Do information producers boost liquidity of IPOs?

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ABSTRACT

This study documents that the presence of potential information producers boosts after-market liquidity for IPOs. The potential information producers examined were number of shareholders, number of analysts, and number of institutional investors. The results show that in general, presence of information producers boosts liquidity of IPOs. Perhaps more importantly, though, no information producer increases all three liquidity measures used: while presence of more number of shareholders and/or institutional investors is important in reducing spreads (i.e., average proportional realized spread and average proportional quoted spread), presence of more number of analysts is important in reducing price sensitivity to order flows (i.e., proportional Kyle λ).

Keywords: liquidity, information producers, initial public offerings

INTRODUCTION

Prior studies on Initial Public Offering (IPOs) suggest reasons why liquidity of IPO shares in the after-market is important to various stakeholders in the IPO process. For example, liquidity of shares is important to insiders of IPO firms because greater liquidity allows the opportunity to trade retained shares on more favorable terms (Aggarwal et al., 2002; Cao et al., 2004). To managers of IPO firms, greater liquidity can lower cost of capital (Boot et al. (2006)) and reduce issue costs of future equity offerings (Aslan and Kumar, 2011; Butler et al., 2005).

Since liquidity can be beneficial to various stakeholders in the IPO process, it is plausible for IPO firms to take actions to increase liquidity of IPO shares. Many IPO studies suggested that IPO firms deliberately set the IPO price lower than the perceived fair value (i.e., underpricing the issue) to increase liquidity in the after-market. This conjecture is not surprising because setting the IPO price is one of the most influential decisions IPO firms can use to incentivize participants to do the things that benefit their stakeholders in the IPO process. For example, Booth and Chua (1996) suggest that issuers underprice to promote oversubscription to allow broad initial ownership. This broad ownership, in turn, increases after-market liquidity. Several studies find evidence consistent with the conjectures of Booth and Chua (see e.g., Pham et al., 2003; Zheng and Li, 2008).

Intuitively, the information arriving in the market about the stocks will trigger the trading activities of investors, determining the liquidity of the stocks in the market. However, before any information becomes available to the market, some information producers should produce it first. Therefore, whether presence of potential information producers increases liquidity of stocks, and if it does, the presence of which type of potential information producers increases which type of liquidity are interesting questions to answer. The liquidity literature does not use the term "information producer" but hints that in general, there is positive relation between liquidity and presence of potential information producers as this study identifies below: Demsetz (1968), Benston and Hagerman (1974) and Jacoby and Zheng (2010) find direct evidence on the positive relationship between the number of shareholders and liquidity. Blume and Keim (2012) report the positive relationship between the number of institutional investors and liquidity. Roulstone (2003) provides evidence on the positive relationship between the number of analysts and liquidity.

What does IPO literature say about relation between liquidity and presence of potential information producers? First, the impacts of number of shareholders and number of analysts on IPO liquidity have not been thoroughly studied yet, while analyst coverage has been mostly used to explain IPO underpricing. Second, the relation between institutional investors and liquidity has been explored primarily from the ownership structure implication on liquidity as we can see in Pham et al. (2003) and Zheng and Li (2008). In addition, these studies mostly used institutional ownership percent but Blume and Keim (2012) suggests that number of institutional investors explain liquidity better. Therefore, it is fair to say that IPO literature has some hints on the relation between presence of potential information producers and liquidity in the after-market. But up to date, no study in the IPO literature investigated the impact of presence of comprehensive list of potential information producers on after-market liquidity. This study fills the gap.

As Ellul and Pagano (2006) summarizes, empirical literature on liquidity identifies that in general, past trading volume and return volatility as major factors influencing liquidity. For liquidity of IPOs, some issue characteristic variables can affect liquidity as well. However, the

focus of the current study is the impact of presence of potential information producers on IPO liquidity. This study considers three different types of potential information producers: number of shareholders, number of institutional investors, and number of analysts.

The next section sets up the empirical framework. It also discusses the variables and data. The following section presents the empirical results and the last section concludes.

EMPIRICAL FRAMEWORK, VARIABLES, AND DATA

It is rather intuitive that presence of potential information producers may increase after-market liquidity of IPO shares. This is because new information primarily drives security transactions. The potential information producers for IPOs this study considers are shareholders, institutional investors, and analysts because of the reasons explained below.

First, intuitively shareholders produce information by researching industry news, surveying the consumer reports etc. For example, YouTube videos, blog postings, and many investment-related forums and websites are full of information produced by investors and shareholders. This study expects that more shareholders there are, higher the liquidity for a stock. However, even if shareholders are not directly producing information about IPO firms, there is another reason why large size of shareholder base can affect liquidity: Holmstrom and Tirole (1993) suggests that presence of large base of investors is necessary for the information production by informed investors. Since informed traders directly extract their compensation for monitoring the firm (hence producing information) from trading profits, the issuing firm should entice enough number of uninformed investors to participate in the trades. Therefore, more number of shareholders can increase after-market liquidity of IPOs. Booth and Chua (1996) also suggest that a larger size of shareholder base may result in higher liquidity of IPOs.

Second, institutional investors have research teams equipped with various skills and access to resources. Therefore, more number of institutional investors investing in IPO firms may mean more information produced about the value of the IPO firms and eventually increase after-market liquidity. Cornelli and Goldreich (2001) explain that institutional investors indicate their interest on IPOs during the bookbuilding process of the offering, helping underwriters in setting the final offer price. Kahn and Winton (2002) also indicate that institutional investors may stay involved with IPO firms to be able to trade profitably on the information they possess in the after-market.

Third, the security analysts play their roles as information producers by producing research reports and earnings forecasts. Empirical studies find that analysts have expert knowledge in industries (Boni and Womack (2006) and Chan and Hameed (2006)) and produce firm specific information (Park and Stice (2000) and Forbes, Huijgen, and Plantinga (2004)). Therefore, this study expects that more number of analysts increase after-market liquidity of IPOs.

In formulating the empirical model, we regress after-market liquidity measures of IPOs on potential information producers after controlling for IPO issue characteristics and trading volume and volatility. Issue characteristics include log of market capitalization, percent of primary shares in the issue, underwriter rank, venture-backing dummy, log of firm age, and tech industry dummy. Based on the liquidity literature, we use contemporaneous average trading volume and return volatility of IPO issues as additional control variables.

Independent Variables

Volume & Volatility: Empirical literature on liquidity identifies, in general, past trading volume and return volatility as major factors influencing liquidity, as Ellul and Pagano (2006) summarizes. This study uses contemporaneous average trading volume and return volatility to control liquidity. While the use of contemporaneous average trading volume and return volatility can cause endogeneity issue, it should not be a big problem since these are used as control variables of liquidity, rather than key explanatory variable.

Issue Characteristics: Conceivably, some issue characteristics can influence after-market liquidity. In the finance literature, the size of the firm often indicates the information available about the firm. Therefore, to control for the size effect on amount of information available, this study includes log of market capitalization calculated as the offer price times number of shares outstanding at the time of offer. Next, percent of primary shares in the offering was included to control for the liquidity effect of percent of shares floating because liquidity is affected by the percentage of shares available for trading. It is calculated as the number of shares newly issued divided by the total shares offered. Log of age is included as additional control for available information.

In IPO literature, IPOs hiring highly reputable underwriters or backed by venture capital firm are considered richer in information: prestigious underwriters (Carter and Manaster 1990, Gompers 1996, Carter et al. 1998) and venture capital firms (Aggarwal et al. 2002, Bradley and Jordan 2002, Loughran and Ritter 2004) are often very selective, working with IPO firms with low uncertainty. Underwriter rank data was from Jay Ritter's web site and venture backed dummy is defined as having a value of one if the issue was backed by a venture capital firm and a value of zero otherwise. Lastly, since the membership in the tech industry can affect liquidity, tech industry dummy was included and tech industry data were from Jay Ritter's web site.

Information Producers: The variables of potential information producers are number of shareholders, number of institutional investors, and number of analysts. *Number of shareholders* is the total number of shareholders at the first reporting date following the offering. *Number of institutional investors* is the number of institutional investors having equity ownership in the IPO by the end of immediate quarter after the IPO. *Number of analysts* is the number of analysts covering the IPO by the end of the immediate quarter after the IPO.

Dependent Variables

Arguably, two most popularly used liquidity measures are bid ask spread-based measures and price impact related measures. This study uses three liquidity measures of IPOs in the after-market as dependent variables often found in liquidity studies: APRS (average proportional realized spread), APQS (average proportional quoted spread), and proportional Kyle λ (i.e., price sensitivity to order flows defined in Kyle (1985) divided by average price).[1] In calculation of APQS and APRS, this study used intraday minute-by-minute trades and quotes for the first four weeks from the IPO date on Nasdaq from the NYSE's Trade and Quotes database (TAQ), and

[1] The realized proportional spread is defined as twice the absolute value of the difference between the most recent transaction price and the quote midpoint prevailing after the trade divided by that quote midpoint. The quoted proportional spread is defined as the difference between the quoted ask price and the quoted bid price divided by the quote midpoint. Interpretation of these liquidity measures is obvious: Wider the spreads are, lower the liquidity. Bigger the sensitivity of the price, the lower the liquidity. In other words, these measures capture illiquidity.

followed the method used by Cao et al. (2004). Kyle λ was estimated using the same data following Brennan and Subrahmanyam's (1996) implementation of the Glosten and Harris (1988) method.[2]

Data

The sample of IPOs used in this study includes all newly issued common stocks listed on the Nasdaq during the period from 2001 to 2009. IPO firm name, offer date, offer price, number of shares outstanding, whether the IPOs are venture capital backed, and number of shares offered are extracted from Thomson Financial's SDC (Security Data Company) database. In addition, daily trading volume and daily returns are extracted for the first 4 weeks of trading from the Center for Research in Security Prices U.S. Stock Database (CRSP) and Compustat. Intraday minute-by-minute trades and quotes on Nasdaq are from the NYSE's Trade and Quotes database (TAQ). Following the other IPO studies, IPOs for firms incorporated outside the United States, closed-end funds, and REITs (Real Estate Investment trusts) were excluded. Also excluded were IPO firms with no valid data from either CRSP or TAQ, IPO firms that change exchange listings or went through mergers or acquisitions within one year after the offerings, and IPOs with an offer price less than $5. After applying these filters, there are 641 IPOs left in the sample.

The key independent variables are number of shareholders at IPO, the number of institutional investors holding equity ownership in the IPO and the number of analysts covering the IPO firm by the end of immediate quarter after the issue. Number of shareholders was from Compustat, number of institutional investors for IPOs was from 13F filings compiled by Thomson Reuters, and number of analysts covering IPOs was from the I.B.E.S. database.

EMPIRICAL RESULTS

Table 1 shows summary statistics on the variables used in the empirical analysis. Average proportional realized spread, average proportional quoted spread, and proportional Kyle λ have mean values 1.13%, 1.54%, and 0.023. Both the standard deviation and minimum and maximum values of potential information producer variables suggest a considerable variation.

Table 2 shows the correlation between liquidity variables and independent variables. Two variables, percent of primary shares and venture-backed dummy, are statistically significant and positively correlated with each of the liquidity variables. All other independent variables excluding potential information producer variables, show inconsistency in the manner they correlate with liquidity variables, either in the sign of the correlation or in the statistical significance. For example, average trading volume is statistically significant and negatively correlated to spread based liquidity variables (i.e., APRS and APQS) but is statistically insignificant and positively correlated with price sensitivity liquidity variable (i.e., proportional Kyle λ).

Regression results of liquidity measures

The results of the (il)liquidity regressions on the potential information producers in table 3 show that the models explain significant percent of the variation in liquidity variables: r-

[2] For more detailed estimation process of these three (il)liquidity measures, please see Hahn, Ligon, and Rhodes (2013).

squares are 37.13%, 41.25%, and 17.87% for regressions of APRS, APQS, and proportional Kyle λ respectively.

In APRS regression, average volume has a negative sign but statistically insignificant. In contrast, variance of returns is statistically significant and positively correlated with APRS. Among issue characteristic variables, log of market capitalization is negatively correlated with APRS and it is statistically significant. This means IPOs with larger market cap experience lower proportional spread, i.e., higher liquidity. Venture-backed dummy is another statistically significant variable and it is positively correlated with APRS, meaning that IPOs backed by venture capital firms tend to have higher proportional spread, i.e., lower liquidity. All three information producer variables are statistically significant and negatively correlated with APRS, implying that information producers boost liquidity.

In APQS regression, average volume and variance of returns are not statistically significant, although their signs are consistent with those in APRS regression. Among issue characteristic variables, log of market capitalization is negatively correlated with APQS and it is statistically significant. This means IPOs with larger market cap experience lower quoted spread, i.e., higher liquidity. Underwriter rank and log of firm age are two additional issue characteristic variables that are statistically significant and have negative signs, implying that IPOs which have been around longer and use more reputable underwriters tend to have lower quoted spread, i.e., higher liquidity. Venture-backed dummy is another statistically significant variable and it is positively correlated with APQS, meaning that IPOs backed by venture capital firms tend to have higher quoted spread, i.e., lower liquidity. Two information producer variables, number of shareholders and number of institutions, are statistically significant and negatively correlated with APQS, implying that those information producers boost liquidity.

In proportional Kyle λ regression, both average volume and variance of returns are statistically significant, although the former is negatively and the latter is positively correlated with proportional Kyle λ (i.e., price sensitivity to order flows). Among issue characteristic variables, log of market capitalization, percent of primary shares, and tech industry dummy are statistically significant and are positively correlated with proportional Kyle λ. This means IPOs with larger market cap, higher percent of primary shares, and from tech industry experience higher proportional Kyle λ, i.e., higher price sensitivity to order flows hence lower liquidity. Only one information producer variable, number of analysts, is statistically significant and negatively correlated with proportional Kyle λ, implying that presence of analysts boost liquidity.

CONCLUSION

This study finds evidence that presence of potential information producers increases after-market liquidity of IPOs. The three information producer variables we examined were number of shareholders, number of institutional investors, and number of analysts. For liquidity measures, we used two spread measures, APRS (Average Proportional Realized Spread) and APQS (Average Proportional Quoted Spread), and one price sensitivity to order flows measure, proportional Kyle λ. In all three liquidity measures, higher value means low liquidity.

The results suggest that no one information producer significantly increases all three measures of liquidity. In fact, each information producer variable is statistically significant for two liquidity regressions. For example, number of shareholders and number of institutions are shown significantly improves liquidity when liquidity is measured by APRS and/or APQS, while

number of analysts is shown significantly to improve liquidity when liquidity is measured by proportional Kyle λ. This result has implications for participants in IPO market. In other words, anyone who would like to decrease spreads of IPOs should take actions to increase number of shareholders and/or number of institutions, while anyone who would like to reduce price sensitivity should entice more analysts.

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APPENDIX

Table 1
Summary Statistics

Variable	N	Mean	STD	Min	Max
Liquidity Measures:					
APRS	641	0.0113	0.0063	0.0011	0.0631
APQS	641	0.0154	0.0085	0.0009	0.0534
Proportional Kyle λ	641	0.0233	0.0699	-0.1419	1.4593
Volume & Volatility Control:					
Average Volume	641	7.7520	13.7196	0.1125	298.5290
Variance of Returns	641	0.3439	0.5596	0.0009	5.2457
Issue Characteristic:					
Market Capitalization	641	761212	1608326	12577	21700000
Percent of Primary Shares	641	0.9114	0.1686	0.0284	1.0000
Underwriter Rank	641	7.1981	2.4348	0	9
Venture Backed	641	0.4299	0.4951	0	1
Firm Age	641	12.5755	19.6558	0	165
Tech Industry Dummy	641	0.3310	0.4707	0	1
Information Producers:					
Number of shareholders	641	1.3831	4.7388	1	273
Number of Analysts	641	29.2687	24.2251	0	74
Number of Institutions	641	2.3347	2.0374	0	29
Initial Return	641	0.27693	0.61874	-0.9834	13.04167

Table 2
Correlation between potential information producers and after-market liquidity

	APRS	APQS	Kyle λ
APRS	1		
APQS	0.8250***	1	
Proportional Kyle λ	-0.0726	-0.1801***	1
Average Trading Volume	-0.3508***	-0.4048***	0.1287
Variance of Daily Return	0.1486***	-0.0566	0.258***
Log of Market Cap	-0.5142***	-0.6004***	0.3217***
Percent of Primary Shares	0.1390***	0.0880***	0.1008***
Underwriter Rank	-0.0908***	-0.1720***	0.0816
Venture Backed	0.2413***	0.2204***	0.1140***
Log of Firm Age	-0.1188***	-0.1012***	-0.0667
Tech Industry Dummy	-0.0044	-0.0736	0.2325***
Number of Shareholders	-0.1163***	-0.1330	0.0919***
Number of Institutions	-0.4742***	-0.4861***	0.1554***
Number of Analysts	-0.3074***	-0.2210	-0.0138***

* indicates statistical significance at 10% level. ** indicates statistical significance at 5% level. *** indicates statistical significance at 1% level.

Table 3
After-market liquidity as a function of potential information producers

	APRS		APQS		Proportional Kyle λ	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Volume & Volatility Control:						
Average Volume	-0.00002	0.00002	-0.00003	0.00003	-0.00038*	0.0002
Variance of Returns	0.00187***	0.00033	0.00010	0.00048	0.01042*	0.00547
Issue Characteristic:						
Log of Market Capitalization	-0.00252***	0.00028	-0.00407***	0.00039	0.01649***	0.00414
Percent of Primary Shares	0.00092	0.00143	0.00099	0.00161	0.01743***	0.00674
Underwriter Rank	-0.00006	0.00007	-0.00018*	0.00003	-0.00021	0.00057
Venture Backed	0.00161***	0.00046	0.00257***	0.00057	0.00591	0.00375
Log of Firm Age	-0.00028	0.00019	-0.00048*	0.00025	0.00031	0.00116
Tech Industry Dummy	0.00002	0.0004	-0.00011	0.00059	0.01213***	0.00466
Information Producers:						
Number of Shareholders	-0.00005*	0.00003	-0.00009**	0.00004	0.00065	0.00047
Number of Institutions	-0.00002*	0.00001	-0.00002*	0.00001	0.00001	0.00011
Number of Analysts	-0.00019*	0.00009	0.00003	0.00014	-0.00196*	0.00103
Constant	0.04409***	0.0034	0.06959***	0.0049	-0.21113***	0.05103
N	641		641		641	
Adj. R-Square	37.13%		41.25%		17.87%	

* indicates statistical significance at 10% level. ** indicates statistical significance at 5% level. *** indicates statistical significance at 1% level.