

Key Investors in IPOs: Information, Monitoring, Laddering or Cronyism?

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Abstract

We analyze institutional investors' IPO participation and identify a group of key investors who persistently receive allocations in the most underpriced IPOs. As a group, their participation is the most significant determinant of IPO underpricing. The majority of key investors appear to be rewarded for information production. They are most associated with underpricing and offer price revisions, and their future trades predict IPO stocks' returns. A minority of key investors are compensated for laddering. Their participation is associated with negatively-correlated future returns. We find no evidence that key investor participation is directly motivated by underwriters' earning kickbacks. However, key investors only receive a small portion of the economic benefits of underpricing. Equivalent benefits go to new funds, lending support to cronyism-based explanations for underpricing.

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Introduction

Investors who receive allocations in initial public offerings (IPOs) often benefit from significant underpricing. The existing theoretical literature proposes a number of explanations for this generosity towards investors, including the information revelation and production theories of Benveniste and Spindt (1989) and Sherman and Titman (2002), optimal post-IPO ownership structure arguments of Brennan and Franks (1997) and Stoughton and Zechner (1998), agency-conflict-based rationales such as those in Loughran and Ritter (2004) and Aggarwal et al. (2002), and the laddering explanation of Hao (2007). However, surprisingly little empirical attention has been paid to which investors benefit most from underpriced allocations. We fill this gap by identifying investors who have benefited most from prior underpriced allocations and studying their relation to underpricing in future offerings. We find support for both information-based and laddering theories of IPO underpricing. However, the value of underpricing allocated to key investors is a small portion of the total money left on the table in IPOs, suggesting that other motivations, particularly agency concerns, affect the extent of underpricing.

Focusing on investors most associated with underpricing provides a new means of testing a variety of explanations for underpricing. It is not *ex-ante* clear whether a group of investors will persistently be associated with the most underpriced offerings. However, the existence of such a group, whose behaviors, characteristics and associations could be measured, could provide valuable new insight into long-standing debates.

We first identify a group of investors, termed key investors, that are associated with significantly underpriced IPOs. Using investors' 13F filings to proxy for allocations, we rank investors according to the abnormal IPO underpricing of their allocations over the prior year. Key investors are those in the top 10% of this ranking. Our measure statistically identifies a group of investors that often hold significantly underpriced shares shortly after IPOs.

Furthermore, the measure is persistent. Over one-third of key investors are still classified as key investors in the following year, suggesting that key investors have traits leading to frequent, highly-underpriced allocations.

While 13F holdings have been used in prior studies (Reuter (2006), Binay et al. (2007)), we conduct a variety of tests to support that 13F holdings are an appropriate proxy for key investor allocations. First, we show that number of key investor holdings do not depend on the time between the IPO and the reporting date at the end of the quarter. If secondary-market buying were driving our identification of key investors, it is likely that the number of key investors would increase over time. Second, we show that secondary-market buying is not a profitable trading strategy, suggesting little motive for key investors to buy after IPOs. Third, we predict key investors' IPO participation using only investor and underwriter characteristics. While underwriter-investor relationships and investor traits likely influence allocations, it is less likely that these same factor influence secondary-market trading. Our predicted measure is highly correlated with realized key investor participation, consistent with the holdings data reflecting IPO allocations.

Our main result is that the number of key investors participating in an IPO is a significant determinant of underpricing. In a simple univariate regression, key investor participation explains over 30% of the variation in underpricing. Furthermore, in various specifications including control variables, a one-standard deviation increase in key investor participation increases underpricing between 10% and 14%. Accounting for offer prices adapting to key investor participation, it is among the most significant determinants of underpricing.

While it is clear key investors have an important role in IPOs, underpricing does not distinguish competing theories. For example, agency-based explanations also predict a positive relation between investor participation and underpricing, as higher underpricing would increase the kickbacks to underwriters. However, agency-based explanations do not predict positive offer price revisions which have been documented for IPOs overall (Hanley (1993)).

We show that this positive relation is particularly strong for key investors: key investor participation is the most significant determinant of offer price revisions. This evidence is inconsistent with underpricing associated with key investors being driven by agency concerns.

Several additional tests differentiate between information production, monitoring and laddering theories of underpricing. In support of an information motivation for underpricing, we show that key investors' future trades predict the next quarters' abnormal returns. In particular, we divide key investors based on their propensities to quickly flip positions, and show that this effect is particularly pronounced for non-flipping key investors. Participation of non-flipping key investors is most strongly associated with underpricing, suggesting this group is being compensated incrementally for revealing information prior to the IPO. The flipping investors trades show no return predictability. However, their participation is strongly associated with negative post-IPO return correlations—a prediction of the laddering hypothesis. Together, these results suggest that two distinct groups of key investors are participating based on separate information-based and laddering motivations.

While not directly tied to our hypothesis tests, we also show that underwriter characteristics, which are commonly controlled for in underpricing regressions, are no longer significant determinants when key investor participation is considered. This suggests that existing underwriter measures may have been identifying those underwriters' abilities to attract key investors to their offerings.

Our evidence is consistent with key investor participation driving underpricing through information and laddering channels. However, aggregate allocation statistics leave room for many alternative explanations for IPO underpricing. For example, key investors, who make up 10% of all investors and account for the majority of the relation between investor participation and underpricing, only receive 14.5% of allocations and 21.4% of the money left on the table in IPOs. In fact, new investors (who have received few IPOs in the last year) receive more allocations than key investors. As a group, new investors receive 18.6%

of allocations and 26.4% of the total money left on the table. This could be interpreted as underwriters using their allocation discretion in an attempt to earn future business from new entrants to the market. Overall, these statistics are consistent with a significant part of the economic value of underpricing being unrelated to key investors' information production.

Our paper makes a number of contributions to the IPO literature. First, we show the importance of institutional investors to underpricing and offer price revisions. Field and Lowry (2009) and Chemmanur et al. (2010) distinguish between retail and institutional investors and document that high institutional ownership after the IPO is positively associated with post IPO share price. Jenkinson and Jones (2004) and Cornelli and Goldreich (2001) study two samples of European IPOs with proprietary data on allocations granted by two different European investment banks and find mixed results. Cornelli and Goldreich (2001) documents that investors that submit informative bids are treated favorably by the underwriter, while Jenkinson and Jones (2004) find little evidence that informative bids are favored and suggest that underwriter tends to favor long-term investors in its allocations. Our evidence supports information-based theories for a subset of key investors. We also show the persistence of investor characteristics (as key investors) over time. In the context of IPOs, Sibo (2014) also studies the persistence of institutional investors' performance. He uses allocation data from 477 Chinese IPOs and finds that institutional investors that performed well in the past also tend to perform well in the future.

Second, we relate to a recent paper by Fjesme (2015) which, using data on allocations in Norwegian IPOs, finds that some institutional investors engage in post IPO price supports and that these investors are treated favorably in subsequent allocations. We find additional evidence consistent with the practice of laddering in IPOs, although only for a minority of key investors.

Third, we also relate to the literature on underwriters' roles in IPOs. Several studies have attempted to rank underwriters according to some measurable characteristics that

would reflect the quality of the underwriter, and use these rankings to explain underpricing. Megginson and Weiss (1991) and Carter and Manaster (1990) find that underwriter rank is related to the level of underpricing, and Hoberg (2007) finds that there are significant and persistent differences in underpricing by different underwriters that relate to underpricing. We contribute to this literature by showing that both measures lose explanatory power in underpricing regressions when controlling for key investor participation, suggesting these measures underwriters' abilities to attract key investors in IPOs.

The rest of the paper is organized as follows. Section 1 discusses existing theoretical literature and discusses potential roles of key investors in IPOs. Section 2 describes the data. Section 3 describes how we identify key investors in IPOs and argues that 13F holdings proxy for allocations. Our empirical analyses are discussed in Section 4. Section 5 concludes.

1 Existing theories and hypothesis development

A vast theoretical literature proposes several explanations for certain investors' favorable treatment in IPOs. For an overview of this literature, see Ritter and Welch (2002), Ljungqvist (2007) and Ritter (2011a) among others. In this section, we review several theories and their predictions that can be tested with our data.

1.1 Information Asymmetry

A large class of explanations is based on the assumption that key investors have superior information about the firm going public. We refer to this broad class of explanations as information-based theories of IPOs. These theories commonly lead to several predictions. First, a key investor who is privately informed is more likely to buy IPO shares if his private information indicates firm value is high (Rock (1986)), hence participation of key investors in IPOs is positively correlated with firms' post-IPO share prices and underpricing. Sec-

ond, underwriters deliberately underprice shares if key investors agree to participate and reveal their private information during bookbuilding (Benveniste and Spindt (1989)). Similarly, the underwriter may underprice shares in order to compensate key investors for costly information acquisition (Sherman and Titman (2002)). These theories predict:

Participation of key investors in IPOs is positively correlated with IPO underpricing.

Information acquired through bookbuilding allows the underwriter to update the offer price. Because informed investors likely participate when they have good information, upward revisions are likely when key investors participate in the IPO:

Participation of key investors in IPOs is positively correlated with offer price revisions.

When key investors reveal information during bookbuilding it affects short-run performance (underpricing). On the one hand, if the information is not fully revealed or incorporated into price initially, it can also affect the longer-term performance of shares in a similar manner. On the other hand, once information is fully incorporated it has no bearing on future performance. As a result:

Short-run and long-run stock performance should be non-negatively correlated.

Finally, if key investors' possess superior information prior to an IPO, this advantage may persist (either via retained information or new information production) leading to informative post-IPO trades, especially relative to less-informed investors' trades.

Changes in post-IPO shareholdings by key investors should predict returns better than changes in shareholdings of non-key investors.

1.2 Monitoring

An alternative class of theories about IPOs posits that key investors engage in monitoring activities. For instance, Mello and Parsons (1998) and Stoughton and Zechner (1998) pro-

pose that investors increase firm values through monitoring, and therefore these investors should receive favorable allocations and prices in an efficient IPO.¹ Along similar lines outside the IPO literature, Holmstrom and Tirole (1993) argues that investors can discipline management and increase firm value by collecting firm-specific information and trading on it, making the firm's price more informative. Alternatively, trading can improve firm value by improving future investment decisions as in Brown (2015). Banerjee et al. (2009) argues that underpricing may be used to secure long-term holding (which may add value to the firm). All of these theories generate empirical predictions similar to those from information-based theories. However, key investors' behaviors may distinguish between the theories.

If key investors provide value through improving price feedback, they should be associated with more active post-IPO trading relative to other investors.

If key investors provide value through long-term holding, they should be associated with longer holding periods relative to other investors.

1.3 Laddering

An alternative explanation termed laddering is based on the idea that key investors may promise the underwriter to buy significant number of shares in the open market after the IPO in exchange for allocation of underpriced shares. Hao (2007) argued that underwriters may favor institutional investors that engage in laddering in order to relax their own price-support activities. Such behavior generally creates upward pressure on shares prices for certain amount of time after the IPO which is eventually reversed. If key investors engage in laddering, their participation in the IPO can be associated with positive offer price revisions and positive first day returns, which are also predicted by information-based theories. The distinguishing feature of the Hao (2007) laddering theory is that the effect on the share price

¹Zingales (1995) and Booth and Chua (1996) also present non-booking-building, value-maximization-based explanations for underpricing.

is temporary. The short-term post IPO returns should be positive while key investors engage in laddering, while long-term returns should be negative as laddering fades with time. That is, laddering is a temporary phenomenon and its effects dissipate once key investors sell their shareholding in the firm.

While the underwriter supports the price, key investors should increase their holdings.

When key investors sell their shares, the share price performance should deteriorate, and:

Short-run and long-run performance of shares should be negatively correlated.

Lastly, if key investors do not possess superior information and instead engage in programmatic buying and selling via laddering, their trades should not predict share prices more than those of other investors:

Changes in post-IPO holdings of shares by key investors should affect the share price to the same extent as changes in holding of non-key investors.

1.4 Cronyism

While rarely formalized, there is a common argument in the IPO literature that key investors get special treatment in IPOs because they have a relationship with the underwriter.² For instance, underwriters may want to please key investors in hopes of securing future, unrelated business (i.e. earn kickbacks). In essence, repeated interaction of investors and underwriters give rise to an agency conflict, and allocations of underpriced IPO shares is one way for underwriters to reward regular clients. While many of the empirical implications are similar to those previously developed, we stress a few differences with the previous theories. In particular, we note that laddering could be considered as a form of cronyism, but we separate it due to its distinct predictions.

If key investors have no superior information and does not engage in either laddering or

²For examples, see Reuter (2006), Ritter and Zhang (2007), Ritter (2011b) and Kang and Lowery (2014)

monitoring, his IPO participation should not be related to firm value. Yet, if the underwriter does underprice the shares to transfer rents to the key investors (and subsequently receive larger kickbacks), then the offer price should be revised downward relative to the initial price range.

Participation of key investors in IPOs is negatively correlated with offer price revisions.

Given their lack of information if cronyism drives underpricing, the trades of key investors should not predict returns more than the trades of other investors:

Changes in post-IPO holdings of shares by key investors should predict returns to the same extent as changes in holding of non-key investors.

Table 1 summarizes the implications of the various theories. While information and monitoring motivations for underpricing are difficult to distinguish between, a number of predictions allow us to test these together against laddering and cronyism alternative. For example, if key investors are associated with underpricing but not offer price revisions, then it is likely that cronyism drives key investors' underpricing. However, finding a positive association among key investor participation, underpricing and offer price revisions does not imply cronyism is not contributing to underpricing. Rather, it would suggest that cronyism is not likely to be the motivation leading to key investors' receiving underpricing allocations in particular offerings.

2 Data and Sample

We identify IPOs using the Thomson Securities Data Corporation (SDC) Platinum Global New Issues database. The sample includes IPOs of U.S. firms' common stocks completed between 1985 and 2011, excluding unit offerings, spinoffs, real estate investment trusts, rights issues, closed-end funds and trusts, and IPOs with an offer price less than five dollars. To

Table 1: Empirical predictions of alternative IPO theories

Relationship	Information	Monitoring	Laddering	Cronyism
Underpricing and Key Investor Participation	+	+	+	+
Offer Price Revision and Key Investor Participation	+	+	+	-
Short and Long-Run Return Correlation	0	0	-	0
Key Investors' Post-IPO Holdings Change	0	0	+	0
Predictive Power of Key Investors' Trades	+	+	0	0

be included in the sample, we require that a firm be in the Center for Research in Security Prices (CRSP) database and that at least one institution reports owning shares in the first quarter after the IPO. Holdings data are from Thomson-Reuters 13F Institutional Holdings (13F) database. We supplement data from the SDC, CRSP and 13F databases from several sources. Consumer Price Index (CPI) data from the Bureau of Labor Statistics is used to adjust dollar values to year 2000 dollars. Founding dates, monthly underpricing and issuance activity, and underwriter rankings are taken from Jay Ritter's website.³ The resulting sample includes 4,938 IPOs.

Lacking direct data on IPO allocations, we follow Binay et al. (2007) and Reuter (2006) and proxy for allocations using the first reported institutional holdings data after issuance. While using 13F holdings data to proxy for allocations has several shortcomings (limited and delayed reporting), several studies provide evidence that this proxy is highly correlated with actual IPO allocations. Using proprietary data on a sample of 38 IPOs managed by a single underwriter, Hanley and Wilhelm (1995) finds that the correlation between 13F holdings

³The data are available at <https://site.warrington.ufl.edu/ritter/ipo-data/>

data and actual allocations is 0.91. Using six of the IPOs with known allocations featured in Ritter and Zhang (2007), we find that 49% of funds holding shares at the end of the quarter received allocations. For key investors (defined shortly) 55% of holdings are associated with IPO allocations.

Our proxy for allocations helps to overcome one limitation in the IPO literature, but allows for alternative interpretations of our results. The limitation, which is common in the literature, relates to the limited availability of data on allocations in IPOs.⁴ As the six IPOs with known allocations show, 13F data noisily identifies true allocations. While this may simply weaken the strength of our tests, it is also possible that this “noise” is important to our results. In fact, *a priori*, the role of investors buying into shares after the IPO may be as important for determining the offer price as the role of investors participating in the offering. In discussing our measure and results, we present evidence consistent with the noise interpretation and argue that using holdings does not bias our findings.

3 Key Investors

3.1 Measuring Key Investors

We define key investors as those that are likely to influence price setting and allocations in IPOs. If such a group of investors exists, and has traits of particular value to firms or underwriters, it is likely that those investors will continue to influence pricing in future offerings. Therefore, we hypothesize that investors who have experienced the most abnormal underpricing in past offerings are likely to predict underpricing in future IPOs.

We calculate a rolling measure of abnormal underpricing in past IPOs as of each IPO’s date. For each date, we consider IPOs over the past year, excluding any funds that did not

⁴Jenkinson and Jones (2004) and Cornelli and Goldreich (2001) overcome this limitation by using detailed proprietary underwriters’ data about bids and allocations. Both papers use European data and find mixed results.

have at least 4 allocations. Abnormal underpricing is equal to the realized underpricing less the average underpricing in that month. For each fund, we adjust abnormal underpricing by multiplying each average by the square root of the number of IPOs a fund participated in over the period. The scaled average provides a ranking mechanism based on the measure’s signal quality. For example, a fund with 100 allocations and average abnormal underpricing of 5% is more reliably a key investor than a fund with 10 allocations and a slightly higher average abnormal underpricing (of say 6%). Importantly, 5% average abnormal underpricing can be a stronger signal of true abnormal underpricing than a value of 6% which is associated with fewer observations.⁵

Our key investor measure is based on ranking funds by adjusted abnormal underpricing. The top 10% of funds are termed key investors and $KeyInvestor = 1$. This process is repeated for each IPO date in the sample, allowing rankings and key investor status to change over time. Finally, for each IPO we count the number of key investors who hold the firm’s stock at the end of the first quarter following the IPO.

$$NumKeyInvestors = \sum_{k \in K} KeyInvestor_k \quad (1)$$

where K is the set of investors who hold shares at the end of the first quarter following the IPO. $NumKeyInvestors$ is our main independent variable in the tests that follow.

Table 2 shows that our key investor measure is persistent. Over one-third of key investors at the beginning of one year are classified as key investors at the beginning of the following year. This is a significant portion as random assignment would suggest only 10% persistence.

Table 3 summarizes the most common key investors throughout our sample period (measured at the beginning of each year). For comparison, the bottom of Table 3 shows similar

⁵Alternatively, using a non-scaled average of abnormal underpricing gives similar, but weaker, results. Without scaling, our key investor measure is less persistent and includes many more small funds with few subsequent allocations.

summary statistics for Blackrock, Vanguard and Fidelity, three of the biggest fund families. The summary statistics indicate that most key investors receive many allocations and that a broad range of fund sizes are included as key investors. For example, Essex Investment Management Company, the most frequent key investor, manages a little over \$1 billion in assets, while Janus Capital Corporation is fourth most frequent and manages over \$90 billion. In general, the key investors we identify do not appear to match up with the “valuable” investors that underwriters pitch as being important to firms (such as Vanguard and Fidelity).

KeyInvestor is based on all IPOs prior to the IPO of interest. While the allocations in prior IPOs have been determined at the time of measurement, the holdings data is not yet public. To ensure that measurement timing is not driving our results, we use two alternative measures. First, we generate our measure at the end of each quarter, and use the prior quarter’s measure for each IPO. Second, we use the same quarterly data, but we only use a measure when it would have been publicly available. This accounts for the 45 day reporting delay in 13F filings. For example, for an IPO occurring on February 10th, we use holdings data from Oct 31st of the prior year. However, for an IPO occurring on February 20th, we use holdings data from December 31st (which would have been made available around February 15th). Using either of these alternative methodologies provides similar results to those presented.

3.2 Flippers and Long-Term Holders

Several theories suggest underpricing may be used to entice key investors to engage in laddering (and subsequently sell, or flip, their shares) or long-term holding. To analyze these possibilities, we develop measures that are likely correlated with these behaviors.

First, we measure flipping activity based on the frequency with which investors sell their complete holdings by the end of the second quarter following the IPO. In these cases, the investors report holdings at the end of the first quarter, but report no holdings at the end

of the second quarter. Investors are ranked based on the frequency with which they flipped their positions in the last year. Those above the median are classified as flippers.

Second, we measure long-term holding activity over a longer time horizon. Given that we must observe a longer time-series of reported holdings to gauge holding behavior, we consider IPOs completed between one and five years prior. We measure the percentage of those IPOs in which the investor reported holdings continuously through the first year after the IPO (i.e. in each of the first four quarters). Investors are then ranked and those above the median are classified as long-term holders.

3.3 Justifying Holdings as a Proxy for Allocations

Use of holdings data as a proxy may bias our key investor measure away from reflecting investors who frequently receive allocations in highly underpriced IPOs. For example, key investors may actually be buying hot IPOs in the secondary market and holding them at the end of the quarter. While we cannot rule out this and other possibilities, we present a number of tests that are consistent with holdings aligning well with actual allocations. We begin by comparing a limited sample of actual allocations to 13F holdings.

Ritter and Zhang (2007) analyze allocations data from 11 IPOs acquired through a Freedom of Information Act request.⁶ Using the overlap between their allocations data and our sample, we compare 6 IPOs' actual allocations to reported 13F holdings at the end of the quarter. Table 4 provides summary statistics. Many allocations were made to individuals or foreign holders who do not report in 13F holdings. Despite this, 48% (64%) of the allocations (shares) matched to funds that report in the 13F holdings data. However, only 19% (9.3% of all allocations) of those matches were also reported as holdings in the 13F data. The other 81% had apparently sold their shares by the end of the quarter. Selling is particularly prominent for new investors: key investors retain 39% of their allocations, non-key investors

⁶The data are available at <https://site.warrington.ufl.edu/ritter/ipo-data/>.

retain 20%, and new investors retain only 5%. Underwriters may be particularly interested in allocating shares to new investors in return for other future business with the underwriter.

Another source of mis-attribution comes from funds that buy after the IPO and do not receive allocations. In the 6 IPOs, 45% of key investor allocations are added after the IPO, while 47% of total allocations are added after the IPO. For new investors, the vast majority (73%) are added after the IPO. While based on a small sample, this data suggests that we underestimate the number of each type of investor. Combining the measurement errors due to flipping and secondary-marketing buying, 13F holdings data underestimates the number of key investors 30%, the number of non-key investors by 62% and the number of new investors by 83%. However, the correlations between the 13F holdings and actual allocations are high. For all investors the series are 95% correlated and the key investor series are 76% correlated. These strong correlations suggests 13F holdings are picking up meaningful variation in investors' and key investors' allocations.

The allocations data also shows that key investors receive more shares and tend to buy additional shares after the IPO. Key investors on average receive 100K shares, while non-key investors receive 45K shares and new investors receive 20K shares. Both key and non-key investors tend to add to their positions after the IPO, doubling their holdings by the end of the year. New investors do the opposite, selling almost half of their holdings by the end of the quarter. This is also consistent with underwriters transferring rents to new investors in order to gain future business.

While our comparison suggests 13F holdings are a good proxy for allocations, several alternative explanations may result in key investors' being associated with underpriced IPOs. It is possible that holdings reflect systematic, secondary market purchases of IPOs, particularly of hot IPOs. If key investors engage in this behavior, they would be associated with substantial underpricing due to their propensity to buy very underpriced stocks after the IPO and hold them until at least the end of the quarter. To test this possibility, we examine

the relation between the number of investors and key investors holding shares at the end of the quarter and the time period between the IPO and the end of the quarter. IPOs that occur earlier in the quarter have more time for investors to purchase shares in the secondary market. Therefore, if post-IPO buying is driving holdings, we would expect higher level of investors and key investors for earlier IPOs. Table 5 shows that the total number of investors increases with the number of days remaining in the quarter, but the number of key investors decreases slightly indicating some selling. This is inconsistent with key investors being identified as such due to post-IPO buying of hot IPOs. However, it does not rule out the possibility as key investors may be purchasing on the first day of the IPO, making within quarter timing irrelevant. Given this caveat, we believe it is more likely that key investors' holdings reflect allocations rather than post-IPO buying.

Another concern is that key investors receive more allocations than we have identified, but they tend to sell their less-underpriced allocations and are misidentified as key investors. Table 6 suggests that this is not the case. It divides the analysis of Table 5 into quantiles based on underpricing. Rather than selling the least underpriced IPOs, key investors tend to sell the most underpriced IPOs. Conversely, other investors are more attracted to underpriced IPOs as their numbers increase most sharply for the highest quartile of underpricing. While not conclusive, the evidence is again supportive of holdings reflecting allocations.

An alternative test is to consider the profitability of a trading strategy that buys on the first-day of an IPO (at the close) and holds until the end of the quarter. If this is profitable, then key investors may simply be those who engage in this post-IPO, buy-and-hold strategy. Column (1) of Table 7 shows that such a strategy is not profitable. Column (2) shows that conditioning on underpricing does not improve the strategy's profitability. While the strategy is not profitable, suggesting it is not motivating holdings, returns through the end of the first quarter are higher when firms have more key investor participation. When more key investors buy, there are larger gains throughout that first quarter. This suggests that

key investors buy shares in the weeks after the IPO, consistent with the evidence from actual allocations in Table 4 that shows that key investors increase their positions by over 120% between the IPO and the end of the quarter.

We may be failing to identify the most important key investors if they flip their most underpriced IPOs before the end of the quarter, leaving them identified as non-key investors. If this is the case, then in future IPOs, those investors should be associated with even more underpricing if they are the true information providers. This would increase the effect for all investors and diminish the relative effect for key investors, biasing tests against finding a difference for key investors. Therefore, we are not worried about this source of bias challenging our conclusions.

In IPO allocations, underwriters often favor past participants and may be attracted to certain investors based on fund characteristics Binay et al. (2007). However, these same traits are not likely to influence secondary-market purchase decisions. Given that post-IPO buying is not a profitable strategy, it seems unlikely that key investors are clustering secondary-market purchases with specific underwriters and thereby establishing “relationships” where none exist. Based on this intuition, if past relationships in the holdings data and fund characteristics predict future holdings, then this is consistent with those holdings reflecting allocations. To test this hypothesis, we follow Brown (2015) in constructing a probit estimation of funds’ end-of-quarter holdings. Using underwriter-investor relationship measures and fund-level controls, we estimate the probability that each investor reports holdings after each IPO. Table 8 reports marginal effects from the estimation results which are divided between new funds (who do not have history necessary for several variables) and established funds.

The results demonstrate the important of underwriter-investor relationships in determining holdings. Interacting with the underwriter once or multiple times within the underwriters’ last 10 IPOs leads to much higher probabilities of holdings, particularly for established

funds. Larger, older and more-frequently trading funds are also more likely to report holdings, as are key investors. Finally, key investors who are either flippers or long-term holders are relatively likely to report holdings. This is consistent with underwriters' having distinct motivations for providing certain investors with allocations. Overall, that past holdings and fund characteristics predict investors' future holdings is consistent with allocations driving end-of-quarter holdings.

As a final test of holdings' ability to proxy for allocations, we compare expected levels of investor and key investor participation (based on the probit analysis) to realized levels. If holdings proxy for allocations, then we would expect the expected levels to be predictive of realized levels. However, if secondary-market buying is driving holdings, no particular relationship is expected. To construct expectations we use the probit estimation to form predicted probabilities of receiving allocations for each investor in each IPO. These probabilities are summed for each IPO, with separate sums for all investors and for key investors, giving $E[NumInstInvestors]$ and $E[NumKeyInvestors]$. The predicted values are correlated 61% and 55% with realized values. Regressing the realized values on predicted values also gives coefficient estimates near one and R^2 values of 37% and 30%, indicating that the constructed estimates are good predictors of the realized values. Altogether, the evidence is consistent with 13F holdings data reflecting allocations.

4 Empirical Results

4.1 Underpricing

Table 9 shows our main result: *NumKeyInvestors* is a first-order determinant of IPO underpricing.⁷ Column (1) highlights that over 30% of underpricing variation is explained by *NumKeyInvestors* alone. In the univariate regression, a one-standard deviation increase

⁷Our main result is robust to separate analysis of the periods 1985 - 1997, 1998 - 2000 and 2001 - 2011.

in *NumKeyInvestors* is associated with 20% higher underpricing. Column (2) provides a baseline regression using control variables common to the IPO literature, and Column (3) adds *NumKeyInvestors* alongside those controls. While economic significance is dampened (to 10%), a t-statistic of 14.3 demonstrates strong statistical significance. For comparison, only offer price revisions are associated with a higher t-statistic (16.1).

Columns (4) and (5) show the incremental relation between underpricing and participation of key investors who are also classified as flippers and long-term holders. Non-flipping investor participation is associated with much more underpricing. This is suggestive of non-cronyism-based motivations being a primary driver of underpricing. Investors' long-term holding behavior does not significantly relate to underpricing.

Following the tests of Hoberg (2007), we consider that key investor participation (and most other control variables) are known in advance of the final pricing of an offering (which typically takes place the morning of or day before initial listing). To account for this, we orthogonalize offer price revisions, giving credit for any covariation to the other independent variables. Using the residuals from a regressions of offer price revisions on the other control independent variables, we repeat our analysis from Column (3). Accounting for the covariation in offer price revision attributable to *NumKeyInvestors*, Column (6) shows *NumKeyInvestors* is the most important determinant of underpricing, having a t-statistic of over 21. Economically, a one-standard deviation increase in *NumKeyInvestors* is associated with 14% higher underpricing.

Our underpricing tests are broadly consistent with key investors being involved with either information production, monitoring, cronyism, or all of the above. However, key-investor splits based on flipping behavior and long-term holding behavior suggest that monitoring does not differentially impact underpricing, and if anything, flipping behavior is less rewarded.

4.2 Instrumental Variables Analysis of Underpricing

While our earlier analyses suggest that holdings are a good proxy for allocations, we undertake an instrumental variables approach to further validate our findings. Our instruments are the expected participation of key investors and investors overall in each IPO. As detailed earlier, the expected participation is calculated for each IPO using a probit analysis predicting reported holdings. Only fund characteristics and fund-underwriter relationships are used in that estimation, providing plausibility for the exclusion restriction.

While satisfying the exclusion restriction is not guaranteed, our construction of the instruments using only fund-related information is likely sufficient. The exclusion restriction requires that the instrument (expected participation) influences the outcome (underpricing) only through the instrumented-variable (realized participation). This restriction could be violated, for example, if funds purchase secondary-market shares of the underpriced IPOs of underwriters whom they have recently received allocations from (or purchased those IPOs in the secondary market). In such a case, expected participation would be related to past secondary-market buying of underpriced IPOs, and the relation to future IPOs would be driven by similar buying.

If we had perfect identification of allocations, this would not be a concern. However, as we proxy for allocations via holdings, we must argue that this is not a plausible scenario. First, the evidence is inconsistent with key investors' buying underpriced IPOs in the secondary market. Table 5 shows that key investor participation is not increasing in the number of days to the end of the quarter. Second, buying in the secondary market is not a profitable strategy (Table 7). Third, the constructed counter-example requires that key investor participation is clustered in time. Within our data, key investors on average use underwriters less than two times per year, which is inconsistent with clustered secondary-market buying of certain underwriters' offerings. Given the many requirements that would have to be met to invalidate the exclusion restriction, we believe expected participation is a valid instrument for realized

participation of key investors and institutional investors overall.

Table 10 shows the first and second-stage estimations using expected values to instrument for *NumKeyInvestors* and *NumInstInvestors*. The first-stage estimations are significant, passing the test for relevancy with a Cragg-Donald Wald F-statistic of 19.48 (Stock-Yogo 10% critical value of 7.03). Furthermore, the analysis confirms a positive and significant relation between *NumKeyInvestors* and underpricing. While the coefficient is attenuated (0.020 vs. 0.027), it is still significant at the 1% threshold (the point-estimate of the *NumInstInvestors* coefficient is positive but insignificant). Using only identification through funds' characteristics and relationships with underwriters, key investor participation is an economically and statistically significant determinant of underpricing. In addition to strengthening our underpricing results, this test further supports that holdings proxy for allocations.

4.3 Offer Price Revisions

Offer price revisions allow us to distinguish between value-added explanations for underpricing and value-destroying, agency-based explanations. Were underpricing entirely motivated by agency-based explanations, it is likely that key investors would experience negative revisions as underwriters lower offer prices to transfer more rents to those investors (and subsequently recapture those rents through other lines of business). While that broadly applies to agency-based explanations, it is important to note that laddering can generate the opposite prediction. As shown by Hao (2007), laddering should be associated with positive offer price revisions and positive underpricing when underwriters do not receive kickbacks from investors. However, profit-sharing via kickbacks can motivate underwriters to lower offer prices as in other agency-based explanations. Therefore, we expect non-agency-based motivations for underpricing lead to a positive relation between key investors and offer price revisions.

Table 11 shows that *NumKeyInvestors* is positively related to offer price revisions. By

itself, Column (1) shows that *NumKeyInvestors* explains 32% of variation in offer price revisions. Column (2) provides a baseline specification with controls, and Column (3) shows that *NumKeyInvestors* maintains as an important explanatory variable in the presence of controls. Notably, including *NumKeyInvestors* increases the explanatory power of the regression by 8%. Columns (4) and (5) split key investors by flipping and holding behavior. Flipping isn't associated with either higher or lower offer price revisions, but long-term holders are more associated with offer price revisions. Long-term holders may provide less information during bookbuilding, and therefore be associated with less underpricing and more upward price revisions.

The results for offer price revisions are consistent with an information-based motivation for key investors' post-IPO holdings.⁸ Offer prices adjust to key investors' future holdings and key investors' holdings strongly correlate with realized underpricing. Bookbuilding and information-revelation theories of underpricing rely on well-informed investors, and our data is consistent with key investors' possessing information that is valuable to the pricing process. While these results are inconsistent with primarily agency-based motivations driving key investor allocations, they do not allow us to distinguish strongly between information production, monitoring and laddering. The following tests further distinguish these competing hypotheses.

4.4 Post-IPO Abnormal Returns

The information-production hypothesis relies on key investors being informed prior to the IPO and being rewarded for revealing their information during bookbuilding. If key investors have valuable information, then it is likely they may continue to possess or generate information after the IPO. If this is the case, then their trading activity after the IPO may predict

⁸Bubna and Prabhala (2011), Chiang et al. (2010) and Ljungqvist and Wilhelm (2002) also provide evidence consistent with investors' receiving rewards for information revelation during bookbuilding.

future returns. Finding a positive relation between future abnormal returns and trading would be consistent with the information production hypothesis, and is not predicted by the other hypotheses.

To test for informed trading, we regress quarterly returns on investors' net trading in the prior quarter. Specifically, we measure the change in the number of investors (key and otherwise) who own the stock at the end of the quarter. As no more investors receive allocations, the change in investors will be non-positive. Therefore, we expect that those firms who are sold by the most investors in the prior quarter will have worse abnormal returns going forward. Furthermore, we expect key investors' selling to be incrementally informative, so more sales by key investors are likely to lead to worse returns. We measure abnormal returns using cumulative abnormal returns and buy-and-hold abnormal returns using either a market-model or a four-factor model for risk-adjustment. Table 12 presents the results.

Panels A through D of Table 12 show results using different measurements of abnormal returns. The results are generally consistent across the panels, so we focus on the results in Panel A. Column (1) shows that overall institutional selling is predictive of future abnormal returns, although the economic significance is small. For each investor who sells, the following quarter's return falls by 10 bps. Column (2) shows that the effect is concentrated with key investors, where per investor selling lowers quarterly returns by 110 bps. When key investors' selling is taken into account, other investors' selling is no longer predictive of returns. Columns (3) and (4) further divide key investors based on flipping and holding behavior. Only non-flippers selling is informative, decreasing future returns by 220 bps. Long-term holders' selling has marginally more significant predictive power than short-term holders. While the differential is only significant using the market-model risk adjustment, all coefficient point estimates are positive, suggesting that long-term holders may be better informed. Column (5) shows a simultaneous estimation with flippers and long-term holders together, and the results are consistent with Columns (3) and (4) with the coefficients for

long-term holders being attenuated.

Overall, the evidence is consistent with information-production motivating key investors' allocations. Key investors' selling appears informative – especially those key investors who do not typically flip allocations. While the evidence does not rule out laddering explanations, at least for a subset of investors who do not flip, underpricing appears to reward information production.

4.5 Laddering

Post-IPO return patterns distinguish the laddering hypothesis from other hypotheses. In the laddering hypothesis, investors commit to purchase additional shares following the IPO as a condition for receiving an underpriced allocation. Therefore, laddering induces additional buying soon after the IPO, which is likely to add upward pressure on the price. However, after the underwriter's price support activities have ceased (typically one month - see CITATION), investors can typically sell their entire position. This creates negative price pressure and laddering results in price reversion (negative correlation) in the months following the IPO. No other hypothesis predicts future return patterns.

To test for price reversion, we regress second-quarter returns on the return earned from the first-day close of the IPO to the end of that quarter. If laddering is a major motivation for key allocations, then we would expect to see a negative relation between these returns – particularly for IPOs with high key investor participation. To further refine our prediction, we also use our classification of flippers and non-flippers. As laddering likely leads to selling by the end of the second quarter following the IPO, we compare those key investors who are above median sellers to other key investors. We expect that any evidence of laddering will be strongest in the flipping sub-sample of key investors.

Table 13 shows the relation between quarterly returns for a number of different sample splits. First, Panel A shows that overall, there is a negative relation between quarterly

returns. As predicted by Hao (2007), this relation is also stronger for the most underpriced IPOs. Panel B shows that key investors appear to be more associated with the negative relation than investors generally. While splitting on above- or below-median participation for either key investor or overall investor participation separates positive and negative relation IPOs, the gap is wider for key investors. Panel C performs a two-way split, dividing IPOs into four groups based on above- or below-median key investor participation, and at the same time above- or below-median overall investor participation. As suggested in Panel B, key investors effectively split the sample between negative and positive relations, while overall investors do not. This is consistent with key investors being involved in laddering. Finally, Panel D splits only key investor participation by key investors' classifications as flippers or non-flippers. Whenever key-investor flippers participation is switched from below- to above-median, the relation flips from positive to negative. The evidence is consistent with key-investor flippers' being involved in laddering.

Combined with the evidence in Table 12, our findings suggest two distinct groups of key investors. While non-flippers are associated with informed trading and more underpricing, flippers are associated with return reversals and less underpricing. The next section examines the economic significance of these two groups, as well as key investors compared to other investors.

4.6 Economic Significance

The results of Tables 9 and 11 show the importance of key investors for both underpricing and offer price revisions. Consistent with underpricing compensating information revelation or value creation, key investors' participation is more strongly related to underpricing and offer price revisions than non-key investors' participation. This is consistent with a small number of investors providing the majority of the pricing information and creating the link between offer price revisions and underpricing. However, while key investors account for the

vast majority of price discovery, Table 14 shows that only 21.4% of the economic benefit from receiving underpriced shares goes to this group of investors. In fact, more economic benefit accrues to new funds than key investors. This supports a number of non-information-based motivations for underpricing, as underwriters could simply increase key investors' share allocations and decrease underpricing accordingly.⁹

4.7 Underwriters

While outside the scope of our hypotheses, the relations among underpricing, key investor participation and measures of underwriter quality are noteworthy. Key investor participation relies on underwriters to link those investors to firms. Given the evidence of underwriter variation in many past studies, it is natural to compare underwriters based on key investor participation in their IPOs. In general, underwriters with the most IPOs tend to have high levels of overall investor participation as well as key investor participation, although substantial variation still exists.

We have included several measures of underwriter quality in our set of control variables. *UnderwriterRank*, established in Carter and Manaster (1990) and extended Carter et al. (1998), presents an underwriter measure based on tombstone listings where higher values are associated with more prestigious underwriters. *UWpremium*, introduced in Hoberg (2007), measures average underpricing of an underwriter's past offerings. Hoberg (2007) shows that underwriters with high values of *UWpremium* are most responsible for offer price revisions and that their market shares have tended to grow over time. Finally, *UWshare*, also used in Hoberg (2007), measures an underwriter's market share of recent IPOs. Column (1) of Table 15 shows that all three of these are significantly and positively related to underpricing in our baseline specification. However, including measures of underwriters' investor networks

⁹Many studies find that underpricing benefits underwriters and investors at the expense of firms. Evidence consistent with this view is provided in Goldstein et al. (2011), Nimalendran et al. (2007), Reuter (2006), Ritter and Zhang (2007), among others.

and investor participation removes their significance.

Columns (2) through (4) of Table 15 show that key investor participation and overall investor participation remove the explanatory power of underwriter measures for underpricing. In Column (2), including measures of the number of investors and key investors an underwriter has allocated shares to in the last year makes all measures except *UWpremium* insignificant. Adding *NumKeyInvestors* and *NumInstInvestors* in Columns (3) and (4) removes the remaining significance of traditional underwriter measures. Network sizes are also not significant in the presence of investor participation measures. Realized investor participation explains most of the underwriter-related variation in underpricing. However, as realized investor participation isn't known prior to the IPO (and in our case, until the following quarter when 13F filings are made public), *UWpremium* and *UWNetworkSize* remain as valuable pre-IPO predictors of underpricing.

The results in Table 15 suggest that underwriters are valuable in the IPO process because they connect firms with institutional investors. In particular, *UWpremium* is highly correlated with key investor participation, suggesting that high underpricing underwriters may have been rewarded with increased market share due to their ability to attract key investors to their IPOs.

5 Conclusion

We identify key investors based on their past IPO participation and show that their participation in future IPOs is highly predictive of underpricing and also offer price revisions. A majority of key investors are likely compensated for information production, and a minority are likely compensated for laddering. However, a great deal of investors' benefits from underpricing accrue to non-key investors, leaving room for alternative theories of IPO underpricing, particularly those highlighting underwriters' benefits from directing shares to

investors in return for other business.

Rewrite conclusion to add laddering

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Appendix: Variable Definitions

ConcurrentIPOs: Number of IPOs issued in the same month as the IPO, as used in Ibbotson et al. (1975).

ConcurrentUnderpricing: Average underpricing of IPOs issued in the same month as the IPO, as used in Ibbotson et al. (1975).

LogAge: Natural logarithm of the firm's age at the time of the IPO based on founding dates from the Field-Ritter dataset used in Field and Karpoff (2002) and Loughran and Ritter (2004).

LogSize: Total dollar value of a fund's positions reported in the 13F filings data.

InvPrice: The inverse of the filing-range midpoint.

KeyInvestor: An indicator variable equal to one if a fund is in the top 10% of abnormal underpricing for funds over the past three years and participated in at least 10 IPOs over that time period.

MktReturn: Market return (CRSP value-weighted return) over the 15 trading days prior to the issue date.

MktStdDev: Standard deviation of market returns (CRSP value-weighted returns) over the 15 trading days prior to the issue date.

MoneyLeft: $Shares \times OfferPrice \times Underpricing$

NumKeyInvestors: The number of institutional investors receiving allocations in an offering with *KeyInvestor* = 1.

NumInstInvestors: The number of institutional investors receiving allocations.

NumRelatedInvestors: A count of the number of investors who have participated in one of an underwriters previous 10 IPOs.

OfferPriceRevision: Percentage change from the midpoint of the first offer price range to the final offering price. The positive relationship between underpricing and offer price

revisions was first documented by Hanley (1993).

Overhang: Shares held by the firm's initial investors divided by the shares issued in the IPO. Bradley and Jordan (2002) documents the importance of this measure.

$\Delta P+$: The minimum of *OfferPriceRevision* and zero.

$\Delta P-$: The maximum of *OfferPriceRevision* and zero.

PercentSold: Total shares in the firm issued divided by the number of shares outstanding after the IPO. Bradley and Jordan (2002) uses a measure of overhang that captures the percent retained by the pre-IPO owners.

PercentInst: Total holdings of institutions in the first reporting quarter divided by the number of shares issued. A similar measure (using more precise allocations data) is used in Ljungqvist and Wilhelm (2002).

Proceeds: Natural logarithm of the total IPO proceeds adjusted to year 2000 dollars.

RelationshipParticipation: The excess participation probability for investors who have prior relationships with the underwriter as used in Binay et al. (2007).

Shares: The number of shares reported by a fund in the 13F filings in the quarter following the IPO (proxy for allocations).

TechFirm: Indicator variable equal to one if the firm's SIC code is in a technology sector as defined by Cliff and Denis (2004).

Underpricing: The return from the IPO offer price to the price at the end of the first day of trading.

UnderwriterRank: Carter Manaster rank originated in Carter and Manaster (1990), and further updated in Carter et al. (1998) and Loughran and Ritter (2004). The data is taken from Jay Ritter's website.

UWpremium: Average abnormal underpricing for an underwriter over the five years preceding an IPO. This measure was first used by Hoberg (2007) as *UnderwriterPersistence*.

VC - Backed: Indicator variable equal to one if the firm is backed by a venture capital firm.

Table 2: Persistence of key investor measure. Key investors are in the top 10% of funds based on the average abnormal underpricing (relative to monthly averages) of IPOs they have participated in over the past year. Start-of-year measures are used to relate key investors from one year to the next. New funds are those with fewer than 4 IPOs over the past year.

Current Year	Prior Year			Total
	Key Investor	New Fund	Other Investor	
Key Investor	35.5	8.2	7.5	10.1
Other Investor	64.5	91.8	92.5	89.9
Total	100.0	100.0	100.0	100.0

Table 3: Key investor summary data. Investors are ranked based on the number of years, at the beginning of which, they are identified as being a key investor. The final column, average percentile ranking, gives the average value of the abnormal underpricing percentile calculated as of the beginning of each year. Only funds identified as key investors for at least 6 years are provided in the main body of the table. For reference, statistics for Blackrock, Fidelity and Vanguard are provided at the bottom of the table.

Fund Name	Num Years <i>KeyInvestor</i> = 1	Num Years in Sample	Number of Allocations	FundValue (millions)	Average Pctl Rank
Most Frequent Key Investors:					
ESSEX INVESTMENT MGMT CO	23	31	1233	\$1,370	88%
PROVIDENT INVT COUNSEL	20	27	687	\$3,390	89%
TURNER INVT PARTNERS INC	13	20	620	\$15,800	78%
JANUS CAPITAL CORP.	13	26	854	\$90,700	82%
TCW ASSET MGMT CO	13	28	955	\$37,800	81%
IDS FINANCIAL SVCS. INC.	13	27	1180	\$107,000	83%
LORD ABBETT & CO	12	27	474	\$37,200	73%
GILDER GAGNON HOWE & CO LLC	12	13	255	\$4,860	97%
DRIEHAUS CAPITAL MGMT	12	19	294	\$2,660	85%
AMERINDO INVMT ADVISORS	11	14	173	\$13,300	92%
MASSACHUSETTS FINL SERV	11	31	1509	\$87,700	72%
DENVER INVT. ADVISORS	11	17	825	\$4,130	86%
INVESTORS RESEARCH CORP	11	28	604	\$45,800	76%
JUNDT/CAPEN ASSOCIATES	11	19	191	\$161	81%
PUTNAM MANAGEMENT CO INC	10	31	1439	\$58,100	77%
PILGRIM BAXTER HOYT GREG	10	23	383	\$531	78%
PRICE T ROWE ASSOCIATE	10	29	878	\$284,000	74%
BERGER ASSOCIATES INC	10	13	353	\$6,690	92%
DUNCAN-HURST CAP MGMT	9	18	617	\$639	80%
VAN WAGONER CAPITAL MGMT	8	12	223	\$58	84%
LOOMIS SAYLES & COMPANY	8	27	402	\$12,800	74%
ROCKEFELLER & COMPANY	8	27	625	\$8,570	70%
G T CAPITAL MANAGEMENT	8	17	232	\$3,270	67%
DREYFUS CORP	8	18	371	\$4,180	71%
USAA INVESTMENT MGMT	7	22	747	\$7,590	78%
HUSIC CAPITAL MGMT.	7	19	528	\$604	70%
ALGER FRED MANAGEMENT	7	19	382	\$12,500	83%
BARON CAPITAL INC	7	17	217	\$15,200	68%
MACKAY SHIELDS FINL CORP	7	27	409	\$8,480	69%
EATON&HOWARD VANCE SANDR	7	29	351	\$30,900	69%
NEXT CENTURY GR INVESTORS, LLC	7	10	89	\$1,700	82%
SIT INVESTMENT ASSOCS.	7	20	192	\$2,250	71%
BANKERS TRUST NEW YORK	7	30	1803	\$87,900	62%
INVESTMENT ADVISERS INC	7	21	432	\$913	65%
STATE STREET RESR & MGMT	7	24	1097	\$18,200	75%
OPPENHEIMER MGMT. CORP.	7	26	1112	\$59,600	76%
PIMCO ADVISORS L P	6	17	418	\$50,800	72%
CAVALRY ASSET MANAGEMENT L.P.	6	6	39	\$1,010	94%
WADDELL & REED INC	6	26	595	\$29,600	67%
FORTIS ADVISERS INC	6	12	238	\$5,160	89%
BRINSON PARTNERS INC	6	19	236	\$52,500	60%
ARBOR CAPITAL MGMT LLC	6	14	140	\$1,140	77%
GEOCAPITAL CORPORATION	6	17	289	\$3,250	67%
A I M MGMT GROUP INC.	6	15	939	\$58,600	80%
PNC FINANCIAL CORP	6	29	447	\$148,000	60%
Other Notable Investors:					
BLACKROCK, INC.	0	12	320	\$704,000	64%
VANGUARD GROUP INC	3	15	1062	\$458,000	78%
FIDELITY MGMT & RES CORP	1	21	2057	\$449,000	81%

Table 4: Comparison of 13F holdings to actual allocations in 6 IPOs. Non-key investors are those in the bottom 90% of adjusted abnormal underpricing who have had at least 4 IPO allocations in the past year. New funds are those with fewer than 4 IPOs over the past year.

	Investors			
	Key	Non-Key	New	Total
Actual Allocations				1395
Matched to 13F Fund	80	459	132	671
Matched to 13F Holdings	31	93	6	130
13F Holdings				
Non-Allocations	25	83	16	124
Total Reported 13F Holdings	56	176	22	254
Correlations	76%	98%	76%	95%
Avg. Shares Received	100,319	45,074	20,265	
Avg. Post-IPO Trading	120%	98%	-47%	

Table 5: Relations between number of days from the IPO to the end of the quarter and the number of key investors and non-key investors reporting holdings in the 13F filings. Robust t-statistics are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	(1) <i>NumKeyInvestors</i>	(2) <i>NumNonKeyInvestors</i>
<i>DaysToQuarterEnd</i>	-0.005*** (-2.715)	0.058*** (7.059)
Constant	3.472*** (3.783)	37.663*** (6.166)
Year Dummies	Yes	Yes
R^2	0.114	0.254
Observations	4,938	4,938

Table 6: Underpricing-quantile-based relations between the number of days from the IPO to the end of the quarter and the number of key investors and non-key investors reporting holdings in the 13F filings. Quantile (1) includes the least underpriced IPOs and four includes the most underpriced. Panel A shows relations for the number of key investors and Panel B shows relations for the number of non-key investors (those in the bottom 90% of adjusted abnormal underpricing who have had at least 4 IPO allocations in the past year). Robust t-statistics are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% levels.

Panel A				
	<i>NumKeyInvestors by Underpricing Quantiles</i>			
	(1)	(2)	(3)	(4)
<i>DaysToQuarterEnd</i>	-0.002 (-1.192)	0.001 (0.416)	-0.005 (-1.538)	-0.010** (-2.438)
Constant	2.445*** (2.638)	-0.069 (-0.416)	3.194*** (2.994)	4.140*** (4.753)
Year Dummies	Yes	Yes	Yes	Yes
R^2	0.054	0.087	0.062	0.121
Observations	1,228	1,072	1,294	1,344
Panel B				
	<i>NumNonKeyInvestors by Underpricing Quantiles</i>			
	(1)	(2)	(3)	(4)
<i>DaysToQuarterEnd</i>	0.040*** (3.011)	0.065*** (3.896)	0.061*** (3.643)	0.069*** (4.404)
Constant	26.670*** (4.733)	15.319** (2.179)	42.260*** (3.159)	65.026*** (8.089)
Year Dummies	Yes	Yes	Yes	Yes
R^2	0.253	0.292	0.237	0.333
Observations	1,228	1,072	1,294	1,344

Table 7: First-quarter (from close-of-first-day to end-of-quarter), average-daily returns for IPO stocks. The average daily return is expressed as a percentage. The sample size is reduced due to a number of IPOs that occur on the last day of the quarter. Variable definitions are provided in the appendix. Robust t-statistics are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	% Return From First-Day Close To Quarter End				
	(1)	(2)	(3)	(4)	(5)
<i>Underpricing</i>		0.566 (1.046)			0.205 (0.380)
<i>NumInstInvestors</i>			0.006 (1.061)		-0.009 (-1.287)
<i>NumKeyInvestors</i>				0.069** (2.011)	0.092** (2.021)
Constant	-0.294** (-2.104)	-0.325** (-2.424)	-0.541** (-1.991)	-0.513*** (-2.900)	-0.196 (-0.776)
Year Dummies	Yes	Yes	Yes	Yes	Yes
R^2	0.024	0.025	0.025	0.026	0.027
Observations	4,877	4,877	4,877	4,877	4,877

Table 8: Probit analysis predicting end-of-quarter holdings. Established funds are those having sufficient data over the last five years to calculate post-IPO buying, long-term holding and flipping measures. New funds are those with insufficient data history. Variable definitions are provided in the appendix. Robust t-statistics are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	(1) New Funds	(2) Established Funds
<i>Churn</i>	-0.000 (-1.011)	0.007*** (4.914)
<i>AUM</i>	0.000*** (12.229)	0.000*** (32.824)
<i>Age</i>	-0.000*** (-27.372)	0.000*** (6.777)
<i>NumPositions</i>	0.000*** (33.264)	0.000*** (46.266)
<i>OneTimeRelationship</i>	0.009*** (40.041)	0.043*** (73.667)
<i>MultipleTimeRelationship</i>	0.017*** (45.014)	0.082*** (94.640)
<i>KeyInvestor</i>	0.004*** (4.767)	0.037*** (6.658)
<i>KeyInv</i> × <i>Churn</i>	0.004** (2.301)	0.003 (0.767)
<i>KeyInv</i> × <i>AUM</i>	-0.000** (-2.389)	-0.000*** (-4.228)
<i>KeyInv</i> × <i>Age</i>	0.000 (0.523)	0.000 (0.847)
<i>KeyInv</i> × <i>NumPositions</i>	-0.000*** (-4.314)	-0.000** (-2.317)
<i>KeyInv</i> × <i>OneTimeRel</i>	-0.002*** (-3.253)	-0.005*** (-4.245)
<i>KeyInv</i> × <i>MultTimeRel</i>	-0.005*** (-6.662)	-0.007*** (-6.116)
<i>AvgPostIPOBuying</i>		0.029*** (18.881)
<i>AvgLongHolder</i>		-0.001 (-0.809)
<i>AvgFlipper</i>		-0.025*** (-12.490)
<i>KeyInv</i> × <i>AvgPostIPOBuying</i>		-0.051*** (-10.486)
<i>KeyInv</i> × <i>AvgLongHolder</i>		0.020*** (3.681)
<i>KeyInv</i> × <i>AvgFlipper</i>		0.038*** (5.442)
Pseudo- R^2	0.107	0.177
Observations	2,951,902	1,763,936

Table 9: Regressions of underpricing on the number of participating key investors and control variables common to the IPO literature. Variable definitions are provided in the appendix. Robust t-statistics are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	<i>Underpricing</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>NumKeyInvestors</i>	0.054*** (27.245)		0.027*** (14.295)	0.034*** (10.837)	0.023*** (7.385)	0.038*** (21.212)
<i>NumKeyFlippers</i>				-0.015*** (-3.290)		
<i>NumKeyHolders</i>					0.006 (1.278)	
<i>LogAge</i>		-0.015*** (-4.857)	-0.012*** (-3.999)	-0.012*** (-3.931)	-0.012*** (-4.041)	-0.019*** (-6.430)
<i>LogSize</i>		-0.083*** (-9.839)	-0.068*** (-8.456)	-0.067*** (-8.312)	-0.068*** (-8.401)	-0.107*** (-13.674)
<i>VC-Backed</i>		0.026*** (3.254)	0.015* (1.928)	0.015** (1.973)	0.015* (1.952)	0.018** (2.287)
<i>TechFirm</i>		0.021** (2.371)	0.009 (1.033)	0.011 (1.300)	0.010 (1.104)	0.022** (2.563)
<i>InvPrice</i>		0.484*** (2.672)	0.629*** (3.607)	0.622*** (3.579)	0.619*** (3.550)	-1.227*** (-8.051)
<i>Overhang</i>		0.026*** (9.752)	0.024*** (9.351)	0.024*** (9.298)	0.024*** (9.348)	0.026*** (9.982)
<i>UWpremium</i>		0.094* (1.822)	0.054 (1.091)	0.052 (1.059)	0.054 (1.082)	0.132*** (2.660)
<i>UnderwriterRank</i>		0.008*** (2.804)	0.003 (0.941)	0.003 (0.946)	0.003 (0.902)	-0.012*** (-3.903)
<i>UWshare</i>		0.132 (1.596)	0.127 (1.606)	0.133* (1.680)	0.129 (1.631)	0.251*** (3.168)
<i>ConcurrentIPOs</i>		-0.000 (-0.760)	-0.000 (-1.414)	-0.001* (-1.689)	-0.000 (-1.461)	-0.000 (-1.073)
<i>ConcurrentUnderpricing</i>		0.004*** (6.838)	0.004*** (6.412)	0.004*** (6.246)	0.004*** (6.375)	0.005*** (8.796)
<i>MarketReturn</i>		4.966** (2.102)	5.298** (2.293)	5.742** (2.502)	5.401** (2.343)	5.035** (2.179)
<i>MarketStdDev</i>		1.657 (1.095)	1.088 (0.736)	0.827 (0.559)	1.001 (0.676)	-0.645 (-0.437)
<i>PercentInst</i>		-0.010 (-0.524)	-0.022 (-1.186)	-0.026 (-1.368)	-0.022 (-1.171)	-0.093*** (-5.197)
<i>NumInstInvestors</i>		0.005*** (10.939)	0.002*** (3.946)	0.002*** (3.767)	0.002*** (3.780)	0.003*** (7.061)
<i>OfferPriceRevision</i>		0.732*** (19.863)	0.603*** (16.055)	0.602*** (16.042)	0.601*** (15.981)	
<i>OPR-Residuals</i>						0.603*** (16.055)
Year Dummies	No	Yes	Yes	Yes	Yes	Yes
R^2	0.302	0.558	0.583	0.585	0.583	0.583
Observations	4,938	4,938	4,938	4,938	4,938	4,938

Table 10: Instrumental variables analysis using estimated investor participation based on underwriter-relationship and fund-specific information to instrument for realized investor participation. Variable definitions are provided in the appendix. Robust t-statistics are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	First-Stage		Second-Stage
	(1) <i>NumInstInvestors</i>	(2) <i>NumKeyInvestors</i>	(3) <i>Underpricing</i>
<i>LogAge</i>	0.593*** (3.641)	-0.029 (-0.793)	-0.014*** (-3.485)
<i>LogSize</i>	13.696*** (46.287)	1.133*** (17.224)	-0.099** (-2.071)
<i>VC-Backed</i>	0.994*** (2.611)	0.477*** (5.639)	0.014 (1.480)
<i>TechFirm</i>	0.125 (0.327)	0.432*** (5.081)	0.012 (1.368)
<i>InvPrice</i>	59.602*** (7.415)	1.593 (0.891)	0.500* (1.838)
<i>Overhang</i>	0.329*** (3.585)	0.104*** (5.087)	0.024*** (10.308)
<i>UWpremium</i>	4.605** (2.398)	0.314 (0.735)	0.051 (1.139)
<i>UnderwriterRank</i>	-0.309** (-2.171)	0.085*** (2.700)	0.004 (1.190)
<i>UWshare</i>	-4.944 (-1.225)	-0.795 (-0.886)	0.124 (1.568)
<i>ConcurrentIPOs</i>	-0.028** (-1.991)	-0.006* (-1.843)	-0.000 (-1.251)
<i>ConcurrentUnderpricing</i>	0.003 (0.197)	0.005* (1.712)	0.004*** (12.844)
<i>MarketReturn</i>	168.435* (1.840)	27.934 (1.373)	4.864** (2.450)
<i>MarketStdDev</i>	63.692 (0.911)	23.742 (1.528)	1.040 (0.700)
<i>OfferPriceRevision</i>	26.212*** (23.865)	7.978*** (32.673)	0.589*** (6.293)
$E[\text{NumInstInvestors}]$	0.292*** (5.130)	-0.078*** (-6.165)	
$E[\text{NumKeyInvestors}]$	-0.093 (-0.376)	0.915*** (16.571)	
$\widehat{\text{NumInstInvestors}}$			0.005 (1.339)
$\widehat{\text{NumKeyInvestors}}$			0.020*** (3.541)
Year Dummies	Yes	Yes	Yes
R^2	0.680	0.553	0.577
Observations	4,938	4,938	4,938

Table 11: Regressions of offer price revisions on the number of participating key investors and control variables common to the IPO literature. Variable definitions are provided in the appendix. Robust t-statistics are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	<i>OfferPriceRevision</i>				
	(1)	(2)	(3)	(4)	(5)
<i>NumKeyInvestors</i>	0.0299*** (40.8973)		0.0180*** (19.3208)	0.0186*** (13.3133)	0.0146*** (8.8051)
<i>NumKeyFlippers</i>				-0.0014 (-0.6394)	
<i>NumKeyHolders</i>					0.0059** (2.4566)
<i>LogAge</i>		-0.0153*** (-8.2187)	-0.0120*** (-6.7330)	-0.0120*** (-6.7147)	-0.0121*** (-6.8106)
<i>LogSize</i>		-0.0814*** (-18.7473)	-0.0641*** (-15.4553)	-0.0640*** (-15.4025)	-0.0636*** (-15.3358)
<i>VC-Backed</i>		0.0132*** (2.8422)	0.0047 (1.0415)	0.0047 (1.0483)	0.0048 (1.0777)
<i>TechFirm</i>		0.0330*** (6.9263)	0.0218*** (4.7909)	0.0220*** (4.8269)	0.0224*** (4.9228)
<i>InvPrice</i>		-3.4759*** (-37.0524)	-3.0781*** (-34.1824)	-3.0785*** (-34.1828)	-3.0826*** (-34.2323)
<i>Overhang</i>		0.0045*** (3.3737)	0.0028** (2.2432)	0.0028** (2.2198)	0.0028** (2.2184)
<i>UWpremium</i>		0.1705*** (6.9006)	0.1294*** (5.5528)	0.1292*** (5.5466)	0.1287*** (5.5272)
<i>UnderwriterRank</i>		-0.0220*** (-13.2925)	-0.0239*** (-14.9406)	-0.0239*** (-14.9359)	-0.0240*** (-14.9829)
<i>UWshare</i>		0.2290*** (4.6433)	0.2059*** (4.4270)	0.2064*** (4.4400)	0.2074*** (4.4677)
<i>ConcurrentIPOs</i>		0.0003** (2.0722)	0.0002 (1.1366)	0.0002 (1.0835)	0.0002 (1.0369)
<i>ConcurrentUnderpricing</i>		0.0025*** (11.4235)	0.0021*** (9.9333)	0.0021*** (9.8780)	0.0020*** (9.7146)
<i>MarketReturn</i>		-0.7215 (-0.6035)	-0.4362 (-0.3786)	-0.3956 (-0.3419)	-0.3345 (-0.2905)
<i>MarketStdDev</i>		-2.7268*** (-3.0173)	-2.8729*** (-3.2823)	-2.8965*** (-3.3069)	-2.9526*** (-3.3847)
<i>PercentInst</i>		-0.1202*** (-13.0108)	-0.1180*** (-13.4747)	-0.1183*** (-13.4894)	-0.1175*** (-13.4330)
<i>NumInstInvestors</i>		0.0050*** (23.8619)	0.0024*** (10.1349)	0.0024*** (10.0748)	0.0023*** (9.6183)
Year Dummies	No	Yes	Yes	Yes	Yes
R^2	0.322	0.521	0.563	0.563	0.564
Observations	4,938	4,938	4,938	4,938	4,938

Table 12: 3-Month Abnormal Returns following quarterly 13F holdings changes. Panels A through D provide similar analyses using different risk adjustment methodologies where CAR is cumulative abnormal return and BHAR is buy-and-hold abnormal return. ΔX measures the change in the number of investors of type X holding shares over the prior quarter. Returns do not incorporate reporting delays in 13F filings and instead take positions at the beginning of each quarter. Variable definitions are provided in the appendix. Robust t-statistics are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% levels.

Panel A					
	Four-Factor CARs				
	(1)	(2)	(3)	(4)	(5)
$\Delta NumInstInv$	0.001* (1.939)	-0.001 (-1.075)	-0.001 (-1.216)	-0.001 (-1.155)	-0.001 (-1.222)
$\Delta NumKeyInv$		0.011*** (3.608)	0.022*** (4.459)	0.006 (1.269)	0.021*** (2.688)
$\Delta NumKeyFlippers$			-0.019*** (-2.779)		-0.019** (-2.448)
$\Delta NumKeyHolders$				0.010 (1.324)	0.001 (0.169)
Observations	4,879	4,879	4,879	4,879	4,879
Panel B					
	Market-Model CARs				
	(1)	(2)	(3)	(4)	(5)
$\Delta NumInstInv$	0.002*** (3.045)	-0.001 (-0.668)	-0.001 (-0.931)	-0.001 (-0.925)	-0.001 (-1.028)
$\Delta NumKeyInv$		0.015*** (4.185)	0.037*** (6.640)	-0.003 (-0.551)	0.022** (2.496)
$\Delta NumKeyFlippers$			-0.041*** (-5.149)		-0.033*** (-3.744)
$\Delta NumKeyHolders$				0.036*** (4.159)	0.021** (2.198)
Observations	4,879	4,879	4,879	4,879	4,879
Panel C					
	Four-Factor BHARs				
	(1)	(2)	(3)	(4)	(5)
$\Delta NumInstInv$	0.001** (2.074)	-0.001 (-0.986)	-0.001 (-1.081)	-0.001 (-1.044)	-0.001 (-1.088)
$\Delta NumKeyInv$		0.012*** (3.622)	0.019*** (3.785)	0.008 (1.550)	0.017** (2.240)
$\Delta NumKeyFlippers$			-0.013* (-1.880)		-0.013 (-1.622)
$\Delta NumKeyHolders$				0.007 (0.971)	0.002 (0.197)
Observations	4,879	4,879	4,879	4,879	4,879
Panel D					
	Market-Model BHARs				
	(1)	(2)	(3)	(4)	(5)
$\Delta NumInstInv$	0.002*** (3.797)	-0.000 (-0.328)	-0.000 (-0.580)	-0.000 (-0.580)	-0.001 (-0.678)
$\Delta NumKeyInv$		0.016*** (4.487)	0.037*** (6.682)	-0.002 (-0.300)	0.022** (2.517)
$\Delta NumKeyFlippers$			-0.039*** (-4.947)		-0.031*** (-3.557)
$\Delta NumKeyHolders$				0.036*** (4.082)	0.021** (2.206)
Observations	4,879	4,879	4,879	4,879	4,879

Table 13: Regressions of second-quarter returns on first-quarter returns (with adjustment). Panels A through D show simple univariate regressions of quarterly returns divided into various IPO splits based on above- and below-median measures of investors. Variable definitions are provided in the appendix. Robust t-statistics are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% levels.

Panel A				
	Overall		Underpricing	
	Full Sample <i>Q2Return</i>	Full Sample <i>Q2Return</i>	<i>Underpricing</i> \geq 6.7% <i>Q2Return</i>	<i>Underpricing</i> $<$ 6.7% <i>Q2Return</i>
Q1Return	-0.023** (-2.097)	-0.023** (-2.097)	-0.029** (-2.004)	-0.007 (-0.395)
Observations	4,904	4,904	2,624	2,280
Panel B				
	Key Investors		Total Investors	
	<i>NumKeyInvestors</i> \geq 2 <i>Q2Return</i>	<i>NumKeyInvestors</i> $<$ 2 <i>Q2Return</i>	<i>NumInstInvestors</i> \geq 17 <i>Q2Return</i>	<i>NumInstInvestors</i> $<$ 17 <i>Q2Return</i>
Q1Return	-0.040*** (-3.116)	0.051** (2.256)	-0.031** (-2.446)	0.014 (0.612)
Observations	3,058	1,846	2,838	2,066
Panel C				
	Two-Way Split: Key Investors vs. Total Investors			
	<i>NumKeyInvestors</i> \geq 2 & <i>NumInstInvestors</i> \geq 17 <i>Q2Return</i>	<i>NumKeyInvestors</i> $<$ 2 & <i>NumInstInvestors</i> \geq 17 <i>Q2Return</i>	<i>NumKeyInvestors</i> \geq 2 & <i>NumInstInvestors</i> $<$ 17 <i>Q2Return</i>	<i>NumKeyInvestors</i> $<$ 2 & <i>NumInstInvestors</i> $<$ 17 <i>Q2Return</i>
Q1Return	-0.039*** (-2.870)	0.076** (2.027)	-0.040 (-1.004)	0.043 (1.585)
Observations	2,474	364	584	1,482
Panel D				
	Two-Way Split of Key Investors: Flippers vs. Non-Flippers			
	<i>NumKeyNonFlippers</i> \geq 1 & <i>NumKeyFlippers</i> \geq 1 <i>Q2Return</i>	<i>NumKeyNonFlippers</i> $<$ 1 & <i>NumKeyFlippers</i> \geq 1 <i>Q2Return</i>	<i>NumKeyNonFlippers</i> \geq 1 & <i>NumKeyFlippers</i> $<$ 1 <i>Q2Return</i>	<i>NumKeyNonFlippers</i> $<$ 1 & <i>NumKeyFlippers</i> $<$ 1 <i>Q2Return</i>
Q1Return	-0.045*** (-3.168)	-0.105*** (-2.671)	0.058* (1.953)	0.067** (2.255)
Observations	2,441	530	892	1,041

Table 14: Summary statistics of underpricing, end-of-quarter holdings (our proxy for allocations) and holdings-implied money left on the table to different classifications of investors. Key investors are in the top 10% of funds based on the average abnormal underpricing (relative to monthly averages) of IPOs they have participated in over the past year. Start-of-year measures are used to relate key investors from one year to the next. New funds are those with fewer than 4 IPOs over the past year.

	Investors		
	Key Investors	Non-Key Investors	New Investors
Average Underpricing	45%	31%	20%
Average Shares Held	184,723	177,979	307,808
Average Money Left	\$1,066,914	\$657,443	\$941,595
Observations	19,098	96,013	22,661
(percent)	14%	70%	16%
Total Money Left (\$B)	\$20.38	\$63.12	\$21.34
(percent)	19%	60%	20%
Adj. Total Money Left (\$B)	\$24.09	\$38.60	\$22.85
(percent)	28%	45%	27%

Table 15: Regressions of underpricing on underwriter characteristics. Network size variables (for key investors and total investors) are calculated by counting unique investor participants in an underwriter's offerings over the past year. Variable definitions are provided in the appendix. Robust t-statistics are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	<i>Underpricing</i>			
	(1)	(2)	(3)	(4)
<i>LogAge</i>	-0.012*** (-3.778)	-0.012*** (-3.719)	-0.012*** (-4.045)	-0.012*** (-4.055)
<i>LogSize</i>	-0.010* (-1.689)	-0.013** (-2.110)	-0.066*** (-8.604)	-0.067*** (-8.660)
<i>VC-Backed</i>	0.031*** (3.838)	0.029*** (3.570)	0.013* (1.678)	0.013 (1.629)
<i>TechFirm</i>	0.022** (2.363)	0.022** (2.398)	0.009 (0.990)	0.009 (0.997)
<i>InvPrice</i>	0.824*** (4.620)	0.798*** (4.488)	0.672*** (3.959)	0.668*** (3.945)
<i>Overhang</i>	0.028*** (10.177)	0.027*** (9.972)	0.024*** (9.329)	0.024*** (9.271)
<i>UWpremium</i>	0.127** (2.393)	0.095* (1.758)	0.054 (1.091)	0.052 (1.030)
<i>UnderwriterRank</i>	0.008*** (2.804)	0.005 (1.645)	0.002 (0.716)	0.001 (0.445)
<i>UWshare</i>	0.167** (1.966)	-0.068 (-0.555)	0.136* (1.713)	0.076 (0.648)
<i>ConcurrentIPOs</i>	-0.000 (-1.093)	-0.000 (-1.276)	-0.000 (-1.476)	-0.000 (-1.498)
<i>ConcurrentUnderpricing</i>	0.004*** (6.681)	0.004*** (6.674)	0.004*** (6.440)	0.004*** (6.450)
<i>MarketReturn</i>	5.734** (2.354)	5.959** (2.445)	5.258** (2.277)	5.287** (2.284)
<i>MarketStdDev</i>	1.938 (1.233)	2.049 (1.296)	1.009 (0.685)	0.992 (0.670)
<i>OfferPriceRevision</i>	0.869*** (24.155)	0.867*** (24.101)	0.610*** (16.787)	0.611*** (16.831)
<i>UW_NetworkSize</i>		0.021** (2.379)		0.008 (0.917)
<i>UW_KeyNetworkSize</i>		0.005 (0.329)		-0.007 (-0.496)
<i>NumInstInvestors</i>			0.002*** (4.003)	0.002*** (3.995)
<i>NumKeyInvestors</i>			0.027*** (14.310)	0.027*** (13.956)
Year Dummies	Yes	Yes	Yes	Yes
R^2	0.533	0.534	0.583	0.583
Observations	4,938	4,938	4,938	4,938