in the year

[9] The prospectuses for all IPOs listed on the Shanghai and the Shenzhen Stock Exchanges can be found on CNINFO (http://www.cninfo.com.cn/information/companyinfo.html), a CSRC designated website for disclosing securities information.
[10] The CSMAR Analyst database is similar to the I/B/E/S database. Both databases include forecasts of accounting variables for different fiscal years and stock recommendations. The CSMAR database includes the name and broker ID of the broker for each observation. We count the brokers based on the broker ID. Note that some reports do not include EPS forecasts.
[11] For the Shanghai and Shenzhen exchanges, three years of positive earnings are required. For the Shenzhen ChiNext market, one year of positive earnings is required.

before the IPO. Our research optimism measure is calculated based on earnings forecasts for the current fiscal year (fiscal year 1, or FY1) if the IPO offer date is at least 90 days away from the end of FY1. If the IPO offer date is close to the current fiscal year end (within 90 days), we use the forecasts for the next fiscal year. These forecasts are simply referred to as FY1 forecasts for the rest of the paper. Note that our earnings forecasts are from unaffiliated analysts. Although the regulations do not explicitly prevent the lead underwriter from issuing analyst reports before the IPO, we see very few analyst reports from affiliated analysts.[12]

2.2 Variable Definitions

We study the impact of analysts on the pricing of IPOs, and our dependent variables are two price changes (returns) for an IPO. The first dependent variable, *Offer Price Revision*, is defined as the percentage change from the expected offer price to the offer price. The second dependent variable, denoted as *IR*, is the initial return for an IPO and is defined as the percentage change from the offer price to the first-day market closing price. We will briefly discuss the constructions of the independent variables for the rest of this sub-section. A list of variable definitions is provided in Appendix Table A1.

Our key independent variables are measures for pre-IPO analyst coverage and analyst optimism. Following Mola and Guidolin (2009), we use the number of brokers that issue reports during a particular period of the IPO process as a measure for the breadth of analyst coverage for an IPO for that period.[13] To study the impact of analyst coverage on offer price revisions, we use the number of brokers that issue reports before the offer date, which we call *Pre-Coverage*. We

[12] Lead underwriters do issue valuation reports before the IPO. These valuation reports were kept confidential before 2011. After 2011, the lead valuation reports have been made public after the initial price inquiries and before the final offer price is set. These reports from lead underwriters are labeled differently and are not treated as analyst reports. We have a small number of regular research reports from affiliated analysts. These analyst reports are likely to be published in the gray area of the CSRC quiet period regulations. Our results remain virtually the same whether we include these reports or not.

[13] If we use the number of analysts and the number of reports as our measures of coverage, the results are qualitatively the same.

denote the number of brokers issuing reports after the offer date (but no later than the listing date) as *Post-Coverage*, and the total number of brokers issuing reports until the listing date as *Overall-Coverage*.[14] We link both *Post-* and *Overall-Coverage* to the initial return of an IPO.

Optimism for a particular analyst is calculated from his/her FY1 earnings forecasts.[15] To measure the implied optimism for an earnings forecast for an IPO, we first calculate the implied P/E ratio based on the FY1 estimated earnings per share (EPS) and the latest stock price before the report date of the forecast. For an EPS forecast published before the offer date, the expected offer price is used. For an EPS forecast published after the offer date, the offer price is used for the implied P/E ratio. Since a more optimistic EPS forecast results in a smaller P/E, we use the negative of the adjusted P/E ratio to measure optimism for a particular analyst report:

$$Optimism = -\frac{Implied\ {}^{P}/_{E}\ from\ EPS\ Forecast - Industry\ average\ {}^{P}/_{E}\ of\ IPOs}{Std.of\ Industry\ {}^{P}/_{E}}$$

where *Industry average P/E of IPOs* is the average of the implied P/E ratios of pre-IPO EPS forecasts of all the IPOs in the same industry during the same year, and *Std. of Industry P/E* is the corresponding standard deviation.[16] We then use the average of *Optimism* based on all EPS forecasts for an IPO reported before the offer date as *Pre-Optimism* of the IPO. The variable *Post-Optimism* is the average of the EPS implied optimism based on all EPS forecasts reported between the offer date and the listing date (inclusive).

We follow the literature in choosing some of our control variables (see, e.g., Hanley and

[14] We include analyst reports that are published on the day of listing (listing date) for the post- and overall-coverage measure. The listing date is also the first day of trading for the IPO. We use the day that is the deadline for institutional investors to subscribe to the IPO as the offer date. This date is also referred to as day *T*.

[15] In unreported analysis, we also use price targets to calculate analyst optimism. The results are consistent with those of earnings forecasts. Note that price targets are likely to be a much noisier measure for analyst optimism since price targets involve the estimation of long-term earnings growth trends. We do not use recommendations because the number of recommendations is low.

[16] IPO firms are classified into 21 industries following the coding system by the CSRC. More specifically, firms in nonmanufacturing sectors are classified based on the first industry code (letter code) while manufacturing firms are classified based on the first two industry codes (both letter and number codes). We use the average implied P/E ratio of all IPOs in the year if there are less than five IPOs in a particular industry during the year.

Hoberg (2012) and Loughran and McDonald (2013)). The names for these control variables are self-explanatory and their detailed definitions are in Appendix Table A1. We also include some variables that are specific to China's IPO market. Both institutional and retail investors have access to an IPO in China and their respective subscriptions are publicly available. To control for investor demand, we include both *Ln(Offline OverSub)* and *Ln(Online OverSub)*, which are defined as the natural logarithms of oversubscription from institutional (offline) and retail (online) investors during the offering, respectively.[17] For both demand measures, oversubscription is calculated as the ratio of the subscription from a particular group of investors (offline or online) divided by the number of shares offered for that group. *SOE Central* and *SOE Local* are dummy variables for State Owned Enterprises. *SOE Central* equals one if the controlling shareholder of the issuing firm is affiliated with the central government. *SOE Local* is defined in a similar manner for local government shareholders. These variables are included to control for the effect of political connections on IPO pricing (Fan, Wong, and Zhang (2007)).

2.3 Summary Statistics

We report the summary statistics for issue and firm characteristics for our sample IPOs in Table 1. One noticeable feature about China's IPOs has been high initial returns. The average initial return for the 859 IPOs in our sample from 2009 to 2012 is 35.1%. We also report the number of IPOs and the annual average initial returns from 1992 to 2017 in Panel A of Figure 1, and the quarterly numbers for 2009-2012 in Panel B of Figure 1. Although the average initial return of 35.1% during 2009-2012 is greater than in the U.S. and most other markets (numbers for 53 countries are available at https://site.warrington.ufl.edu/ritter/ipo-data/), average initial returns for IPOs in China have been very high in most other years. One of the key reasons for the

[17] Institutional investors can participate in the online part as well, but their participation is uncommon. See Chemmanur, Ma, Wu, and Yu (2017) and Cao, Leng, Liu, and Megginson (2017).

high initial returns in China is the CSRC's price-earnings cap on the offer price that has existed for most of the years other than 2009-2012.

The average offer price revision, measured from the CSRC-approved proceeds per share (i.e., the expected offer price) to the offer price, is 139.5% for the IPOs in our sample. This average increase is much higher than the comparable U.S. figure. For example, Hanley and Hoberg (2010) report an average price adjustment of 4.3% for the 1996-2005 period . Note that not all IPOs in our sample have positive price revisions. The minimum offer price revision, as reported in Table 1, is -61.9%.

The large magnitude of offer price revisions does not make the expected offer price an invalid reference point. An issuing firm has to go through a lengthy process to get the proposed investments approved, and the proposed investments and hence the expected offer price become a useful anchor point for investors to value the company. Although the magnitude of the adjustments from the expected to the final offer price is large, we do not see any cross-sectional patterns that make the expected offer price an invalid starting point to measure premarket information production. Furthermore, our expected offer price measure is also consistent with file price ranges when such comparisons are available due to simultaneous listings on multiple exchanges. For example, Metallurgical Corporation of China, Ltd. went public in September 2009 on both the Stock Exchange of Hong Kong (SEHK) and the Shanghai Stock Exchange (SSE). In its prospectus for the SEHK, the initial file price range is HK$ 6.16-6.81. Using the midpoint of HK$ 6.49, the company reports that the amount of expected proceeds is HK$15,988 million. This amount is the same as the amount of investment for the three projects reported in the prospectus for its listing on the SSE. That is, the implied offer price based on proposed investments for the IPO proceeds and the number of IPO shares, which we call the expected

offer price, is the same as the actual midpoint of the file price range for the listing on the SEHK.

During our sample period of 2009 to 2012, private firms account for a large portion of IPOs. Many state-owned enterprises had already gone public before 2006. As shown in Table 1, only 9% of our IPOs are controlled by either the central or local governments.

We report the summary statistics on analyst coverage and optimism in Table 2. Our sample only includes pre-IPO (primary market) analyst coverage. The average number of brokers covering an IPO before listing is 10.6 (the median is 10), reflecting the unique active primary market analyst coverage of IPOs in China. Neither Chinese nor U.S. quiet period regulations prohibit recommendations by independent analysts. In the U.S., these reports are rare for IPOs, whereas in China they are common. A likely reason for the difference is that both retail and institutional investors in China do not depend on being a client of an underwriter to get an allocation of shares in an IPO. For both institutional and retail investors, if there is excess demand, shares are allocated pro rata or by lottery with no underwriter discretion involved. Thus, a brokerage firm has an incentive to cover the stock prior to the IPO even though it is not part of the underwriting syndicate.

Analysts working for the underwriters have an incentive to hype an IPO in order to achieve a higher offer price and/or leave more money on the table if the underwriters have allocation discretion. But all analysts have incentives to be excessively optimistic for three other reasons (Bradley, Jordan, and Ritter (2008)). First, if issuing companies prefer to hire investment banking firms that provide positive coverage for future deals, analysts have an incentive to cover a company and make optimistic forecasts. Second, if management is unwilling to talk to analysts that have a negative recommendation on the firm, a pessimistic analyst is put at an informational disadvantage. Third, owners of a stock want an analyst to be publicly optimistic. This latter

incentive may have been especially strong in China during our sample period because short-selling was prohibited.[18]

Table 2 also reports analyst optimism based on FY1 EPS forecasts. Note that we use the industry average of implied P/E ratios of all pre-IPO analyst forecasts, both before and after the offer date, to standardize our optimism measure. The averages for *Pre-* and *Post-Optimism* measures are 0.52 and -0.93, respectively. This pattern arises largely because pre- and post-optimism measures use different prices (expected vs. actual offer price) to compute the implied P/E ratios, while the overall average is used to standardize the two measures.[19] Our optimism measure does not take into account differences in growth rates between stocks. For cross-sectional comparisons, IPOs with a greater growth rate will in general have higher prices and larger P/E ratios, which will result in lower optimism measures since analyst optimism is the negative of the adjusted P/E ratio. Because growth companies generally have more price revisions and greater underpricing, this will create a bias against our results.

3. Primary Market Analyst Research, Offer Price Revisions, and Initial Returns

The literature suggests that analyst research in the secondary market is informative and affects stock prices and corporate activities (see, e.g., Brennan and Subrahmanyam (1995), Kelly and Ljungqvist (2012), and Derrien and Kecskés (2013)). For the primary markets, greater analyst following can produce more information and reduce information asymmetry, and hence reduce a firm's cost of capital by allowing a firm to go public at a higher offer price.

[18] Short-selling is allowed for seasoned stocks after March 2010, but the restriction remains for IPOs within three months of listing.

[19] We use the overall average during the same year in the same industry for standardizing the measures so that we can have more IPOs for the calculations. The mean expected offer price, which is used to calculate the implied P/E ratio for *Pre-Optimism*, is 11.87, and the mean offer price, which is used for the *Post-Optimism* calculation, is 26.43. So the means of 0.52 vs. -0.93 for *Pre-* and *Post-Optimism* implies that the pre-offer date earnings forecasts are slightly higher than the post-offer date ones. But note that our analyses rely on separate use of pre- and post-offer date optimism measures. The use of different prices for the implied P/E calculations thus does not affect our results.

Furthermore, pre-IPO analyst coverage can also increase the stock price by increasing the investor pool (Merton (1987) and Zhang (2004)) or by attracting more media coverage and hence more attention from unsophisticated investors (see, e.g., Bhattacharya, Galpin, Ray, and Yu (2009)). More optimistic coverage can induce larger demand for the stock and result in a higher market price (see, e.g., James and Karceski (2006)). Overall, analysts can have a significant impact on IPO pricing because of their information production and their marketing efforts. We thus hypothesize that more research coverage and greater optimism will have a positive impact on the first-day market closing price and hence a positive impact on the initial return of an IPO if the offer price is not proportionally increased.

Since analyst research is publicly observable, the underwriter and the issuing firm can condition the offer price on pre-issue analyst reports. In particular, when coverage is more extensive and/or optimistic, the lead underwriter anticipates that the institutional investors will be more willing to accept a higher offer price. Thus, we posit that an increase in analyst coverage and optimism before the offer date will have a positive impact on offer price revisions.

In this section, we test the above hypotheses by examining the relations between pre-IPO analyst research and offer price revisions and initial returns.

3.1 Analyst Research and Offer Price Revisions

We first investigate the relations between pre-offer date analyst coverage/optimism and offer price revisions. The results are reported in Table 3. We include *Ln(1+Pre-Coverage)*, which is the natural logarithm of one plus the number of brokers covering an IPO before the offer date, in Regressions (1) – (3) and (5). We further include analyst optimism in Regressions (4) and (5). Neither industry nor year fixed effects are included in Regression (1). Regression (2) includes year fixed effects, and Regression (3) includes both industry and year fixed effects.

The IPO market condition (measured as *IR[-30,offer]*, the average initial return of all IPOs that were listed during the 30 calendar days before the offer date) has a positive coefficient in all regressions and is statistically significant in Regressions (1), (4), and (5). The positive coefficient on *IR[-30,offer]* suggests that a favorable IPO environment gives the underwriter of an IPO more room to revise the offer price up. The coefficient on the overall market condition (*MktRet[-30,offer]*, the return on the composite market index for the 30 days before the offer date) is statistically insignificant in all regressions, in contrast to the positive coefficients typically found in U.S. studies.

For the other control variables, the coefficient on *Ln(Assets)* is negative and statistically significant at the one percent level in all regressions. Our discussions with practitioners suggest that analysts do not have greater incentives to cover large firms as these large firms have less room for price increases after the IPO. The negative association of firm size and offer price revision for the IPO in our sample is consistent with this view. The statistically negative coefficient on *Overhang*, the number of shares retained divided by the number of shares offered, in Regressions (1) through (3), is consistent with a negatively sloped demand curve – a greater share overhang will depress the price expectation of an IPO given that more shares will become available when share lockup expires. The share overhang coefficient becomes insignificant, however, when we also include analyst optimism in Regressions (4) and (5).

Table 3 also shows that IPOs with higher earnings (higher *ROE*) have more positive offer price revisions, but underwriter reputation (measured as market share, *Lead MktShare*) seems to have little impact on offer price revisions. We also control for the identity of the controlling shareholder to examine whether firms with connections to the government have greater price revisions. Inconsistent with Fan, Wong, and Zhang (2007), the coefficients on *SOE Central*

Dummy and *SOE Local Dummy* are statistically insignificant in all regressions. The different impact of government ownership in Fan et al. (2007) and our regressions might be due to the difference in how we measure political connections. Fan et al. (2007) measure whether the CEO has political connections, and the two dummy variables that we use only capture the political identity of the controlling shareholder. Furthermore, in our sample period fewer issuers have government ownership, and these IPOs may have lower growth prospects.

The coefficients on the key independent variable, *Ln(1+Pre-Coverage)*, are positive and statistically significant in all regressions except Regression (3). The coefficients on the other key independent variable, *Pre-Optimism*, are positive and highly significant, with and without controlling for the breadth of analyst coverage.[20] Economically, if we use Regression (5) as an example, a one standard deviation increase in the number of brokers covering an IPO before the offer date (3.61 brokers) from the mean (7.70 brokers) is associated with a 9.85% ($28.37 \times [\ln(1 + 7.70 + 3.61) - \ln(1 + 7.70)]$) increase in the offer price. For an average IPO with an expected offer price of ¥11.87 issuing 71.9 million shares, the 9.85% increase in the offer price represents an increase of 84.1 million yuan (or US$13.4 million based on the 2012 exchange rate) in IPO proceeds. For earnings forecast optimism, the coefficient of 99.15 on *Pre-Optimism* suggests that a one-standard-deviation increase in *Pre-Optimism* is associated with a 65.4% (99.15×0.66) higher offer price revision. This effect is also economically significant. These results suggest that greater analyst coverage and more optimistic research enable the lead underwriter of an IPO to adjust the offer price further upwards.

Note that some of our variables, such as the offer price revision, have high standard

[20] The correlation between *Ln(1+Pre-Coverage)* and *Pre-Optimism* is very low and slightly negative (-0.03). We also do not have stability concerns due to high correlations among other independent variables. The drop of significance for *Ln(1+Pre-Coverage)* in Regression (3) is due to statistical power for adding the fixed effects.

deviations. To make sure that our results are robust, we also use bootstrap estimates for calculating the standard errors and t-statistics for the regressions in Tables 3 and 4. To obtain sufficient accuracy, we use 500 bootstrap repetitions (Andrews and Buchinsky (2000)). The statistical significance of the coefficients on our key variables remains virtually the same.

3.2 Analyst Research and Initial Returns

In this subsection we examine the relations between pre-IPO research and initial returns. Since initial returns are measured as the price difference from the offer price to the first-day market closing price, we distinguish analyst research before and after the offer date in studying the relations between primary market research and initial returns.

The regression results are reported in Table 4. We include industry and year fixed effects in all regressions. We report the baseline regression with only the control variables in Regression (1). These control variables are generally well behaved and their coefficients are consistent with what have been reported in the literature. Both the IPO and the overall market conditions, as captured by *IR[-30,offer]* and *MktRet[-30,List]*, have a statistically significant positive impact on the initial returns, consistent with Lowry and Schwert (2004). It is noteworthy that in Table 3 offer price revisions do not adjust to market returns, resulting in a large effect on initial returns in Table 4. Large and highly profitable firms, as indicated by the coefficients on *Ln(Assets)* and *ROE*, are less underpriced. This pattern is expected since these firms are less risky and have less information asymmetry. Share overhang is positively related to initial returns, albeit insignificant in Regression (1), showing a weaker effect than in studies using U.S. data (Bradley and Jordan (2002)). Lead underwriter reputation as captured by *Lead MktShare* has a significantly negative impact on initial returns. IPOs with high investor demand and larger oversubscriptions have more would-be investors that do not get share allocations. If they then buy in the aftermarket,

this demand explains the reliably positive coefficients on *Ln(Offline OverSub)* and *Ln(Online OverSub)*. IPOs controlled by local governments are more underpriced.[21]

The key variables of interest are the analyst related measures. In Regression (3), we include our measure of the number of brokers making recommendations after the offer date through the listing date, *Ln(1+Post-Coverage)*. This variable has a positive but insignificant coefficient. We include both *Ln(1+Post-Coverage)* and the measure for analyst optimism, *Post-Optimism*, in Regression (5). The coefficient on *Post-Optimism* is positive and highly significant. The coefficient on *Ln(1+Post-Coverage)* remains statistically insignificant. Economically, a one standard deviation increase in *Post-Optimism* is associated with an increase of 5.5% (7.80 × 0.70) for the first-day return. For the IPOs in our sample, this effect represents an increase of about 16% of the mean first-day return of 35.1%.

Another important variable of interest is the offer price revision. The coefficients on *Offer Price Revision* in four of the five regressions in Table 4 are reliably negative, without and with analyst related measures on the right hand side of the regressions. Economically, the coefficients on *Offer Price Revision* imply a decrease of 3.24% to 6.49% in the initial return for an IPO if its offer price revision is increased by one standard deviation (108.11%). The generally significant and economically important negative coefficients on *Offer Price Revision* suggest that the well-documented partial adjustment phenomenon as in Benveniste and Spindt (1989) and Hanley (1993) does not exist for China's IPO market. This non-positive relation is likely due to the fact that the lead underwriter for an IPO in China does not control the allocation of the IPO shares and hence cannot reward institutional investors with underpriced shares. The underwriter

[21] Institutional (offline) and retail (online) oversubscriptions can be affected by analyst coverage and optimism. We drop *Ln(Offline OverSub)* and *Ln(Online Oversub)* and re-estimate the regressions in Table 4. The coefficients on key variables remain qualitatively the same.

instead tries to obtain a higher offer price so that its percentage spread income will be greater.[22] Everything else being equal, a higher offer price will leave less room for the price on the first trading day to go up, resulting in a negative relationship between the offer price revision and the initial return.

From an information acquisition perspective, the negative coefficients on *Offer Price Revision* are consistent with the model in Benveniste and Wilhelm (1990), suggesting that uniform pricing and evenhanded share distribution make information gathering from investors in the primary market less useful. From an agency perspective, the lack of a positive coefficient on *Offer Price Revision* is also consistent with the Loughran and Ritter (2002) prospect theory explanation for the partial adjustment of offer prices, since without share allocation discretion, leaving money on the table does not generate additional revenue from rent-seeking investors. Regardless, the negative coefficients on *Offer Price Revision* suggest that underwriters' offer price adjustment behavior changes when they do not have share allocation discretion, as is also the case for Indian IPOs (Bubna and Prabhala (2011)).

A third theory, Edelen and Kadlec's (2005) opportunity cost theory, predicts that there will be partial adjustment both when underwriters have discretion to allocate shares and when they don't, which is the Chinese case. They posit that when a firm receives positive feedback from the market about its future profitability, the opportunity cost of a failed offering is higher, and thus a firm will want to err on the side of leaving money on the table rather than risk a failed offering. Using U.S. data, Ince (2014) conducts tests that he interprets as rejecting the

[22] Note that the lead underwriter's incentives of increasing the offer price as we discuss here will not result in zero underpricing. The lead underwriter still has the incentive to avoid a failed IPO and investors are still compensated for taking risk in investing in an IPO. The risk-related factors are supported by the negative coefficients on *Ln(Assets)* and *ROE*.

mechanism design and opportunity cost theories, and supporting the agency theory. Our evidence also rejects the opportunity cost theory.

Overall, the results reported in Tables 3 and 4 suggest that greater pre-offer date analyst coverage and optimism are associated with higher offer price revisions, and that post-offer date optimistic analyst coverage has a positive impact on initial returns. These results suggest that analyst coverage for IPOs in the primary market can significantly impact IPO pricing.

4. Endogeneity of Analyst Coverage and 2SLS Regressions

4.1 Endogeneity of Analyst Coverage

The number of analysts covering a company at the time of the IPO is not random; it is partly driven by market conditions, analyst expertise, client needs, etc. Bradley, Jordan, and Ritter (2008, Table 7) identify the market cap and turnover ratio as the most important determinants of coverage by non-underwriter analysts in the year after the IPO for U.S. IPOs. These factors for potential analyst coverage do not suggest a clear reason for endogeneity (higher price revisions and higher initial returns attract more analysts and higher EPS forecasts beforehand). Also note that in our empirical setup, offer price revisions and initial returns happen in the future, after analysts initiate coverage. Even if analysts chase hot IPOs, i.e., if the expected price revisions and expected returns positively affect coverage, the analysts have to forecast which IPOs are hot. So endogeneity of analyst coverage can only arise when we fail to control for factors that significantly affect both analyst coverage and IPO pricing.

To shed light on the sources of potential biases, we use offer price revision and analyst coverage to illustrate the sources of possible endogeneity. The structural equations for offer price revision (*Revision*) and analyst coverage (*Analyst*) are as follows:

$$Revision = \alpha_1 + \beta_1 Controls + \gamma_1 Analyst + \theta_1 u + \varepsilon_1 \quad (1)$$

$$Analyst = \alpha_2 + \beta_2 Controls + \theta_2 u + \varepsilon_2 \quad (2)$$

In Eqs (1) and (2), we explicitly separate out from the control variables the source of information, denoted as u, that can be observed by analysts and investors, but not an econometrician. If both $\theta_1 \neq 0$ and $\theta_2 \neq 0$, an omitted-variable bias in estimating Eq. (1) will arise because an econometrician does not observe u and cannot control for it.

For this omitted variable problem to arise, u must have an impact on *Revision* through channels in addition to analyst coverage. If $\theta_2 \neq 0$ but $\theta_1 = 0$, that is, u is proprietary information for the analyst, we do not have an estimation bias. It is possible to have public but unobservable information that has a systematic impact on both analyst coverage and IPO pricing. But we do not see strong reasons for such a case. To the contrary, it is more likely that u captures an analyst's private information. This is the rationale for us to separate analyst coverage into a predicted part and an innovation part and relate both to the offer price revision and initial return in the next section.

Also note that even if u is private information and thus $\theta_1 = 0$ in Eq. (1), the coefficient γ_1 does not necessarily represent causality in a typical corporate finance sense. For example, an analyst can visit different restaurants and report an unusually large crowd for a restaurant chain. Such a report will have a positive impact on the stock price of the restaurant chain and speed up the price discovery process. However, we do not want to claim causality for analyst coverage per se in this case. The coefficient γ_1 can capture causal effects of a greater investor base as modeled in Merton (1987) or the expected reduction in future information asymmetry as modeled in Kelly and Ljungqvist (2012). Such effects are not related to u and will not result in any endogeneity biases.

We can make similar arguments with initial returns and analyst optimism. In addition to u being omitted, endogeneity biases can also arise if ε_1 and ε_2 are correlated. Again we do not see a strong reason for this to be a significant concern. Nevertheless, to make sure that endogeneity concerns do not drive our results, in the next sub-section we employ an instrumental variable (IV) approach and 2SLS regressions to re-examine the relations between analyst coverage/optimism, offer price revisions, and initial returns.

4.2 2SLS Regression Results

We first decompose the pre- and post-offer date coverage and optimism measures into predicted and innovation (residual) components. More specifically, we use two historical measures as instrumental variables (IVs) for the first-stage regressions, which we call the lead effect and the industry effect. We use the average number of brokers and the average optimism from all pre-IPO reports on IPOs underwritten by the same lead underwriter of the current IPO during the last twelve months (LTM) to capture the lead effect (the effect of potential lead connections). We also use the LTM averages for all pre-IPO reports on all IPOs in the same industry of the current IPO to capture the market sentiment for the industry. For ease of presentation, we term it the industry effect. We denote these four variables as *LTM Pre-Coverage_Lead*, *LTM Pre-Coverage_Ind*, *LTM Pre-Optimism_Lead*, and *LTM Pre-Optimism_Ind*, respectively, for the four LTM averages based on pre-offer date coverage and optimism. The historical variables for the post-offer analyst coverage and optimism variables are labeled in the same way.[23]

We posit that these historical variables can be useful IVs. Analysts are more likely to

[23] We use the last twelve months for which an underwriter has non-zero IPOs for each month. We go back more than twelve calendar months if an underwriter does not have any IPOs during the prior 12 months. We do so to minimize the impact of zeros on the mean calculations.

provide coverage and when they do, provide more optimistic coverage, for stocks with which they have connections (Mola and Guidolin (2009), Irvine (2001), and Niehaus and Zhang (2010)). Such connections can affect both current and past IPO research coverage. An analyst would thus be more likely to cover the lead underwriter's current IPO if this analyst has covered the same underwriter's past IPOs, suggesting that LTM measures based on lead underwriters are relevant. IPOs also come in waves and firms from similar industries are often clustered. This industry clustering suggests that the industry-based LTM measures are also relevant. For these LTM measures to be valid IVs, we also need them to be uncorrelated with the error terms of the respective second-stage regressions, i.e., these LTM measures are exogenous. Note that the endogeneity concern is that information in u in Eqs. (1) and (2) is contained in the regression error terms, and this happens because analyst coverage and optimism measures can only partly capture the private information of the analysts represented by u. It is unlikely that the historical measures for other IPOs by the same underwriter are correlated with the *private* information of the current IPO. For the industry LTM measures, industry return momentum likely causes time-series correlations, but analyst *private* information should not be strongly autocorrelated. So both lead and industry LTM measures likely satisfy the exclusion condition.

We report the first-stage regressions in Table 5. For each of the four measures for pre- and post-offer date coverage and optimism, we report two regressions: one with only lead-related LTM variables, and one with both lead- and industry-related LTM variables.[24] Our control variables differ depending on whether the dependent variable is pre- or post-offer date.

All of our historical coverage variables based on the same lead underwriter or the same industry have coefficients that are indistinguishable from zero. These results suggest that

[24] We use the lead-only based predictive component to address any concerns that the industry-based LTM measures can still be endogenous due to time-series correlations in industry effects.

interactions with the lead underwriter through past IPOs or more analyst coverage in the same industry do not result in more coverage for the current IPO beyond what we can predict with the existing control variables.

The coefficients on historical optimism measures all have negative signs, but with one exception, all of them are statistically insignificant. The insignificant coefficients on historical optimism measures suggest that lead underwriter connections and industry characteristics do not have much predictive power for analyst earnings forecast optimism of the current IPO. As we show in Table 8 on relationship analysts that are affiliated through cross-ownership, connected analysts are indeed more likely to cover an IPO and are more likely to be more positive. The results in Table 5 on historical optimism measures suggest that unaffiliated analysts demonstrate some mean reversion in their earnings forecasts, possibly due to their client needs and their reputational concerns.

In Table 6, we report the second-stage regression results with the predicted values of analyst coverage and optimism in Regressions (1) – (4) in Panels A (offer price revisions) and B (initial returns). In contrast to the results reported in Tables 3 and 4, all predicted values for the coverage and optimism measures are statistically insignificant. There could be two reasons for the insignificance of the coefficients on these predicted values. One, we simply do not have good instrumental variables. Two, these insignificant results for the second-stage regressions are simply because analyst influence comes from their private information and there are no significant omitted variable bias concerns.

As we discussed in Section 4.1, endogeneity concerns arise if our analyst measures fail to capture some public yet unobservable information that is related to IPO price revision and initial returns. Our results in Table 8 suggest that relationship analysts tend to support a lead

underwriter with which they have connections. If many analysts use public yet unobservable information in their coverage decisions and earnings forecasts, it is very likely that some patterns would arise between past and current analyst coverage measures for IPOs by the same lead underwriter or for the same industry. We do not observe these patterns in our first- and second-stage regressions.[25] Also, our industry-related historical measures have some predictive power in the first-stage regressions as reported in Table 5, but what such predictive power captures is unrelated to IPO pricing, as the predicted variables based on these historical measures show little significance in the second-stage regressions. Thus, we think that the second possibility – no significant omitted variable concerns – is probably more relevant to our results.[26]

5. Primary Market Analyst Research: Hype and/or Information Production?

Analysts can hype a stock. Or they can disseminate information. Both information production and marketing (hype) can be useful for securities issuance. Gao and Ritter (2010) and Huang and Zhang (2011) show that underwriters perform useful marketing functions. The recent debate on quiet period regulations, as suggested by the correspondence between the U.S.

[25] We also use the lead and industry LTM averages as IVs and repeat our analysis in Tables 5 and 6 for a sample of IPOs that cover the period of 2006-2008. Both the lead and the industry-based LTM averages have statistically significant prediction power for analyst coverage and optimism. These results confirm that the lead and industry-based historical measures are relevant. Their prediction power is likely due to the price caps by the CSRC for IPOs because such price caps based on P/E ratios make IPO pricing more predictable. For the sample period of 2009-2012, price caps are removed, and information is likely to be more fully incorporated in the IPO pricing process. This removal of price caps makes both IPO pricing and analyst coverage less predictable, indicating that omitted variables can be less a concern.

[26] Hong and Kacperczyk (2010), Kelly and Ljungqvist (2012), and Derrien and Kecskés (2013) use mergers and closures of brokerage and investment banking firms and the resulting reduction in analyst coverage for seasoned stocks as an exogenous shock to study the effect of analyst coverage on analyst forecasting biases, information asymmetry, and investments. Although there are very few mergers and closures of brokerages in China during our sample period, due to intensive competition many brokerage firms cut their research teams or even closed their research departments altogether during 2009 to 2012. We track the disappearance of analysts due to these cuts and closures and treat them as exogenous shocks to stock coverage. More specifically, for the current IPO underwritten by a particular investment bank, say, bank A, if analyst B covered IPOs underwritten by bank A within three years of the current IPO and analyst B's affiliated firm experienced a downsizing and analyst B is no longer in the sample, we treat analyst B as a reduction for potential coverage for bank A's current IPO. We treat such potential analyst coverage reduction as being exogenous. We find that such potential analyst coverage reductions have a negative effect on offer price revisions, consist with our OLS regression results reported in Table 3. Our analyst coverage reduction measure is very noisy since we can only identify potential, not ongoing, coverage reductions. As a result, the negative relationship between the exogenous coverage reduction measure and offer price revisions is statistically insignificant.

Congress and the SEC, focuses on encouraging more information dissemination/production. Regulators are often concerned about manipulative market hype for IPOs. The rule making for many SEC regulations in the U.S., including the 2012 JOBS Act, attempts to balance these two forces. In this and the next section, we present evidence on the existence of information production and hype in primary market analyst research. We also try to shed light on the balance of hype and information production that occurs with pre-IPO analyst research.

For affiliated and unaffiliated analysts, their hype-motivated research coverage can be predictable. We thus decompose analyst coverage and optimism into predicted and innovative components. We posit that the predicted components of analyst coverage and optimism are more related to analyst hype, while the innovative components can better capture their information production. This characterization of the residual terms of the first-stage regressions is not absolute. An unexpected increase in analyst coverage can still attract more investors and hence have a price impact even if the analyst simply recycles public information.

The underwriters of an IPO receive a certain percentage of the proceeds as fees and thus have incentives to increase the offer price. The pro rata allocation rule means that China's investment banks do not have as strong an incentive for leaving money on the table as that in the U.S., as suggested by Nimalendran, Ritter, and Zhang (2007) and others, since the lead underwriter does not have the ability to preferentially allocate shares to its most profitable clients. If the lead underwriter influences and works with analysts from unaffiliated investment banks and brokers to provide research coverage for its IPO, its connections and relationships are likely to be persistent. This persistence is the rationale for us to use past coverage to capture the impact of the lead underwriter in the first stage regressions to decompose analyst coverage and optimism. We also use the averages for all analyst reports on all IPOs in a particular industry

during the last twelve months to capture the market sentiment for the industry in the first stage regressions. The two measures capture the effect of aggregating public information by analysts in their marketing efforts. Analyst hype is likely to have a positive impact on the stock price (Aggarwal, Krigman, and Womack (2002)). Consequently, if we use lead and industry measures to forecast research coverage and optimism on an IPO, the predicted coverage and predicted optimism will have a positive impact on the offer price and the market price.

Womack (1996) suggests that secondary market analyst research has investment value. It is also reasonable to expect that analysts in China do valuable research and produce useful information on IPOs that they cover. Unexpected research will be captured by the residual term in the first-stage predictive regressions. We call the residual term in such predictive regressions the innovation component of analyst research. Since the innovation component is more likely to capture the private information of analyst reports, it will be positively related to the offer price and the market price (and initial returns) if analysts can produce useful private information.

We use the first-stage regressions in Table 5 to decompose the pre- and post-offer date coverage and optimism measures into predicted and innovation (residual) components. We examine how the predicted and residual components of these coverage and optimism measures affect offer price revisions and initial returns. The regression results are reported in Regressions (5) – (8) in Panels A (offer price revisions) and B (initial returns) in Table 6.

In Regressions (5) – (8) in Panel A of Table 6, we regress *Offer Price Revision* on the predicted and residual components of *Ln(1+Pre-Coverage)* and *Pre-Optimism*. The predicted values continue to be insignificant. Regardless of the model specifications for decomposing analyst coverage and optimism, however, the coefficients on the residual terms for both *Ln(1+Pre-Coverage)* and *Pre-Optimism* are always reliably positive. Put together, these results

suggest that surprises in analyst coverage and optimism are positively associated with offer price revisions.

In Regressions (5) – (8) in Panel B of Table 6, we examine whether the predicted and residual components of *Ln(1+Post-Coverage)* and *Post-Optimism* help predict the initial returns. As we noted before in discussing the Table 4 results, since the motivation of currying favor with the lead underwriter is less of a concern during the post-offer date period, post-offer date coverage has little impact on initial returns. Both the predicted and residual components of *Ln(1+Post-Coverage)* still have little effect on the initial returns in the regressions in Panel B of Table 6. As expected, the coefficients on the residual components, *Residual Post-Optimism by LEAD&IND* and *Residual Post-Optimism by LEAD*, are positive and statistically significant.

Overall, the results in Table 6 suggest that for both analyst coverage and earnings forecast optimism, their impact on offer price revisions and initial returns are largely due to the residual components that are unexpected by the market. These results suggest that pre-IPO analyst research produces useful information.

6. Long-Run Performance and Relationship Analysts

Quiet period restrictions and the relaxations of such restrictions in the JOBS Act are motivated by attempting to balance the good (information production that can help improve IPO pricing) and the bad (hype that can mislead investors). It is not easy to quantify the relative magnitude of hype and information production for analyst research in either the primary or the secondary markets, especially for the subset of hype efforts that aim at misleading investors. But for both investors and regulators, it would be useful to show that information production is not a side show or dominated by hype. In this section, we present additional evidence by examining

two additional aspects of pre-IPO analyst research: the long-run return prediction power of primary market analyst research and the consequence of excluding research reports from analysts affiliated with brokers that are at least partly owned by the lead underwriter.

6.1 Analyst Research and IPO Long-Run Performance

In this sub-section, we examine the relations between primary market analyst coverage and optimism and the long-run performance of IPOs. Price reactions of analyst forecasts on the secondary market are often incomplete and a post-forecast drift has been documented (Chan, Jegadeesh, and Lakonishok (1996), Gleason and Lee (2003), and Hui and Yeung (2013)). Such a drift can also exist in the stock returns of IPOs due to underreactions to the pre-IPO research. If analyst research is dominated by misleading hype (a collection of marketing efforts), pre-IPO analyst research ought to have negative marginal predictive power for the long-run performance of IPOs. If analyst research contains new information, and if a forecast drift due to underreactions exists, pre-IPO research would have a positive impact on IPO long-run performance.

We use one-, two-, and three-year buy-and-hold returns (BHRs) after the IPO as the measures for IPO long-run performance. We calculate the buy-and-hold returns for a specific holding period (one to three years) using compounded monthly returns starting with the first month after the IPO listing date (e.g., March for any IPO during February). As a control variable, the market buy-and-hold returns for the same holding period are based on the value-weighted market return of both the Shanghai and Shenzhen stock exchanges. The cumulative abnormal return (CAR) for an IPO is calculated as the compounded monthly return differences of the IPO and the corresponding market index for the same holding period.

We report the summary statistics of IPO long-run performance in Panel A of Table 7. The

regression results are reported in Panel B of Table 7. We use the one-, two-, and three-year BHRs, respectively, as the dependent variable in the three regressions. The coefficients on *Ln(1+Post-Coverage)* are positive and statistically significant in all three regressions for predicting the one- to three-year BHRs. The coefficients on *Ln(1+Pre-Coverage)* are also positive but only statistically significant in the three-year BHR regression. The coefficients on *Pre-Optimism* and *Post-Optimism* are generally positive, and the coefficient on *Pre-Optimism* is marginally significant at the 10% level for predicting the three-year BHR. These results are inconsistent with the hypothesis that analysts have hyped the stock to an unsustainably high level, and provide some support for the argument that analyst coverage involves information production. Note that we need market underreactions to have the positive coefficients on the analyst coverage variables. Such underreactions are more likely to exist if analyst forecasts involve information production. Most of the control variables in the regressions are insignificant, but *Ln(assets)* is reliably negative in all three regressions. This negative relation between firm size and long-run returns is in contrast to the positive relation found in studies using U.S. data.

6.2 Relationship Analysts

In our sample, all underwriters are subsidiaries of securities firms that also have asset management and brokerage businesses. Except for one specialized research firm, almost all analyst reports are from such securities firms. At the end of 2012, there were 113 securities firms in China. A large shareholder can hold shares in no more than two securities firms, and if a particular large shareholder does hold shares in two such securities firms, it can at most control one of them (controlling is usually defined as holding more than 50% of the shares). This limitation is called the “one equity participation, one controlling” policy by the CSRC. Although it is not a widespread phenomenon, some securities firms that issue research reports and engage

in IPO underwriting do have the same large shareholder.

All securities firms in China are required to file annual reports with the government. We hand collect large shareholder information of all the securities firms that issue research reports or engage in IPO underwriting from the website of the Securities Association of China (SAC at http://www.sac.net.cn/). In a given year, we then combine all IPO lead underwriters and all securities firms (brokers) that have issued any reports. This procedure results in a matrix of 54,622 underwriter-broker pairs.[27] Note that an underwriter would be paired with each broker twice if it has underwritten two IPOs. For each possible lead underwriter-broker pair, we code a dummy variable, *Relationship*, that equals one if the underwriter and the broker have the same larger shareholder, and equals zero if no cross-ownership between the pair exists.[28] Note that for a particular underwriter-broker pair, the broker may or may not cover any given IPO.

Panel A of Table 8 reports the summary statistics for the underwriter-broker pairs. The mean value of the *Relationship* measure is 2.67%, showing that over our sample period 2.67% of the 54,622 underwriter-broker pairs have cross-ownership. An analyst from a broker that has cross-ownership with the lead underwriter (*Relationship*=1), which we call a relationship analyst, is more likely to cover an IPO, all else being equal.[29] We have analyst coverage from both of two brokerage firms for 15.86% of the pairs in our sample. But conditioning on the variable *Relationship* being one, 29.95% of the pairs have coverage from both brokerage firms.

It is also possible that a relationship analyst receives pressure to provide more optimistic coverage. We report the summary statistics on coverage optimism with different relationship values in Panel B of Table 8. For both the pre- and post-offer date coverages, there is a

[27] We do not have the same 113 brokers each year, and not all of them issued reports in every year. So the total number of broker-IPO pairs is less than 97,067 (113×859).
[28] Central Huijin Investment Ltd. and China Jianyin Investment Securities Co., Ltd. are treated as same shareholder since the former is the parent company of the latter, and both are shareholders of big securities firms.
[29] Note that all analysts covering an IPO in the primary market in our sample are unaffiliated with the lead underwriter.

difference in analyst optimism for connected ($Relationship = 1$) vs. unconnected ($Relationship = 0$) brokers, although the difference for post-offer date optimism is very small.

We examine the relationships between cross-ownership and analyst research using multivariate regressions to control for the impact of confounding factors, and the results are reported in Regressions (1) through (4) of Panel C of Table 8. Consistent with the patterns in the summary statistics in Panels A and B of Table 8, $Relationship$ has a statistically significant positive impact on pre-offer date research coverage, while its impact on post-offer date coverage is statistically indistinguishable from zero. Again, the insignificant result for post-offer date coverage is not surprising, since the offer price is already determined at the offer date.

For the pre- and post-offer date earnings forecasts, the coefficients on $Relationship$ in Regressions (3) and (4) of Panel C of Table 8 are positive but only statistically significant for *Pre-Optimism* in Regression (3). These results suggest that relationship analysts are more likely to provide more optimistic research. Note that earnings forecast optimism has a significant positive impact on IPO pricing as reported in Tables 3 and 4; these results indicate that hype likely exists with pre-IPO analyst research, at least when the connections between the analyst and the underwriter are strong (such as cross-ownership). Our results are consistent with those reported by Huyghebaert and Xu (2015).

Given that cross-ownership has a significant positive impact on analyst coverage and earnings forecast optimism, we want to make sure that the significant impact of analyst coverage on offer price revisions (the results reported in Table 3) and the significant impact of post-offer date optimism on initial returns (the results reported in Table 4) are not driven by relationship analysts. We thus remove all the individual analyst reports by relationship analysts ($Relationship$=1) and recalculate the pre- and post-coverage and optimism measures. We then

re-run the regressions and report the results in Regressions (5) (for offer price revisions) and (6) (for initial returns) in Panel C of Table 8.

For the initial return regression, Regression (6) of Panel C of Table 8, only the coefficient on post-offer date earnings forecast optimism is positive and statistically significant. The point estimates of post-offer date analyst coverage and earnings forecast optimism are also similar to those reported in Table 4. For the offer price revision in Regression (5) in Panel C of Table 8, the coefficients on *Ln(1+Pre-Coverage)* and *Pre-Optimism* are still positive and are still statistically significant at the one percent levels. The results suggest pre-IPO analyst coverage and earnings forecast optimism still have a significant impact on offer price revisions even after we remove all the research reports from relationship analysts. We also want to point out, however, that the magnitudes of the coefficients on *Ln(1+Pre-Coverage)* and *Pre-Optimism* are only about half of those in Regression (5) of Table 3 when research reports from relationship analysts are included. This reduced magnitude suggests that, again, analysts with connections to the underwriter likely also use their research to hype an IPO, although they do produce information as a group.

7. Conclusions

More than twenty-five years since the rebirth of China's stock market, many of the operations and regulations of the IPO market are similar to those in developed markets such as the U.S. Unlike the U.S., however, it is common in China for unaffiliated brokers to initiate coverage of an IPO before trading starts. For a sample of 859 IPOs from 2009 to 2012, there are on average 10.63 brokers that provide pre-IPO coverage for each offering. Such widespread coverage provides a unique opportunity to examine how analysts and their information production in the primary market can affect the pricing of IPOs.

We find that analyst coverage and optimistic earnings forecasts have a significant positive impact on offer price revisions and initial returns. For example, our estimates suggest that the offer price revision of an IPO is on average 9.85% higher when the number of brokers that publish reports before the offer date increases by 3.61 (one standard deviation) above the mean. For an average IPO, this effect represents a gain of ¥84.1 million (US$13.4 million) in proceeds.

A one standard deviation increase in forecasted earnings is associated with a 65% higher offer price. Importantly, there is no evidence that higher earnings forecasts are linked to lower long-run returns. In other words, the earnings forecasts are not merely used for hyping the IPOs. Instead, the evidence suggests that underwriters are rationally pricing IPOs based on forecasted earnings rather than merely relying on historical earnings. In contrast, current CSRC policy restricts the offer price to rely on historical earnings, with the price-earnings ratio capped at 23.

We decompose the number of brokers covering an IPO and the optimism of the earnings forecast into predicted and residual components. We find that the significant impacts of pre-IPO analyst research come from the residual components. This result suggests that it is the information content of analyst coverage not expected by investors that drives the relationship between pre-IPO analyst coverage and IPO pricing.

We also examine the relations between pre-IPO analyst coverage and the long-run performance of IPOs. We find that pre-IPO analyst coverage and optimism are associated with higher IPO long-run buy-and-hold returns. When we examine research reports from connected and non-connected analysts, we find that a connection due to cross-ownership makes an analyst more likely to cover an IPO before the offer date and to provide more optimistic earnings forecasts. But after we remove the research reports from these connected analysts, pre-IPO

analyst research by the remaining analysts still demonstrates a significant positive impact on IPO pricing. Together, these results suggest that analysts do produce useful information in their pre-IPO coverage, although hype/marketing likely exists on China's IPO market.

Finally, an interesting result for China's IPOs is that offer price revisions are negatively associated with initial returns. This finding is in contrast to the partial adjustment phenomenon documented for IPOs in the U.S. and many other countries. We interpret this result as a consequence of the pro rata share allocation rules for China's IPOs. Since the lead underwriter cannot use allocations of underpriced shares to reward regular investors for supplying information or for being a profitable client, positive information provided by analysts and other sources is more fully incorporated into the offer price.

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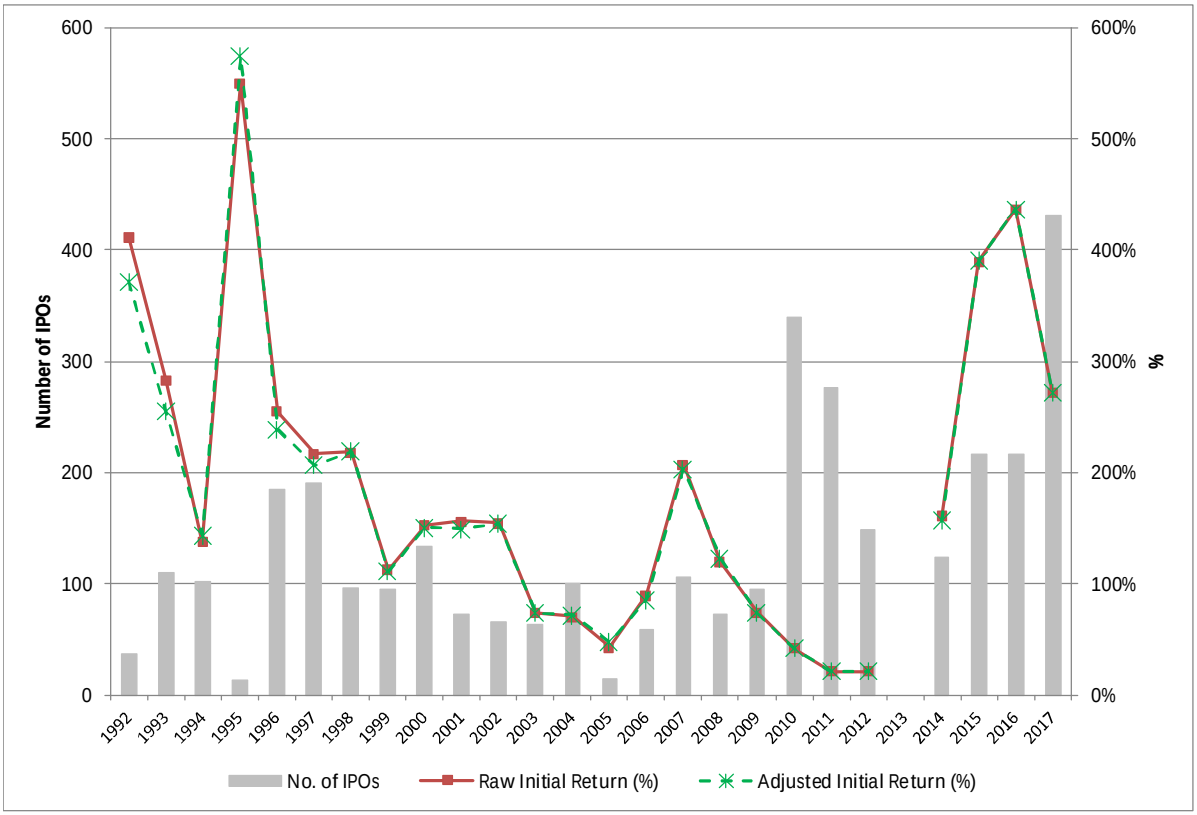
Figure 1 China's IPOs

We plot the number of IPOs (on the left axis) and the average initial returns (on the right axis). The data are from the China Stock Market & Accounting Research (CSMAR) database. Panel A reports the annual numbers for China's overall IPO market from 1992 to 2017 (based on listing year and A-share only, where A-share refers to stocks for domestic investors). Initial return of an IPO is defined as the percentage change from the offer price to the market closing price on the first day when the price of the IPO is no longer subjected to a price cap. For all IPOs from 1992 to 2012, the market closing price on the first day of trading is used since IPO prices on the first listing day were not subjected to price caps during the 1992-2012 period. For IPOs after 2013, the price increase of an IPO is capped at 44% on the first day of trading and at 10% afterwards (this 10% cap applies to all seasoned stocks). We thus track each IPO until the day when its price increase is no longer subjected to the price cap, and the market closing price on that day is used as the ending price for initial returns. The longest time for an IPO to be no longer subjected to the price cap is 29 trading days. Because of the variable length of the window for calculating initial returns, we report both the raw and market-adjusted initial returns in Panel A. The market returns are based on the value-weighted index of all stocks listed on either the Shanghai or Shenzhen stock exchanges. The big drop in the number of IPOs in 2005 reflects the suspension of IPOs by the China Securities Regulatory Commission (CSRC). We also have IPO suspensions for 2008Q4, 2009Q1, 2009Q2, 2012Q4, and most of 2013. The big increase in the number of IPOs in 2010 corresponds to the introduction of the Growth Enterprises Market, ChiNext, on the Shenzhen Stock Exchange, which aims at helping small growth firms to go to public. There were 13 IPOs before 1992 but some of the initial returns were very large. We also exclude the following IPOs for the 1992-2017 sample: 71 financial institutions, 71 IPOs with H-shares being listed on the Hong Kong Stock Exchange before or with the A-share IPO, 20 exchange offers (shares being offered in exchange of existing public listed shares), and 46 IPOs with missing initial returns.

The Number of IPOs/Raw Initial Return (%)/Adjusted Initial Return (%) reported in Panel A of Figure 1 for 2006 – 2017 are as follows: 2006: 59/90%/85%; 2007: 106/207%/203%; 2008: 72/119%/123%; 2009: 95/74%/74%; 2010: 340/42%/42%; 2011: 276/21%/21%; 2012: 148/21%/21%; 2013: 0/./.; 2014: 124/161%/157%; 2015: 216/390%/390%; 2016: 216/437%/437%; 2017: 431/272%/272%.

Panel B reports the quarterly numbers of IPOs and initial returns for our sample period from 2009 to 2012 (based on listing date). We also report the price revisions on the right axis in Panel B. Since no IPOs are subjected to price caps between 2009 and 2012, initial return in Panel B is simply defined as the percentage change from the offer price to the market closing price on the first day of trading. Offer price revision is defined as the percentage change from the expected offer price to the offer price. We do not subtract market index returns for either price change in Panel B.

Panel A: China's IPOs: 1992-2017



Panel B: Number of IPOs, Price Revisions, and Initial Returns, 2009-2012

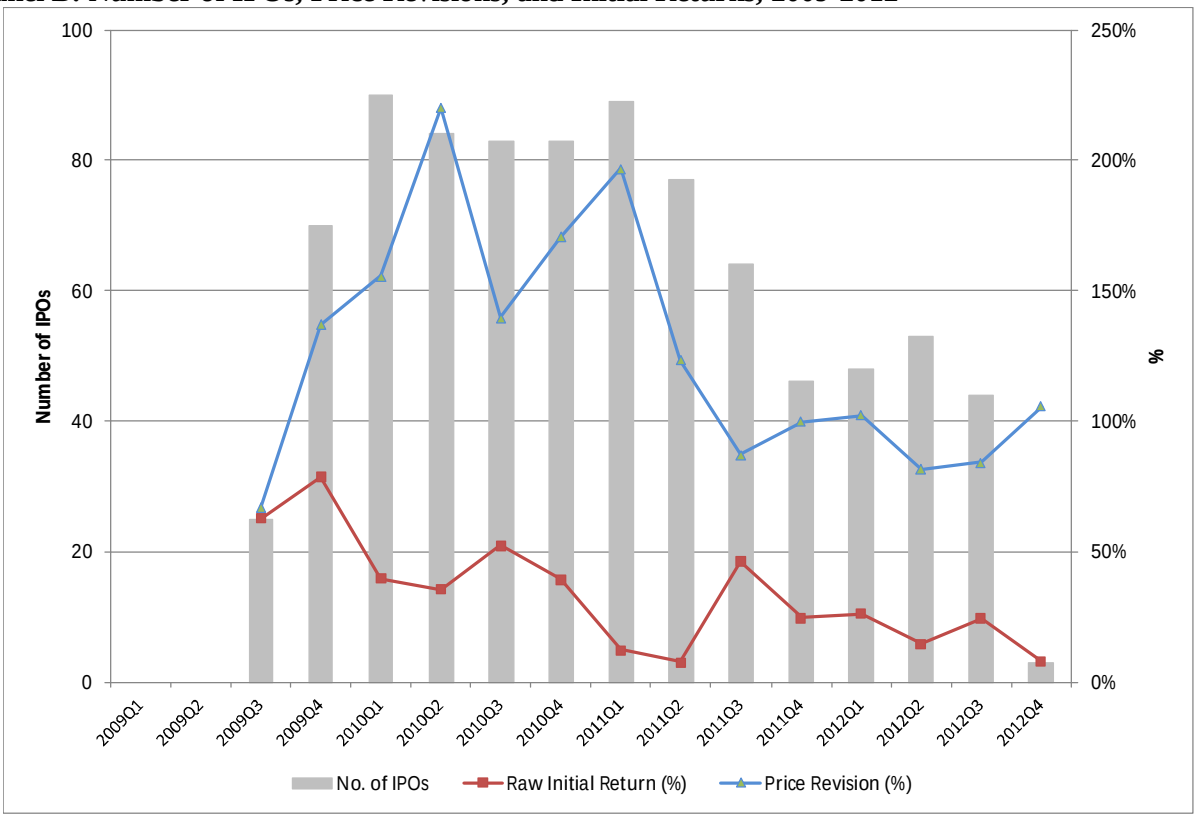


Table 1: Descriptive Statistics of IPOs, 2009-2012

Table 1 reports the summary statistics of 859 Chinese IPOs from 2009 to 2012. The data are from the China Stock Market & Accounting Research (CSMAR) database. Financial firms and exchange offers are excluded. We also exclude firms that have shares listed on the Hong Kong Stock Exchange before or simultaneously with the current IPO. *IR* (%) is the initial return of an IPO, defined as the percentage change from the offer price to the first-day market closing price. *Offer Price Revision* (%) is calculated as the percentage change from the expected offer price to the offer price. *Expected Offer Price* is the ratio of the *Expected Proceeds* (reported as proposed investments for the use of IPO proceeds) over the *Expected Number of Shares* offered (the maximum number of shares that can be offered as approved by the CSRC). IPOs in China are allocated to both institutional investors and retail investors. The *Off-* and *On-line Oversubscription*s are the ratios of the number of shares subscribed to the shares allocated for institutional and retail investors, respectively. For the other issue characteristics, offer price, shares offered, and proceeds are from the CSMAR database, and overhang is the ratio of the number of shares retained by the issuing firm's existing owners over the number of shares offered.

Market returns are based on the value-weighted index of all the stocks listed on the Shanghai or Shenzhen stock exchanges. *MktRet [-30, Offer Date]* (*MktRet [-30, Listing Date]*) is the compounded market return from the 30 calendar days before the offer date (the listing date) to the offer date (the listing date). The *Market Share of Lead Underwriter*(s) is computed using all the IPOs during the recent three years prior to the current IPO. When there are multiple lead underwriters for an IPO, we split the proceeds equally for calculating market share. For firm characteristics, sales, assets, leverage (percentage debt over assets), P/E ratio (offer price over latest EPS before IPO), and age (IPO year minus year of firm being founded) are based on the reported items for the latest fiscal year before the IPO. *Shares after IPO* is the total number of shares outstanding after the IPO. *Ownership of controlling shareholder (%)* is the percentage of shares both directly and indirectly under the control of the controlling shareholder (it's set as missing if no controlling shareholders exist). These data items on firm characteristics are also from the CSMAR database. We define *SOE Central* (*SOE Local*) as a dummy variable that equals one if the controlling shareholder is, or is controlled by, the central (local) government, and zero otherwise. *Market Value of Equity* is defined as the first-day market price times the total number shares outstanding after the IPO. Assets, market value, and IPO proceeds (expected and actual) are adjusted for inflation (using the Consumer Price Index) and are in 2011 Chinese Yuan. The numbers for the IPOs in 2012 are not adjusted. For more detailed variable definitions, see Appendix Table A1.

	N	Mean	Median	SD	Min	Max
IR (%)	859	35.09	26.38	39.99	-26.33	275.33
Offer Price Revision (%)	857	139.53	125.76	108.11	-61.94	778.92
Expected Offer Price (Yuan)	857	11.87	10.63	6.72	1.70	88.99
Expected Proceeds (Million Yuan)	857	553.61	300.59	1,783.74	82.73	44,100.13
Expected Shares Offered (Million Shares)	857	71.88	27.00	462.52	8.67	12,000.00
Offer Price（Yuan）	859	26.43	23.00	14.82	3.50	148.00
Shares Offered (Million Shares)	859	70.25	27.00	451.74	8.67	12,000.00
Proceeds (Billion Yuan)	859	1.06	0.68	2.23	0.17	54.61
Offline Oversubscription	859	51.27	30.50	57.43	1.10	355.24
Online Oversubscription	838	157.64	133.00	122.52	1.53	1,019.00
Overhang	859	3.30	3.00	1.24	1.50	9.00
MktRet [-30, Offer Date](%)	859	-0.51	-0.92	6.43	-23.17	16.50
MktRet [-30, Listing Date](%)	859	-0.29	-0.79	6.73	-23.56	17.08
Market Share of Lead Underwriter (%)	859	2.68	1.41	3.46	0.00	23.69
Sales (Billion Yuan)	852	1.52	0.45	8.77	0.05	220.01
Assets (Billion Yuan)	857	1.51	0.46	9.11	0.07	222.26
Leverage (%)	849	45.88	46.24	15.86	3.80	88.78
ROE (%)	855	29.76	26.94	13.62	0.18	166.93
P/E (trailing, using offer price)	859	49.93	47.51	20.35	12.22	150.82
Age (Years)	853	8.33	8.00	4.96	0.00	28.00
Shares After IPO (Million Shares)	859	281.94	107.85	1,280.11	34.67	30,000.00
Ownership of Controlling Shareholder (%)	818	44.75	43.71	16.87	5.89	99.32
SOE Central Dummy	859	0.04	0.00	0.19	0.00	1.00
SOE Local Dummy	859	0.05	0.00	0.23	0.00	1.00
Market Value of Equity (Billion Yuan)	852	6.01	3.65	10.34	0.87	213.26

Table 2: Descriptive Statistics of Primary Market Analyst Coverage of IPOs

Table 2 reports the summary statistics of pre-IPO (primary market) analyst coverage. The analyst coverage data are from the CSMAR database. We report both breadth and optimism of analyst coverage of an IPO. Breadth of coverage is measured in two different ways, the number of brokers covering the firm and the number of reports of earnings per share (EPS) forecasts, and for three periods: *Overall Coverage* for the whole period before the listing of the IPO, *Pre-Coverage* for the period before the offer date at which the offer price is determined, and *Post-Coverage* from the offer date to, and including, the listing date. We also report the optimism measures based on fiscal year 1 (FY1) EPS forecasts for the pre- and post- periods. For each period,

$$Optimism = -\frac{Implied\ {}^{P}/_{E}\ from\ EPS\ Forecast - Industry\ average\ {}^{P}/_{E}\ of\ IPOs}{Std.of\ Industry\ {}^{P}/_{E}}.$$

Note that we use the negative value of the scaled industry-adjusted P/E ratio for FY1 EPS forecasts since a more optimistic EPS forecast leads to a lower P/E ratio. A greater number for the optimism measure thus implies more optimistic coverage.

	N	Mean	Median	SD	Min	Max
Overall Coverage: Total No. of Brokers before IPO Listing Date	859	10.63	10.00	4.28	0.00	28.00
Pre-Coverage: No. of Brokers before Offer Date	859	7.70	7.00	3.61	0.00	22.00
Post-Coverage: No. of Brokers from Offer to Listing	859	3.90	4.00	2.19	0.00	14.00
Overall: No. of EPS Forecasts	859	10.73	10.00	4.53	0.00	31.00
Pre-Coverage: No. of EPS Forecasts	859	6.90	7.00	3.51	0.00	21.00
Post-Coverage: No. of EPS Forecasts	859	3.83	4.00	2.22	0.00	14.00
Pre-Optimism	833	0.52	0.64	0.66	-4.36	2.65
Post-Optimism	819	-0.93	-0.87	0.70	-4.65	0.94

Table 3: Analyst Research and Offer Price Revisions

Table 3 presents regression results with *Offer Price Revision*, defined as the percentage change from the expected offer price to the offer price, as the dependent variable. The key independent variables are *Ln(1+Pre-Coverage)* and *Pre-Optimism*. *Pre-Coverage* is measured as the number of brokers before covering an IPO before the offer date. *Pre-Optimism* for an IPO is measured as the negative of the mean value of scaled industry-adjusted implied P/E ratios based on all FY1 EPS forecasts before the offer date for the IPO. A higher optimism measure implies more optimistic earnings forecasts. For the detailed definition of the expected offer price as well as the control variables, see the notes in Tables 1, 2, and A1. We include industry and/or year fixed effects in some regressions but do not report their coefficients. We report heteroskedasticity-consistent t-statistics in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Ln(1+Pre-Coverage)	23.12***	12.14*	7.31		28.37***
	(3.08)	(1.65)	(0.95)		(3.92)
Pre-Optimism				99.20***	99.15***
				(13.45)	(13.18)
IR [-30,Offer]	0.51***	0.07	0.01	0.32**	0.34**
	(2.92)	(0.36)	(0.07)	(2.00)	(2.11)
MktRet [-30,Offer]	-0.56	0.08	0.15	-0.08	-0.32
	(-0.99)	(0.15)	(0.29)	(-0.18)	(-0.75)
Overhang	-7.38***	-8.10***	-8.47***	1.84	1.78
	(-2.69)	(-3.05)	(-2.91)	(0.80)	(0.79)
Lead MktShare	-1.44	0.84	0.75	0.60	0.43
	(-1.24)	(0.78)	(0.68)	(0.71)	(0.49)
Ln(Assets)	-15.37***	-15.38***	-12.07***	-14.28***	-15.44***
	(-3.76)	(-3.86)	(-2.70)	(-4.15)	(-4.44)
ROE	1.82***	2.01***	1.98***	0.82***	0.81***
	(4.52)	(5.18)	(5.24)	(2.70)	(2.71)
SOE Central Dummy	6.09	-1.86	-12.96	11.76	7.56
	(0.29)	(-0.09)	(-0.57)	(0.66)	(0.43)
SOE Local Dummy	-17.28	-16.06	-25.49	-13.90	-13.72
	(-1.14)	(-1.13)	(-1.59)	(-1.08)	(-1.08)
Constant	39.07*	55.64**	57.15*	-48.47	-101.83***
	(1.67)	(2.24)	(1.94)	(-1.30)	(-2.74)
Industry Fixed Effect	No	No	Yes	Yes	Yes
Year Fixed Effect	No	Yes	Yes	Yes	Yes
Observations	851	851	851	827	827
Adjusted R-squared	0.096	0.169	0.189	0.516	0.525

Table 4: Analyst Research and Initial Returns

The dependent variable in Table 4, *IR (%)*, is defined as the percentage return from the offer price to the market closing price on the first trading day. The key independent variables are as follows. *Ln(1+Post-Coverage)* is defined as *Ln(1+No. of Brokers after Offer Date)*, and *Ln(1+Pre-Coverage)* is defined as *Ln(1+ No. of Brokers before Offer Date)*. *Post-Optimism* is measured as the negative of the mean value of scaled industry-adjusted implied P/E ratios based on all FY1 EPS forecasts for the IPO after the offer date, and *Pre-Optimism* is measured in the same way with analyst forecasts before the offer date. A greater optimism measure implies more optimistic coverage. *Offer Price Revision* is defined as the percentage change from the expected offer price to the offer price. For the definitions of other variables, see Tables 1, 2, and A1 for more information. We include industry and year fixed effects in all regressions but their coefficients are omitted. We report heteroskedasticity-consistent t-statistics in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Ln(1+Post-Coverage)			1.11		1.83	3.71
			(0.44)		(0.60)	(1.14)
Ln(1+Pre-Coverage)				-2.38		-7.17*
				(-0.97)		(-1.96)
Post-Optimism					7.80***	8.19***
					(3.84)	(3.45)
Pre-Optimism						-3.27
						(-0.98)
Offer Price Revision		-0.06***	-0.06***	-0.06***	-0.04***	-0.03
		(-5.13)	(-5.12)	(-5.11)	(-3.69)	(-1.36)
IR [-30,Offer]	0.27***	0.29***	0.29***	0.29***	0.33***	0.33***
	(4.06)	(4.30)	(4.29)	(4.28)	(4.72)	(4.62)
MktRet [-30,List]	1.86***	1.83***	1.83***	1.86***	1.78***	1.83***
	(11.74)	(11.67)	(11.69)	(11.25)	(10.94)	(10.54)
Lead MktShare	-0.67**	-0.61**	-0.61**	-0.59**	-0.60**	-0.58**
	(-2.47)	(-2.15)	(-2.15)	(-2.08)	(-2.12)	(-2.00)
Overhang	1.83	1.49	1.51	1.47	2.31*	2.06*
	(1.52)	(1.25)	(1.25)	(1.23)	(1.92)	(1.76)
Ln(Offline OverSub)	5.01***	6.18***	6.09***	6.40***	6.40***	6.65***
	(3.20)	(4.05)	(3.98)	(4.09)	(4.06)	(4.20)
Ln(Online OverSub)	8.58***	6.47***	6.42***	6.42***	4.97***	4.89***
	(5.38)	(4.04)	(3.98)	(4.00)	(3.01)	(2.87)
Ln(Assets)	-4.82***	-5.55***	-5.67***	-5.35***	-8.08***	-7.59***
	(-2.64)	(-3.05)	(-3.08)	(-2.92)	(-4.09)	(-3.82)
ROE	-0.32***	-0.24***	-0.24***	-0.23***	-0.34***	-0.35***
	(-3.45)	(-2.65)	(-2.68)	(-2.62)	(-3.70)	(-3.71)
Leverage	0.01	-0.01	-0.00	-0.00	0.00	0.01
	(0.16)	(-0.06)	(-0.03)	(-0.06)	(0.03)	(0.15)
SOE Central Dummy	1.43	0.63	0.39	0.89	2.62	3.32
	(0.28)	(0.11)	(0.07)	(0.16)	(0.44)	(0.55)
SOE Local Dummy	13.09*	12.59*	12.46*	12.67*	11.96	11.24
	(1.80)	(1.76)	(1.73)	(1.77)	(1.61)	(1.52)
Constant	-34.65*	-38.18***	-38.74***	-35.17**	-17.23	-5.31
	(-1.80)	(-2.61)	(-2.66)	(-2.39)	(-0.93)	(-0.29)
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	825	824	824	824	786	771
Adjusted R-squared	0.395	0.412	0.412	0.412	0.426	0.427

Table 5: Predicting Analyst Coverage and Optimism: First-Stage Regressions

Table 5 presents regression results for predicting analyst coverage and optimism for an IPO by using the last twelve months (LTM) average coverage and average optimism. The dependent variables, *Ln(1+Pre-Coverage)* and *Pre-Optimism*, are the same as in Table 3; *Ln(1+Post-Coverage)* and *Post-Optimism* are the same as in Table 4. In addition to the firm and issue characteristics of an IPO, we use the LTM averages of coverage and optimism of either pre-offer date or post-offer date analyst reports as instrumental variables (IVs). As indicated by each variable name, for an IPO, an IV variable is the average of a particular variable for all IPOs by either the same lead underwriter or the same industry during the LTM before the IPO. For example, *LTM Pre-Coverage_Lead* is the average of *Pre-Coverage* for all IPOs during the LTM prior to the current IPO by the same lead underwriter, and *LTM Pre-Coverage_Ind* is the average of *Pre-Coverage* for all IPOs in the same industry during the LTM prior to the current IPO. For presentation purposes, *MktRet[-30 Offer] (MktRet[-30 Listing])*, the market returns for the past 30 calendar days prior to the offer (listing date), *Offer Price Revision*, the revision of the offer price from the expected offer price, and *IR[-30 Offer]*, the average initial return of IPOs during the past 30 calendar days prior to the offer date of the current IPO, have been rescaled in this table and are in decimals. We also include both industry and year fixed effects in all regressions, and their coefficients are omitted. For the definitions of other control variables, see Tables 3, 4, and A1. We report heteroskedasticity-consistent t-statistics in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(1+Pre-Coverage)		*Pre-Optimism*		*Ln(1+Post-Coverage)*		*Post-Optimism*	
Ln(1+LTM Pre-Coverage_Lead)	-0.00	-0.01						
	(-0.06)	(-0.18)						
Ln(1+LTM Pre-Coverage_Ind)		0.06						
		(0.95)						
LTM Pre-Optimism_Lead			-0.01	-0.01				
			(-0.17)	(-0.22)				
LTM Pre-Optimism_Ind				-0.01				
				(-0.17)				
Ln(1+LTM Post-Coverage_Lead)					-0.05	-0.06		
					(-0.76)	(-0.87)		
Ln(1+LTM Post-Coverage_Ind)						0.02		
						(0.33)		
LTM Post-Optimism_Lead							-0.03	-0.05
							(-0.44)	(-0.79)
LTM Post-Optimism_Ind								-0.16***
								(-2.60)

Table 5 Continued:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(1+Pre-Coverage)		*Pre-Optimism*		*Ln(1+Post-Coverage)*		*Post-Optimism*	
MktRet[-30 Offer]	0.97***	1.00***	0.41	0.43				
	(3.95)	(4.06)	(1.13)	(1.12)				
MktRet[-30 Listing]					0.12	0.24	0.00	-0.04
					(0.44)	(0.90)	(0.00)	(-0.13)
Offer Price Revision					-0.01	-0.01	-0.23***	-0.22***
					(-0.60)	(-0.61)	(-9.87)	(-9.68)
Leverage					-0.00*	-0.00*	0.00	0.00
					(-1.84)	(-1.66)	(0.20)	(0.14)
Ln(Offline OverSub)					0.07***	0.07***	-0.14***	-0.14***
					(2.99)	(2.96)	(-3.86)	(-3.69)
Ln(Online OverSub)					0.04	0.04	0.12***	0.13***
					(1.51)	(1.42)	(3.36)	(3.46)
IR[-30 Offer]	-0.14*	-0.15*	-0.35***	-0.36***	-0.16	-0.17*	-0.55***	-0.55***
	(-1.72)	(-1.86)	(-2.74)	(-2.75)	(-1.54)	(-1.65)	(-4.79)	(-4.80)
Log(Assets)	0.05***	0.05***	0.04	0.03	0.10***	0.10***	0.20***	0.21***
	(2.71)	(2.62)	(1.30)	(0.97)	(3.21)	(3.06)	(5.45)	(5.69)
ROE	0.001	0.001	0.012***	0.012***	0.005***	0.004***	0.010***	0.010***
	(0.75)	(0.74)	(6.63)	(6.58)	(4.24)	(4.07)	(5.38)	(5.38)
SOE Central Dummy	0.11	0.12	-0.27*	-0.28*	0.21**	0.22**	-0.21*	-0.22*
	(1.09)	(1.19)	(-1.80)	(-1.82)	(2.20)	(2.23)	(-1.71)	(-1.78)
SOE Local Dummy	0.01	0.01	-0.11	-0.13	0.12	0.09	0.22*	0.22*
	(0.15)	(0.17)	(-0.85)	(-0.97)	(1.36)	(1.09)	(1.90)	(1.84)
Overhang	0.01	0.00	-0.11***	-0.11***	-0.01	-0.01	-0.09***	-0.09***
	(0.40)	(0.06)	(-4.77)	(-4.45)	(-0.56)	(-0.71)	(-3.72)	(-3.79)
Lead MktShare	0.01**	0.01*	0.00	0.00	0.00	0.00	-0.00	-0.00
	(1.98)	(1.95)	(0.27)	(0.02)	(0.77)	(0.68)	(-0.07)	(-0.02)
Constant	2.09***	1.93***	1.58***	0.12	1.10***	0.96**	-1.11**	-1.23**
	(9.61)	(9.63)	(6.49)	(0.14)	(3.18)	(2.58)	(-2.17)	(-2.31)
Observations	827	812	800	784	799	784	762	747
Adjusted R-squared	0.196	0.195	0.088	0.084	0.195	0.192	0.273	0.277

Table 6: Predicted and Innovative Components of Analyst Research, Offer Price Revisions, and Initial Returns: 2nd-Stage Regression Results

Table 6 reports regression results on the effects of predicted and innovation (residual) components of analyst coverage and optimism on offer price revisions and initial returns. The dependent variable in Panel A is *Offer Price Revision*, which is defined as the percentage change from the expected offer price to the offer price, as defined in Table 3. The dependent variable in Panel B is *Initial Return (IR)*, which is defined as the percentage return from the offer price to the market closing price on the first trading day, as defined in Table 4. In both Panels A and B, predicted and residual values of a variable are from the corresponding first-stage regression in Table 5. Note that we use "*by LEAD*" in the variable name to indicate that we use the historical measure of all the IPOs by the same lead underwriter during the last twelve months, as well as other firm and IPO characteristics, in the first-stage regression for the predicted or residual values. Similarly, we use "*by LEAD&IND*" to indicate that the first-stage regression includes both the historical measure from all IPOs by the same lead underwriter and the historical measure from all IPOs in the same industry on the right-hand-side. For the regressions in both panels, we include the same set of control variables as those in Table 3 or Table 4, depending on the left-hand-side variable. The coefficients on the control variables have similar patterns as those reported in Tables 3 and 4 and are omitted. We also include both industry and year fixed effects in all regressions in Panels A and B, and their coefficients are omitted. For both panels, Regressions (1) through (4) only include predicted values while Regressions (5) through (8) include both predicted and residual values. For all regressions, we report the z-statistics based on bootstrapping because we include both the predicted and residual values from the first-stage regressions in some regressions. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Effects on Offer Price Revisions

	With Predicted Values Only				With both Predicted and Residual Values			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pred. Ln(1+Pre-	-21.54		-20.04		-21.51		-30.19	
Coverage) by LEAD	(-0.63)		(-0.48)		(-0.64)		(-1.33)	
Res. Ln(1+Pre-					0.10		0.31***	
Coverage) by LEAD					(1.38)		(4.05)	
Pred. Ln(1+Pre-		-0.31		0.43		-0.30		0.96
Coverage) by LEAD&IND		(-0.13)		(0.14)		(-0.11)		(0.35)
Res. Ln(1+Pre-						0.09		0.31***
Coverage) by LEAD&IND						(1.35)		(5.13)
Pred. Pre-Optimism			-1.53				-2.36	
by LEAD			(-0.18)				(-0.48)	
Res. Pre-Optimism							0.99***	
by LEAD							(14.41)	
Pred. Pre-Optimism				-0.76				-1.34
by LEAD&IND				(-0.12)				(-0.26)
Res. Pre-Optimism								1.00***
by LEAD&IND								(12.25)
Observations	825	810	800	784	825	810	800	784
Adjusted R-squared	0.189	0.187	0.186	0.186	0.190	0.188	0.520	0.522

Panel B: Effects on Initial Returns

	With Predicted Values Only				With both Predicted and Residual Values			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pred. Ln(1+Post-	-24.39		-91.18		-24.39		-59.69	
Coverage) by LEAD	(-0.34)		(-0.76)		(-0.27)		(-0.64)	
Res. Ln(1+Post-					0.97		2.29	
Coverage) by LEAD					(0.34)		(0.78)	
Pred. Ln(1+Post-		21.70		-9.44		21.70		5.21
Coverage) by LEAD&IND		(0.30)		(-0.13)		(0.28)		(0.07)
Res Ln(1+ Post-						1.08		2.10
Coverage) by LEAD&IND						(0.47)		(0.69)
Pred. Post-Optimism			171.86				173.79	
by LEAD			(1.52)				(1.57)	
Res. Post-Optimism							7.76***	
by LEAD							(3.29)	
Pred. Post-Optimism				13.89				14.00
by LEAD&IND				(0.53)				(0.64)
Res. Post-Optimism								7.93***
by LEAD&IND								(4.44)
Observations	799	784	762	747	799	784	762	747
Adjusted R-squared	0.402	0.403	0.404	0.404	0.401	0.403	0.416	0.417

Table 7: Analyst Research and IPO Long-Run Performance

Table 7 presents the descriptive statistics and the regression results on one-, two-, and three-year buy-and-hold returns (BHRs) after the IPO for 859 IPOs from 2009-2012. We calculate the buy-and-hold returns for a specific holding period (one to three years) using compounded monthly returns starting from the first month after the IPO trading date (e.g., June for all IPOs that listed in May). The market buy-and-hold returns for the same holding period are based on the value-weighted market index return of both the Shanghai and Shenzhen stock exchanges. The cumulative abnormal return (CAR) for an IPO is calculated as $\left[\prod_{t=1}^{T}(1 + r_t^{IPO}) - \prod_{t=1}^{T}(1 + r_t^{Mkt})\right] \times 100\%$, where r_t^{IPO} and r_t^{Mkt} are the monthly returns for the IPO and the market index for month t and T equals 12, 24, and 36 for one-, two-, and three-year abnormal returns, respectively. Delistings have been rare in China, and all 859 of our sample IPOs survived for at least 36 months after the IPO. Panel A reports the summary statistics for BHRs and CARs in percentages. Panel B reports the regression results with the corresponding BHRs as the dependent variables. The variables of interest are the analyst coverage and optimism variables, and they are defined in the same way as in Tables 3 and 4. The control variables are defined in Appendix Table A1. We include dummy variables for industry fixed effects for all regressions, although their coefficients are not reported. We report heteroskedasticity-consistent t-statistics in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Note that the number of observations in each regression is less than 859 as reported in Panel A because of missing values for analyst measures and other control variables.

Panel A: Summary Statistics of Post-IPO Performance

	N	Mean	Median	SD	Min	Max
1 Year BHR after IPO (%)	859	-8.3	-16.8	37.6	-65.6	259.1
2 Year BHR after IPO (%)	859	-2.5	-22.5	66.1	-79.8	567.4
3 Year BHR after IPO (%)	859	45.1	-5.1	138.6	-84.1	1,078.9
1 Year CAR after IPO (%)	859	-2.8	-11.4	34.1	-60.7	263.7
2 Year CAR after IPO (%)	859	9.5	-8.6	62.0	-63.5	575.3
3 Year CAR after IPO (%)	859	41.6	2.2	119.0	-122.6	988.7

Panel B: Regression of Post-IPO Performance

	(1)	(2)	(3)
	1 Year BHR	*2 Year BHR*	*3 Year BHR*
Ln(1+Post-Coverage)	5.06*	14.52***	17.89**
	(1.73)	(2.63)	(2.03)
Post-Optimism	1.24	5.30	-1.57
	(0.60)	(1.55)	(-0.23)
Ln(1+Pre-Coverage)	0.83	8.54	14.99*
	(0.28)	(1.65)	(1.77)
Pre-Optimism	0.99	3.90	10.37*
	(0.47)	(1.22)	(1.67)
Initial Return (%)	-0.09***	-0.18***	-0.29***
	(-3.07)	(-3.55)	(-3.15)
1 Year Market Return after IPO	1.53***		
	(15.80)		
2 Year Market Return after IPO		2.14***	
		(11.90)	
3 Year Market Return after IPO			1.96***
			(13.68)
Ln(Assets)	-5.20***	-14.64***	-24.33***
	(-2.96)	(-4.40)	(-4.19)
ROE	-0.07	-0.24	-0.68**
	(-0.61)	(-1.27)	(-2.09)
Leverage	0.01	0.17	0.03
	(0.07)	(0.69)	(0.09)
SOE Central Dummy	4.77	3.41	4.70
	(0.79)	(0.22)	(0.21)
SOE Local Dummy	-5.01	2.38	-24.19
	(-1.06)	(0.35)	(-1.42)
Overhang	-1.62	0.94	-1.07
	(-1.47)	(0.49)	(-0.40)
Ownership (%)	0.07	-0.04	0.06
	(1.03)	(-0.34)	(0.29)
Lead MktShare	0.84*	2.10***	2.86*
	(1.79)	(2.63)	(1.96)
Constant	33.50	-1.32	-8.27
	(0.77)	(-0.05)	(-0.21)
Industry Fixed Effect	Yes	Yes	Yes
Observations	753	753	753
Adjusted R-squared	0.261	0.224	0.428

Table 8: Relationship Analysts and Research Coverage

Table 8 presents the summary statistics on relationship analysts (analysts that are related to the underwriter through cross-ownership) and their impacts on research coverage, offer price revisions, and initial returns. We report the percentage of coverage for IPO-broker pairs in Panel A, where we count coverage as one if a broker has an analyst that provides coverage for an IPO for a particular IPO-broker pair and zero otherwise. We report average optimism for individual analyst reports in Panel B. Regression results are reported in Panel C. For the underwriter-broker pair sample in Panel A, we include all the possible pairs of all brokers and all IPOs (underwriters) for a particular year, regardless of whether a brokerage firm issues an analyst report for an IPO or not. We do exclude the underwriter-broker pair if the brokerage firm is the same as the underwriter of the IPO (research coverage by affiliated analysts is not included in our early analysis). Note that the pairing is on an annual basis. *Relationship* is a dummy variable that equals one for an underwriter-broker pair if the large shareholder of the underwriter of the IPO is also listed as a major or controlling shareholder of the brokerage firm. For Panel B, the mean values of optimism measures are based on individual reports (note that the summary statistics on optimism reported in Table 2 are based on IPOs), and the dummy variable *Relationship* is defined in the same way as in Panel A for the relationship between the brokerage firm that issues the report and the underwriter of the IPO under coverage.

For Panel C, the dependent variable is reported at the top of each column. *Relationship* is a dummy variable as defined in Panels A and B, and the other independent variables are defined in the same way as in Tables 3 and 4. For presentation purposes, *Offer Price Revision*, the revision of the offer price from the expected offer price, is rescaled in this table and is in decimal format when used as an explanatory variable. For Regressions (1) and (2) on pre- and post-coverage and *Relationship*, the sample is the underwriter-broker pairs as in Panel A. For Regressions (3) and (4) on pre- and post-optimism and *Relationship*, the sample is the individual reports as in Panel B. The number of observations is slightly smaller than that in the respective sample in either Panels A or B due to missing values. For Regression (5) of *Offer Price Revision* and Regression (6) of *Initial Return* (*IR*), the sample is the IPO sample as in Tables 3 or 4. For Regressions (5) and (6), the research reports from relationship analysts (reports for which *Relationship* equals one) are excluded in the calculations of the coverage and optimism variables. For all regressions, heteroskedasticity-consistent t-statistics are reported in parentheses, and *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Summary Statistics for Brokerage-IPO Pairs

	Overall			*Relationship*=1			*Relationship*=0		
Variable	N	Mean	Std.	N	Mean	Std.	N	Mean	Std.
Relationship (%)	54,622	2.67	16.12						
Coverage (%)	54,622	15.86	36.53	1,459	29.95	45.82	53,163	15.47	36.16
Pre-Coverage (%)	54,622	10.50	30.65	1,459	25.50	43.60	53,163	10.08	30.11
Post-Coverage (%)	54,622	5.79	23.35	1,459	5.66	23.04	53,163	5.79	23.36

Panel B: Summary Statistics for Individual Analyst Reports

	Overall			*Relationship*=1			*Relationship*=0		
Variable	N	Mean	Std.	N	Mean	Std.	N	Mean	Std.
Pre-Optimism	5,695	0.40	0.87	365	0.52	0.93	5,330	0.40	0.86
Post-Optimism	3,168	-0.73	0.78	82	-0.70	0.65	3,086	-0.73	0.78

Panel C: Regression Results

	(1) Pre-Coverage Dummy	(2) Post-Coverage Dummy	(3) Pre-Optimism	(4) Post-Optimism	(5) Offer Price Revision, %	(6) Initial Return, %
Relationship	0.62***	-0.01	0.10**	0.10		
	(16.12)	(-0.24)	(2.08)	(1.44)		
Ln(1+Pre-Coverage)					18.14***	
					(2.98)	
Pre-Optimism					32.69***	
					(4.89)	
Ln(1+Post-Coverage)						1.87
						(0.75)
Post-Optimism						7.72***
						(3.66)
Offer Price Revision (in decimals)		0.00		-0.20***		-4.44***
		(0.39)		(-8.14)		(-3.82)
IR [-30,Offer]	-0.00	-0.00	-0.00	-0.01***	0.18	0.33***
	(-0.88)	(-1.33)	(-1.59)	(-4.67)	(1.08)	(4.68)
MktRet [-30,Offer]	0.01***		0.00		0.08	
	(4.81)		(0.09)		(0.20)	
MktRet [-30,List]		0.00*		-0.01*		1.79***
		(1.84)		(-1.90)		(10.96)
Ln(Expected Proceeds)	0.04**		-0.87***		-111.20***	
	(2.12)		(-18.64)		(-11.05)	
Overhang	0.01	-0.00	-0.16***	-0.08***	-9.75***	2.32*
	(0.96)	(-0.46)	(-7.57)	(-3.81)	(-3.95)	(1.92)
Lead MktShare	0.00	-0.00	0.02***	-0.01	3.50***	-0.62**
	(1.14)	(-0.07)	(3.79)	(-0.78)	(3.58)	(-2.15)
Ln(Offline OverSub)		0.06***		-0.11***		6.25***
		(4.48)		(-2.89)		(3.97)
Ln(Online OverSub)		0.02		0.06		5.19***
		(1.08)		(1.56)		(3.14)
Ln(Assets)	-0.00	0.06***	0.66***	0.20***	53.42***	-8.21***
	(-0.15)	(3.28)	(17.97)	(5.76)	(6.81)	(-4.08)
ROE	0.00	0.00***	0.02***	0.01***	2.92***	-0.34***
	(0.21)	(3.96)	(10.87)	(5.28)	(6.18)	(-3.61)
Leverage		-0.00		0.00		0.01
		(-1.57)		(0.34)		(0.09)
SOE Central Dummy	0.04	0.14***	-0.08	-0.20*	11.74	2.36
	(0.66)	(2.71)	(-0.70)	(-1.83)	(0.60)	(0.39)
SOE Local Dummy	-0.02	0.07	-0.16	0.24**	-25.27**	11.87
	(-0.51)	(1.52)	(-1.47)	(2.22)	(-1.97)	(1.60)
Constant	-1.53***	-1.66***	-6.85***	-19.13***	579.43***	-33.46**
	(-8.38)	(-8.74)	(-2.96)	(-6.42)	(9.11)	(-2.31)
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	54,132	52,344	5,642	3,030	825	782
Pseudo/Adjusted R^2	0.016	0.010	0.229	0.224	0.477	0.422

Appendix: Table A1: Variable Definitions

We use data from the China Stock Market & Accounting Research (CSMAR) database or directly from the IPO prospectus filed with the CSRC to construct the variables for IPOs from 2009-2012. Most of the data are from the CSMAR database unless otherwise noted. For sales, assets, and proceeds (actual and expected), the number is adjusted for inflation and is expressed in the 2011 level of Chinese yuan. The numbers for the IPOs of 2012 are not adjusted.

Variable	Definition
IR (%)	The percentage change from the offer price to the first-day market closing price.
Offer Price Revision (%)	The percentage change from the expected offer price to the offer price.
Expected Offer Price	The ratio of the expected proceeds divided by the expected number of shares offered as approved by the CSRC.
Expected Proceeds	The proposed investments for the use of IPO proceeds as reported in the prospectus. This data item is manually retrieved from the prospectus. Filings with the CSRC by public firms can be found at CNINFO (http://www.cninfo.com.cn/information/companyinfo.html).
Expected No. of Shares	The maximum number of shares that can be offered as being approved by the CSRC.
Proceeds	Offer price times the number of shares offered, where the number of shares offered is almost always the maximum number of shares approved by the CSRC.
Ln(Expected Proceeds)	The natural logarithm of expected proceeds.
Offline Oversubscription	The ratio of the total subscriptions from institutional investors divided by the number of shares that are allocated to institutional investors.
Online Oversubscription	The ratio of total subscriptions from retail investors divided by the number of shares that are allocated to retail investors.
Ln(Offline OverSub)	The natural logarithm of *Offline Oversubscription*.
Ln(Online OverSub)	The natural logarithm of *Online Oversubscription*.
Overhang	The number of shares retained divided by the number of shares offered.
IR [-30,Offer]	Average percentage initial return for the IPOs during the past 30 calendar days before the offer date of the current IPO.
IR [-30,Listing]	Average percentage initial return for IPOs during the past 30 calendar days before the listing date of the current IPO.
MktRet [-30, Offer]	The compounded market percentage return for the past 30 calendar days before offer date of the current IPO. Market returns are based on the value-weighted index of all stocks listed on the Shanghai or Shenzhen stock exchanges.
MktRet [-30,Listing]	The compounded market percentage return for the past 30 calendar days before the listing date of the current IPO.
Lead MktShare	The percentage market share for a lead underwriter based on the total IPO proceeds credited to the lead divided by the total proceeds of all IPOs during the past three years from the current IPO. For multiple lead underwriters in an IPO, the proceeds are split equally for each underwriter.
Assets	Total assets for the latest fiscal year before the IPO.
Ln(Assets)	The natural logarithm of assets.
Leverage (%)	Percentage of total debt over assets for the latest fiscal year before the IPO.
ROE (%)	Return on equity for the latest fiscal year before IPO.

Table A1 Continued:

Variable	Definition
P/E	Offer price over the earnings per share (EPS) for the latest fiscal year before the IPO. This EPS number is reported in the final prospectus and is available from the CSMAR database.
Market Value of Equity	First-day market closing price times the number of shares outstanding after IPO
Ownership of Controlling Shareholder (%)	Percentage of shares directly or indirectly under the control of the controlling shareholder before IPO.
SOE Central Dummy	A binary variable that equals one if the controlling shareholder of the IPO firm is or controlled by the central government, and zero otherwise.
SOE Local Dummy	A binary variable that equals one if the controlling shareholder of the IPO firm is or controlled by a local government at the provincial or city level, and zero otherwise.
Pre-Optimism	The mean optimism based on EPS forecasts issued before the offer date. The mean value of the *negative* of the scaled industry-adjusted P/E ratios based on all Fiscal Year 1 (FY1) EPS forecasts issued by analysts before the offer date for an IPO. The implied P/E ratio for an EPS forecast is the ratio of the latest price of the IPO over the EPS forecast. We use the expected offer price as the price for the stock if the EPS forecast is published before the offer date. The adjustment is as follows: – (*Implied P/E-Industry P/E*)/ *Std. of Industry P/E*, where *Industry P/E* is the average of the implied P/E ratios of pre-IPO EPS forecasts of all the IPOs in the same industry during the same year, and *Std. Industry P/E* is the corresponding standard deviation. We use the mean and standard deviation based on all IPOs during the year for standardization if there are less than five IPOs in a particular industry. Note that the industry adjustments are based on all reports of all IPOs in the same industry in the same year.
Post-Optimism	The mean optimism based on EPS forecasts issued between the offer and the listing dates (see the definition above for *Pre-Optimism* for details for optimism calculations). We use the offer price if the forecast is published after the offer date. Note that the industry adjustments are based on all reports of all IPOs in the same industry in the same year.
Overall Coverage	The natural logarithm of one plus the number of brokers covering the IPO before trading.
Ln(1+Pre-Coverage)	The natural logarithm of one plus the number of brokers covering the IPO before the offer date.
Ln(1+Post-Coverage)	The natural logarithm of one plus the number of brokers covering the IPO between the offer and the listing dates.
Relationship	Dummy variable that equals one for a brokerage firm-IPO pair if the largest shareholder of the underwriter of the IPO is also listed as a major or controlling shareholder of the brokerage firm.