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Innovations in new venture financing: Evidence from Indian SME IPOs

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1. Introduction

One of the most fundamental questions of enterprise research is, how are new ventures financed (Cassar, 2004; Fraser, 2005)? Access to finance is a critical factor in the survival, growth, and profitability of entrepreneurial ventures (Clatworthy, 1998), and a key growth constraint for small and medium enterprises (SMEs) in particular (Beck & Demirgüç-Kunt, 2006). SMEs with limited tangible assets and low profitability often find it difficult to obtain bank loans (Jiang, Cai, Keasey, Wright, & Zhang, 2014). Beck, Demirgüç-Kunt, and Martinez Peria (2008) examine SME financing practices in 45 countries and find that debt financing is costlier and more difficult for SMEs to obtain because they have a higher perceived risk of default. De and Nagaraj (2014) find that even though smaller firms are more productive and have lower response time to market, they lack political clout and have less access to government credits than do larger firms. In a study of Indian manufacturing sector firms, Ghosh (2007) finds a high concentration of bank debt among the SME firms. Yet SMEs contribute to socioeconomic development by creating new businesses and jobs (Beck, Demirgüç-Kunt, & Maksimovic, 2005), a role that is particularly important in emerging economies.[1] Recognizing the importance of the micro, small, and medium enterprise (MSME) sector in the country's economic growth, employment generation, and export capability, in 2014 the government of India launched a "Make in India" program to boost the sector's manufacturing and design capabilities.

One of the ways in which an SME firm can overcome its financing constraints is to use an initial public offering (IPO) (Kim, 1999). Going public helps an issuing firm gain better visibility and prestige, increase borrowing capacity (Kim, 1999), lower the cost of capital (Ibbotson, Sindelar, & Ritter, 1988), and expand its existing network of relationships with outside agents (Ravasi & Marchisio, 2003). Entrepreneurs and venture capitalists can exit from their liquid investments and diversify their portfolios if the investee firms are listed on the stock exchange. But SMEs find it challenging to raise equity from outside investors because of adverse selection and information asymmetry (Becchetti & Trovato, 2002), and difficult to list their IPOs on the main board because of regulatory constraints related to firm size, profitability, and net worth.

Therefore, specialized stock markets have been set up targeting SMEs, or specific segments of a main stock exchange have been dedicated to direct listing and trading facilities for SME firms. These specialized SME markets, also known as new or junior markets, usually have more lenient listing rules and help fill the equity gap for new and emerging businesses. The World Federation of Exchanges (WFE) provides a list of 35 SME markets from around the world, as of the end of 2014, including NASDAQ

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[1] For example, the micro, small, and medium enterprise (MSME) sector in India consists of about 36 million units and provides employment to over 80 million people. The MSME sector in India manufactures over 6000 products, and contributes to around 8% of GDP, 45% of total manufacturing output, and 40% of the country's exports (MSME, 2016).

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(US), AIM (London), TSX Venture (Canada), KOSDAQ (Korea), MOTHERS (Japan), GEM (Hong Kong), and ChiNext (China). Several studies have looked at the challenges and benefits of such new, SME, or junior markets in the developed economies,[2] but their potential in emerging economies has not been extensively analyzed[3] and remains a timely and important topic for research.

To our knowledge, our study is the first to examine SME IPOs that are listed on the dedicated BSE SME Exchange in India. Our sample comprises 106 SME IPOs that were listed on the BSE SME Exchange from its inception in 2012 to the end of August 2015. The distinctive regulations of the BSE SME Exchange related to mandatory underwriting and market making responsibilities, minimum investor participation, IPO process timelines, company characteristics required for listing, and ongoing disclosure requirements differentiate it from the BSE Main Board.

In this paper, we first examine the determinants of IPO underpricing in the BSE SME Exchange. In particular, we analyze how IPO allocation to market makers and timing of SME IPOs are associated with the degree of IPO underpricing. Second, we investigate how IPO allocation to market makers and IPO demand from retail individual investors affect the development of IPO aftermarket liquidity. Finally, we study the determinants of long-run performance of SME IPOs, and test the ability of SME IPO timing and IPO underwriter reputation to predict that long-run performance.

The rest of the paper is organized as follows. Section 2 discusses the institutional context and distinctive regulations of the BSE SME Exchange. Section 3 reviews the related IPO literature on initial underpricing, aftermarket liquidity, and long-run performance, and develops the key hypotheses of our research. Section 4 describes the sample data and descriptive statistics; Section 5 presents the research design. The results are discussed in Section 6. Finally, Section 7 concludes our study.

2. Institutional context

2.1. The BSE SME exchange

The BSE SME Exchange is the first dedicated stock exchange for Indian SMEs. In 2010 the Indian government recommended setting up a dedicated stock exchange for SMEs to provide them with greater equity financing opportunities. It envisaged that a dedicated SME platform would encourage entrepreneurship and innovation by helping SMEs and investors to come together. The BSE received final approval from the Indian securities market regulator, the Securities Exchange Board of India (SEBI), to launch the SME platform in 2011, and the first SME IPO was listed on this exchange in March 2012.[4]

The BSE SME Exchange uses the BSE on-line trading (BOLT) platform as its trading system. Normal trading hours are between 09:00:00 and 15:30:00. The risk management system is similar to that of the Main Board: all the mark to market margins, VAR margins, extreme loss margin, and special margins applicable to the Main Board also hold for the SME Exchange. The trade settlement cycle is T + 2 days, as on the Main Board. However, while the BSE Main Board is organized as a purely order-driven stock exchange, the trading system on the SME Exchange can be either quote-driven or hybrid.

2.2. Distinctive regulations

Both SEBI and BSE have laid down regulations for the governance of the SME Exchange, several of which differ from the regulations applicable on the BSE Main Exchange and are designed to accommodate the funding requirements of Indian SMEs while also protecting the interests of the investor community. First, the SME IPOs are mandatorily 100% underwritten by the investment bank managing the IPO listing, out of which at least 15% of the shares are to be underwritten on its own account. This ensures guaranteed subscription of the SME IPOs by the underwriters even if the market response is poor.

Second, the investment bank managing the SME IPO is also responsible for mandatory market making during the initial three years from IPO listing. During this period, the market makers are required to provide two-way quotes for at least 75% of the time on any given trading day. This ensures liquidity of SME stocks in the secondary market by allowing investors to trade against the quotes provided by the market makers at any point in time. Third, the minimum number of investors participating in an SME IPO is only 50, as against the minimum requirement of 1000 investors for an IPO on the Main Board. But the minimum application amount as well as the minimum trading lot is INR 100,000 on the SME Exchange. This threshold amount has been deliberately kept higher for the SME Exchange than for the Main Board to encourage only informed investors to participate in SME IPOs, which are generally considered riskier because of greater information asymmetry and adverse selection issues.

Fourth, the SME IPO process is shorter and faster than the listing process in the Main Board. For example, firms must get approval from the SME Exchange before listing, but SEBI approval is not required, as it is for Main Board listing. Similarly, Main Board requirements such as filing a draft red herring prospectus (DRHP) and issuance of public notice have been waived for listing on the SME Exchange. Consequently, the entire IPO process can be completed within 2 to 3 months on the SME Exchange as against the average of 8 to 9 months on the Main Board.

[2] Previous studies have examined SME stock exchanges in various developed economies such as Canada (Carpentier, L'her, & Suret, 2010), the UK (Amini, Keasey, & Hudson, 2010), Germany (Martin, 2001), France (Mahérault & Belletante, 2004), and Japan (Honjo & Harada, 2006).

[3] More recently, Tan, Huang, and Lu (2013) and Jiang et al. (2014) have examined the Chinese SME exchange.

[4] Subsequently, the National Stock Exchange (NSE), which is the other major Indian stock exchange, also launched its own dedicated SME exchange in September 2012. As of 30 September 2016, 20 SMEs were listed on this exchange.

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Fifth, the listing conditions for SMEs are easier than those of the Main Board. An issuer with postissue face value capital between INR 10 million and INR 250 million is eligible for listing in the SME Exchange; beyond 250 million, the issuer must migrate to the Main Board. The listing conditions on minimum tangible assets, net worth, and track record of distributable profits are also simpler for the SME Exchange. Finally, the compliance norms are less stringent, as listed SMEs are required to report financial results only half yearly, not quarterly as on the Main Board.

The distinctive regulations of the SME Exchange are likely to influence pricing and investor participation in SME IPOs. For example, the SME IPO process being faster than listing on the Main Board, we would expect higher information asymmetry in the SME IPO market, as investors and research analysts would have less time to produce information and analyze values. Further, the listing conditions and compliance norms being less stringent for the listed SMEs, investors are also likely to face higher adverse selection risks in this market. Consequently, we would expect SME IPOs to be more underpriced as a compensation for this additional risk. On the other hand, the higher minimum application amount (INR 100,000) and lower minimum investor participation (50) required in an SME IPO are likely to reduce the participation of retail investors.

Moreover, since market making is mandatory during the first three years of the SME IPO aftermarket, and there is regulatory onus on the underwriting investment bank to ensure liquidity in the listed stock in the form of continuous two-way quotes, at least a portion of SME IPOs is always allocated to the market makers. This allocation is made on a discretionary or firm allotment basis, and hence the oversubscription time in the market-maker segment of the IPO is always 1. Finally, since SME IPOs must be 100% underwritten by the investment bank that is managing the IPO listing, they are more likely to be timed to market, as the investment bank has a greater incentive to minimize its underwriting risks in case the market should respond unfavorably. We discuss our findings in this paper in Sections 5 and 6.

3. Background literature and hypotheses

3.1. IPO underpricing

IPO underpricing is one of the most commonly studied and typical empirical facts in corporate finance (Ljungqvist, 2005; Loughran, Ritter, & Rydqvist, 1994). Several explanations have been proposed, of which a vast majority assume information asymmetry. For example, Rock (1986) suggests a winner's curse model in which the issuer deliberately underprices its IPO to elicit participation from uninformed investors. Beatty and Ritter (1986) interpret IPO underpricing as a compensation provided to investors by the issuer for ex-ante uncertainty risk. Their framework implies that underpricing should be positively related to the degree of information asymmetry between the IPO firm and the outside investors, and any certification mechanism that reduces this information risk should also reduce underpricing. Accordingly, credible signals such as high quality underwriters (Carter & Manaster, 1990) and auditors (Beatty, 1989), and backing of venture capitalist investors (Megginson & Weiss, 1991), have been found to be negatively associated with the degree of IPO underpricing.

The information asymmetry risk is acute for newly listed firms, as there is usually very little information about such firms in the public domain, and of course no historical trading data for benchmarking the firm valuation. This risk is particularly severe for SME IPOs, since smaller firms are often perceived to have higher probability of default (Beck et al., 2008). Such information asymmetry raises the cost of external funds, and contributes to additional financing constraints for SMEs (Kim, 1999). Mahérault (2004) examines a sample of IPOs issued by French small and medium-sized family businesses, and finds that their equity financing strategies differ from those adopted by non-SME firms. Similarly, Gregory, Rutherford, Oswald, and Gardiner (2005) examine the financial growth model of SME firms and suggest that their financing strategies differ from those of large firms. Mahérault and Belletante (2004) examine firms listed on the French SME exchange and find evidence of mispricing in the SME IPO market. Carpentier and Suret (2010) examine new venture listings on the Canadian SME exchange and hint at lack of investor sophistication and inability to accurately price SME securities. Moreover, it remains largely unclear whether venture capitalists "certify" SME IPOs by reducing information asymmetry risks, as the SME IPO literature finds evidence both that they do (Jiang et al., 2014) and that they don't (Tan et al., 2013).

One of the unique features that differentiate IPOs listed on the BSE SME Exchange from IPOs on the Main Board is the presence of market makers. By SEBI guidelines,[5] the investment bank managing an SME IPO must ensure market making through stockbrokers on the SME Exchange for a minimum of three years from the date of listing. Also, the market maker's initial inventory on the date of allotment must be at least 5% of the total IPO volume. This regulation is important for successful listing of SME IPOs because it reduces the ex-ante uncertainty risk around liquidity of IPO stocks in the secondary markets, thereby encouraging more investors to buy shares. If the market maker deliberately exceeds this minimum inventory, it sends a strong positive signal to outside investors about the quality of the SME IPO, reflecting confidence in the stock's fundamental value. Higher IPO subscription by market makers should further reduce aftermarket liquidity risk, an important determinant of IPO underpricing (Ellul & Pagano, 2006). Accordingly, we hypothesize that

Hypothesis 1a. SME IPOs with higher subscription from market makers exhibit lower initial underpricing.

IPO market prices can be subject to fads (Shiller, 1990). Ibbotson and Jaffe (1975) and Ritter (1984) document phases of "hot issue" markets characterized by high IPO volumes and high initial returns. Lowry (2003) examines this variation and suggests that

[5] Please see Chapter X B of SEBI Issue of Capital and Disclosure Regulations (ICDR) on "Issue of Specified Securities by Small and Medium Enterprises."

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investor sentiment plays a significant role in determining the aggregate IPO volume. Therefore, firms prefer to time their security offerings when investors are overly optimistic (Baker & Wurgler, 2000). The presence of such sentimental investors in IPO markets leads to initial price run-ups (Dorn, 2009) that get measured as high initial underpricing. Therefore, we hypothesize that

Hypothesis 1b. SME IPOs that are timed to market exhibit higher initial underpricing.

3.2. IPO aftermarket liquidity

One of the important characteristics of a successful IPO is a liquid secondary aftermarket (Corwin, Harris, & Lipson, 2004). A liquid stock allows venture capitalists to exit from their investments and diversify their portfolios. Ibbotson et al. (1988) find that improved share liquidity reduces the firm's cost of capital. Higher liquidity of stocks in the secondary market leads to more effective corporate governance (Maug, 1998), attracts more investors, reduces transaction costs in subsequent equity offerings (Ibbotson & Ritter, 1995), and lowers gross fees charged by underwriters in equity offerings (Butler, Grullon, & Weston, 2005). Investors tend to seek additional compensation in the form of illiquidity premiums for investing in stocks with higher liquidity risk (Brennan & Subrahmanyam, 1996). Liquidity risk factors in IPO exit markets also affect the investment decisions of venture capitalists (Cumming, Fleming, & Schwienbacher, 2005).

The mandatory presence of market makers is likely to increase the liquidity of the newly traded stock in the IPO aftermarket, for various reasons. First, underwriters often act as market makers to stabilize newly traded stocks (Ellis, Michaely, & O'hara, 2000). A larger inventory will enable the market makers to provide greater aftermarket support to the newly listed stocks. Second, higher-volume subscription to an IPO by market makers will strongly signal better quality of the SME IPO to outside investors and increase the liquidity of the newly listed security by reducing information asymmetry and adverse selection risk of uninformed traders in the secondary market (Ellul & Pagano, 2006). Finally, market makers' larger inventories will increase the "supply of immediacy" in the secondary market (Grossman & Miller, 1988), which should increase the liquidity of SME IPOs in the secondary market. Thus,

Hypothesis 2a. Higher subscription to SME IPOs by market makers improves stock liquidity in the IPO aftermarket.

Retail individual investors play an active role in the IPO markets, particularly in India (Neupane & Poshakwale, 2012), where IPO mechanisms are relatively more transparent. Retail investors are known to be more prone to sentiments and less sophisticated than institutional investors (Kumar & Lee, 2006). Cornelli, Goldreich, and Ljungqvist (2006) find that the irrational behavior of retail investors drives up post-IPO prices. Dorn (2009) finds that retail investors tend to demand IPO allocations for sentimental reasons. The retail investor demand during IPO bookbuilding appears to increase issue price and initial returns, and is negatively associated with long-run performance (Derrient, 2005). Higher IPO allocation to retail individual investors is likely to diffuse IPO ownership, resulting in a more liquid secondary market (Booth & Chua, 1996). Extending these findings to SME IPOs, we suggest that

Hypothesis 2b. Subscription of SME IPOs by retail individual investors improves stock liquidity in the IPO aftermarket.

3.3. IPO long-run performance

The stock price performance of IPOs in the years after listing has been studied extensively. IPO firms have been found to underperform non-IPO firms in the long run (Loughran et al., 1994; Ritter, 1991; Ritter & Welch, 2002), leading to debates on the reasons, such as earnings management by issuers before IPO offerings (Teoh, Welch, & Wong, 1998), managerial overoptimism (Heaton, 2002), or investor overconfidence (Purnanandam & Swaminathan, 2004). The literature has also examined whether certification mechanisms such as venture capital backing (Brav & Gompers, 1997) and underwriter reputation (Carter, Dark, & Singh, 1998; Loughran & Ritter, 1995) effectively identify IPOs with better long-run performance.

A number of recent studies particularly examine the long-term performance of equity investments in SME exchanges. Brau and Osteryoung (2001) examine the determinants of successful micro-IPOs in the United States. Carpentier et al. (2010) examine the new venture stock market in Canada and find that investments in the SME exchange tend to generate higher rates of return than those in the main exchange. Chorruk and Worthington (2013) study IPOs issued on the Thailand SME exchange and observe that SME IPOs outperform main board IPOs up to the second year after listing. In contrast, Carpentier, L'Her, and Suret (2012) examine SME seasoned equity offerings in Canada and find that SME firms perform poorly and generate significantly negative returns in the years following the issue. Several other studies examine the performance of SME firms and their securities issued on SME exchanges in Germany (Martin, 2001), Japan (Honjo & Harada, 2006), and the United Kingdom (Filatotchev, Wright, & Arberk, 2006).

Investors often seek credible signals from high-quality issuers, particularly in the IPO market, where they face significant problems of adverse selection and information asymmetry. These problems are exacerbated in the case of penny stocks (Bradley, Cooney, Dolvin, & Jordan, 2006) and SME IPOs (Carpentier et al., 2010), as both agency risks and market risks are intensified by equity financing of new or small ventures. Therefore, the due diligence responsibilities of the investment bank managing an IPO become even more important for equity offerings on a dedicated SME exchange. For example, Carpentier and Suret (2011) examine Canadian penny stock IPOs and find that those underwritten by more reputable intermediaries tend to perform better

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in the long run. We suggest that, to safeguard their reputations, the more reputable investment banks will attempt to market IPOs of higher quality SMEs in the BSE SME Exchange. Accordingly, we hypothesize that

Hypothesis 3a. SME IPOs that are underwritten by reputable underwriters exhibit higher long-run performance.

The presence of sentimental investors can influence both IPO price (Dorn, 2009) and volume (Lowry, 2003). Investment banks are known to advise their firms to issue IPOs during bullish phases of the market, when it is easier for them to market the securities to overoptimistic investors. However, issuers who successfully take advantage of such "windows of opportunity" are also associated with lower long-run performance. Ljungqvist, Nanda, and Singh (2006) suggest that this inferior long-run performance is an outcome of initial price run-ups due to the "exuberance" of IPO investors. We extend this argument to SME listings and argue that

Hypothesis 3b. SME IPOs that are timed to market exhibit lower long-run performance.

4. Research design

4.1. IPO underpricing

We examine the determinants of SME IPO underpricing by regressing the initial performance of the IPOs on a set of hypotheses variables and a host of control variables, as specified below (regression model A):

$$\begin{aligned} \text{UNDERPRICING}_{i,t} = {} & \alpha_0 + \alpha_1 * \text{AGE}_{i,t} + \alpha_2 * \text{LEVERAGE}_{i,t} + \alpha_3 * \text{INSIDER}_{i,t} + \alpha_4 * \text{MKT\_MAKER}_{i,t} + \\ & \alpha_5 * \text{UW\_REP}_{i,t} + \alpha_6 * \text{LAG\_MKT\_RET}_{i,t} + \alpha_7 * \text{LOG\_FIRM\_SIZE}_{i,t} + \alpha_8 * \text{ADJ\_CFO}_{i,t} + \\ & \alpha_9 * \text{SUBS\_TOTAL}_{i,t} + \alpha_{10} * \text{LAG\_MKT\_VOL}_{i,t} + \alpha_{11} * \text{INDUSTRY\_FE}_{i,t} + \alpha_{12} * \text{YEAR\_FE}_{i,t} \end{aligned} \quad (1)$$

In this model, the dependent variable (UNDERPRICING) is underpricing of the IPO of the i-th SME firm at time t, and the independent variables are similarly indexed across firm-years. We estimate the dependent variable either directly from the IPO underpricing (RAW_IU) (Loughran et al., 1994), or after adjusting it for market return (ADJ_IU) (Lin & Hsu, 2008). For the

Table 1
Definitions of variables.
This table lists the abbreviations, units, and definitions of all the variables used in our analysis.

Variable	Unit	Definition
Firm characteristics		
Age	Years	Age of firm in years, between date of incorporation and IPO listing
Adj_cfo	%	CFO, scaled by total assets
B_m_ratio	%	Book-to-market ratio of equity in the financial year immediately preceding the IPO
Cfo	INR mm	Operating cash flow during the financial year immediately preceding the IPO
Firm_size	INR mm	Total assets of firm
Log_firm_size	#	Natural logarithm of total assets of firm in INR million
Insider	%	Percentage ownership held by promoters, after IPO
Leverage	%	Ratio of total debt to total assets in the financial year immediately preceding the IPO
Roe	%	Return on equity (PAT/book value of equity) in the financial year immediately preceding the IPO
IPO characteristics		
Adj_iu	%	Adjusted initial underpricing of IPO, defined as raw_iu – BSE Small Cap Index return during IPO listing day
Ipo_proceeds	INR mm	Issue price, multiplied by number of shares issued in the IPO
Lag_mkt_ret	%	BSE Small Cap Index return during the 60 trading days preceding the IPO listing
Lag_mkt_vol	%	BSE Small Cap Index return volatility during the 60 trading days preceding the IPO listing
Mkt_maker	%	Percentage of IPO subscribed by designated market maker
Raw_iu	%	Initial underpricing of IPO, defined as (first day closing price – offer price)/offer price
Subs_rii	x	Number of times the retail investor category of IPO is oversubscribed
Subs_total	x	Number of times the overall IPO is oversubscribed
Uw_rep	#	Dummy variable representing IPO underwriter reputation
Liquidity measures		
Tor	%	Average daily turnover ratio, calculated as volume of shares traded divided by total number of shares outstanding
Tor_5d	%	TOR, calculated over first 5 trading days of IPO listing
Tor_20d	%	TOR, calculated over first 20 trading days of IPO listing
Tor_60d	%	TOR, calculated over first 60 trading days of IPO listing
Long-run performance measures		
Bhar	%	Buy-and-hold abnormal return, where the BSE Small Cap Index is the market portfolio
Bhar_260d	%	Bhar during first 260 trading days of IPO listing (excluding IPO underpricing)
Car	%	Cumulative abnormal return, where the BSE Small Cap Index is the market portfolio
Car_260d	%	Car during first 260 trading days of IPO listing (excluding IPO underpricing)

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computation of market return, we assume that the BSE Small Cap Index represents a market portfolio on the BSE SME Exchange. Our first hypothesis variable is measured as percentage of total IPO allocated to market makers (MKT_MAKER). For the second hypothesis variable, we measure the lagged market return (LAG_MKT_RET) from the BSE Small Cap Index return during the 60 trading days preceding the SME IPO listing date. As our hypotheses imply, we expect the coefficient of MKT_MAKER to be significantly negative and the coefficient of LAG_MKT_RET to remain significantly positive in the regression results.

Our regression model controls for several firm characteristics—such as age (AGE), firm size (LOG_FIRM_SIZE), debt-to-total assets ratio (LEVERAGE), promoter ownership (INSIDER), and cash from operating activities (ADJ_CFO)—and for IPO characteristics, such as underwriter reputation (UW_REP) and total IPO demand (SUBS_TOTAL). Younger firms are often considered riskier for IPO investments (Ritter, 1984), and firms with higher operating cash flows are likely to be perceived as less risky at the time of IPO listing. Carter and Manaster (1990) and Carter et al. (1998) find that more reputable underwriters tend to associate themselves with low-risk IPO offerings that require less underpricing. We calculate the market share of each SME IPO underwriter on the BSE SME Exchange by adding up its proportions of all SME IPO volumes during this sample period. An underwriter reputation dummy variable is then constructed, which takes the value 1 for those underwriters that have above-median market shares of IPO underwriting, and 0 otherwise. The definitions of all the variables are also provided in Table 1.

Recent studies on the Indian IPO market by Neupane and Poshakwale (2012) and Khurshed, Paleari, Pande, and Vismara (2014) find that retail investors play a critical role in it and that its mechanisms are quite transparent. Therefore, our subsequent regression models of IPO underpricing include IPO oversubscription in the retail investor segment (SUBS_RII) as an explanatory variable instead of the total IPO oversubscription number (SUBS_TOTAL). However, since the IPO allocation to market makers is made on a discretionary or firm allotment basis, these models do not include the demand from market makers.[6] Previous IPO studies suggest that recent market volatility has significantly increased IPO underpricing (Ellul & Pagano, 2006; Neupane, Neupane, Paudyal, & Thapa, 2016). Hence, we also include recent market volatility (LAG_MKT_VOL) as an additional explanatory variable; we measure lagged market volatility from the standard deviation of BSE Small Cap Index returns during the 60 trading days preceding the SME IPO listing date.

4.2. IPO aftermarket liquidity

To investigate the factors that influence the aftermarket liquidity of SME IPOs, we propose the following model specification (regression model B):

$$\begin{aligned}\text{LIQUIDITY}_{i,t} = {} & \alpha_0+\alpha_1 * \text{LOG\_FIRM\_SIZE}_{i,t}+\alpha_2 * \text{IPO\_PROCEEDS}_{i,t}+\alpha_3 * \text{MKT\_MAKER}_{i,t}+\alpha_4 * \text{ADJ} \\ & \text{\_IU}_{i,t}+\alpha_5 * \text{SUBS\_RII}_{i,t}+\alpha_6 * \text{UW\_REP}_{i,t}+\alpha_7 * \text{INSIDER}_{i,t}+\alpha_8 * \text{INDUSTRY\_FE}_{i,t}+\alpha_9 * \text{YEAR\_FE}_{i,t}\end{aligned} \tag{2}$$

In this model, the dependent variable (LIQUIDITY) is the liquidity of the IPO security of the i-th SME firm at time t, and the independent variables are similarly indexed across firm-years. We measure the liquidity of SME IPOs from the average turnover ratio of the IPO security over 5 trading days (TOR_5D), 20 trading days (TOR_20D), and 60 trading days (TOR_60D) in the IPO aftermarket. As our hypotheses imply, we expect the SME IPO aftermarket to remain significantly more liquid when there is higher IPO allocation to market makers (MKT_MAKER), or there is a greater retail investor demand for the SME IPOs (SUBS_RII). We add firm characteristics such as firm size as measured by total assets (LOG_FIRM_SIZE) and promoter ownership (INSIDER), and IPO characteristics such as IPO size (IPO_PROCEEDS), adjusted IPO underpricing (ADJ_IU), and underwriter reputation (UW_REP) as control variables. The definitions of all the variables are provided in Table 1.

We also investigate the evolution of SME IPO aftermarket liquidity by examining the monotonicity of average turnover ratios of SME stocks in their IPO aftermarkets. We conduct a Jonkheere-Terpstra (JT) trend analysis, which is a nonparametric test for ordered differences among classes. In our study, the JT trend analysis tests the null hypothesis that the average turnover ratios of SME stocks calculated over different horizons of IPO aftermarket trading are equal, against the alternative hypothesis that they are highest at the beginning of the IPO listing, and decrease monotonically over time.

4.3. IPO long-run performance

To examine the long-run performance of SME IPOs in the BSE SME Exchange, we adopt the following specification (regression model C):

$$\begin{aligned}\text{LONG-RUN\_ABNORMAL\_RETURN}_{i,t} = {} & \alpha_0+\alpha_1 * \text{AGE}_{i,t}+\alpha_2 * \text{LOG\_FIRM\_SIZE}_{i,t}+\alpha_3 * \text{ROE}_{i,t}+ \\ & \alpha_4 * \text{UW\_REP}_{i,t}+\alpha_5 * \text{INSIDER}_{i,t}+\alpha_6 * \text{LAG\_MKT\_RET}_{i,t}+\alpha_7 * \text{ADJ\_IU}_{i,t}+\alpha_8 * \text{INDUSTRY\_FE}+ \\ & \alpha_9 * \text{YEAR\_FE}\end{aligned} \tag{3}$$

In this model, the dependent variable (LONG-RUN_ABNORMAL_RETURN) is long-run abnormal return from IPO security of the i-th SME firm at time t, and the independent variables are similarly indexed across firm-years. Following Ritter (1991) and Carpentier et al. (2010), we estimate the long-run abnormal return from IPO security using buy-and-hold abnormal return

[6] The oversubscription time in the market-maker segment of the IPO is always 1, since the IPO shares are allocated to market makers on a discretionary or firm allotment basis.

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(BHAR) and cumulative abnormal return (CAR) over 130 trading days (BHAR_130D and CAR_130D) or 260 trading days (BHAR_260D or CAR_260D). The cumulative abnormal return for stock i over a duration of T days is calculated as

$$CAR_{i,T} = \sum_{t=1}^{T}\left(R_{i,t} - R_{m,t}\right) \tag{4}$$

where $R_{i,t}$ and $R_{m,t}$ denote the stock return and market return on day t, respectively. The buy-and-hold abnormal return for stock i over a duration of T days is calculated as

$$BHAR_{i,T} = \prod_{t=1}^{T}\left(1 + R_{i,t}\right) - \prod_{t=1}^{T}\left(1 + R_{m,t}\right) \tag{5}$$

In both the above expressions, we use the BSE Small Cap Index return as a proxy for market return on the BSE SME Exchange, and exclude the initial underpricing from the long-run performance measures. The buy-and-hold abnormal return proxy has the advantage over the cumulative abnormal return proxy that it captures the actual investment experience of an IPO investor. Therefore, we plot the buy-and-hold abnormal returns of various portfolios to examine the dispersion of SME IPO long-run performances. For portfolio level analysis and comparison of long-run IPO performance, we take the median of buy-and-hold abnormal returns for all the constituent SME IPO stocks of the portfolios to capture the investment experience of an average retail individual IPO investor. Our variables of interest in the above regression model are underwriter reputation dummy (UW_REP) and lagged market return (LAG_MKT_RET). As our hypotheses imply, we expect the coefficient of UW_REP to be significantly positive and the coefficient of LAG_MKT_RET to be significantly negative. We control for various firm characteristics—such as age (AGE), firm size as measured by total assets (LOG_FIRM_SIZE), return on equity as measured by profit after tax divided by book value of equity (ROE), and promoter stake (INSIDER)—and IPO characteristics—such as adjusted IPO underpricing (ADJ_IU). The definitions of all the variables are provided in Table 1.

In all the regression models mentioned above (A, B, and C), we control for industry and year fixed effects by adding dummy variables for different industries (INDUSTRY_FE) and years (YEAR_FE). All the regression results presented in this paper report t-statistics calculated by White's (1980) method for calculating heteroskedasticity-consistent standard errors.

5. Sample data

5.1. Data sources and summary

The sample data for this study consist of all the IPOs that were listed on the BSE SME stock exchange from its inception in March 2012 until August 2015.[7] For each of these 106 IPOs, we hand collect data from three sources. The Prowess database of the Centre for Monitoring Indian Economy (CMIE database), which is similar to the COMPUSTAT database of U.S. firms, provides us with information related to the accounting and financial statements of Indian firms (Khanna & Palepu, 2000). Prime Database Services (PDS) provides information on several IPO issue characteristics (Khurshed et al., 2014). Finally, we download IPO prospectuses from the BSE SME website.

Table 2 summarizes our sample data, both by year of IPO listing (Panel A) and by face value capital (Panel B). The SMEs raised a total of INR 7.9 billion through the 106 IPOs during this sample period.[8] The average age of the SMEs at the time of listing is 11.9 years, while the average size, as measured by total assets, is INR 263.8 million. In accord with the existing IPO literature, we find that the SMEs are, on average, underpriced by 0.7% at the time of IPO issuance. However, the level of initial underpricing varies significantly across the sample period. For example, the average SME IPO is underpriced by 9.3% in 2014 and 6.8% in 2015, while it is overpriced by 14.4% in 2013. The average level of oversubscription is 1.35 for the entire issue, and 1.14 for only the retail individual investor portion. Investor demand, as measured by the oversubscription numbers, is lower in 2013 than in the later years. The average BSE Small Cap Index[9] return during the two months before IPO listing shows a trend that is similar to the variation of the IPO underpricing. For example, in 2013, when the average secondary market returns in these small firms are negative in the months preceding the IPO listings, the IPO demand is lowest as measured by issue oversubscription numbers, and the average IPO first-day return is negative. These observations are consistent with recent findings suggesting that the pricing of IPOs is significantly affected by broader market sentiment in general (Ljungqvist et al., 2006) and the participation of sentimental retail investors in the IPOs in particular (Dorn, 2009). The volume of IPO activity is highest in 2014 when 39 SMEs are listed, though the amount of money raised through SME IPOs peaks in 2013 at INR 3.2 billion. Overall, we find that the SME IPO market has remained quite vibrant during the sample period of our study despite year-to-year fluctuations in primary market activity.[10] The definitions of all the variables are provided in Table 1.

Panel B in Table 2 summarizes the sample data broken down by face value capital. As we note above, if a firm's postissue face value capital is beyond INR 250 million it must migrate to the Main Board. However, if the postissue face value capital is between INR 100 million and INR 250 million, the SME has the choice to list itself either on the SME Exchange or on the Main Board. There

[7] The first IPO was listed on the BSE SME Exchange by B. C. B. Finance, on 13 March 2012.
[8] The average exchange rate during the sample period was INR 66 per US dollar.
[9] BSE Small Cap Index is an index that is maintained and tracked by BSE, and represents the performance of small-cap firms listed on the BSE Main Board.
[10] During the same sample period, only 27 IPOs were listed on the main BSE stock exchange, with an aggregate issue volume of INR 139 billion.

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Table 2
Sample data summary.
This table presents the summary statistics for a sample of 106 SME IPOs listed during March 2012–August 2015, by year (panel A) and by postissue face value capital (panel B). Age denotes the age of the firm, in years. Firm_size denotes the total assets of the firm, in INR million. Raw_iu and adj_iu denote the raw and adjusted initial underpricing of IPO, respectively, in percentages. Subs_rii and subs_total denote the number of times the retail segment and the total IPO issue are oversubscribed. Lag_mkt_ret denotes the lagged market return during the 60 trading days preceding the IPO listing, in percentage, where the BSE Small Cap Index is used to proxy the market portfolio. The definitions of all the variables are also provided in Table 1.

Panel A: sample characteristics by year

Sample period	Volume of IPOs		Age	Firm_size	Raw_iu	Adj_iu	Subs_rii	Subs_total	Lag_mkt_ret
(Year)	(#)	(INR bn)	(Yr)	(INR mm)	(%)	(%)	(#)	(#)	(%)
2012	11	0.76	8.45	111.51	1.10	0.97	1.00	1.24	1.56
2013	32	3.20	13.22	289.26	-14.43	-14.44	0.99	1.27	-1.49
2014	39	2.68	13.46	293.90	9.40	9.29	1.15	1.41	2.68
2015	24	1.27	9.17	250.61	6.51	6.81	1.40	1.41	3.07
Full	106	7.91	11.9	263.77	0.69	0.70	1.14	1.35	1.39

Panel B: sample characteristics by postissue face value capital

Face value capital	Volume of IPOs		Age	Firm_size	Raw_iu	Adj_iu	Subs_rii	Subs_total
(Range in INR million)	(#)	(INR bn)	(Yr)	(INR mm)	(%)	(%)	(#)	(#)
Less than 50	25	1.18	9.16	122.22	−2.63	−2.45	1.32	1.37
Between 50 and 100	33	1.81	12.06	222.82	4.70	4.63	1.25	1.45
Between 100 and 150	22	1.85	12.73	343.56	2.32	2.34	0.90	1.17
Between 150 and 200	16	1.75	13.31	283.48	−7.04	−7.02	1.11	1.38
Between 200 and 250	10	1.31	14.1	545.72	4.56	4.38	0.93	1.35
Full	106	7.91	11.9	263.77	0.69	0.70	1.14	1.35

are 58 IPOs in our sample with postissue face value capital of less than INR 100 million, while the remaining 48 have postissue face value capital between INR 100 million and INR 250 million. The oversubscription times of the retail segment and total IPO issue do not differ significantly across these two groups. However, the average IPO underpricing is lower for IPOs with face value capital between INR 150 million and INR 200 million, although we do not observe any clear discernible pattern linking face value capital and underpricing.

Table 3
Descriptive statistics (I).
This table presents the summary statistics of firm and IPO characteristics for a sample of 106 SME IPOs listed during March 2012–August 2015. Age denotes the age of the firm, in years. Cfo and firm_size denote the pre-IPO cash flow from operating assets and pre-IPO total assets of the firm, respectively, in INR million. Insider denotes the post-IPO promoter ownership in the firm, in percentages. Leverage denotes the pre-IPO ratio of total debt to total assets, in percentages. Roe denotes the pre-IPO return on equity, in percentages. Sales denote the pre-IPO net sales of the firm, in INR millions. B_m_ratio denotes the pre-IPO book-to-market ratio of the firm, in percentages. Issue_price and IPO_proceeds denote the issue price and gross proceeds from the IPO, in INR and INR million respectively. Lag_mkt_ret and lag_mkt_vol denotes the lagged market return and lagged market volatility, respectively, during the 60 trading days preceding IPO listing, in percentages, where the BSE Small Cap Index is used to proxy the market portfolio. Mkt_maker denotes the percentage of the IPO subscribed by the designated market maker. Subs_rii and subs_total denote the number of times the retail segment and the total IPO issue are oversubscribed. Uw_rep denotes a dummy variable that takes the value 1 for SME IPOs with above-median underwriter reputation, and 0 otherwise. The definitions of all the variables are also provided in Table 1.

	Units	Mean	Median	Std. Dev.	Min	Max
Pan0065l A: firm characteristics						
Age	Years	11.90	10.50	7.23	2.00	31.00
Cfo	INR mm	-11.59	-3.65	59.60	-244.00	156.90
Firm_size	INR mm	265.23	141.35	304.15	15.30	1442.50
Insider	%	49.36	50.70	18.82	20.09	75.11
Leverage	%	21.99	19.16	21.65	0.00	69.98
Roe	%	7.70	1.85	12.72	-6.95	58.00
Sales	INR mm	316.87	48.80	606.79	0.00	2770.00
Panel B: IPO characteristics						
B_m_ratio	%	53.14	43.43	41.46	6.93	214.52
Issue_price	INR	26.69	20.00	22.11	10.00	120.00
Ipo_proceeds	INR mm	74.61	57.48	57.55	15.00	277.48
Lag_mkt_ret	%	1.39	1.46	5.84	-10.27	17.82
Lag_mkt_vol	%	0.99	0.99	0.18	0.63	1.37
Mkt_maker	%	6.54	5.25	3.24	5.00	16.77
Subs_rii	X	1.14	1.11	0.64	0.21	2.76
Subs_total	X	1.35	1.26	0.33	1.00	2.46
Uw_rep	#	0.52	1.00	0.50	0.00	1.00

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5.2. Descriptive statistics

Table 3 provides the descriptive statistics of firm characteristics (Panel A) and IPO characteristics (Panel B). The average age is 11.9 years at the time of listing, though the range varies widely from 2 years to 31 years. The average sales and total assets are INR 317 million and INR 264 million respectively. The average cash flow from operating activities is negative at the time of IPO listing. This highlights the riskiness of equity investments in SME IPOs, where the firm is likely to be young, small, and less profitable. The return on equity varies from −7% to 58% in our sample, suggesting that investors face a significant adverse selection risk. Average debt-to-total-assets ratio is 22%, while the average stake owned by the promoters (or the owners) is 49% at the time of IPO listing.

The average issue size of an SME IPO is INR 75 million. The average total IPO oversubscription is 1.35, which is greater than the average retail investor oversubscription of 1.14. This indicates either that SME IPOs have yet to attract significant interest from retail individual investors, or that individual investors deliberately avoid SME IPOs because of their high risk and high minimum application size. The average two-month return from small cap firms in the secondary market during the SME IPO launch varies from −10% to 18%, indicating that SME IPOs have been listed under both favorable and unfavorable market conditions during our sample period. The IPO allotment to a market maker varies from the minimum requirement of 5% to a maximum of 17% of the SME IPO.

Table 4 provides the descriptive statistics of firm performance (Panel A) and aftermarket liquidity (Panel B). The average SME IPO is underpriced by 0.7%, though there is a significant variation in the extent of underpricing in our sample. For example, the worst first-day return from the IPO offering price is −96%, while the best-performing SME IPO is underpriced by 146%. This indicates the difficulty of an IPO valuation exercise for an SME firm, whether done by the firm itself, the underwriter, or the outside investors, and once again highlights the intensity of information asymmetry and acute adverse selection risks specific to SME IPO markets. We observe similar patterns in the long-run performance of SME IPOs, where we can identify clear “winners” and “losers” by buy-and-hold abnormal returns (BHAR) and cumulative abnormal returns (CAR). For example, the best-performing SME IPO yields a maximum buy-and-hold abnormal return of 1273% (CAR of 275%) over 1 year after listing, while the worst performer yields a buy-and-hold abnormal return of −149% (CAR of −158%) over the same period.

We measure the aftermarket liquidity of SME IPOs using turnover ratios, calculated over 1 month (20 days), 3 months (60 days), 6 months (130 days), and 1 year (260 days) in the immediate IPO aftermarket. We find that the SME stocks are most liquid in the first month of IPO listing, when the average turnover ratio is 0.47%. However, the aftermarket liquidity deteriorates over time, and the average turnover ratio falls to 0.09% within one year from IPO listing. Panel A in Table 5 provides the average daily turnover ratios of SME IPOs and the stocks composing the BSE Small Cap Index during different intervals after IPO listing. We observe that the SME IPO stocks are initially more liquid than the small cap stocks that are listed on the Main Board. However, their liquidity falls below that of the small cap stocks within a year after the IPO. The results of Jonckheere-Terpstra trend analysis, presented in Panel B of Table 5, confirm the initial findings that the liquidity of the SME IPOs decreases monotonically after the IPO. This pattern underscores the concerns of SME IPO investors about the liquidity of SME stocks in the secondary market, and highlights the importance of mandatory market making by underwriters in the BSE SME Exchange.

Table 4
Descriptive statistics (II).
This table presents the summary statistics of IPO performance and liquidity measures for a sample of 106 SME IPOs listed during March 2012–August 2015. Raw_iu and adj_iu denote the raw and adjusted initial underpricing of IPO, respectively, in percentages. Bhar_130d and bhar_260d denote buy-and-hold abnormal return during the first 130 trading days and the first 260 trading days of IPO listing, respectively (excluding IPO underpricing). Car_130d and car_260d denote cumulative abnormal return during the first 130 trading days and the first 260 trading days of IPO listing, respectively (excluding IPO underpricing). Tor_5d (tor_20d, tor_60d, tor_130d and tor_260d) denotes the average daily turnover ratio of the firm during the first 5 (20, 60, 130 and 260, respectively) trading days of IPO listing, in percentages. For the computation of abnormal returns, the BSE Small Cap Index is used to proxy the market portfolio. The definitions of all the variables are also provided in Table 1.

	Units	Mean	Median	Std. Dev.	Min	Max
Panel A: performance measures						
Initial underpricing						
Raw_iu	%	0.69	3.59	33.04	−95.80	146.25
Adj_iu	%	0.70	2.99	32.83	−96.73	146.32
Buy-&-hold abnormal return						
Bhar_130d	%	10.76	−5.03	79.40	−101.56	330.48
Bhar_260d	%	79.55	−26.08	319.63	−148.77	1272.76
Cumulative abnormal return						
Car_130d	%	2.70	−3.81	57.42	−135.70	128.04
Car_260d	%	8.23	−14.07	106.58	−157.85	275.08
Panel B: liquidity measures						
Turnover ratio						
Tor_5d	%	1.20	0.82	1.08	0.02	3.75
Tor_20d	%	0.47	0.34	0.38	0.01	1.56
Tor_60d	%	0.21	0.16	0.16	0.00	0.62
Tor_130d	%	0.13	0.10	0.09	0.00	0.41
Tor_260d	%	0.09	0.08	0.06	0.01	0.27

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Table 5
Evolution of liquidity in SME IPO aftermarkets.
This table presents the measures of liquidity (Panel A) and results of Jonkheere-Terpstra (JT) trend analysis to test monotonicity in liquidity in IPO aftermarkets (Panel B) for a sample of 106 SME IPOs listed during March 2012–August 2015. BSE Small Cap Stocks in Panel A are the constituent stocks of the BSE Small Cap Index. Tor_20d (tor_60d, tor_130d and tor_260d) denotes the average daily turnover ratio of the firm during the first 20 (60, 130 and 260, respectively) trading days of the IPO listing, in percentages. The definitions of all the variables are also provided in Table 1.

Panel A: evolution of liquidity in the SME IPO aftermarket

Liquidity measure Aftermarket horizon	Tor_20d (20 days)	Tor_60d (60 days)	Tor_130d (130 days)	Tor_260d (260 days)
SME IPO stocks	0.47	0.21	0.13	0.09
BSE small cap stocks	0.11	0.11	0.11	0.11

Panel B: test of monotonicity in IPO aftermarket liquidity

Days since listing	Liquidity measure	Mean value
20	tor_20d	0.47
60	tor_60d	0.21
130	tor_130d	0.13
260	tor_260d	0.09
JT Z-stat		(−9.55)
p-Value		0.00

6. Results and analysis

Table 6 provides the Pearson correlation coefficient matrix for the variables related to firm and IPO characteristics. We observe that firm size is significantly related to IPO issue size (0.522). In accord with our first set of hypotheses, we find that IPO underpricing has a significantly positive correlation with lagged market returns before listing (0.345) and negative correlation with IPO allocation to market markers (−0.290). The IPO demand from retail investors, as measured by retail investor oversubscription, appears to be significantly skewed towards smaller (−0.281) and younger (−0.198) SMEs, suggesting that individual investors have considerable appetite for high-risk, high-return pay-offs from high-growth SME firms. We also note that the book-to-market ratio is relatively higher for larger (0.359) and more mature (0.222) firms, indicating a risk-return trade-off in IPO pricing on the BSE SME Exchange.

6.1. Determinants of IPO underpricing

In this section, we examine the determinants of IPO underpricing in the BSE SME Exchange (see Table 7). We find that the size of IPO allocation to market maker has a significantly negative relationship with the degree of IPO underpricing. We further note that a one standard deviation increase in the initial allocation to market makers is associated with a reduction of raw IPO

Table 6
Correlation matrix.
This table presents the correlation matrix of firm and IPO characteristics for a sample of 106 SME IPOs listed during March 2012–August 2015. Adj_iu denotes the adjusted initial underpricing of IPO, in percentages. Log_ta denotes the natural logarithm of total assets of the firm, in INR million. Age denotes the age of the firm, in years. Insider denotes the post-IPO promoter ownership in the firm, in percentages. Leverage denotes the pre-IPO ratio of total debt to total assets, in percentages. Adj_cfo denotes the pre-IPO cash flow from operating assets scaled by pre-IPO total assets of the firm, in percentages. Subs_rii denotes the number of times the retail segment of the IPO issue is oversubscribed. B_m_ratio denotes the pre-IPO book-to-market ratio of the firm, in percentages. Lag_mkt_ret denotes the lagged market return during the 60 trading days preceding IPO listing, in percentages, where the BSE Small Cap Index is used to proxy the market portfolio. Uw_rep denotes a dummy variable that takes the value 1 for SME IPOs with above-median underwriter reputation, and 0 otherwise. Mkt_maker denotes the percentage of the IPO subscribed by the designated market maker. Log_IPO_proceeds denotes the natural logarithm of gross proceeds from the IPO in INR million. The definitions of all the variables are also provided in Table 1.

Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	Adj_iu	1.000											
(2)	Log_ta	0.171*	1.000										
(3)	Age	−0.103	0.304***	1.000									
(4)	Insider	0.161*	0.270***	−0.012	1.000								
(5)	Leverage	0.140	0.265***	−0.002	0.348***	1.000							
(6)	Adj_cfo	−0.083	0.102	0.141	0.120	0.169*	1.000						
(7)	Subs_rii	0.037	−0.281***	−0.198**	−0.125	−0.214**	−0.098	1.000					
(8)	B_m_ratio	0.137	0.359***	0.222**	0.038	−0.159	−0.151	0.067	1.000				
(9)	Lag_mkt_ret	0.345***	−0.014	−0.107	0.050	−0.085	−0.037	0.159	−0.013	1.000			
(10)	Uw_rep	−0.177*	−0.031	0.196**	−0.23**	−0.221**	0.064	−0.140	−0.118	−0.052	1.000		
(11)	Mkt_maker	−0.290***	−0.207**	−0.109	−0.153	−0.108	0.161*	−0.039	−0.125	−0.087	0.016	1.000	
(12)	Log_ipo_proceeds	−0.105	0.522***	0.154	−0.079	0.035	0.095	−0.440***	−0.187*	−0.113	0.301***	0.068	1.000

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Table 7
Determinants of initial underpricing of SME IPOs.
This table reports estimated coefficients of the parameters mentioned in the regression model below for a sample of 106 SME IPOs listed during March 2012–August 2015. The dependent variables raw_iu and adj_iu denote the raw and adjusted initial underpricing of the IPO, in percentages respectively. Age denotes the age of the firm, in years. Leverage denotes the pre-IPO ratio of total debt to total assets, in percentages. Insider denotes the post-IPO promoter ownership in the firm, in percentages. Mkt_maker denotes the percentage of the IPO subscribed by the designated market maker. Uw_rep denotes a dummy variable that takes the value 1 for SME IPOs with above-median underwriter reputation, and 0 otherwise. Lag_mkt_ret denotes the lagged market return during the 60 trading days preceding the IPO listing, in percentages, where the BSE Small Cap Index is used to proxy the market portfolio. Log_firm_size denotes the natural logarithm of pre-IPO total assets of the firm, in INR million. Adj_cfo denotes the pre-IPO cash flow from operating assets scaled by pre-IPO total assets of the firm, in percentages. Subs_total (subs_rii) denotes number of times the total (retail segment of) IPO issue is oversubscribed. Lag_mkt_vol denotes the lagged market volatility during the 60 trading days preceding the IPO listing, in percentages, where the BSE Small Cap Index is used to proxy the market portfolio. The definitions of all the variables are also provided in Table 1. The t-statistics are calculated using White's (1980) procedure to measure heteroskedasticity-consistent standard errors. Statistical significance levels of 10%, 5% and 1% are indicated by *, **, and ***, respectively.

$$UNDERPRICING_{i,t} = \alpha_0 + \alpha_1 * AGE_{i,t} + \alpha_2 * LEVERAGE_{i,t} + \alpha_3 * INSIDER_{i,t} + \alpha_4 * MKTMAKER_{i,t} + \alpha_5 * UWREP_{i,t} + \alpha_6 * LAGMKTRET_{i,t} + \alpha_7 * LOGFIRMSIZE_{i,t} + \alpha_8 * ADJCFO_{i,t} + \alpha_9 * SUBSTOTAL_{i,t} + \alpha_{10} * LAGMKTVOL_{i,t} + \alpha_{11} * INDUSTRYFE_{i,t} + \alpha_{12} * YEARFE_{i,t} \quad (1)$$

Dependent variable (Model)	Raw_iu (1)	Adj_iu (2)	Raw_iu (3)	Adj_iu (4)
Intercept	32.2947	33.4571	22.7471	23.7149
Age	−0.4131	−0.407	−0.4352	−0.4279
Leverage	0.1093	0.1037	0.1198	0.1139
Insider	−0.0471	−0.0436	−0.0783	−0.0753
Mkt_maker	−4.5540***	−4.5392***	−4.4373***	−4.4173***
Uw_rep	−6.8128	−6.9887	−6.5826	−6.7960
Lag_mkt_ret	1.4076***	1.3559**	1.4653***	1.4148***
Log_firm_size	5.9406**	5.7384**	5.9721**	5.7462**
Adj_cfo	−4.2677	−4.3284	−4.0541	−4.1312
Subs_total	6.4380	6.0156		
Subs_rii			1.6350	1.3968
Lag_mkt_vol			19.7536*	19.7375*
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R^2 (%)	23.29	22.72	23.15	22.62
Obs. (N)	106	106	106	106

underpricing by 14.755%, which is equivalent to a savings of INR 11 million for an SME firm with an average IPO issue size of INR 75 million.[11] The results strongly support our first hypothesis (Hypothesis 1a), that SME IPOs with higher initial subscription from market makers exhibit lower IPO underpricing.

We also find that the coefficient of lagged market returns is positive and highly significant, which suggests that SME IPOs listed during market rises tend to have higher initial underpricing. The results are similar to some previous findings (Bradley et al., 2006), and provide strong evidence in support of our second hypothesis (Hypothesis 2a), that SME IPOs that are timed to market tend to exhibit higher initial underpricing. Like Jiang et al. (2014), we find firm size to be significantly positively related to underpricing. Like Neupane et al. (2016), we also find that recent market volatility is positively associated with underpricing. The remaining variables carry signs consistent with our expectations, even though they are not statistically significant.

In sum, we find that SME IPO pricing is significantly influenced by both IPO allocation to market makers and the prevailing secondary market sentiments at the time of IPO listing. And we offer a new insight: an SME firm can potentially reduce IPO underpricing by negotiating with its underwriter to allocate a higher proportion of the IPO to the designated market maker, if the stock exchange is similar in structure to the BSE SME platform.

6.2. Determinants of liquidity in the IPO aftermarket

In this section, we investigate the factors that affect the liquidity of SME IPOs in the immediate IPO aftermarket, as measured by the average turnover ratio of IPO stock over various periods (see Table 8). In accord with our first hypothesis on IPO aftermarket liquidity (Hypothesis 2a), we find that liquidity is higher when the designated market maker receives a greater proportion of IPO shares in the initial primary market allocation. The relationship is also economically significant, as a one standard deviation (3.24%) increase in market maker subscription is associated with an increase in the average IPO aftermarket turnover ratio of 27.5% points in the first week, 9% points in the first month, and 3.6% points in the first 3 months.

The results also indicate that higher demand from retail individual investors is positively associated with greater IPO aftermarket liquidity, particularly in the first week and first month of aftermarket trading, although the statistical significance drops sharply beyond the first month. In line with our second hypothesis on aftermarket liquidity (Hypothesis 2b), the results suggest that retail individual investors can play an active role in the development of secondary markets starting from the day of IPO listing

[11] The standard deviation of allocation to market makers in our sample data is 3.24% (see Table 3).

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Table 8
Determinants of liquidity of SME IPOs.
This table reports estimated coefficients of the parameters mentioned in the regression model below for a sample of 106 SME IPOs listed during March 2012–August 2015. The dependent variables tor_5d, tor_20d and tor_60d denote the average daily turnover ratio of the firm during the first 5, 20 and 60 trading days of the IPO listing, respectively, in percentages. Log_firm_size denotes the natural logarithm of pre-IPO total assets of the firm, in INR million. IPO_proceeds denotes the gross proceeds from the IPO, in INR million. Mkt_maker denotes the percentage of the IPO subscribed by the designated market maker. Adj_iu denotes the adjusted initial underpricing of the IPO, in percentages, where the BSE Small Cap Index is used to proxy the market portfolio. Subs_rii denotes the number of times the retail segment of the IPO issue is oversubscribed. Uw_rep denotes a dummy variable that takes the value 1 for SME IPOs with above-median underwriter reputation, and 0 otherwise. Insider denotes the post-IPO promoter ownership in the firm, in percentages. The definitions of all the variables are also provided in Table 1. The t-statistics are calculated using White's (1980) procedure for measuring heteroskedasticity-consistent standard errors. Statistical significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

$$LIQUIDITY_{i,t} = \alpha_0 + \alpha_1 * LOGFIRMSIZE_{i,t} + \alpha_2 * IPOPROCEEDS_{i,t} + \alpha_3 * MKTMAKER_{i,t} + \alpha_4 * ADJIU_{i,t} + \alpha_5 * SUBSRII_{i,t} + \alpha_6 * UWREP_{i,t} + \alpha_7 * INSIDER_{i,t} + \alpha_8 * INDUSTRYFE_{i,t} + \alpha_9 * YEARFE_{i,t} \quad (2)$$

Dependent variable (Model)	Tor_5d (1)	Tor_20d (2)	Tor_60d (3)
Intercept	0.2898	0.1824	0.3631***
Log_firm_size	0.1666	0.0371	−0.0056
Ipo_proceeds	−0.3175*	−0.0927	−0.0691***
Mkt_maker	0.0848***	0.0285**	0.0111**
Adj_iu	−0.0072***	−0.0023**	−0.0007
Subs_rii	0.3059*	0.1381*	0.0187
Uw_rep	−0.3282	−0.1016	−0.0286
Insider	0.0105*	0.0035	0.0014
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R^2 (%)	14.05	14.22	12.23
Obs. (N)	103	103	94

up through the first month of aftermarket trading, particularly in Indian SME markets, as Deb and Marisetty (2010) observed for Main Board IPOs. However, their positive effect on liquidity does not seem to extend beyond the first month. We also observe that SME issues with large initial underpricing tend to exhibit lower aftermarket liquidity. This result is consistent with Ellul and Pagano's (2006) finding that IPOs that are expected to have a less liquid aftermarket require greater compensation in the form of higher underpricing. We also suggest that this negative association could be induced by the signaling effects of IPO allocation to market makers, particularly in the BSE SME market, where large initial allocations to market makers lower liquidity risk and therefore IPO underpricing on one hand, and increase aftermarket liquidity on the other.

Additionally, we observe that SME stocks with larger IPO size tend to have lower turnover ratio in the IPO aftermarket, as is indicated by the significantly negative coefficient of IPO proceeds in the regression results. Since IPO issue size has a significantly

Table 9
Determinants of long-run performance of SME IPOs.
This table reports estimated coefficients of the parameters mentioned in the regression model below for a sample of 106 SME IPOs listed during March 2012–August 2015. The dependent variables car_260d and bhar_260d denote the cumulative abnormal return and buy-and-hold abnormal return during the first 260 trading days of the IPO listing, respectively (excluding IPO underpricing). Age denotes the age of the firm, in years. Log_firm_size denotes the natural logarithm of pre-IPO total assets of the firm, in INR million. Roe denotes the pre-IPO return on equity, in percentages. Uw_rep denotes a dummy variable that takes the value 1 for SME IPOs with above-median underwriter reputation, and 0 otherwise. Insider denotes the post-IPO promoter ownership in the firm, in percentages. Lag_mkt_ret denotes the lagged market return during the 60 trading days preceding the IPO listing, in percentages, where the BSE Small Cap Index is used to proxy the market portfolio. Adj_iu denotes the adjusted initial underpricing of IPO, in percentages. The definitions of all the variables are also provided in Table 1. The t-statistics are calculated using White's (1980) procedure for measuring heteroskedasticity-consistent standard errors. Statistical significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

$$LONG\text{-}RUNABNORMALRETURN_{i,t} = \alpha_0 + \alpha_1 * AGE_{i,t} + \alpha_2 * LOGFIRMSIZE_{i,t} + \alpha_3 * ROE_{i,t} + \alpha_4 * UWREP_{i,t} + \alpha_5 * INSIDER_{i,t} + \alpha_6 * LAGMKTRET_{i,t} + \alpha_7 * ADJIU_{i,t} + \alpha_8 * INDUSTRYFE + \alpha_9 * YEARFE \quad (3)$$

Dependent variable (Model)	Car_260d (1)	Bhar_260d (2)
Intercept	161.6719***	401.3011***
Age	−2.8421**	−4.0247**
Log_firm_size	5.4386**	9.1275
Roe	3.6337***	11.5910***
Uw_rep	20.7838**	92.5609
Insider	−2.0959***	−7.1506***
Lag_mkt_ret	−1.7205**	−4.9729**
Adj_iu	−0.9927***	−3.6485***
Industry FE	Yes	Yes
Year FE	Yes	Yes
Adj. R^2 (%)	49.00	58.45
Obs.(N)	64	64

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negative correlation (−0.440) with retail investor subscription, it is plausible that smaller IPOs tend to have a more liquid IPO aftermarket because of greater participation by retail investors who are either purely speculating or seeking equity investments in higher growth opportunities.

In summary, we find that IPO aftermarket liquidity in the BSE SME market significantly improves with higher IPO allocation to designated market makers and greater IPO demand from retail individual investors in the SME primary market. This finding has special relevance for Indian SME markets, where liquidity of investments is a key financing constraint for SMEs (De & Nagaraj, 2014), and retail investors could be allowed to play a bigger role, as they do in the BSE Main Board.

6.3. Determinants of IPO long-run performance

In the third section, we examine whether the timing of SME IPOs and the reputation of the IPO underwriters help predict long-run IPO performance (see Table 9), as measured by buy-and-hold abnormal returns (BHAR) and cumulative abnormal returns (CAR) over 1 year (260 trading days) after IPO listing. In accord with our first hypothesis on long-term performance (Hypothesis 3a), we find that SME IPOs underwritten by reputable underwriters tend to exhibit significantly higher long-term performance. On average, an investor earns 21% higher cumulative abnormal return and 93% higher buy-and-hold abnormal return from SME IPOs underwritten by reputable underwriters than from those of nonreputable underwriters. This return differential is consistent with that found in previous studies (Carter et al., 1998; Michaely & Shaw, 1994) and indicates the added importance of a certification mechanism such as underwriter reputation in an SME IPO market, where information asymmetry and adverse selection risks are substantially high.

We also observe that the lagged market return and initial underpricing of the IPO have significantly negative associations with the yearly cumulative abnormal return and yearly buy-and-hold abnormal return. Like those of Ljungqvist et al. (2006), our results strongly support the second hypothesis (Hypothesis 3b) on IPO long-term performance, and suggest that SME IPOs that are timed to market (Daniel, Hirshleifer, & Subrahmanyam, 1998) tend to perform significantly worse in the longer run. For example, a one standard deviation increase in lagged market return is associated with a 10% decrease in cumulative abnormal return and a 29% decrease in buy-and-hold abnormal return. On analyzing the estimated coefficients of the control variables, we find that young and more profitable SME firms tend to make significantly superior returns to their IPO investors, a result similar to the previous findings of Coad and Tamvada (2012) and Carpentier et al. (2010). Similarly, SME IPOs with low insider stake tend to outperform SME IPOs with higher insider stake, possibly because the former have superior corporate governance norms and more effective monitoring (Abor & Adjasi, 2007).

In sum, we find that underwriter reputation acts as a credible certification mechanism for SME IPOs on the BSE SME Exchange, as it does on the Main Board. IPO investors would therefore be better off picking up this signal and focusing only on those SME IPOs underwritten by more reputable investment banks. Investors should avoid subscribing to SME IPOs that are timed to over-optimistic market sentiments, since they tend to yield significantly inferior returns in the longer run.

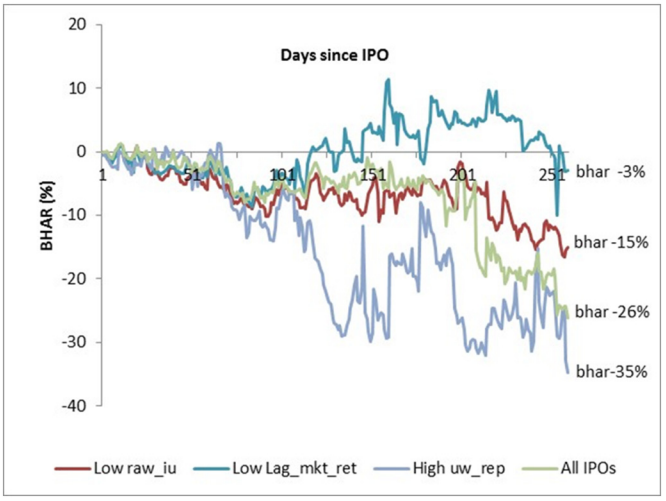

Fig. 1. SME IPO long-run performance. This chart plots the median buy-and-hold abnormal returns (bhar) of four different portfolios, constructed of IPOs that are below the median raw initial underpricing (raw_iu), below the median lagged market return (lag_mkt_ret), or above the median underwriter reputation (uw_rep), and of all IPOs, from a sample of 106 SME IPOs listed during March 2012–August 2015. Bhar is calculated for up to the first 260 trading days of IPO listing (excluding IPO underpricing). Raw_iu denotes the raw initial underpricing of IPO, in percentages. Lag_mkt_ret denotes the lagged market return during 60 trading days preceding IPO listing, in percentages. Uw_rep denotes a dummy variable that takes the value 1 for SME IPOs with above-median underwriter reputation, and 0 otherwise. For computation of market return, the BSE Small Cap Index is used to proxy the market portfolio.

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6.4. Is the BSE SME exchange a "lemons market"?

Previous studies have highlighted the problems of information asymmetry and adverse selection risks in equity capital markets in general (Loughran et al., 1994), and SME IPO markets in particular (Carpentier et al., 2010; Florin & Simsek, 2007). For example, equity investments in younger and smaller firms tend to be riskier, as the firms face significant financing constraints (Kim, 1999) and have to depend on costlier options such as unsecured bank loans to fund their business growth (Beck et al., 2008; Ghosh, 2007). In this section, we segregate the SME IPOs that are listed on the BSE SME Exchange into various portfolios on the basis of IPOs above or below the median raw initial underpricing (RAW_IU), lagged market return (LAG_MKT_RET), and underwriter reputation (UW_REP), and also construct a portfolio containing all IPOs from our sample. We then examine the buy-and-hold abnormal returns from these portfolios in the SME IPO aftermarket.

Fig. 1 plots the median values of buy-and-hold abnormal returns (BHAR) in four different portfolios. As we note above, Rock (1986) suggests that uninformed investors such as retail investors tend to receive a higher allocation of shares in overpriced IPOs because significant adverse selection risks prevail in IPO markets. Therefore, our first portfolio consists of IPOs with below-median initial underpricing (LOW RAW_IU). However, Amihud, Hauser, and Kirsh (2003) suggest that uninformed investors can reduce this exposure by basing their decision to buy on publicly available information. Therefore, for our second and third portfolios, we consider all IPOs that have below-median lagged market returns (LOW LAG_MKT_RET) and above-median underwriter reputation (HIGH UW_REP) respectively. Finally, we include all the IPOs from our sample in the fourth portfolio. In each portfolio, the median retail investor experiences significantly negative buy-and-hold abnormal returns. For example, the median buy-and-hold

Table 10
SME IPO long-run returns.
This table presents the summary statistics of buy-and-hold abnormal returns (bhar) of various portfolios from a sample of 106 SME IPOs listed during March 2012–August 2015, constructed of IPOs with above-median and below-median raw initial underpricing (raw_iu), lagged market return (lag_mkt_ret), and underwriter reputation (uw_rep), and all IPOs, for medium-term performance (Panel A) and long-term performance (Panel B), respectively. Panel C presents the means and medians of allocation-adjusted buy-and-hold abnormal returns to retail IPO investors, where allocation-adjusted return is calculated as buy-and-hold abnormal return divided by the corresponding retail IPO oversubscription number. Bhar_130d and bhar_260d denote the buy-and-hold abnormal returns during the first 130 and 260 trading days of the IPO listing, respectively (excluding IPO underpricing). Raw_iu denotes the raw initial underpricing of IPO, in percentages. Lag_mkt_ret denotes the lagged market return during the 60 trading days preceding the IPO listing, in percentages. Uw_rep denotes a dummy variable that takes the value 1 for SME IPOs with above-median underwriter reputation, and 0 otherwise. For computation of market return, the BSE Small Cap Index is used to proxy the market portfolio. The definitions of all the variables are also provided in Table 1.

Portfolio type	Descriptive summary measures						
	Portfolio #	Obs #	Min	Mean	Median	Max	Std. Dev.
Panel A: medium-term performance (bhar_130d)							
High raw_iu	1	39	−93.36	12.20	5.43	225.15	70.70
Low raw_iu	2	46	−101.56	9.54	−6.64	330.48	86.86
High adj_iu	3	39	−93.36	13.19	5.43	225.15	70.23
Low adj_iu	4	46	−101.56	8.70	−7.96	330.48	87.14
High lag_mkt_ret	5	39	−101.56	9.69	−16.40	330.48	90.89
Low lag_mkt_ret	6	46	−93.36	11.67	−3.12	201.11	69.22
High uw_rep	7	48	−101.56	5.17	−26.95	330.48	88.72
Low uw_rep	8	37	−93.36	18.01	−1.74	225.15	65.87
All IPOs	9	85	−101.56	10.76	−5.03	330.48	79.40
Panel B: long-term performance (bhar_260d)							
High raw_iu	1	27	−132.57	−18.59	−51.93	189.3	102.66
Low raw_iu	2	37	−148.77	151.17	−14.99	1272.76	398.35
High adj_iu	3	26	−132.57	−16.91	−51.50	189.30	104.32
Low adj_iu	4	38	−148.77	145.55	−15.14	1272.76	394.45
High lag_mkt_ret	5	31	−145.62	−9.48	−51.07	862.06	181.54
Low lag_mkt_ret	6	33	−148.77	163.18	−2.88	1272.76	394.15
High uw_rep	7	40	−148.77	119.47	−34.75	1272.76	386.65
Low uw_rep	8	24	−132.57	13.02	−20.78	522.70	137.67
All IPOs	9	64	−148.77	79.55	−26.08	1272.76	319.63

Panel C: allocation-adjusted buy-and-hold abnormal return to retail IPO investors

		bhar_130d		bhar_260d	
Portfolio type	Portfolio #	Mean	Median	Mean	Median
High raw_iu	1	12.2	5.42	−18.6	−51.94
Low raw_iu	2	9.54	−6.64	151.16	−14.98
High adj_iu	3	13.20	5.42	−16.92	−51.50
Low adj_iu	4	8.70	−7.96	145.56	−15.14
High lag_mkt_ret	5	9.70	−16.40	−9.48	−51.08
Low lag_mkt_ret	6	11.66	−3.12	163.18	−2.88
High uw_rep	7	5.18	−26.94	119.46	−34.76
Low uw_rep	8	18.02	−1.74	13.02	−20.78
All IPOs	9	10.76	−5.04	79.56	−26.08

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abnormal return over the first 260 trading days is −15% for the portfolio of IPOs with below-median raw initial underpricing, and is −3% and −35% for the portfolios of IPOs with below-median lagged market return and above-median underwriter reputation, respectively.

Table 10 reports the descriptive summary of buy-and-hold abnormal returns for 130 trading days (panel A) and 260 trading days (panel B), for each of the 9 portfolios constructed on the basis of IPOs above and below the median raw initial underpricing (RAW_IU), adjusted initial underpricing (ADJ_IU), lagged market return (LAG_MKT_RET), and underwriter reputation (UW_REP), and the full sample of IPOs. The predominantly negative value of the median buy-and-hold abnormal returns across all the different portfolios suggests that there is a significant ex-ante adverse selection risk in the BSE SME Exchange, and an average uninformed retail investor is most likely to experience significantly negative abnormal returns from SME IPO investments, even if the investment decisions take into account publicly available information such as lagged market returns and underwriter reputation.

One of the distinctive features of the Indian IPO market is the regulatory requirement of separate tranches for institutional, noninstitutional, and retail investors in the primary market, which ensures that different categories of investors do not directly compete with one another for IPO allocation. Further, underwriters do not enjoy any discretionary power of allocation in Indian IPOs, so retail investors receive IPO allocation on a pro rata basis. Therefore, some of the previous studies, such as those by Koh and Walter (1989), Levis (1990), and Neupane and Poshakwale (2012), also examine allocation-adjusted returns. Following Amihud et al. (2003) and Neupane and Poshakwale (2012), we measure the allocation-adjusted buy-and-hold abnormal returns to individual retail IPO investors by dividing the buy-and-hold returns from each IPO by the corresponding retail investor oversubscription level.[12] Panel C in Table 11 presents the means and medians of allocation-adjusted buy-and-hold abnormal returns to retail IPO investors for different portfolios of SME IPOs. We observe that the median allocation-adjusted buy-and-hold return from portfolios of IPOs with below-median raw and adjusted initial underpricing (portfolios 2 and 4) is significantly negative, at −6.64% and −7.96% for 130 trading days, and −14.98% and −15.14% for 260 trading days. The median allocation-adjusted buy-and-hold returns from the portfolios of IPOs with below-median lagged market returns and above-median underwriter reputation (portfolios 5 and 8) are also negative over both 130 and 260 days of aftermarket trading. These findings further reinforce our earlier results that an average retail IPO investor faces a significant adverse selection risk in the BSE SME market, and signaling mechanisms such as IPO allocation to market makers and underwriter reputation alone may not be able to fully mitigate this risk for an average IPO investor, particularly when a significant proportion of the IPOs are issued by fundamentally low-quality SME firms.

The sum of the evidence from SME IPO long-run buy-and-hold abnormal returns suggests that SME IPO investors are potentially facing a lemons market (Akerlof, 1970) in the BSE SME Exchange. This problem is likely to be of particular concern for retail investors, who tend to be less informed and less sophisticated than institutional investors. It is vitally important that the regulator SEBI, the BSE stock exchange, and academic researchers should suggest policies and regulations that can address this issue.

7. Conclusion

SMEs are considered important contributors to economic growth and development for any country. Their efficiency and productivity are particularly relevant in an emerging economy such as India, where SMEs serve as engines of employment, innovation, and entrepreneurship for a large segment of the population. Financing constraints that impede their growth and survival become immeasurably important in such a context. In this paper, we analyze the development of a recently established junior stock exchange that is dedicated to Indian SMEs. We find that IPOs that either are timed to market or have larger allocations to market makers tend to exhibit higher initial performance; that IPO allocation to market makers and IPO demand from retail individual investors increase liquidity in the IPO aftermarket; and that IPO timing and underwriter reputation significantly predict the long-term performance of SME IPOs.

These results have significant implications for investors, policy makers, and regulators. SMEs selling their shares to the public in the IPO market face three key obstacles in the form of agency risk, market risk, and execution risk (Carpentier et al., 2010). Our findings suggest that such risks can be at least partially mitigated through regulations that will increase the participation of retail investors in that market and enlarge the allocations of SME IPOs to the assigned market makers. We suggest that academics and policy makers compare the risks and regulations of the BSE SME Exchange with those of established junior or SME exchanges in other countries before incorporating specific regulation changes. Investors interested in long-term performance should shun SME IPOs that are timed to market or underwritten by poorly reputed firms.

BSE SME markets face two critical issues. First, easier listing and disclosure requirements have encouraged more SMEs to list their IPOs on the BSE SME Exchange, but have also increased the adverse selection risks faced by IPO investors, as is clearly evident in the predominantly negative median long-term abnormal returns shown in our analysis. Should the regulator consider raising the minimum standards for IPO listing, to lower this adverse selection risk, or should it help more SMEs to tap the equity capital markets to ease their financing constraints? Second, there is a gradual deterioration of aftermarket liquidity in SME IPO stocks, but the participation of retail individual IPO investors can significantly improve this liquidity. Should the regulator consider options to encourage greater retail investor interest in SME IPOs, such as lowering the minimum application size in SME IPO markets to boost the liquidity of SME stocks in the secondary market, or should it remain more concerned about the adverse selection

[12] We thank the anonymous referee for suggesting to us that we examine the allocation-adjusted returns to the retail investors.

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risks for marginal retail individual investors, who tend to be less informed and less sophisticated than the average institutional investor? Future researchers should carefully evaluate these important cost-benefit tradeoffs.

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