Buying Analyst and Investor Attention through IPO proceeds

June 17, 2019

Abstract

We examine the effect of IPO proceeds on the post-IPO information environment. We exploit variation in the amount of capital raised across IPOs that is unrelated to firm size and manager decisions using an instrumental variable approach, and find that marginal increases in IPO proceeds lead to large increases in analyst coverage and institutional ownership in the first two years a firm is public. Increases in IPO proceeds also lead to more frequent follow-on offerings and longer survival as a public firm. We find evidence that immediate shocks to ownership diversification represent one plausible channel through which changes in IPO proceeds affect long-run visibility and investor demand. Overall, our findings highlight important rewards to selling additional shares at the IPO.

1. Introduction

A high quality information environment is critical for newly public firms. Mehran and Peristiani (2010), Bharath and Dittmar (2010), and Mola, Rau, and Khorana (2013) find that failure to attract a critical mass of visibility and investor interest is a major reason firms abandon public markets. One way that IPO issuers can attract post-IPO visibility and interest is by reducing their offer price (i.e., increasing underpricing). Not only does underpricing attract media and investor attention (Aggarwal, Krigman, and Womack, 2002), but it can also be used by issuers to attract analyst coverage.[1] In this paper, we introduce and examine an alternative way for firms to attract post-IPO visibility and investor interest: the amount of IPO equity raised.

An important but unanswered question in the IPO literature is how the amount of capital raised in an IPO affects post-IPO visibility. On the one hand, a lower offer price and share rationing reduce the amount of equity raised and increase aftermarket attention, which is consistent with literature suggesting the demand for IPO shares is inelastic.[2] To this point, Booth and Chua (1999) find that oversubscription and high underpricing are associated with greater aftermarket demand and liquidity, and Demers and Lewellen (2003) find that high initial returns help generate website traffic.

On the other hand, increasing the amount of capital raised may attract post-IPO visibility and investor interest by diversifying the shareholder base. Larger offerings are likely to expand the set of long-term institutional investors. Dispersed ownership can enhance visibility and investor interest directly through Merton (1987)'s investor recognition channel, and indirectly, through a liquidity channel whereby greater ownership dispersion improves liquidity, and greater liquidity increases investors' incentive to learn about the firm (Holmstrom and Tirole, 1993).[3] Consistent with these theories, Lang, Lins, and Miller (2004) show that greater ownership dispersion can increase the equilibrium supply of analyst coverage, which is crucial for newly public firms (e.g., O'Brien and Tan 2015; Green, Jame, Markov, and Subasi 2014).

[1] See, e.g., Weber, Willenborg, and Yang (2018), Cliff and Denis (2004), and Rajan and Servaes (1997).
[2] See, e.g., Koh and Walter (1989) and Brennan and Franks (1997).
[3] Specifically, dispersed ownership increases the number of liquidity traders, and this increases incentives for informed traders to gather information and to trade (Kyle, 1984), which can attract visibility and interest.

There are several empirical challenges associated with identifying the effect of changes in the amount capital raised in an IPO on visibility, which stem from the correlation between offering size and unobserved factors, such as investment opportunities, investor demand, and firm size. To overcome these challenges, we introduce variation in IPO proceeds that is arguably exogenous to these factors to identify the effect of increased IPO equity on post-IPO visibility and investor interest. Specifically, we use 30-day post-IPO market returns as a shock to overallotment option exercise (OAE) (and in turn, the amount of IPO equity raised) that is unrelated to firm size or any decisions made during the IPO process.

The overallotment (or greenshoe) option is a standard feature in firm-commitment IPOs that allows underwriters to increase the amount of equity raised in an IPO by up to 15% by purchasing shares from the issuer at the offer price anytime within 30 days of the IPO issue date. In practice, underwriters typically oversell the issue by at least 15% in the pre-market, meaning that the overallotment option amounts to a decision of how to buy back the additional shares sold short. If the issuer's newly issued shares trade above the IPO offer price, it is optimal for underwriters to fully exercise the overallotment option and cover the entire pre-IPO short position via direct purchase of shares from the firm, leading to a higher amount of equity raised (see e.g., Chen and Ritter, 2000). If the firm's shares trade at or below the offer price in the aftermarket, underwriters will likely not exercise the full (or any of) the option, leading to a lower amount of IPO equity raised.

Our empirical strategy is to first document the effect of IPO proceeds on long-run measures of visibility and investor interest, specifically, sell-side analyst coverage and the fraction of shares held by institutional owners one and two years after the IPO. We then examine whether any effect that IPO proceeds has on long-run visibility and investor interest appears to be due in part to the immediate impact IPO proceeds has on ownership dispersion and market liquidity.

In our first set of empirical tests, we use ordinary least squares (OLS) to regress long-run post-IPO visibility and investor interest on both the dollar amount of pre-overallotment IPO proceeds and the overallotment exercise (OAE). Both measures of offering amount are positively associated with our measures of visibility and investor interest. However, this OLS evidence cannot be interpreted

causally, because it does not account for potential correlated omitted variables. Although the regression controls for factors such as firm size and IPO underpricing, it does not control for other (unobservable) factors, such as IPO quality, investment opportunities, underwriter price support, and retail investor demand.

To better identify the casual effect of IPO offering amount, we use NASDAQ returns in the first thirty days after a firm's IPO as an instrument for OAE in a two-stage least squares (2SLS) framework.[4] Our instrument captures the non-idiosyncratic component of firms' 30-day post-IPO returns, which is exogenous to firm characteristics, and also to decisions made at the time of the IPO.[5] We first show that the NASDAQ returns during the overallotment period are a strong predictor of OAE (with a t-statistic of 5.23). We next show that this relation only holds within the half of IPOs that we estimate would have traded nearest to the IPO offer price during the first thirty days of trading in the absence of market returns. We refer to this half of IPO issuers as the OAE sensitive sample. Within the OAE sensitive sample, a one standard deviation increase in 30-day post-IPO NASDAQ returns predicts a 3% increase in the amount of equity raised. Because our identification strategy requires post-IPO NASDAQ returns to significantly affect OAE, we conduct the majority of our analyses on the OAE sensitive sample.[6]

Our exclusion restriction requires that, after controlling for long-run (i.e., one-year) post-IPO NASDAQ returns, 30-day post-IPO NASDAQ returns do not affect long-run post-IPO visibility and investor interest except to the extent that they affect OAE. This assumption is supported by the fact that 30-day post-IPO NASDAQ returns are beyond the control of managers. Consistent with this, 30-day post-IPO NASDAQ returns are unrelated to essentially all pre-IPO-firm and IPO characteristics.[7] However, our exclusion restriction is violated if a general relation exists between NASDAQ returns immediately following a firm's IPO date and future firm-specific visibility and investor interest.

[4] Our empirical strategy is similar to Bernstein (2015), who uses NASDAQ returns to instrument for IPO completion.
[5] This idea is similar to that used in the CEO pay-for-luck literature when proxying for the component of stock returns that are exogenous to managerial decisions (Bertrand and Mullainathan, 2001; Garvey and Milbourn, 2006).
[6] Using the full sample provides qualitatively similar results.
[7] We examine the relation between our instrument and fifteen firm and IPO characteristics and only one (cash-to-assets) is statistically significant at the 5% level or better.

Although such a relation is possible ex-ante, the placebo tests presented in Figure 1 below reveal no significant relation between long-run analyst coverage or institutional ownership percentage and NASDAQ returns either in the weeks before the IPO or in the weeks after the overallotment expiration. In contrast, Figure 1 indicates a strong relation between post-IPO NASDAQ returns in the first 30 days and long-run analyst coverage and institutional ownership. Moreover, additional analyses indicate that this relation only exists in the OAE sensitive sample. Thus, post-IPO overallotment-period NASDAQ returns are uniquely related to post-IPO analyst coverage and institutional ownership in a manner consistent with our exclusion restriction.

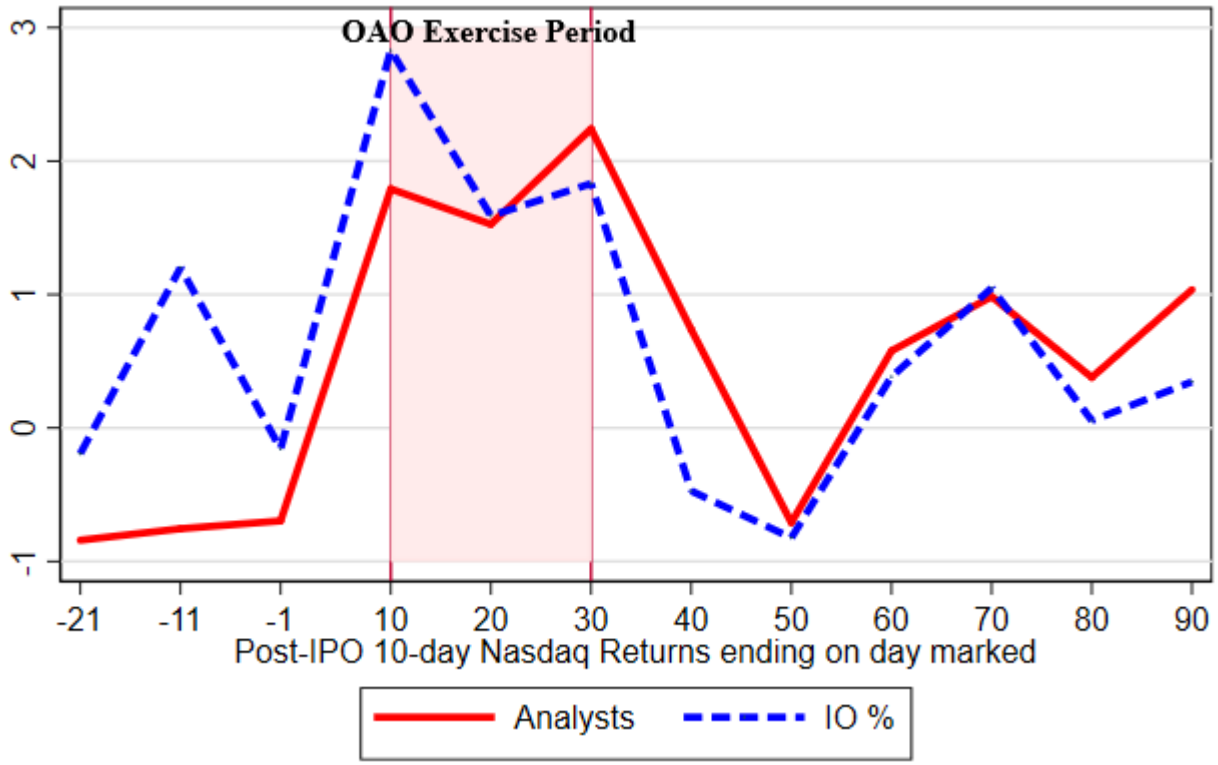

Figure 1: 10-Day NASDAQ Return Windows Predicting Long-Run post-IPO Visibility

This figure plots estimates of the relation between post-IPO visibility and twelve 10-day NASDAQ return buckets surrounding a firm's IPO date. We regress the natural log of the number of analysts covering the firm (solid line), and the natural log of the percentage of institutional ownership (dashed) in the second year of trading on 10-day NASDAQ returns ending on the day indicated on the x-axis (where day 0 is the IPO issue day). The figure plots the coefficient on each NASDAQ return bucket. The left y-axis represents the percent change in each measure for a 1% increase in the respective 10-day NASDAQ return. The sample is restricted to the OAE sensitive sample and all regressions include the IPO and firm-level control variables listed in Appendix A1.

Under our identifying assumptions, the second stage 2SLS coefficients provide estimates of the causal effect of OAE, and the amount of equity raised, on post-IPO financial visibility. In our main

results, we show that increasing the amount of equity raised in an IPO results in a significant and economically large increase in visibility and investor interest one and two years after an IPO. Measuring firm outcomes one year after the IPO, we estimate that a 1% increase in the amount of equity raised results in a 3% increase in the number of analysts, and a 3% increase in institutional ownership percentage. These effects intensify throughout the first two years firms are public. For instance, the effect of a 1% increase in offering size on analyst coverage increases from approximately 2% six months after the IPO to over 3.5% two years after the IPO.

We then provide evidence that one reason increasing the size of an IPO increases investor interest is that it provides an initial shock to ownership dispersion and market liquidity. A 1% increase in the amount of capital raised in an IPO increases the number of institutional investors by 4.5% and reduces bid-ask spreads by about 6% as of the second post-IPO filing.[8] Our evidence is consistent with the predictions of Holmstrom and Tirole (1993) in that there are linkages between liquidity, ownership dispersion, and investor interest. These results suggest that small variations in the amount of IPO equity raised can have significant and persistent effects on newly public firms.

In our final set of tests, we examine whether increasing the amount of IPO equity raised changes the way newly public firms interact with public markets. We begin by investigating how the amount of IPO equity raised affects subsequent equity issuance. Although exogenously increasing the amount of equity raised during an IPO may reduce a firm's demand for equity, we find that increasing initial offering size increases a firm's issuance of future equity. These findings are consistent with existing literature suggesting that enhanced visibility reduces the cost of raising equity (see e.g., Bowen, Chen, and Cheng, 2008). We also find that the amount of initial equity raised is an important determinant of how long a firm remains publicly traded. Hazard model estimates reveal a positive relation between 30-day post-IPO NASDAQ returns and issuers' life expectancy, while NASDAQ returns in subsequent 30-day periods do not share this relation. Likewise, two-stage estimates reveal a positive relation between IPO offering amount and survival as a public firm. Thus, not only does the

[8] The first post-IPO filing can occur before the end of the overallotment period.

amount of initial capital raised influence the propensity of future equity issuances, it also increases the likelihood that a firm retains access to public equity markets.

Our paper contributes to several strands of literature. First, we contribute to the literature on the benefits of public market access. Mehran and Peristiani (2009) establish the importance of post-IPO visibility and investor interest for retaining access to public markets. We show that post-IPO visibility and investor interest are positively linked to the amount of equity raised in an IPO, and one reason for this relation is the immediate effect that increases in offering size have on ownership dispersion and liquidity. Other determinants discussed in the existing literature as relating to post-IPO visibility and investor interest include IPO underpricing (Booth and Chua, 1996; Cliff and Denis, 2004; Ljungqvist, 2005), and the number and quality of underwriters (Jeon, Lee, Nasser, Via, 2015). Our results are distinct from the effect of underpricing and underwriter quality, as we use exogenous variation in offering amount unrelated to underwriter selection and IPO pricing (and we focus on firms with low to moderate underpricing). To our knowledge, we provide the first direct evidence of the consequences to changes in the amount of equity raised in an IPO.

Second, we add to literature on post-IPO analyst coverage in particular, and post-IPO visibility, more generally. Prior work emphasizes the importance of analyst coverage for enhancing firm reputation and lowering the cost of equity (e.g., James and Karceski, 2006; Pagano et al., 1998; Li and You 2015; O'Brien and Tan, 2015). Regulators also value the role of analysts for newly public firms, passing the JOBS Act in 2012 to stimulate more analyst coverage for IPO firms (IPO Task Force 2011; Dambra, Field, Gustafson, and Pisciotta, 2018). Our study shows that the amount of equity raised in an IPO as another way through which firms can attract greater analyst coverage. Interestingly, our evidence also suggests that analysts can benefit from covering these firms. Firms with (exogenously determined) increases in IPO proceeds are more likely to conduct future equity offerings, providing opportunities for future investment banking and brokerage fees (Krigman, Shaw, and Womack, 2001).

Finally, by showing that random fluctuations in post-IPO market returns significantly predict long-run post-IPO visibility and investor interest, we contribute to the growing literature highlighting the importance of serendipitous shocks for the trajectory of corporations and individuals. For example,

Bernstein (2015) shows that short-term market fluctuations following a firm's IPO filing affect the probability of going public, and in turn, long-run innovation, while Oyer (2006, 2008), Kahn (2010), Oreopoulos, Wachter, and Heisz (2012), and Schoar and Zuo (2017) all document sizeable and persistent effects of economic conditions during the time of college graduation on initial job placement, and subsequent career progression.

2. Data Description and Preliminary Analysis

Our sample begins with all U.S. firm-commitment IPOs in Thomson One's New Issues Database between 1996 and 2012. The sample starts in 1996 because that is the first year for which the U.S. Securities and Exchange Commission's (SEC) Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system regularly provides IPO prospectuses and post-IPO quarterly filings. The sample ends in 2012 so that we have sufficient time to observe post-IPO outcomes.[9] We exclude unit offerings, foreign issues, and all deals with SIC codes: 6091, 6371, 6722, 6726, 6732, 6733, and 6799. This results in a sample of 2,947 IPOs with non-missing values for all control variables and post-IPO firm and industry returns. Our analyses investigating post-IPO outcomes have slightly smaller sample sizes due to delistments and missing dependent variables. For example, 2,837 firms remain public through their fifth post-IPO quarterly filing, at which point we measure year one outcomes, and 2,502 survive an additional year, at which point we measure year two outcomes.

2.1 Measuring amount of IPO equity raised via the Overallotment Option

We first measure the amount of IPO equity raised as the dollar value of proceeds that a firm raises in the IPO, as reported by Thomson One, before accounting for underwriter fees or overallotment proceeds. This measure approximates the (pre-overallotment) post-IPO public float. We transform this measure by converting it to 2012 dollars and taking the natural log. Although the existing literature frequently includes such a variable as a control, it is rarely the subject of much discussion (see e.g., Rajan and Servaes, 1997; Field and Lowry, 2009). In fact, Liu, Sherman, and Zhang (2014) do not control for IPO proceeds at all when examining whether media attention affects long-run investor

[9] This keeps our sample constant for year one outcomes, given that we only have institutional ownership data through the end of 2013. For second-year institutional ownership outcomes, the sample is slightly smaller.

recognition, electing instead to control for firm size via the natural log of total assets. One reason that many studies do not discuss the relation between IPO proceeds and various outcomes of interest is that the OLS coefficient is difficult to interpret. The coefficient on IPO proceeds may capture the effect of firm size, investor demand, or a firm's demand for capital.

We circumvent these confounding effects using an empirical strategy centered on the overallotment option exercise (OAE) as a second source of variation in the amount of equity raised. The overallotment option, which is present in virtually all US IPOs over the past several decades, allows an underwriter to increase the amount of equity raised in an IPO by up to 15% by purchasing shares from the issuer at the offer price anytime within 30 days of the IPO date. Ellis, Michaely, and O'Hara (2000) note that the overallotment decision is typically carried out by the lead underwriter on behalf of the underwriting syndicate. Since the lead underwriter almost always oversells the issue by at least 15 percent in the pre-market, the overallotment option amounts to a decision of how the underwriter will buy back the additional shares sold short. If the firm's newly issued shares trade above the IPO offer price, it is optimal for the underwriter to exercise the overallotment option by purchasing shares from the firm at the IPO offer price to cover their pre-IPO short position (see e.g., Chen and Ritter, 2000). If the firm's shares trade at or below the offer price in the aftermarket, the underwriter will likely cover at least some of the short position by providing price support and buying up shares in the secondary market (Aggarwal 2000).

Our primary data source for overallotment information is the Thomson One database. However, because the data are frequently missing, we supplement Thomson One's reporting of OAE with hand-collection. In addition to searching IPO prospectuses, we search the first several post-IPO quarterly filings, which often disclose the number of additional shares purchased from the firm by the underwriter following the IPO.[10]

[10] In many cases, the OAE is split between primary and secondary shares in the same proportion as the IPO. To the extent that the split differs, OAE may still accurately reflect the split that would have occurred had the pre-overallotment IPO proceeds been increased. An exception to this would be if insiders could opportunistically sell more (or less) secondary shares depending on the market returns over the first 30-days. To our knowledge this practice is not common. Notably, since we observe secondary shares as of the prospectus, our measurement is not subject to the concern raised in Ang and Brau (2003) that insiders sometimes conceal the amount of secondary shares offered through pre-IPO amendments.

2.2 Descriptive Statistics

Panel A of Table 1 provides descriptive statistics on the variables used throughout our analysis. To ensure that outliers do not influence our inferences, all (non-return) continuous variables that are not logged are winsorized at the top and bottom 1%.[11] Unreported tests indicate that results are nearly identical without winsorization.

On average, OAE increases the amount of IPO equity raised by 11%. Unreported statistics indicate that the overallotment option is fully exercised in over 60% of IPOs and not exercised at all in 23% of IPOs, with the remaining OAEs being approximately uniformly distributed between 0% and 15%. In 2012 dollars, the average IPO firm raises approximately $153 million (pre-overallotment) and has $964 million in pre-IPO assets. The distributions of IPO proceeds and total assets are positively skewed as the median IPO firm raises $66 million and has total assets of $40 million. On average, 89% of IPO proceeds come from primary shares. Finally, the average IPO issuer is unprofitable, with a return on assets of negative 29 percent. Consistent with existing literature, the average (median) IPO issuer's stock price goes up by 27% (11%) on the first day of trading.

Panel B provides descriptive statistics on the post-IPO measures of ownership dispersion, liquidity, and long-run visibility we use as dependent variables throughout the analysis. Ownership dispersion and liquidity are measured and presented as of the second post-IPO quarterly filing. More specifically, ownership dispersion measures the number of 13F filers holding the stock as of the second post-IPO filing, and liquidity measures the average daily closing bid-ask spread from the second to the third post-IPO filing. Analyst coverage and institutional ownership percentage statistics are measured as of the end of the first and second full post-IPO filing years. On average, IPO issuers have approximately 37 institutional owners as the second post-IPO quarterly filing, and an average bid-ask spread of approximately 2%. During the first year of being public, the average firm is covered by between 5.5 analysts, which grows to 7.5 analysts in the second year. Additionally, at the end of the first year, the typical IPO firm is 36% owned by institutions, which grows to 41% by the end of the

[11] One exception is our measures of liquidity (bid-ask spread and Amihud illiquidity) to which we apply 2.5% winsorization to account for a larger propensity of outliers. Results are similar, albeit with higher standard errors, using 1% (or zero) winsorization.

second year. Firms conduct SEOs approximately 22% (16%) of the time in the first (second) year they are public. Conditional on conducting an SEO, firms raise approximately $330 million, resulting in the average firm raising approximately $72 and $56 million in SEO proceeds during the first and second year after they go public. Lastly, 12% of issuers delist within two years. See Appendix A1 for formal variable definitions.

2.3. The OLS Association between IPO proceeds and Investor and Analyst Attention

Attracting attention from analysts and investors is critical to a newly public firm's ability to benefit from public markets (Mehran and Peristiani, 2009). In Table 2, we provide some preliminary evidence on how post-IPO visibility and investor interest are influenced by the amount of equity raised in an IPO. We regress measures of long-horizon post-IPO visibility and investor interest one year and two years after the IPO on both OAE and the inflation adjusted dollar amount of IPO proceeds (*Ln(Pre-OAE Proceeds)*). We use analyst coverage and the percent of institutional ownership as our primary measures of post-IPO visibility and investor interest, which Mehran and Peristiani (2010), Bharath and Dittmar (2010), and O'Brien and Tan (2015), among others, argue are critical dimensions of visibility and interest for firms to maintain a viable cost of equity.

Across the first two columns of Table 2, we find a strong association between the two measures of IPO equity raised and first year analyst coverage and institutional ownership. We find similar results in columns two and three of Table 2 when we examine the effect of issuance size on second year post-IPO outcomes. The economic magnitude implied by the coefficients on the OAE and IPO proceeds are economically large. For instance, Column 3 suggests that a 1% increase in inflation adjusted (pre-overallotment) IPO proceeds is associated with a 0.3% increase in the number of analysts. The coefficient on OAE indicates similar, but larger, effects.[12]

Although these OLS estimates report a positive relation between IPO proceeds and post-IPO visibility and investor interest, they must be interpreted cautiously as the OLS coefficients could be

[12] Unreported tests suggest that these effects are robust to alternative measures of longer-horizon post-IPO visibility and investor interest, including the number of analyst forecasts issued, during either the first or second year a firm is public.

biased upwards or downwards. The relation between IPO proceeds and one-year post-IPO visibility could be overstated due to the correlation between IPO proceeds and firm size, since firm size is positively related to analyst coverage and institutional ownership. Alternatively, there are reverse causality reasons that the OAE coefficient could be understated. First instance, low levels of institutional ownership could be correlated with the overallotment option triggering because non-institutional (i.e., retail) investors tend to overpay for shares of newly public firms (see e.g., Dorn, 2009; Derrien, 2005; Ljungqvist et al., 2006), causing more frequent OAE when institutional ownership and analyst coverage is low. In the next section, we move to a discussion of how we identify the relation between IPO proceeds and post-IPO visibility and investor interest via plausibly exogenous variation in the amount of capital raised in an IPO.

3. Identification Strategy

To address the endogenous relationship between the amount of equity raised in an IPO and other issuer and IPO characteristics, we exploit the fact that OAE, and in turn the amount of IPO equity raised, is partially determined by factors outside the control of management and underwriters. As discussed in Section 2.1, the main driver of OAE is the firm's returns during the 30-day period in which underwriters are deciding whether or not to exercise the overallotment option. Although IPO pricing and underwriter price support significantly affect a firm's returns during this period, a portion of these 30-day returns is driven by market conditions, which are completely outside the control of managers and underwriters. Thus, initial post-IPO market returns represent quasi-random variation in OAE. In this section, we explain how we use this variation to instrument for OAE in a two-stage least squares (2SLS) framework.

3.1. Two-Stage Least Squares Estimation

To identify the effect of the amount of IPO equity raised on post-IPO visibility and investor interest, we conduct 2SLS analysis where we use 30-day post-IPO NASDAQ returns as an instrumental variable (IV) for overallotment exercise, denoted as OAE. In our first stage, we regress OAE, ranging between 0.00 and 0.15, on $NASDAQ\ Ret._{[0,29]}$ and a variety of control

variables illustrated in Eq. 1 below:

$$OAE = \alpha_1 NASDAQ\ Ret._{[0,29]} + \alpha_2 NASDAQ\ Ret._{[-180,-1]} + \alpha_3 Firm\ Ret._{[0]} +$$

$$\alpha_4 NASDAQ\ Ret._{[0,360]} + \Sigma\, a_i Controls + \theta_{FF49} + \varphi_t + \varepsilon \quad (1)$$

We expect the firm's returns in the first 30 days after going public to be the primary driver of OAE. *NASDAQ Ret.[0,29]*, our IV, isolates the portion of firm performance that is beyond managers' control. In general, Eq. 1 regresses OAE on variables determined before the end of the overallotment period. The only explanatory variable measured after this period is the first-year NASDAQ returns. Results are not sensitive to dropping this control from the analysis; however, we include it in our main specification to control for the possibility that our second stage outcomes of first and second-year visibility and investor interest are directly related to market conditions. We also control for pre-IPO market returns (*NASDAQ Ret.[-180,-1]*) to capture the effect of hot-markets on the IPO process and subsequent outcomes (Alti, 2006).

Eq. 1 also includes additional pre-IPO control variables, including fixed effects for both Fama-French 49 industries (θ_{FF49}) and the year-quarter of IPO issuance (φ_t). Firm-level pre-IPO controls include ln(assets); ln(firm age); ln(market-to-book), cash-to-assets; net income-to-assets; sales-to-assets; debt-to-assets; property, plant and equipment to assets; and 30-day pre-IPO media mentions. We also include several deal characteristics, such as indicators for a venture capital or private equity backed offering, the number of bookrunners, and the percentage of primary shares sold. Appendix A1 includes formal definitions of all variables we use throughout the analysis.

Eq. 2 formalizes the second stage regression:

$$Outcome_{Yr\,t} = \beta_1 \widehat{OAE} + \beta_2 NASDAQ\ Ret._{[-180,-1]} + \beta_3 Firm\ Ret._{[0]} +$$

$$\beta_4 NASDAQ\ Ret._{[0,360]} + \Sigma\, b_i Controls + \theta_{FF49} + \varphi_t + \varepsilon \quad (2)$$

Here, we regress post-IPO measures of visibility and investor interest (i.e., analyst coverage and institutional ownership), measured either one or two years after the IPO, denoted $Outcome_{Yr\,t}$, on

the predicted value of OAE from Eq. 1, $\widehat{OAE}$. In the accompanying analysis in which we try to understand the relation between OAE and longer-run visibility and investor interest, we also regress measures of immediate post-IPO ownership dispersion and liquidity (i.e., number institutional holders and bid-ask spread) on the predicted value of OAE from Eq. 1.

We include the same set of controls from Eq. 1 in Eq. 2, minus our IV, *NASDAQ Ret.*$_{[0,29]}$. We correct the second stage standard errors for the presence of a generated regressor and cluster standard errors at the year-quarter level.[13] Again, our one- and two-year outcomes of interest of analyst coverage and institutional ownership are used to capture post-IPO visibility and investor interest. The coefficient of interest is β_1, which approximates the effect of increasing OAE by 100 percent. Since OAE ranges from 0 to 0.15, a reasonable way to interpret β_1 is to divide it by 100 and view it as a linear approximation of the effect of increasing IPO equity raised by 1%.

3.2. Localizing our Identification Strategy

The thirty day post-IPO market returns (*NASDAQ Ret.*$_{[0,29]}$) should only affect OAE to the extent that the IPO issuer's stock would have traded near the IPO offer price (i.e., the threshold at which it becomes optimal for underwriters to exercise the overallotment option) in the absence of market returns. Under the assumptions of the Capital Asset Pricing Model (CAPM), firms that fit this description will be ones with values of $|Firm\ Returns_{[0,29]} - \beta * (Market\ Returns_{[0,29]})|$ that are closest to zero.

We empirically estimate the sample of firms that theoretically would have traded closest to their offer price in the absence of market returns in two ways. The main empirical challenge in arriving at such a sample is estimating the IPO firm's beta, β. For seasoned firms, β is typically estimated in some period prior to the event being examined. This is not possible for IPO firms since there is no high frequency price data prior to the IPO. The first way we address this data limitation is to use a cross-sectional β, estimated by regressing IPO firms' initial 30-day returns

[13] We obtain generally smaller standard errors clustering at the industry level or double clustering at the industry and year-quarter levels.

on initial 30-day NASDAQ returns; the beta is the estimated coefficient on 30-day NASDAQ returns. An important benefit to this cross-sectional β is that it captures the potentially unique way that IPO firms' returns covary with market returns during the first 30 days they are public. The limitation is that every IPO firm is assumed to have the same β.

An alternative approach is to construct a firm-specific beta using a matched seasoned firm. The intuition behind this follows directly from studies examining long-run abnormal returns for IPO issuers, which benchmark IPO issuers to seasoned firms that are similar in terms of size and book-to-market.[14] We follow this literature by matching each IPO issuer to the seasoned firm (i.e., a firm that has been public for at least four years) within a 30% market capitalization band with the most similar book-to-market ratio to the IPO issuer. Our firm-specific beta equals the coefficient on NASDAQ returns obtained from regressing the daily returns of the matched seasoned firm on NASDAQ returns during the 360 days ending the day prior to the IPO date.

In our subsequent analysis, we consider the OAE sensitive sample as IPOs for which $|Firm\ Returns_{[0,30]} - \beta * (Market\ Returns_{[0,30]})|$ is below the sample median. Appendix A2 presents descriptive statistics for OAE sensitive issuers compared to other issuers. In unreported multiple regressions, we find that the biggest determinant of whether an IPO issuer ends up in the OAE sensitive sample is IPO underpricing. OAE sensitive firms have average (median) underpricing of 8% (5%), compared to 44% (25%) in the non-sensitive sample. This is not surprising, since it is unlikely that an issuer's price will linger around the IPO offer price if first day returns are extremely high. This is also notable because earlier studies find that leaving money on the table through underpriced shares is one way issuers can attract visibility in the aftermarket. Our focus on OAE sensitive firms provides the additional benefit of limiting the influence of underpricing by focusing on the subsample of IPOs for which underpricing is relatively low. Many of the other descriptive differences between OAE sensitive and non-sensitive IPO issuers are

[14] See e.g., Lyon, Barber, and Tsai (1999); Ritter and Welch (2002); Brau, Couch, and Sutton (2012); Lowry, Michaely, and Volkova (2017).

characteristics, such as size, that are correlated with IPO underpricing. OAE sensitive issuers are bigger, less likely to be VC backed, and have lower market-to-book ratios.

The differences between the OAE sensitive issuers and other issuers are not problematic for our identification strategy. However, it is important to remember when interpreting our results. To the extent that β is appropriately measured, we expect OAE sensitive firms to exhibit a more positive relation (as compared to OAE insensitive firms) between OAE and 30-day post-IPO NASDAQ returns in the first stage.

3.3. Evidence on Identifying Assumptions

Interpreting β_1 in Eq. 2 above as the causal effect of OAE on post-IPO visibility and investor interest is only appropriate to the extent that the identifying assumptions of 2SLS are met. The first of these assumptions (i.e., the relevance condition) states that *NASDAQ Ret.*$_{[0,29]}$ is a relevant predictor of OAE. The second (i.e., the exclusion restriction) states that *NASDAQ Ret.*$_{[0,29]}$ does not predict post-IPO visibility and investor interest for reasons other than its effect on OAE.

3.3.1 Relevance of Instrument

We begin by examining the relevance of our IV, *NASDAQ Ret.*$_{[0,29]}$, as a predictor of OAE. Column 1 of Table 3 shows that *NASDAQ Ret.*$_{[0,29]}$ is a significant predictor of OAE when estimating Eq. 1 over the full sample. The t-statistic on *NASDAQ Ret.*$_{[0,29]}$ of 5.23 suggests that our IV is sufficiently strong. Squaring this t-statistic yields an F-statistic of over 25 and Stock and Yogo (2005) show that the potential bias of the IV estimate attributable to weak instruments can be at most 10% when the first-stage F-statistic is over 16. As expected, IPO underpricing – a component of the firm's returns during the first 30 days – is another highly significant predictor of OAE. Unreported tests (1) suggest that the estimated effect remains significant and of similar magnitude using a tobit regression and (2) yield similar results excluding the control for first-year NASDAQ returns.

In Columns 2 and 3, we partition the sample based on whether we expect an IPO to have high or low sensitivity of OAE to *NASDAQ Ret.*$_{[0,29]}$, according to the cross-sectional β approach discussed in Section 3.2. As expected, we find that OAE is more sensitive to post-IPO market returns in the OAE sensitive sample (i.e., the sample for which we estimate the stock price would have lingered around the offer price in the absence of any market returns). Comparing Column 2 to Column 1, the coefficient on *NASDAQ Ret.*$_{[0,29]}$ almost triples and the t-statistic increases to 6.74. The coefficient of 0.335 in Column 2 suggests that a one standard deviation (or 0.07 point) increase in *NASDAQ Ret.*$_{[0,29]}$ predicts an approximately 3 percentage point higher probability of OAE. In contrast, Column 3 indicates no statistically significant relation between *NASDAQ Ret.*$_{[0,29]}$ and OAE for the OAE insensitive sample. Thus, the cross-sectional β approach appears to successfully identify IPO firms whose OAE decision is sensitive to post-IPO market conditions.

In Columns 4 and 5 we split the sample based on the expected sensitivity of OAE to *NASDAQ Ret.*$_{[0,29]}$, according to the firm-specific β approach. Again, we find that the coefficient on *NASDAQ Ret.*$_{[0,29]}$ is almost twice as large in the high OAE sensitive sample in Column 4 versus the low OAE sensitive sample in Column 5. However, the firm-specific beta sample partition does not split as precisely on OAE sensitivity as the cross-sectional beta partition. As such, we use the OAE sensitive sample constructed using the cross-sectional beta, i.e., Column 2 of Table 3, as our localized sample throughout the remainder of our analysis.[15]

3.3.2. Evidence on the Exclusion Restriction

Our exclusion restriction requires that 30-day post-IPO NASDAQ returns do not affect post-IPO visibility or investor interest for any reason other than through their effect on OAE. This assumption seems reasonable, because 30-day post-IPO NASDAQ returns are independent of firm and IPO characteristics and beyond the control of managers. However, our exclusion restriction is violated if a general relation exists between NASDAQ returns following a firm's IPO and future

[15] We present robustness analyses of our main results in Appendix A4 using the sample partitioned on firm specific betas.

firm visibility and investor interest. Atanasov and Black (2017) argue that three ways to enhance the credibility of a 2SLS procedure are (1) to conduct direct plug-in (or difference-in-differences) estimations in which second stage outcomes are regressed directly on the IV, (2) to conduct falsification or placebo tests, and (3) to ensure covariate balance between the treated and non-treated observations. Below we examine the validity of our identifying assumptions along these three dimensions.

We begin by regressing one-year post-IPO visibility and investor interest on NASDAQ returns in the first, second, and third month after a firm goes public. This analysis provides both a direct plug-in estimation of the relation between our IV and the second stage outcomes (i.e., point (1) above), as well as a placebo test that examines whether there is a general relation between post-IPO NASDAQ returns and our second stage outcomes (i.e., point (2) above). To the extent that the amount of equity raised in an IPO affects the degree to which IPO issuers can attract a critical amount of visibility and investor interest, we expect the first month's NASDAQ returns to be significantly related to post-IPO visibility and interest. However, a significant relation between the second- and third-month's NASDAQ returns and post-IPO interest would cast doubt on the validity of our exclusion restriction.

Regressions in the first two columns of Table 4 examine the sample of firms for which OAE is sensitive to 30-day post-IPO NASDAQ returns. Results in both columns indicate a significant relation between immediate post-IPO 30-day NASDAQ returns and our measures of long-run visibility and investor interest.[16] A one standard deviation (or 7 percentage point) increase in 30-day NASDAQ returns predicts roughly a 10% increase in both the number of analysts covering a firm and institutional ownership percentage during the first year it is public. In contrast, none of the other four coefficients on *NASDAQ Ret.*$_{[30,59]}$ and *NASDAQ Ret.*$_{[60,89]}$ are significant.[17]

[16] We find qualitatively similar results using the natural log of the number of analyst forecasts, share turnover, and breadth of institutional ownership.

[17] Unreported tests examining 30 day returns prior to the IPO provides similar (null) results, although these findings are subject to a possible selection issue whereby certain types of IPO issuers time their IPO relative to recent returns.

Figure 1 (which we discuss in the introduction) and Figure 2 decompose the results in Panel A of Table 4. These figures examine how NASDAQ returns during various 5 and 10 day buckets around a firm's IPO relate to longer-run post-IPO visibility and investor interest. In Figure 2, we replicate the regression from Table 4, but replace *NASDAQ Ret.*$_{[0,29]}$ with 5-day increments (e.g, *NASDAQ Ret.*$_{[0,5]}$, *NASDAQ Ret.*$_{[6,10]}$, etc.). Visually, we observe a discontinuity in the relation between post-IPO visibility and post-IPO NASDAQ returns right at the end of the overallotment option period, 30 days after the IPO. In particular, there is a significant positive relation between NASDAQ returns and one-year analyst coverage and institutional holding percentage through the end of the overallotment period. Such a relation does not exist for NASDAQ returns measured during any of the adjacent periods. As we discuss in the introduction, Figure 1 presents estimates using a similar approach, but with ten day windows, before and after the IPO. Again, we observe no relation between our measures of post-IPO visibility and investor interest and NASDAQ returns in the pre- or post-OAE windows, but significant relations during the OAE period. These figures show that there is something unique about the relation between market returns during the first 30 days a firm is public and long-run post-IPO visibility and investor interest.

To further examine whether the increased probability of OAE is the driver of the unique relation between 30-day post-IPO NASDAQ returns and post-IPO visibility and investor interest, we next investigate whether the relation persists when OAE is not sensitive to post-IPO NASDAQ returns. Specifically, in Columns 3-4 of Table 4, we replicate the analysis in Columns 1-2 using the OAE non-sensitive sample (i.e., the sample from Column 3 of Table 3). Neither of the coefficients on *NASDAQ Ret.*$_{[0,29]}$ are statistically significant, and both are less than 25% of the magnitude of the corresponding coefficients in Columns 1-2. We find similar evidence of insignificant relations between second and third month market returns (i.e., *NASDAQ Ret.*$_{[30,59]}$ and *NASDAQ Ret.*$_{[60,89]}$) and post-IPO outcomes.

We also follow the recommendation in Atanasov and Black (2017) to examine whether our IV is related to firm characteristics, which is our setting's equivalent to covariate balance among

treated and control firms (i.e., point (3) above). To accomplish this, we conduct a series of univariate regressions where the dependent variables are the firm characteristics that we control for in Table 2 (i.e., *Ln(Firm Age)*, *Ln(Assets)*, *Ln(MtB)*, *Cash/Assets*, *Net Income/Assets*, *Sale/Assets*, *Total Debt/Assets*, *PP&E/Assets*, *Media Attn.*) and the lone independent variable is the 30-day post-IPO NASDAQ returns. Out of these nine regressions, only cash to assets is significantly related to 30-day post-IPO NASDAQ returns at the 5% level or better. We conduct a similar exercise using IPO characteristics. We find no significant relation between our IV and *Ln(Pre-OAE Proceeds)*, *VC-Backed*, *PE-Backed*, *% Primary*, or *Lead Managers*. This evidence suggests that firms exposed to positive and negative post-IPO NASDAQ returns shocks are similar, which empirically supports the claim that post-IPO NASDAQ returns are beyond the control and predictive ability of management, underwriters, and pre-IPO investors.

Taken together, the evidence in Table 4 and Figures 1 and 2 is consistent with our exclusion restriction. A violation of our exclusion restriction would entail some non-OAE channel through which 30-day post-IPO NASDAQ returns predict post-IPO outcomes that a) must also explain why the relation between post-IPO outcomes and NASDAQ returns in subsequent months fails to exist and b) why the relation between 30-day post-IPO NASDAQ and longer-run outcomes is concentrated in the OAE sensitive sample.

Although we view such an alternative explanation as unlikely, we do consider the possibility that 30-day post-IPO NASDAQ returns uniquely generate media attention, which then cascades (only for OAE sensitive firms) into more favorable post-IPO firm visibility and other related outcomes. To test the plausibility of this channel, we follow Liu, Sherman, and Zhang (2014) and measure media attention as the number of news articles mentioning the firm that are released in the public press immediately after a firm goes public. Specifically, we conduct Factiva searches for the number of articles that mention the firm, published from relevant outlets during the first 30 days. In Appendix A3, we regress this measure of media attention on post-IPO NASDAQ returns within our OAE sensitive sample. The coefficients on 30-day post-IPO

NASDAQ returns are insignificant, with t-statistics around -1. In addition, Liu, Sherman, and Zhang (2014) show that media attention in the month prior to going public predicts post-IPO outcomes and we find no relation between pre-IPO NASDAQ returns and long-run post-IPO outcomes.

The evidence in this section suggests that our identifying assumptions are plausible. Under these assumptions, we interpret β_1 in Equation 2 as the causal effect of the amount of equity raised in an IPO (through OAE) on post-IPO visibility and investor interest.

4. Effect of IPO Proceeds on Visibility and Investor Interest

In this section, we use the 2SLS framework discussed in Section 3 to identify the marginal effect of IPO proceeds on post-IPO visibility and investor interest. While prior evidence suggests that constraining price or quantity of new equity shares is often rewarded with aftermarket attention, expanding the size of a new equity issue has the potential to increase ownership diversification which can expand investor recognition and increase investor demand. Additionally, given the large cost firms incur on each share issued, averaging between 20 and 30 percent, it is rational for firms to demand meaningful rewards from issuing more shares at the IPO. Some of the most important rewards to raising initial equity discussed in the prior literature are visibility and investor interest (e.g., Rajan and Servaes, 1997; Cliff and Denis, 2004; Mehran and Peristiani, 2009; Liu and Ritter, 2011; O'Brien and Tan, 2015). We seek to provide the first evidence on whether raising more money at the IPO helps firms achieve greater visibility and investor interest, and ultimately, take better advantage of public markets.

4.1. Main Results

In Table 5, we directly address the question of how the amount of equity raised in an IPO affects post-IPO visibility and investor interest. We use our sample of OAE sensitive issuers, for which 30-day post-IPO NASDAQ returns represent a relevant and arguably exogenous shock to the amount of equity raised, and estimate the second stage 2SLS regression outlined in Eq. 2. The

dependent variable in Column 1 is the natural log of analyst coverage at the end of the first year, and the dependent variable in Column 2 is the percentage of institutional ownership. Columns 3 and 4 estimate the same regressions as in Columns 1-2, but examine analyst coverage and institutional ownership as of the second year following the IPO.

Because the dependent variable in Column 1 is logged, the coefficient of 3.29 in Column 1 suggests that a 1% increase in IPO issue size (i.e., a 0.01 increase in Instrumented OAE) predicts an approximate 3.4% increase in the number of analysts during the first year a firm is public. The coefficient of 99.2 in Column 2 suggests that the same increase in IPO issue size increases institutional ownership percentage by about 1 percentage point, which is about 3% of the sample average institutional ownership. Appendix A4 indicates similar estimates using firm-specific betas to define the OAE sensitive sample.[18]

In Columns 3-4, we examine whether the effects of raising more capital at the IPO grow over time after the IPO. Columns 3-4 are estimated in the same fashion as Columns 1-2, but the dependent variables are measured during or at the end of the second year a firm is public. We continue to find a positive relation between initial offering amount and post-IPO visibility and investor interest, but with even larger magnitudes than those in the first year. In Figure 3, we perform an analysis similar to Table 5, but at the quarterly level, to more precisely examine whether the effect of IPO proceeds on post-IPO visibility and investor interest is indeed increasing in the years following a firm's IPO. In the figure, the x-axis represents the quarter relative to the IPO at which the outcome variable is measured. Each point on the line plots the coefficient on *Instrumented OAE*, using the same regression specification as in Table 5. The results in Figure 3 show that the effect of IPO proceeds on institutional ownership is increases nearly monotonically over the first eight quarters that a firm is public, while the effect on analyst coverage levels off after the fifth post-IPO quarter.

[18] Our results are qualitatively similar when we use three alternative measures of visibility: the number of analyst forecasts, share turnover, and breadth of institutional ownership.

The results in Table 5 and Figure 3 are consistent with the idea of feedback effects between various dimensions of visibility and investor interest, whereby analyst coverage and institutional ownership complement each other. These types of feedback effects are supported by prior research, which finds positive relations between analyst coverage, institutional ownership, and also liquidity, in a number of contexts.[19] Changes to one of these, following changes in the amount raised in an IPO, could create a visibility multiplier effect. Identifying exactly channel through which investor demand and visibility initially expands is difficult, but one argument consistent with theory is that selling a greater portion of the firm increases ownership diversification (Holmstrom and Tirole, 1993). This in turn improves liquidity because informed shareholders are will to invest in and trade on information, and this then draws in more institutional shareholders and increases the demand for analyst research.

We explore the plausibility of the ownership diversification mechanism more directly in Table 6. Specifically, we explore whether one reason that increases in the amount of equity raised in an IPO has such large and persistent effects on long-run visibility and investor interest is because of the immediate effect increases in IPO proceeds has on ownership dispersion and stock liquidity.[20] We measure immediate ownership dispersion and stock liquidity using the number of institutional owners holding the stock as the second post-IPO quarterly filing, and the average daily bid-ask spread over the 60 calendar days preceding the second post-IPO quarterly filing. We find large positive effects from increases in the amount of equity raised on initial ownership dispersion and stock liquidity. A 1% increase in the amount of IPO equity raised increases the number of institutional owners by 4.5% and reduces the bid-ask spread by 5%, relative to the average, as of the first post-overallotment-period quarterly filing.

[19] See, for example, Irvine (2003), Roulstone (2003); Grullon, Kanatas, and Weston (2004), Chordia, Roll, Subrahmanyam (2011); Kelly and Ljungqvist (2012); Edmans, Fang, and Zur (2013); Mola, Rau, and Khorana (2013); Li and You (2015); and Cao, Gustafson, and Velthuis (2018).

[20] This is also consistent with arguments in Merton (1987), where shocks to investor recognition boost investor demand.

Taking a step back, the magnitudes of our 2SLS estimates are larger than the corresponding OLS estimates. As discussed in Atanasov and Black (2017), such an increase in magnitude can be caused by omitted variables or reverse causality in the OLS specification. However, Atanasov and Black (2017), along with Jiang (2017), discuss the importance of a clear discussion of the economics behind the magnitude of both the change in the coefficient and the resulting 2SLS coefficient. One plausible explanation for the larger 2SLS coefficient (relative to the OLS coefficient) is that retail investor demand both lowers institutional ownership and makes OAE more likely, since evidence suggests that retail investors overpay for IPO shares (see e.g., Dorn, 2009; Derrien, 2005; Ljungqvist et al., 2006). In this scenario, we would expect our 2SLS analysis, which isolates the variation in OAE that is due to fluctuations in NASDAQ returns, to increase the magnitude of the OAE coefficient. The substantial marginal rewards to visibility and investor interest implied by the 2SLS estimates also make sense given the equivalently high marginal issuance costs of IPO shares documented by existing literature (Ritter, 1987; Chen and Ritter, 2000).

Collectively, the above evidence suggests that there are large marginal rewards to raising additional equity in an IPO. When interpreting this evidence, it is important to recognize that our 2SLS analysis is a local identification strategy, identifying the effects of IPO issue size on firms to the extent that their OAE is sensitive to post-IPO market returns. Appendix A2 shows that, not surprisingly, the OAE insensitive firms have fundamentally different initial returns (44.67%, on average) as compared to our localized sample (8.13%, on average). Therefore, similar to other local identification strategies, such as regression discontinuity design (e.g., Bakke and Whited 2012), our 2SLS analysis has strong local validity but weaker external validity. Put differently, future research is needed to determine whether the visibility and investor interest response to increases in the amount of IPO equity raised that we document are similar among IPO issuers with different characteristics.

5. IPO Proceeds and Public Market Access

Our finding that increases in the amount of equity raised in an IPO substantially increases visibility and investor interest raises the possibility that increases in IPO issue size meaningfully affect the probability that firms return to the primary market to conduct a follow-on offering. Visibility and investor interest have been shown to reduce the cost of raising equity (Bowen, Chen, and Cheng 2008, Grullon, Kanatas, and Weston, 2004, Chemmanur and Yan, 2009). An increase in these critical determinants of the cost of equity may increase the likelihood of a seasoned equity offering (SEO). For instance, Chang, Dasgupta, and Hilary (2006) find that firms with less analyst coverage are more likely to issue debt than equity in subsequent offerings. However, the impact of raising more equity in the IPO could have the opposite effect and reduce the likelihood and/or size of an SEO because it reduces a firm's need for subsequent capital.

To investigate the effect of the amount raised in an IPO on post-IPO equity issuance activity, we obtain a comprehensive sample of SEOs from Thomson One's equity issues database. Consistent with Krigman, Shaw, and Womack (2001), we find that a large percentage of IPO issuers raise additional equity in the years following their IPO. Specifically, in our OAE sensitive sample, 30% of IPO issuers raise additional equity by the end of year 2 (i.e., two years after their first post-IPO quarterly filing). Our first measure of post-IPO equity issuance is an indicator for whether a firm conducts an SEO in a particular year. Column 1 and 2 of Table 7 indicate a positive relation between IPO proceeds and SEO issuance activity. Specifically, a 1% increase in IPO proceeds leads to a 2.5% (1.7%) increase in the likelihood of an SEO in the first (second) year following their public market entry.

Columns 3 and 4 replicate this analysis using the natural log of one plus SEO proceeds raised during a year, scaled by IPO proceeds, as the dependent variable. We continue to find a positive relation between *Instrumented OAE* and SEO activity in the two years after a firm is public. This result is robust to a variety of transformations, including scaling by total assets instead of IPO proceeds or using the natural log of one plus unscaled SEO proceeds.

These findings represent, to our knowledge, the first evidence that newly public firms' equity financing decisions are path dependent – raising more initial equity actually induces the firm to raise additional equity in the public markets over the subsequent two years. Evidence of this effect requires exogenous variation in IPO issue size to rule out the possibility that persistent factors, such as investment opportunities, increase both IPO issue size and subsequent equity offerings.

In our final set of tests, we examine whether the positive impact of IPO proceeds on post-IPO visibility and investor interest culminate with a positive relation between IPO proceeds and survival as a public firm. Column 1 of Table 8 presents estimates from a hazard model where the dependent variable is the length of time until a firm delists. We find a positive relation between 30-day post-IPO NASDAQ returns and the life expectancy of a public firm. Column 2 presents two-stage estimates using a second stage probit model where the dependent variable indicates whether a firm remains listed on a public exchange for at least two years. Again, we find a positive relation between the amount of IPO equity raised and survival as a public firm, suggesting a 1% increase in IPO proceeds reduces the probability of delisting within the first two years by about 2 percentage points. These results contribute to existing evidence that analyst coverage, institutional ownership, and stock liquidity are important reasons that firms remain public (see e.g., Mehran and Peristiani, 2010; Bharath and Dittmar, 2010; Mola, Rau, and Khorana, 2012). In addition, we extend the limited literature on post-IPO survival (see e.g., Jain and Kini, 2003; Demers and Joos, 2007) by suggesting that firms can influence their survival rate by adjusting the amount of equity they raise in their IPO. Our collective evidence suggests that the amount of equity raised in an IPO is an important determinant of the success of going public by shaping the first-order benefits of selling shares to public investors.

6. Conclusion

Visibility and investor interest are critical for newly public firms. Failure to attract sufficient visibility and investor interest is a major reason that firms opt to leave public markets (Mehran and

Peristiani, 2009). One way that IPO issuers can attract post-IPO visibility and investor interest is by adjusting the amount of equity raised in their IPO. While there are several reasons increasing the amount of equity raised in an IPO could harm aftermarket investor interest given the importance of underpricing for investor attention, we find the opposite. We find that increasing the amount of equity raised in an IPO drastically improves post-IPO visibility and investor interest, and this appears to lower the cost of equity for future equity issuances and extends the amount of time firms remain on public exchanges.

We are able to circumvent empirical challenges in identifying the effect of changes in the amount raised in an IPO arising from correlations between the amount of equity raised and unobserved factors – such as investor demand and corporate investment opportunities – by introducing overallotment option exercise (OAE) as a new source of variation in the amount of IPO equity raised. Our identification strategy exploits the fact that market fluctuations in the first thirty days after a firm goes public are an important driver of OAE, and thus the amount raised in an IPO. We thus provide casual evidence on the effect of marginally increasing the amount raised in an IPO on visibility and investor interest, which are critical determinants of the cost of equity.

While there are several ways increasing the amount raised in an IPO could affect long-run post-IPO visibility and investor, we provide evidence that at least one way this occurs is through an initial boost to ownership dispersion and liquidity that follows increases in the size of an IPO. Our results provide an important benchmark for managers of the benefits of increasing the amount raised in an IPO to trade off against the large observable costs, such as underwriter expenses and a loss of control (Chen and Ritter, 2000), and unobservable costs, such as the cost of market monitoring (Holmstrom and Tirole, 1993), that make increasing the amount of equity raised costly to initial owners.

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Appendix A1: Data Definitions

Variable Name	Variable Definition (source in parentheses)
IPO Controls	
OAE	The dollar amount of the overallotment option exercised by the lead underwriter within 30 days of the IPO issue date, as a fraction of IPO proceeds (Thomson One, hand collection).
Pre-OAE Proceeds	Total shares offered times the offer price (excluding the OAE shares), in 2012 dollars (Thomson One).
VC-Backed	An indicator variable taking a value of one if the IPO issuer has venture capital funding and zero otherwise (Thomson One).
PE-Backed	An indicator variable taking a value of one if the IPO issuer has private equity funding and zero otherwise (Thomson One).
% Primary	Percentage of total proceeds raised during the IPO that flow to the company, as opposed to initial shareholders (Thomson One).
Lead Managers	Number of unique underwriters in the IPO deal that are listed as lead managers (Thomson One).
Media Attn.	The number of searchable news articles that mention a firm over the 30 days preceding the firm's offer date (articles defined as in Liu, Sherman, and Zhang (2014)) (Factiva).
Firm Age	Years between a firm's founding date and its offer date (Field-Ritter founding-dates database available on Jay Ritter's webpage).
Firm Controls	
Assets	Total assets from the most recent fiscal year prior to the IPO (Compustat).
MtB	Assets plus the market value of equity minus book value of equity minus IPO proceeds, all scaled by assets. The market value of equity is measured as total shares outstanding times the offer price. Book value of equity and assets are measured as of the most recent fiscal year prior to IPO (Compustat).
Cash/Assets	Cash and Cash Equivalents, scaled by total assets, as of the most recent fiscal period prior to the IPO (Compustat).
Net Income/Assets	Net income, scaled by total assets, from the most recent fiscal year prior to the IPO (Compustat).
Sale/Assets	Total revenue, scaled by total assets, from the most recent fiscal year prior to the IPO (Compustat).
Total Debt/Assets	The sum of long-term debt and debt in current liabilities, scaled by total assets, from the most recent fiscal year prior to the IPO (Compustat).
PP&E/Assets	Property, Plant, and Equipment scaled by total assets, as of the most recent fiscal period prior to the IPO (Compustat).
Return Controls	
NASDAQ Ret.$_{[-180,-1]}$	The buy-and-hold compounded NASDAQ returns over the six months preceding the IPO (CRSP).
Firm Ret.$_{[0]}$	The percentage difference between the close on the first day of trading and the firm's offer price (CRSP).
NASDAQ Ret.$_{[0,29]}$	The buy-and-hold compounded NASDAQ returns over the first thirty days a firm is trading (CRSP).
Ab. Firm Ret.$_{[0,29]}$	The difference between buy-and-hold realized firm returns over the first thirty days a firm is trading and the predicted return of the firm over this window, where predicted return of the firm is computed as the product of a) the sample-wide sensitivity of firm returns to NASDAQ returns over this window (i.e., beta), and b) the realized NASDAQ returns over this window (CRSP).
NASDAQ Ret.$_{[0,360]}$	The buy-and-hold compounded NASDAQ returns over the first 360 days a firm is trading (CRSP).

Appendix A1: Data Definitions (continued)

Variable Name	Variable Definition (source in parentheses)
Return Controls	
NASDAQ Ret.$_{[30,59]}$	The buy-and-hold compounded NASDAQ returns over the second month a firm is trading (CRSP).
NASDAQ Ret.$_{[60,89]}$	The buy-and-hold compounded NASDAQ returns over the third month a firm is trading (CRSP).
Outcome Variables – Measured either one or two years after the IPO date	
Ownership Dispersion	The total number of unique 13F reporting institutions holding the issuing firm (as of the second post-IPO quarterly filing) (Thomson Reuters).
Liquidity	The average daily difference between the closing ask and closing bid, divided by the absolute value of the closing price (CRSP) over the sixty days preceding the second post-IPO quarterly filing. The extreme tails of the sample-wide distribution of daily spreads are set to the top and bottom 1% before computing firm-level averages.
Number of Analysts	The total number of sell-side analysts covering the firm over the first four post-IPO quarters (or second four post-IPO quarters) (I/B/E/S).
Institutional Ownership Percentage	The percentage of shares outstanding held by 13F reporting institutions as of either the 4th post-IPO quarterly filing, or the eigth quartely filing.
Post-IPO Media Attention	The number of searchable news articles that mention a firm over the first 30 days following the firm's offer date (articles defined as in Liu, Sherman, and Zhang (2014)) (Factiva).
Delistment Rate	The number of months from issuance until delistment, or until the end of the sample if the firm does not delist before the end of 2016 (CRSP).
Delist	An indicator taking a value of one if the firm delists before its ninth post-IPO quarterly filing, and zero otherwise. CRSP delist codes 200-290 (buyouts), (400-490 (liquidations), 500(removal, reason unavailable), 505-591(removal, reason supplied), and 700 are used to indicate delistment (CRSP).
SEO Indicator	An indicator for an SEO during a year (Thomson One).
SEO Proceeds	SEO proceeds raised during a year scaled by IPO proceeds (Thomson One).

Appendix A2: Descriptive Statistics, partitioned by OAE sensitivity

This table provides descriptive statistics for two subsamples of IPOs with non-missing pre-IPO accounting and founding date information, post-IPO return data, and Year 1 outcome information. The left two columns present means and medians for issuers with above-median sensitivity of OAO exercise to NASDAQ returns (1,410 issuers) and the right two columns presents statistics for below-median issuers (1,427). We estimate sensitivity of OAO exercise to NASDAQ returns by computing abnormal firm returns over the first 30 days of trading, with the closest 50% of the sample to zero (in absolute value) classified as above median sensitivity. Abnormal firm returns are computed as firm returns minus the average cross-sectional equity beta times 30-day NASDAQ returns. The cross-sectional equity beta is estimated by regressing initial 30-day firm returns on initial 30-day NASDAQ returns; the beta is the coefficient on 30-day NASDAQ returns. All variables are defined in Appendix A1. Panel A presents means and medians IPO characteristics and pre-IPO firm characteristics (scaled variables are winsorized at top and bottom 1%). Panel B presents summary statistics on the IPO period return variables (presented as percentages) and Panel C presents summary statistics for the main dependent variables.

Panel A: IPO and Pre-IPO Firm Characteristics

	High-Sensitivity		Low Sensitivity	
	Mean	Median	Mean	Median
OAE	0.09	0.15	12.05	15.00
Pre-OAE Proceeds ($ mil.)	172.95	60.06	132.51	68.94
VC-Backed	0.38	0.00	0.52	1.00
PE-Backed	0.22	0.00	0.14	0.00
% Primary	0.87	1.00	0.91	1.00
Lead Managers	1.43	1.00	1.25	1.00
Media Attn.	5.26	3.00	7.19	5.00
Firm Age	19.73	10.00	13.88	7.00
Total Assets ($ mil.)	1282.15	50.66	650.05	33.16
MtB	8.94	3.39	16.52	6.87
Cash/Assets	0.23	0.10	0.28	0.18
Net Income/Assets	-0.24	0.004	-0.34	-0.03
Sale/Assets	1.11	0.86	1.18	0.94
Total Debt/Assets	0.39	0.29	0.35	0.20
PP&E/Assets	0.21	0.13	0.22	0.14

Panel B: IPO Period Returns

	Mean	Median	Mean	Median
Pre-Issue Returns	10.11	8.69	13.69	10.64
Firm Ret.$_{[0]}$	8.13	4.81	44.67	24.88
NASDAQ Ret.$_{[0,29]}$	1.21	1.39	0.77	0.98
Absolute Firm Abnormal Ret.$_{[0, 29]}$	10.18	9.46	70.32	44.15
NASDAQ Ret.$_{[0,360]}$	15.20	15.47	9.61	14.06

Panel C: Post-IPO Outcomes

	Mean	Median	Mean	Median
Ownership Dispersion	33.42	25.00	39.75	34.00
Bid-Ask Spread	0.023	0.017	0.019	0.013
Analysts Year 1	5.10	4.00	6.01	5.00
Analysts Year 2	6.88	6.00	8.25	7.00
Institutional Ownership Year 1	36.56	31.96	35.84	32.07
Institutional Ownership Year 2	41.64	37.01	40.67	35.95
SEO Indicator Year 1	0.18	0.00	0.26	0.00
SEO Indicator Year 2	0.19	0.00	0.14	0.00
Delist Year 2	0.11	0.00	0.12	0.00

Appendix A3: Post-IPO NASDAQ Returns and Media Attention

This table presents OLS results from regressing Post-IPO Media Attention, defined as the number of searchable news articles (from Factiva) mentioning a firm in the first 30 days they are public, on compounded NASDAQ returns over the first 30 days a firm is trading (i.e., NASDAQ Ret.$_{[0,29]}$). The sample for both columns is restricted to firms with above-median sensitivity of OAO exercise to NASDAQ returns. We estimate sensitivity of OAO exercise to NASDAQ returns by computing abnormal firm returns over the first 30 days of trading, with the closest 50% of the sample to zero (in absolute value) classified as above median sensitivity. Abnormal firm returns are computed as firm returns minus the average cross-sectional equity beta times 30-day NASDAQ returns. The cross-sectional equity beta is estimated by regressing initial 30-day firm returns on initial 30-day NASDAQ returns; the beta is the estimated coefficient on 30-day NASDAQ returns. In addition to the seven control variables listed, each column includes additional control variables for IPO and firm characteristics, which are listed and defined in Appendix A1. Each column also includes Fama-French 49 industry and issue year-quarter fixed effects. T-statistics, using standard errors that are clustered by calendar year-quarter, are reported in parentheses below the coefficients. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	(1) Post-IPO Media Attention	(2) Post-IPO Media Attention
NASDAQ Ret.$_{[0,29]}$	**-0.276**	**-0.308**
	(-0.90)	**(-1.11)**
NASDAQ Ret.$_{[-180,-1]}$	-0.386	-0.115
	(-1.46)	(-0.37)
Firm Ret.$_{[0]}$	0.404***	0.394***
	(3.08)	(2.88)
NASDAQ Ret.$_{[0, 360]}$		0.573
		(1.48)
Ln(Pre-OAE Proceeds)	0.191***	0.191***
	(5.62)	(5.71)
Media Attn.	0.325***	0.323***
	(7.14)	(6.98)
Ln(Assets)	0.055**	0.055**
	(2.51)	(2.57)
Ln(MtB)	0.091**	0.092***
	(2.50)	(2.59)
Firm Controls	Yes	Yes
IPO Controls	Yes	Yes
Industry Fes	Yes	Yes
Year-Quarter Fes	Yes	Yes
Adj. R-squared	0.584	0.586
Observations	1,410	1,410

Appendix A4: Effect of IPO Proceeds on Visibility and Investor Interest **Firm-Specific Betas**

This table presents second stage 2SLS regressions of post-IPO visibility and investor interest over the first two years of trading to estimate the effect of changes in the amount of equity raised in an IPO. The dependent variable in Column 1 and 3 is the natural log of the number analysts covering the firm. The dependent variable in Column 2 and 4 is the percentage of shares held by institutional shareholders. The dependent variables in Columns 1-2 are measured at the end of the first year of trading, while the dependent variables in Columns 3-4 are measured at the end of the second year. The explanatory variable of interest is Instrumented OAE, which is the fitted value of OAE from Model 2 of Table 3. The regression sample for each column is restricted to firms with above-median sensitivity of OAO exercise to NASDAQ returns. We estimate sensitivity of OAO exercise to NASDAQ returns by computing abnormal firm returns over the first 30 days of trading, with the closest 50% of the sample to zero (in absolute value) classified as above median sensitivity. Abnormal firm returns are computed as firm returns minus a firm-specific equity beta times 30-day NASDAQ returns. Firm-specific equity betas are estimated by taking the trailing 360-day market beta of the closest seasoned peer (more than four years of trading history) in terms of book-to-market, conditional on market cap being within 30% (Ritter and Welch, 2002). In addition to the four control variables listed, each column includes additional control variables for IPO and firm characteristics, which are defined in Appendix A1. Each column also includes Fama-French 49 industry and issue year-quarter fixed effects. t-statistics, using standard errors that are clustered by calendar year-quarter, are reported in parentheses below the coefficients. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Panel A: Year 1 Outcomes

	(1) Ln(Analysts) Year 1	(2) IO % Year1	(3) Ln(Analysts) Year 2	(4) IO % Year2
Instrumented OAE	**2.208****	**61.896**	**4.279****	**174.194***
	(2.32)	**(1.04)**	**(2.51)**	**(1.89)**
NASDAQ Ret.$_{[-180,-1]}$	-0.086	-1.499	-0.210	-8.588
	(-0.41)	(-0.16)	(-0.62)	(-0.64)
Firm Ret.$_{[0]}$	-0.320	-9.627	-0.724	-30.148
	(-1.39)	(-0.65)	(-1.59)	(-1.54)
Ln(Pre-OAE Proceeds)	0.273***	13.027***	0.285***	11.057***
	(11.20)	(7.90)	(8.16)	(5.81)
First Year NASDAQ Returns	0.029	8.210	0.276	8.670
	(0.14)	(1.13)	(1.08)	(0.86)
Industry and Year-Quarter FEs	2.208**	61.896	4.279**	174.194*
	(2.32)	(1.04)	(2.51)	(1.89)
Adj. R-squared	0.578	0.441	0.433	0.369
Observations	1,404	1,404	1,269	1,247

Figure 2: 5-Day Return Windows Predicting Long-Run post-IPO Visibility and Investor Interest

This figure plots coefficients for regressions of analyst coverage and institutional ownership as a function of several periods of post-IPO NASDAQ returns, along with the same control variables used in Column 2 of Table 3. The sample is restricted to our OAE sensitive sample (see Section 2.2). Each line represents a separate regression; the dependent variable for the solid line regression is the natural log of the number of analysts covering the firm in the second year of trading; the dependent variable for dashed line is the natural log of the percentage of shares held by institutional owners two years after going public. Each point on each line represents the coefficient for one of the several post-IPO NASDAQ return variables. The ten 5-day post-IPO NASDAQ return variables measure cumulative NASDAQ returns over the post-IPO calendar windows of (0,5), (6,10), (11,15), (16,20), (21,25), (26,30), (31,35), (36,40), (41,45), (46,50). The first six windows fall within the overallotment option period; the last four windows occur after the overallotment option has expired. The left y-axis measures percent change in analyst coverage; the right y-axis measures percentage point change in institutional ownership. The number assigned to each tick mark on the x-axis reflects the post-IPO calendar day that matches the final day for the respective return variable in the regressions.

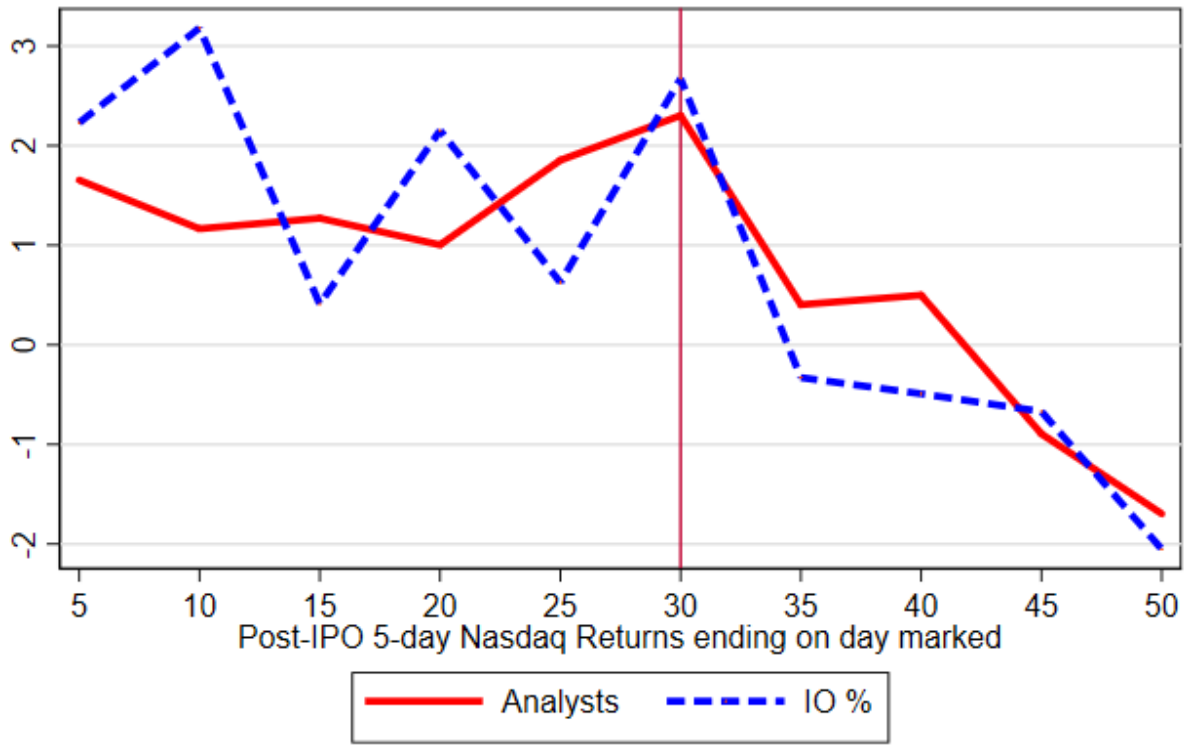

Figure 3: Time Series Variation in Post-IPO Visibility and Investor Interest

This figure plots coefficients for regressions of analyst coverage and institutional ownership as a function of (the predicted value of) overallotment exercise, along with the same control variables used in Column 2 of Table 3. The dependent variable for green solid line is the number of unique analysts initiating coverage for the firm (i.e., *Analysts*). The dependent variable for the blue line is the percentage of shares held by 13F filers (i.e., *IO %*). Each point on the lines represents the coefficient for overallotment exercise in one of the second stage regressions. There are seven total regressions for each measure (e.g., *Analysts and IO %*), and the dependent variable across the seven regressions for a given measure reflects a different post-IPO quarter, as labeled on the x-axis (quarter 2 reflects the second post-IPO quarter). *Analysts* is logged so regression coefficients measure a percentage change in y for a 1% change in overallotment exercise; the coefficients in *IO %* regressions measure a percentage point change in institutional ownership for a 100% increase in overallotment exercise. The sample of IPO firms is restricted to those with above-median sensitivity of OAO exercise to NASDAQ returns. We estimate sensitivity of OAO exercise to NASDAQ returns by computing abnormal firm returns over the first 30 days of trading, with the closest 50% of the sample to zero (in absolute value) classified as above median sensitivity. Abnormal firm returns are computed as firm returns minus the average cross-sectional equity beta times 30-day NASDAQ returns. The cross-sectional equity beta is estimated by regressing initial 30-day firm returns on initial 30-day NASDAQ returns; the beta is the estimated coefficient on 30-day NASDAQ returns.

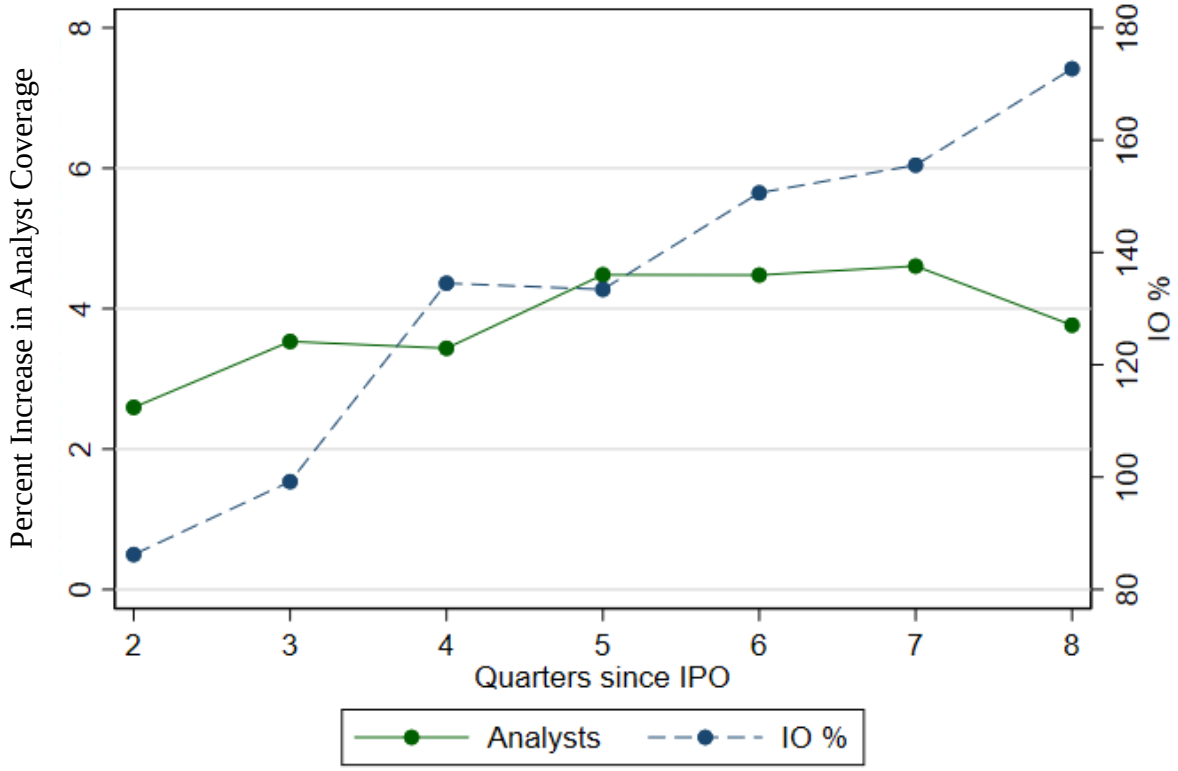

Table 1: Descriptive Statistics

This table provides descriptive statistics for the 2,837 IPOs with non-missing pre-IPO accounting and founding date information, post-IPO return data, and Year 1 outcome information. All variables are defined in Appendix A1. Panel A presents means, medians, and standard deviations of IPO and pre-IPO firm characteristics, and IPO period returns (presented as percentages). Scaled variables are winsorized at top and bottom 1%. Panel B presents summary statistics for the main dependent variables.

Panel A: IPO and Pre-IPO Firm Characteristics

	Mean	Median	Std.
OAE	0.11	0.15	0.06
Pre-OAE Proceeds ($ mil.)	152.608	65.819	518.744
VC-Backed	0.448	0.000	0.497
PE-Backed	0.178	0.000	0.383
% Primary	0.889	1.000	0.215
Lead Managers	1.340	1.000	0.822
Media Attn.	6.232	4.000	12.019
Firm Age	16.788	8.000	23.082
Total Assets ($ mil.)	964.204	39.955	9894.082
MtB	12.749	4.885	24.572
Cash/Assets	0.254	0.133	0.271
Net Income/Assets	-0.288	-0.004	0.752
Sale/Assets	1.142	0.914	1.081
Total Debt/Assets	0.370	0.245	0.457
PP&E/Assets	0.214	0.136	0.214
NASDAQ $Ret._{[-180,-1]}$	11.910	9.802	17.516
Firm $Ret._{[0]}$	26.511	11.364	53.335
NASDAQ $Ret._{[0,29]}$	0.984	1.167	7.237
NASDAQ $Ret._{[0,360]}$	12.387	14.943	29.703

Panel B: Post-IPO Outcomes

	Mean	Median	Std.
Ownership Dispersion	36.60	29.00	25.49
Bid-Ask Spread	0.022	0.014	0.024
Analysts Year 1	5.56	5.00	4.25
Analysts Year 2	7.57	6.00	6.37
Institutional Ownership Year 1	36.20	32.05	25.53
Institutional Ownership Year 2	41.15	36.34	28.93
SEO Indicator Year 1	0.22	0.00	0.42
SEO Indicator Year 2	0.16	0.00	0.37
Delist Year 2	0.12	0.00	0.32

Table 2: OLS Determinants of Post-IPO Outcomes

This table presents OLS regressions where the dependent variables in Columns 1 & 3 are the natural log of the number of analysts initiating coverage (i.e., *Ln(Analysts)*) in the first and second post-IPO years, and the dependent variable in Columns 2 & 4 are the percentage of shares held by institutional owners (i.e., *IO %*), in the first and second post-IPO years. All variables are defined in Appendix A1. Each column includes Fama-French 49 industry and issue year-quarter fixed effects. t-statistics, using standard errors that are clustered by calendar year-quarter, are reported in parentheses below the coefficients. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	(1) Ln(Analysts) Year 1	(2) IO% Year 1	(3) Ln(Analysts) Year 2	(4) IO % Year 2
OAE	**0.901*** **	**49.026*** **	**1.182*** **	**53.745*** **
	(5.64)	**(8.50)**	**(5.50)**	**(7.91)**
Ln(Pre-OAE Proceeds)	0.297***	12.321***	0.285***	11.665***
	(16.93)	(10.94)	(9.41)	(9.68)
NASDAQ Ret.$_{[-180,-1]}$	-0.070	-10.501*	-0.218	-7.672
	(-0.46)	(-1.73)	(-0.82)	(-0.94)
Firm Ret.$_{[0]}$	0.118***	2.787***	0.201***	0.933
	(5.70)	(3.57)	(4.93)	(1.16)
Nasdaq Ret.$_{[0,360]}$	0.333**	3.301	0.476***	7.301
	(2.50)	(0.77)	(2.68)	(0.99)
VC-Backed	0.151***	7.302***	0.130***	8.807***
	(5.30)	(6.95)	(3.25)	(6.98)
PE-Backed	0.079***	7.973***	0.115***	9.250***
	(2.90)	(5.75)	(3.28)	(6.32)
% Primary	0.072*	-2.348	0.076*	-4.022
	(1.84)	(-0.99)	(1.65)	(-1.52)
Lead Managers	-0.012	-2.090**	-0.044***	-2.783***
	(-0.90)	(-2.41)	(-2.78)	(-3.11)
Media Attn.	0.053***	-0.702	0.030	-0.806
	(4.36)	(-1.18)	(1.61)	(-1.05)
Ln(Firm Age)	-0.014	1.826***	-0.019	1.560***
	(-1.36)	(3.60)	(-1.31)	(2.84)
Ln(Assets)	0.096***	-2.813***	0.136***	-1.986***
	(7.77)	(-3.73)	(6.05)	(-2.82)
Ln(MtB)	0.137***	-6.071***	0.191***	-4.511***
	(7.10)	(-5.58)	(6.91)	(-5.32)
Cash/Assets	0.108***	-4.089**	0.161***	-3.959
	(2.92)	(-2.16)	(3.37)	(-1.55)
Net Income/Assets	0.044***	0.932	0.078***	3.039***
	(2.92)	(1.42)	(3.99)	(3.33)
Sale/Assets	0.035***	-0.555	0.027*	-0.452
	(4.23)	(-1.49)	(1.79)	(-0.80)
Total Debt/Assets	-0.053**	1.988	-0.054*	2.651*
	(-2.53)	(1.60)	(-1.82)	(1.72)
PP&E/Assets	0.075	-4.559*	0.169**	-1.096
	(1.51)	(-1.84)	(2.48)	(-0.36)
Industry FEs	Yes	Yes	Yes	Yes
Year-Quarter FEs	Yes	Yes	Yes	Yes
Adj. R-squared	0.608	0.416	0.502	0.402
Observations	2,837	2,837	2,502	2,425

Table 3: First Stage, Determinants of Overallotment Exercise

This table presents results from regressing overallotment exercise (i.e., *OAE*) (which ranges from 0.00 to 0.15 and represents the increase in IPO proceeds attributable to overallotment exercise) on compounded NASDAQ returns over the first 30 days a firm is trading (i.e., NASDAQ Ret.$_{[0,29]}$). Columns 2 and 4 (3 and 5) contain subsamples of issuers with above- (below-) median sensitivity of OAO exercise to NASDAQ returns. In each column, we estimate sensitivity of OAO exercise to NASDAQ returns by computing abnormal firm returns over the first 30 days of trading, with the closest 50% of the sample to zero (in absolute value) classified as above median sensitivity. Abnormal firm returns in Columns 2-3 are computed as firm returns minus the average cross-sectional equity beta times 30-day NASDAQ returns. The cross-sectional equity beta is estimated by regressing initial 30-day firm returns on initial 30-day NASDAQ returns; the beta is the estimated coefficient on 30-day NASDAQ returns. Abnormal firm returns in Columns 4-5 are computed as firm returns minus a firm-specific equity beta times 30-day NASDAQ returns. Firm-specific equity betas are estimated by taking the trailing 360-day market beta of the closest seasoned peer (more than four years of trading history) in terms of book-to-market, conditional on market cap being within 30% (Ritter and Welch, 2002). Each column includes additional control variables for issuers' post-IPO returns, IPO characteristics, and firm characteristics, which are defined in Appendix A1. Each column also includes Fama-French 49 industry and issue year-quarter fixed effects. t-statistics, using standard errors that are clustered by calendar year-quarter, are reported in parentheses below the coefficients. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	Cross-Sectional Beta			Firm-Specific Beta	
	Full Sample	High OAE Sensitivity	Low OAE Sensitivity	High OAE Sensitivity	Low OAE Sensitivity
	(1)	(2)	(3)	(4)	(5)
	OAE	OAE	OAE	OAE	OAE
NASDAQ Ret$_{[0,29]}$	**0.124*** **	**0.335*** **	**0.008**	**0.191*** **	**0.118*** **
	(5.23)	**(6.74)**	**(0.29)**	**(5.16)**	**(6.19)**
NASDAQ Ret.$_{[-180,-1]}$	0.022	-0.041	0.039**	-0.028	0.037**
	(1.18)	(-1.64)	(2.54)	(-1.24)	(2.22)
Firm Ret.$_{[0]}$	0.040***	0.206***	0.025***	0.241***	0.023***
	(4.08)	(9.87)	(3.95)	(7.35)	(3.13)
Nasdaq Ret.$_{[0,360]}$	-0.025	-0.012	-0.023	-0.033	-0.008
	(-1.54)	(-0.53)	(-1.62)	(-1.51)	(-0.44)
Ln(Pre-OAE Proceeds)	0.003	0.000	0.004	-0.000	0.007**
	(1.23)	(0.11)	(1.28)	(-0.05)	(2.15)
VC-Backed	0.006**	0.002	0.010***	0.005	0.003
	(2.17)	(0.46)	(3.47)	(1.10)	(0.89)
PE-Backed	0.000	0.002	-0.001	0.000	0.003
	(0.12)	(0.40)	(-0.25)	(0.06)	(0.68)
% Primary	-0.012**	-0.006	-0.017**	-0.011	-0.016**
	(-2.29)	(-0.85)	(-2.30)	(-1.42)	(-2.53)
Lead Managers	0.001	0.003	0.001	0.002	-0.002
	(0.65)	(1.24)	(0.26)	(0.88)	(-0.57)
Media Attn.	-0.002	-0.004	-0.000	-0.003	-0.002
	(-1.36)	(-1.62)	(-0.28)	(-1.49)	(-0.95)
Ln(Firm Age)	-0.000	-0.002	0.006**	0.001	0.001
	(-0.28)	(-1.33)	(2.25)	(0.57)	(0.62)
Ln(Assets)	-0.001	-0.000	-0.004*	-0.000	-0.003
	(-0.55)	(-0.02)	(-1.84)	(-0.08)	(-1.59)
Ln(MtB)	-0.001	-0.005	-0.001	-0.004	-0.004
	(-0.52)	(-1.48)	(-0.56)	(-1.06)	(-1.46)
Cash/Assets	-0.008	-0.011	-0.000	-0.008	-0.010

	(-1.26)	(-1.43)	(-0.01)	(-0.84)	(-1.27)
Net Income/Assets	0.005**	0.004	0.007***	0.007**	0.005**
	(2.35)	(1.51)	(2.81)	(2.27)	(2.12)
Sale/Assets	0.003***	0.002	-0.001	0.002	-0.000
	(2.81)	(1.30)	(-0.59)	(1.12)	(-0.26)
Total Debt/Assets	-0.004	0.001	-0.011***	0.005	-0.005
	(-1.35)	(0.24)	(-2.59)	(1.26)	(-1.03)
PP&E/Assets	0.008	-0.010	0.033***	-0.003	0.008
	(1.31)	(-1.14)	(4.42)	(-0.32)	(1.48)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.151	0.335	0.176	0.247	0.132
Observations	2,947	1,467	1,480	1,427	1,426

Table 4: Initial NASDAQ Returns and Post-IPO Visibility and Investor Interest

This table presents OLS regressions where the dependent variable in Columns 1 and 3 is the natural log of the number of analysts covering the firm (i.e., *Ln(Analysts)*), and the dependent variable in Columns 2 and 4 of is the percentage of shares held institutional shareholders (i.e., *IO %*). Dependent variables in each column are measured as of the fourth post-IPO quarterly filing. The explanatory variables of interest are the compounded NASDAQ returns over the first 30 days a firm is trading (i.e., NASDAQ Ret.$_{[0,29]}$), and the NASDAQ returns over the subsequent two thirty day periods (i.e., NASDAQ Ret.$_{[30,59]}$ and NASDAQ Ret.$_{[60,89]}$). Each column includes additional control variables for post-IPO returns as well as IPO and firm characteristics. Columns 1-2 contain a subsample of issuers with above-median sensitivity of OAO exercise to NASDAQ returns; Columns 3-4 contain a below-median subsample. We estimate sensitivity of OAO exercise to NASDAQ returns by computing abnormal firm returns over the first 30 days of trading, with the closest 50% of the sample to zero (in absolute value) classified as above median sensitivity. Abnormal firm returns are computed as firm returns minus the average cross-sectional equity beta times 30-day NASDAQ returns. The cross-sectional equity beta is estimated by regressing initial 30-day firm returns on initial 30-day NASDAQ returns; the beta is the estimated coefficient on 30-day NASDAQ returns. All variables are defined in Appendix A1. Each column also includes Fama-French 49 industry and issue year-quarter fixed effects. t-statistics, using standard errors that are clustered by calendar year-quarter, are reported in parentheses below the coefficients. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	High Sensitivity Sample		Low Sensitivity Sample	
	(1)	(2)	(1)	(2)
	Ln(Analysts)	IO %	Ln(Analysts)	IO %
	Year 1	Year 1	Year 1	Year 1
NASDAQ Ret.$_{[0,29]}$	**1.399*** **	**35.783*** **	**-0.004**	**3.685**
	(4.88)	**(2.58)**	**(-0.02)**	**(0.56)**
NASDAQ Ret.$_{[30,59]}$	0.354	-5.561	-0.154	-7.430
	(1.03)	(-0.41)	(-0.65)	(-0.95)
NASDAQ Ret.$_{[60,89]}$	0.339	16.329	0.124	-0.266
	(1.17)	(1.31)	(0.60)	(-0.04)
Returns Controls	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
IPO Controls	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes
Year-Quarter FEs	Yes	Yes	Yes	Yes
Adj. R-squared	0.618	0.650	0.588	0.354
Observations	1,410	1,410	1,451	1,450

Table 5: Effect of IPO Proceeds on First and Second Year Visibility and Investor Interest

This table presents second stage 2SLS regressions of post-IPO visibility and investor interest over the first and second year of trading to estimate the effect of changes in the amount of IPO capital raised. The dependent variable in Columns 1 and 3 is the natural log of the number analysts covering the firm (i.e., *Ln(Analysts)*). The dependent variable in Columns 2 and 4 is the percentage of shares held by institutional shareholders (i.e., *IO %*). The dependent variables in Columns 1 and 2 are measured at the end of the first year of trading, while the dependent variables in Column 3 and 4 are measured at the end of the second year of trading. The explanatory variable of interest is Instrumented OAE, which is the fitted value of OAE from Model 2 of Table 3. The regression sample for each column is restricted to firms with above-median sensitivity of OAO exercise to NASDAQ returns. We estimate sensitivity of OAO exercise to NASDAQ returns by computing abnormal firm returns over the first 30 days of trading, with the closest 50% of the sample to zero (in absolute value) classified as above median sensitivity. Abnormal firm returns are computed as firm returns minus the average cross-sectional equity beta times 30-day NASDAQ returns. The cross-sectional equity beta is estimated by regressing initial 30-day firm returns on initial 30-day NASDAQ returns; the beta is the estimated coefficient on 30-day NASDAQ returns. In addition to the four control variables listed, each column includes additional control variables for IPO and firm characteristics, which are defined in Appendix A1. Each column also includes Fama-French 49 industry and issue year-quarter fixed effects. t-statistics, using standard errors that are clustered by calendar year-quarter, are reported in parentheses below the coefficients. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	(1) Ln(Analysts) Year 1	(2) IO % Year 1	(3) Ln(Analysts) Year 2	(4) IO % Year 2
Instrumented OAE	**3.353*** **	**99.204*** **	**4.754*** **	**155.550*** **
	(4.82)	**(2.66)**	**(4.53)**	**(3.59)**
NASDAQ Ret.$_{[-180,-1]}$	0.201	1.141	0.008	-4.401
	(1.26)	(0.12)	(0.03)	(-0.38)
Firm Ret.$_{[0]}$	-0.514***	-17.198*	-0.706**	-19.987*
	(-3.10)	(-1.65)	(-2.36)	(-1.87)
Ln(Pre-OAE Proceeds)	0.281***	13.373***	0.305***	12.167***
	(11.57)	(8.66)	(8.43)	(7.45)
NASDAQ Ret.$_{[0, 360]}$	0.202	7.610	0.277	3.801
	(1.15)	(1.45)	(1.26)	(0.44)
Firm Controls	Yes	Yes	Yes	Yes
IPO Controls	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes
Year-Quarter FEs	Yes	Yes	Yes	Yes
Observations	1,439	1,439	1,292	1,271

Table 6: Immediate Effect of IPO Proceeds on Ownership Dispersion and Liquidity

This table presents second stage 2SLS regressions of the immediate post-IPO effect of changes in the amount of IPO capital raised on ownership dispersion and stock liquidity. The dependent variable in Column 1 is the natural log of the number of institutional shareholders (i.e., *Ownership Dispersion*). The dependent variable in Column 2 is the average daily bid-ask spread as a percentage of price (i.e., *Liquidity*). The dependent variable in Column1 is measured as of the second post-IPO quarterly filing, while the dependent variable in Column 2 is averaged throughout the 60 days ending at the second post-IPO filing. The explanatory variable of interest is Instrumented OAE, which is the fitted value of OAE from Model 2 of Table 3. The regression sample for each column is restricted to firms with above-median sensitivity of OAO exercise to NASDAQ returns. We estimate sensitivity of OAO exercise to NASDAQ returns by computing abnormal firm returns over the first 30 days of trading, with the closest 50% of the sample to zero (in absolute value) classified as above median sensitivity. Abnormal firm returns are computed as firm returns minus the average cross-sectional equity beta times 30-day NASDAQ returns. The cross-sectional equity beta is estimated by regressing initial 30-day firm returns on initial 30-day NASDAQ returns; the beta is the estimated coefficient on 30-day NASDAQ returns. In addition to the four control variables listed, each column includes additional control variables for IPO and firm characteristics, which are defined in Appendix A1. Each column also includes Fama-French 49 industry and issue year-quarter fixed effects. t-statistics, using standard errors that are clustered by calendar year-quarter, are reported in parentheses below the coefficients. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	(1) Ownership Dispersion	(2) Liquidity
Instrumented OAE	**4.509*** **	**-0.110*** **
	(3.31)	**(-3.44)**
NASDAQ Ret.$_{[-180,-1]}$	0.288	-0.002
	(0.73)	(-0.21)
Firm Ret.$_{[0]}$	-0.512	0.014*
	(-1.58)	(1.91)
Ln(Pre-OAE Proceeds)	0.547***	-0.006***
	(10.47)	(-8.05)
NASDAQ Ret.$_{[0, 360]}$	0.189	-0.009
	(0.66)	(-1.33)
Firm Controls	Yes	Yes
IPO Controls	Yes	Yes
Industry FEs	Yes	Yes
Year-Quarter FEs	Yes	Yes
Observations	1,466	1,461

Table 7: Effect of IPO Proceeds on Future Equity Capital Raising

This table presents second stage 2SLS regressions estimating the effect of additional IPO proceeds on the degree of future equity raising over the first and second year following the IPO. The dependent variables in Columns 1 and 2 are indicator variables equaling one if a firm conducts an SEO over the first four completed quarters following the IPO (Column 1), or the second set of four completed quarters (Column 2), and zero otherwise. The dependent variable in Column 3 (4) is the natural log of one plus total SEO proceeds raised by the IPO firm during the first (second) four completed quarters following the IPO scaled by IPO proceeds. The explanatory variable of interest in each column is *Instrumented OAE*, which is the fitted value of OAE from Model 2 of Table 3. The regression sample for each column is restricted to firms with above-median sensitivity of OAO exercise to NASDAQ returns. We estimate sensitivity of OAO exercise to NASDAQ returns by computing abnormal firm returns over the first 30 days of trading, with the closest 50% of the sample to zero (in absolute value) classified as above median sensitivity. Abnormal firm returns are computed as firm returns minus the average cross-sectional equity beta times 30-day NASDAQ returns. The cross-sectional equity beta is estimated by regressing initial 30-day firm returns on initial 30-day NASDAQ returns; the beta is the estimated coefficient on 30-day NASDAQ returns. In addition to the four control variables listed, each column includes additional control variables for IPO and firm characteristics, which are defined in Appendix A1. Each column also includes Fama-French 49 industry and issue year-quarter fixed effects. t-statistics, using standard errors that are clustered by calendar year-quarter, are reported in parentheses below the coefficients. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	(1) SEO Indicator Year 1	(2) SEO Indicator Year 2	(3) Ln(SEO Proceeds Year 1)	(4) Ln(SEO Proceeds Year 2)
Instrumented OAE	**2.473*** **	**1.674*** **	**13.033*** **	**8.758** **
	(3.74)	**(2.59)**	**(3.63)**	**(2.44)**
NASDAQ Ret.$_{[-180,-1]}$	-0.162	0.113	-0.833	0.260
	(-0.86)	(0.62)	(-0.81)	(0.26)
Firm Ret.$_{[0]}$	-0.402**	-0.513***	-2.151**	-2.524**
	(-2.17)	(-2.73)	(-2.15)	(-2.35)
Ln(Pre-OAE Proceeds)	0.051**	0.016	0.326***	0.156
	(2.33)	(0.88)	(2.61)	(1.50)
NASDAQ Ret.$_{[0, 360]}$	0.129	0.087	0.688	0.196
	(0.81)	(0.73)	(0.92)	(0.32)
Firm Controls	Yes	Yes	Yes	Yes
IPO Controls	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes
Year-Quarter FEs	Yes	Yes	Yes	Yes
Observations	1,410	1,254	1,410	1,254

Table 8: Firm Survival

This table presents Cox and second stage 2SLS regressions explaining variation in the probability of exchange delistment after a firm goes public. The dependent variable in Column 1 is the time to delistment (in months) if the IPO firm delists before the end of the year 2016, and the number of months until the end of the year 2016 otherwise. This represents right-censored, single-event survival data. Column 1 is thus estimated using a Cox hazard model, which estimates the conditional probability of delistment, given that the firm has survived up to a given point. Delistment is measured as exchange removal for negative reasons using CRSP codes 200-290 (buyout), 400-490 (liquidation), 500 (stopped trading, reason unavailable), 505-591 (stopped trading, reason supplied), and 700. The dependent variable in Column 2 is an indicator variable equaling one if the firm delists (for the reasons mentioned above) within the first two years of trading and zero otherwise. The explanatory variable of interest in Column 1 is the buy-and-hold NASDAQ returns over the first 30 days of trading (i.e., *NASDAQ Ret.*$_{[0,29]}$), and the main explanatory variable in Column 2 is *Instrumented OAE*, which is the fitted value of OAE from Model 2 of Table 3. The regression sample for each column is restricted to firms with above-median sensitivity of OAO exercise to NASDAQ returns. We estimate sensitivity of OAO exercise to NASDAQ returns by computing abnormal firm returns over the first 30 days of trading, with the closest 50% of the sample to zero (in absolute value) classified as above median sensitivity. Abnormal firm returns are computed as firm returns minus the average cross-sectional equity beta times 30-day NASDAQ returns. The cross-sectional equity beta is estimated by regressing initial 30-day firm returns on initial 30-day NASDAQ returns; the beta is the estimated coefficient on 30-day NASDAQ returns. In addition to the four control variables listed, each column includes additional control variables for IPO and firm characteristics, which are defined in Appendix A1. Column 2 also includes Fama-French 49 industry and issue year-quarter fixed effects. t-statistics, using standard errors that are clustered by calendar year-quarter, are reported in parentheses below the coefficients. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	(1) Delistment Rate	(2) Delist within 2 Years
NASDAQ Ret.$_{[0,29]}$	**-1.427*** **	
	(-2.82)	
Instrumented OAE		**-1.830*** **
		(-3.63)
NASDAQ Ret.$_{[-180,-1]}$	0.182	-0.197
	(0.74)	(-1.07)
Firm Ret.$_{[0]}$	0.265	0.504***
	(0.93)	(3.23)
Ln(Pre-OAE Proceeds)	-0.028	0.001
	(-0.44)	(0.08)
NASDAQ Ret.$_{[0, 360]}$	0.228	0.065
	(1.49)	(0.30)
Firm Controls	Yes	Yes
IPO Controls	Yes	Yes
Industry FEs	No	Yes
Year-Quarter FEs	No	Yes
Observations	1,410	1,410