

# Contagion effects of equity financing announcements within business groups\*

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## Abstract

We examine whether announcements of financing decisions by group-affiliated firms have any spillover effects on the value of their member firms. Employing data on rights offerings, private placements of equity, and follow-on public offerings by group-affiliated firms in India, we find that a positive (negative) market reaction to the announcement of a financing decision by a group-affiliated firm also leads to a positive (negative) market reaction for non-event firms within the same business group. Further, this contagion effect is stronger for the group's leading firms, firms that announce relatively large issues of equity, and financially constrained firms. Our results are robust to several checks as well as alternative measures of our main variables of interest.

*Keywords:* Business groups; Contagion effects; Equity issues; Event study; Financing decisions; Spillovers

*JEL Codes:* G14, G30, G32

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# 1 Introduction

Do announcements of financing decisions by group-affiliated firms have any spillover effects on the market value of their member firms?<sup>1</sup> If so, what factors explain this spillover? We attempt to unravel these questions by examining the equity financing decisions made by publicly listed group-affiliated firms in India, a market with one of the highest numbers of group affiliates globally.<sup>2</sup> Knowing answers to these questions is important for investors because group-affiliated firms that announce raising money typically form a minuscule proportion of publicly listed firms in any given year in an economy but decisions of these firms have value implications for their other member firms that form a relatively large proportion of listed firms.<sup>3</sup>

Business groups, which represent a set of legally independent firms with common ownership and control by a certain set of shareholders (known as controlling shareholders), are a popular organizational form in developing as well as developed economies (Dau et al., 2021; La Porta et al., 1999). Prior literature has examined the spillover effects of the announcements of earnings (Bae et al., 2008; Cheung et al., 2014), credit rating changes (Joe and Oh, 2018; Kwon et al., 2016), and capital expenditure (Chen and Chang, 2020) within business groups. However, none of these events is likely to be as strong an indicator of potential reallocation of resources within business groups as financing decisions due to the presence of internal capital markets within business groups (Chang and Hong, 2000; Khanna and Palepu, 2000; Gopalan et al., 2007; Buchuk et al., 2014; Gopalan et al., 2014). Thus, announcements of financing decisions, which potentially imply subsequent large-scale reallocation of resources within business groups, are an ideal candidate for the examination of spillover effects.

As an anecdotal example, Godrej Properties Limited, a firm affiliated with the

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<sup>1</sup>The literature also refers to spillovers as information transfers or information externalities (see, for example, Pandit et al. (2011)).

<sup>2</sup>Specifically, we focus on the announcements of rights offerings, private placements of equity, and follow-on public offerings by group-affiliated firms and their subsequent spillovers.

<sup>3</sup>The member firms of a business group are also known as group affiliates.

Godrej Group, announced a private placement of common stock for INR 25 billion (equivalent to USD 360.55 million based on the prevailing exchange rate on the date of the announcement) on April 30, 2019. The market reacted negatively to the announcement, resulting in a three-day cumulative abnormal return (CAR) of  $-7.88\%$  for the shareholders of the event firm.<sup>4</sup> A portfolio of other listed firms within the Godrej Group experienced an equal-weighted CAR of  $-1.69\%$  and a value-weighted CAR of  $-1.05\%$  (see Figure 1). This indicates that the market reaction to the equity financing announcement of a group-affiliated firm likely affects the abnormal returns of other listed firms within the group in the same direction as that of the event firm.

**Insert Figure 1 here**

To examine the spillover effects, we choose the market reaction to the announcement of the financing decision rather than the decision announcement itself as our event due to the following reasons. First, the financing decision by a group-affiliated firm does not necessarily convey good news. On the one hand, a financing decision can be good news if it signals the funding of positive net present value projects or alleviation of financial constraints for the firm (Bae et al., 2008; Almeida et al., 2015). On the other hand, a financing decision may also exacerbate the agency conflicts between the firm's controlling shareholders and minority shareholders if the money raised is likely to be diverted to either controlling shareholders or less efficiently run firms in the group (Bertrand et al., 2002; Bae et al., 2002; Cheung et al., 2006). Therefore, transactions that club both positive and negative news together can obscure their information content. Additionally, the market reaction to the announcement of a financing decision captures the surprise component of the information contained in it, which is more significant for the spillover than the announcement itself. Moreover, our approach is consistent with the extant literature (Joe and Oh, 2018; Chen and Chang, 2020).

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<sup>4</sup>We use the 'event firms', 'announcing firms', and 'focal firms' interchangeably throughout the paper. In a similar vein, we also use the terms 'non-announcing firms', 'non-event firms', and 'non-focal' firms synonymously.

We choose India as the empirical context of our study for three prominent reasons. First, India has one of the most significant numbers of group-affiliated firms (Khanna and Yafeh, 2007), making it a suitable setting to examine our research questions.<sup>5</sup> Second, an empirical study on business groups requires historical affiliation data. For India, this data has recently become available through the Prowess database, covering periods from 1988 onwards (Jindal and Seth, 2019). Finally, prior studies have focused on spillovers within business groups based in Korea (Bae et al., 2008; Joe and Oh, 2018; Kwon et al., 2016), Hong Kong (Cheung et al., 2014), and Taiwan (Chen and Chang, 2020). We provide fresh perspectives on within-group spillovers using not only a new event but also a new empirical context.

We find that a positive (negative) market reaction to the announcement of an equity financing decision by a group-affiliated firm also leads to a positive (negative) market reaction for non-event firms within the same business group. In other words, we document a strong contagion effect of the announcements of equity financing decisions by a group-affiliated firm on the value of other member firms. Further, we find that the contagion effect is stronger (i) when the financing decision is announced by a leading firm within the group, (ii) when the size of the announced equity issue is relatively large, and (iii) when the announcing firm is financially more constrained. Our results are robust to a battery of checks. While our study has been carried out in India, we expect our results to hold broadly in other markets with business groups as well.

We contribute to two major strands of literature. First, we contribute to the literature on business groups by documenting the role of internal capital markets within these organizational forms. Our results indicate that an equity issue by a group-affiliated firm can significantly affect the value of other affiliated firms within the group and that this effect varies depending on the relative standing of the firm within the group, the size of the equity issue, and the degree of financial constraints faced by the firm. Additionally,

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<sup>5</sup>Out of the largest 500 firms in India, about 60% by number and 65% by market capitalization are affiliated to business groups (Chakrabarti et al., 2008; Jackling and Johl, 2009).

we also contribute to the literature on spillover effects of financing decisions by showing that an equity issue by a firm does not just affect the value of firms within the same industry as documented previously (Braun and Larrain, 2009; Chod and Lyandres, 2011; Hsu et al., 2010; Li and Zhang, 2021; Slovin et al., 1992; Spiegel and Tookes, 2020), but also the value of firms in other industries that are part of the same business group.

The rest of the paper is organized as follows. In Section 2, we discuss the background literature and come out with our predictions. Section 3 describes our data. In Section 4, we detail our methodology and present our empirical results. We examine the alternative explanations as well as the robustness of our results in Section 5. Finally, Section 6 concludes our study.

## 2 Background literature and predictions

### 2.1 Business groups

Business groups are characterized by sets of legally independent firms operating in diversified industries and yet tied together by economic as well as social relationships (both formal and informal), such as common ownership and control, interlocks of directors, and the presence of group-wide platforms and processes (Cuervo-Cazurra, 2006; Khanna and Yafeh, 2007; Aguilera et al., 2023).<sup>6</sup> While they are a prominent organizational form in many countries across the globe, they are known by different names in various geographies. For instance, they are known as *qiye jituan* in China, *business houses* in India, *keiretsus* and *zaibatsus* in Japan, *chaebols* in Korea, *grupos economicos* in Latin America, *grupos* in Spain, *guanxiqiye* in Taiwan, and *family holdings* in Turkey, among others (Aguilera et al., 2023).

Depending on their ownership, business groups can be classified into three different types: family-owned groups, widely-held groups, and state-owned groups (Cuervo-

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<sup>6</sup>See Carney et al. (2011), Colli and Colpan (2016), Holmes et al. (2018), Dau et al. (2021), Aguilera et al. (2023), Kingler-Hans et al. (2024), and Aguilera et al. (2024) for recent reviews of the literature on business groups.

Cazurra, 2006). Notably, family-owned groups are quite common in developed as well as developing economies, including but not limited to, Continental Europe (Belgium, Greece, Italy, Portugal, and Sweden), Asia (Hong Kong, India, Indonesia, Israel, Korea, Malaysia, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, and Turkey), and Latin America (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela).<sup>7</sup> While widely-held groups are more common in developed economies (e.g., Japan), state-owned groups are mostly found in developing economies (e.g., China) (Aguilera et al., 2023).

Member firms within a business group are often organized into either a horizontal or a vertical structure. In a horizontal structure, the group’s controlling shareholders hold equity stakes directly in all the member firms. In a vertical or pyramidal structure, on the other hand, the controlling shareholders exercise indirect control over most of the member firms through a chain of control (Masulis et al., 2011). In other words, controlling shareholders, despite their limited ownership (i.e., cash flow rights) in a few firms of a pyramidal business group, control all its member firms (Bertrand and Mullainathan, 2003).<sup>8</sup>

Business groups can potentially enhance as well as destroy the value of their member firms. On the one hand, business groups create internal capital markets (Hoshi et al., 1991; Khanna and Palepu, 2000) that enable affiliated firms to allocate capital effectively (Almeida et al., 2015; Gopalan et al., 2014), avoid default on obligations (Gopalan et al., 2007), finance potentially control-threatening acquisitions with cash or debt (Jindal and Seth, 2019), delay the decision to go public (Larrain et al., 2021), reduce fluctuations in employment (Faccio and O’Brien, 2021), foster innovation (Belenzon and Berkovitz, 2010), and better handle periods of financial crises and other shocks (Matvos and Seru, 2014; Almeida et al., 2015; Kuppuswamy and Villalonga, 2016; Santioni et al., 2019; Faccio and O’Brien, 2021; Masulis et al., 2023). On the other hand, business groups can

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<sup>7</sup>Each of these countries had at least 15% of all listed firms affiliated with family business groups in the sample used by Masulis et al. (2011).

<sup>8</sup>Notably, most of the business groups in India are family-owned groups with a pyramidal structure. Some non-family groups as exceptions include Larsen & Toubro Group and ITC Group (Jindal and Seth, 2019).

also result in tunneling or expropriation of minority shareholders' wealth (Johnson et al., 2000; Bertrand et al., 2002; Bae et al., 2002; Baek et al., 2006; Cheung et al., 2006) and a reduction in competition (Kandel et al., 2019). Therefore, they have been termed as 'paragons or parasites' (Khanna and Yafeh, 2007), 'red barons or robber barons' (Perotti and Gelfer, 2001), and 'heroes or villains' (Claessens et al., 2000) in the prior literature.

Business group-affiliated firms often engage in diversified activities, leveraging their unique structures to operate across multiple industries. These firms frequently engage in intra-group transactions for goods and services, creating intricate networks of business relationships (Joe and Oh, 2018; Li, 2021). This interconnectedness means that the performance of one firm may significantly affect other firms within the group (Khanna and Palepu, 2000; Gopalan et al., 2007). Such relationships may lead to both risk-sharing and resource allocation efficiencies, but they may also result in potential conflicts of interest or resource misallocation (Belenzon et al., 2013; Almeida and Wolfenzon, 2006).

## 2.2 Spillover effects

Shi et al. (2022) define interorganization spillover as "*the unintended impact of an event in a focal organization on the perceptions and decisions of other organizations that belong to the same category (categories) as the focal organization (i.e., peer organizations) as well as their stakeholders.*" To keep the scope of the literature manageable, we narrow down this definition to briefly review the literature that examines the unintended effect of an announcement by an event firm (i.e., announcing firm) on the stock prices of other firms (i.e., non-event or non-announcing firms) that belong to the same category as the event firm. These categories include industry membership, supply-chain partnership, strategic alliance and joint venture partnership, and business group affiliation, among others.<sup>9</sup>

Figure 2 depicts different kinds of spillovers that can result from actions by an event firm. An announcement by this firm can influence the stock prices of its industry rivals, supply chain partners (i.e., suppliers and customers), strategic alliance and joint

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<sup>9</sup>Notably, these categories are not mutually exclusive.

venture partners, and member firms within the same business group. Specifically, if a positive (negative) stock price reaction to an announcement by an event firm also leads to a positive (negative) market reaction, on average, for other firms in the same category, the effect is called a contagion effect. Alternatively, if a positive (negative) stock price reaction to an announcement by an event firm leads to a negative (positive) market reaction for other firms sharing the same category, the phenomenon is called a competitive effect. Put simply, a contagion (competitive) effect leads to changes in the stock prices of event and non-event firms sharing the same category in the same (different) direction.<sup>10</sup>

### Insert Figure 2 here

Numerous studies have examined inter-organizational spillovers on stock prices of firms that share the same industry. Specifically, prior studies have looked at intra-industry spillover effects of announcements related to financing decisions (Slovin et al., 1992; Hsu et al., 2010; Chod and Lyandres, 2011; Li and Zhang, 2021), dividend changes (Firth, 1996), going private transactions (Slovin et al., 1991), capital expenditure (Chen et al., 2007), corporate restructuring (Slovin et al., 1995), bankruptcy (Lang and Stulz, 1992; Cheng and McDonald, 1996), earnings (Foster, 1981), management earnings forecasts (Baginski, 1987), mergers and acquisitions (Akhigbe and Madura, 1999; Song and Walkling, 2000; Clougherty and Duso, 2009; Gaur et al., 2013; Davis et al., 2021; Derrien et al., 2021; Mataigne et al., 2021; Yilmaz, 2024), corporate scandals (Goldman et al., 2012; Yu et al., 2015), mass layoffs (Bordeman et al., 2021) and cyber security breaches (Islam et al., 2022), among others.

Some studies have also examined the spillover effects on parties within a supply chain, strategic alliance, and joint venture. For instance, an earnings announcement by a firm affects the stock prices of its suppliers (Pandit et al., 2011) as well as customers (Eshleman and Guo, 2014). Also, the announcement of a bankruptcy filing by a firm

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<sup>10</sup>It is possible for an announcement to result in both competitive and contagion effects at the same time. However, we only get to observe the effect that is dominant.



negatively affects the stock prices of its non-bankrupt strategic alliance partners (Boone and Ivanov, 2012).

Finally, another strand of literature has also looked at the spillover effects of group-affiliated firms' announcements of earnings (Bae et al., 2008; Cheung et al., 2014), credit rating changes (Joe and Oh, 2018; Kwon et al., 2016), and capital expenditure (Chen and Chang, 2020) on the stock prices of other member firms in the group.

Overall, prior literature documents that an announcement by a firm can potentially affect the stock prices of its industry rivals, customers, suppliers, strategic alliance and joint venture partners, and other firms in the same business group, with the magnitude and direction of the effect depending on the type of the event announcement.

## 2.3 Predictions

When a group-affiliated firm announces raises money through an issue of equity, it can convey either good or bad news for the event firm. On the one hand, the announcement can be good news if it signals the financing of positive net present value projects, alleviation of financial constraints, or overcoming financial distress for the firm. The good news for the event firm is also likely to be good news, on average, for other non-event firms in the group for at least two reasons. First, the event firm, as a consequence of raising money, is likely to rely less on the resources of other firms. Additionally, the recapitalization of the event firm is likely to reduce its likelihood of getting into financial difficulty, thereby avoiding the possible loss of reputation or negative signal about the group as a whole (Gopalan et al., 2007).<sup>11</sup>

On the other hand, the announcement of an equity financing decision can also be bad news for the event firm if it signals the presence or intensification of agency

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<sup>11</sup>It is noteworthy that if the money being raised by the event firm is likely to be diverted to bailing out some financially troubled firm in the group, it is likely to be good news for the firm being bailed out as well as for other non-event firms in the group as it would avoid the loss of group's reputation. However, this does not necessarily represent bad news for the event firm that is bearing the cost of bailing out the troubled firm. This is because it also sends a signal that if the event firm gets into trouble in the future, it is also likely to be bailed out by other firms.

conflicts between the firm’s controlling and minority shareholders.<sup>12</sup> The bad news for the event firm is also likely to be bad news, on average, for non-event firms in the group. For example, if investors perceive that the money raised through the equity financing decision is likely to be tunneled to the group’s controlling shareholders (Johnson et al., 2000; Bertrand et al., 2002), it is bad news for the event firm. This is also likely to be bad news for other non-event firms in the group as it likely signals the possible presence of agency conflicts at the group level.

Based on the above discussion, we predict that good news for the event firm (as evident from a positive market reaction to the announcement) will have a positive spillover effect, leading to a positive market reaction for other group firms. Conversely, bad news for the event firm (as evident from a negative market reaction to the announcement) will have a negative spillover effect, resulting in a negative market reaction for other group firms. Thus, we state our first prediction below.

**Prediction 1:** *The market reaction to an equity issue announcement by a group-affiliated firm has a contagion effect on the value of other member firms in the business group.*

Lead firms within a business group often have a stronger reputation and market presence than their affiliates. Investors closely monitor their actions, leading to more pronounced signaling effects. Firms with better reputations may have a greater ability to signal their quality through financial decisions (Chemmanur and Fulghieri, 1994), which may be extrapolated to lead firms within a business group where their equity issuance might signal information about the group’s overall prospects. Lead firms typically occupy central and influential positions within the business group, often dictating strategic directions and resource allocations.

Internal capital markets within business groups tend to function more efficiently when led by a central firm (Almeida and Wolfenzon, 2006), suggesting that the financial

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<sup>12</sup>The controlling shareholders of a firm are also known as promoters in local parlance. Notably, all firms in a business group typically share the same set of controlling shareholders.

decisions of a lead firm carry more weight and have a more significant impact on the affiliated firms' performance and valuation (Lang and Stulz, 1992). Joe and Oh (2018) explore the role of a leading firm within Korean chaebols and find that the spillover effects of announcements related to credit rating changes are more significant when these changes pertain to the lead firm. We expand upon their paper and examine whether the impact of an equity issue announcement by a lead firm is stronger than that by non-lead firms.

**Prediction 2:** *The contagion effect of the equity issue announcement by a group-affiliated firm on the value of other member firms is stronger when the event firm is the leading firm within the group.*

The extent of spillover of equity issue announcement by a group-affiliated firm on other firms within the group may also depend on the size of the issue. A larger issue size is likely to signal stronger future growth opportunities or substantial upcoming investments, which can positively affect the perceived value of other affiliated firms due to potential spillover effects. Conversely, if the market interprets the large issue size as a sign of potential dilution or financial distress, it can negatively impact the perceived value of other affiliated firms (Chemmanur et al., 2009).

A substantial equity issuance can indicate a substantial capital inflow and potential reallocation based on the presence of good opportunities, benefiting all affiliated firms (Stein, 1997; Santioni et al., 2019). However, if the reallocation is seen as inefficient or as bailing out weaker firms, it might lead to negative market reactions (Hertzel et al., 2008; Gopalan et al., 2014).

Further, a large issue results in a greater cash inflow, potentially improving the debt capacity for both the firm and the group. However, if the issuance is perceived as a response to financial strain, it could raise concerns about the group's overall financial health (DeAngelo et al., 2010).

**Prediction 3:** *The contagion effect of the equity issue announcement by a group-affiliated firm on the value of other member firms is higher when the equity issue is relatively large.*

If the firm announcing equity issue is financially constrained, financial contagion may be more pronounced as financial distress in one firm may spread to others due to perceived interdependencies (Chang and Hong, 2000).

On the one hand, it can lead to reduced financial risk and favorable market response for affiliated firms. Raising external equity by financially constrained firms may alleviate pressure on the group's internal capital market, allowing other firms to retain their capital for growth, leading to stronger positive spillover effects. On similar lines, preventing the bankruptcy of a financially constrained firm through equity issuance protects the value of affiliated firms from reputation costs (Gopalan et al., 2007)

On the other hand, it may signal financial difficulties, exacerbating concerns about the group's financial health, leading to stronger negative spillover effects (Rajan and Zingales, 1998). Insufficient internal funds may also reflect poorly on resource allocation within the group and affect investor perceptions more strongly (Stein, 1997). This leads us to our fourth prediction.

**Prediction 4:** *The contagion effect of the equity issue announcement by a group-affiliated firm on the value of other member firms is stronger when the event firm is financially constrained.*

### 3 Data

Equity issues can be broadly classified into initial public offerings (IPOs) and seasoned equity offerings (SEOs). SEOs further include rights offerings, private placements of

equity, and follow-on public offerings.<sup>13,14,15</sup> Since firms often signal IPO launches much before their publicly announced dates, it becomes a challenge to pinpoint their first date of revelation to the public. Therefore, we exclude IPOs from our sample, and focus only on SEOs.

We obtain our initial sample of equity offerings (that include rights offerings, private placements of equity, and follow-on public offerings) with issue opening dates falling between the fiscal years 2003 and 2023 from the Prime database.<sup>16</sup> We merge this data with firm-level financial and business group affiliation data from CMIE Prowess.<sup>17,18</sup> We use historical classification data to account for the changes in group ownership. We identify the group ownership immediately before the announcement date to prevent misclassification of the firm. We consider the board resolution date as the designated announcement date. Since the date of announcement for the right issues is not directly available in the database, we hand-collect announcement dates from the letter of offer for each identified issue. We employ text-based and hand-matched firm names from the two databases to combine the data. We also consider the firm name changes to make the data comprehensive. We exclude the issues by firms that we could not match with firms

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<sup>13</sup>Rights offerings involve offering existing shareholders the opportunity to purchase additional shares, typically at a discounted price relative to the current market price. These offerings allow existing shareholders to maintain their proportional ownership in the firm.

<sup>14</sup>Private placements of equity involve selling shares directly to a select group of institutional or accredited investors, rather than the general public. This method is often quicker and less costly than public offerings.

<sup>15</sup>Follow-on public offerings usually involve issuing shares to the public at large. Existing shareholders of the firm, however, can also participate in these offerings if they wish to.

<sup>16</sup>Prime Database provides extensive data on primary capital markets, with details of fundraising by Indian corporations and the Government through equity, debt, or securitization, both within the country and abroad. It has previously been used by [Bubna and Prabhala \(2011\)](#), [Clarke et al. \(2016\)](#), and [Jindal and Seth \(2019\)](#).

<sup>17</sup>Prowess database, maintained by the Centre for Monitoring Indian Economy (CMIE), is a comprehensive database of financial performance covering over 40,000 Indian companies since 1990, including detailed financial statements and market data. The database has been used extensively in prior studies on business groups in India ([Khanna and Palepu, 2000](#); [Bertrand et al., 2002](#); [Gopalan et al., 2007](#); [Siegel and Choudhury, 2012](#); [Helmets et al., 2017](#); [Li, 2021](#)).

<sup>18</sup>All companies in the Prowess database are mapped to an ownership group as per CMIE's ownership classification system. This system is a tree-like structure. At the broadest level, companies are classified as either being owned by the government or the private sector. Within the private sector, CMIE associates a company with a business group based on several factors, including the promoter's stake, percentage of equity ownership with a particular individual or family, and management control.

in Prowess.

We exclude the following types of issues from our sample: (1) equity issues that are announced simultaneously with issues of other security classes, such as convertible debt and preference shares (to isolate the spillover effects of equity issues from other issues), (2) equity issues announced by public sector undertakings (as the principal shareholder (i.e., the government) is likely to have a very different set of objectives relative to other kinds of shareholders), (3) equity issues announced by standalone firms (as our analyses are limited to group-affiliated firms), (4) equity issues announced by banking and financial services firms (as these firms have different regulatory and capital structure requirements), (5) equity issues announced by group-affiliated firms that have less than two publicly listed firms in the group (as we require stock price data for the event firm and at least one non-event firm), and (6) equity issues for which data is inadequate for empirical analyses. Table 1 describes the step-by-step procedure to arrive at our final sample of 255 equity issues, including 126 rights offerings, 120 private placements of equity, and 9 follow-on public offerings.<sup>19,20</sup>

### Insert Table 1 here

Table 2 presents the distribution of equity issues across time (Panel A), industry (Panel B), and business group (Panel C). Panel A indicates an average of 12 equity issues through rights issues, private placements, and follow-on public offerings per year, with an increase in the number of issues in 2009. Panel B shows the concentration of issues in the manufacturing and construction industries, followed by information and communication.<sup>21</sup> Panel C lists the number of issues per business group for those groups with at least three issues during the sample period. We observe that the highest number

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<sup>19</sup>Notably, unlike the US, follow-on public offerings are a far less common way of issuing equity in India.

<sup>20</sup>Certain equity issues are structured across two to three tranches, although approval is obtained in a single board meeting. We club these multiple events into one and aggregate the issue amount across these events.

<sup>21</sup>We classify equity-issuing firms into various industries based on the first two digits of the National Industrial Classification (NIC) scheme of economic activities published by the Government of India and available at <https://udyamregistration.gov.in/docs/NIC-code-for-MSME-classification-definition.pdf>

of issues is by the Tata Group (11 during the sample period), followed by Birla Aditya Group (10 during the sample period), and RPG Enterprises Group (8 during the sample period).

**Insert Table 2 here**

Figure 3 illustrates the distribution of equity issues over the sample period. The height of each bar represents the issue amount (primary axis), and the line indicates the number of issues (secondary axis).

**Insert Figure 3 here**

Table 3 presents the summary statistics of the key financial variables for the announcing firms in our sample. The *Offer Size* exhibits considerable variability, with a mean of INR 11.4 billion and a standard deviation of INR  $\sim$ 43 billion. On similar lines, the market value of equity of the announcing firm before the issue (*Mcap*) shows substantial dispersion, averaging 96.5 billion INR with a standard deviation of INR  $\sim$ 500 billion. The mean *ROA* is 0.03, indicating moderate profitability, and *Leverage* averages 0.36, reflecting typical debt levels. The mean *M/B* (market-to-book ratio) is 3.58, while *R&D* intensity and *Cash* ratios are 0.01 and 0.02, respectively, both with medians close to zero, suggesting limited R&D investment and cash holdings among many firms. These statistics highlight significant diversity in the financial characteristics of the firms within the sample.

**Insert Table 3 here**

## 4 Empirical methodology and results

### 4.1 Methodology

We employ the standard event study methodology (Brown and Warner, 1985) to calculate abnormal returns (AR) and cumulative abnormal returns (CAR) around equity issue

announcements. Specifically, we use the market model to compute the AR for firm  $i$  on day  $t$  as:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (1)$$

where  $R_{it}$  and  $R_{mt}$  represent the observed return on day  $t$  on the stock of event firm  $i$  and that on the market index, respectively. We use the Nifty 50 Index to proxy for the market index.<sup>22,23</sup> The parameters of the market model,  $\alpha_i$  and  $\beta_i$ , are estimated by regressing stock returns on the market returns over a 200-trading-day estimation period ending sixty days prior to the event date (Balachandran et al., 2008). We then compute CAR between dates  $t_1$  and  $t_2$  by adding AR from day  $t_1$  to day  $t_2$ . We use  $(-1, +1)$ , a three-day window centered at the announcement date, for reporting our main results.<sup>24</sup>

For estimating the spillover effect of an equity financing announcement by a group-affiliated firm on other non-event firms in the same business group, we compute an equal-weighted CAR for a portfolio of all non-event firms in the group.<sup>25</sup> The portfolio approach is an econometrically superior approach as it avoids cross-sectional correlation among individual returns of non-event firms (Firth, 1996; Szewczyk, 1992).<sup>26</sup> Our approach is consistent with prior literature on within-group spillover effects of announcements on corporate decisions (Joe and Oh, 2018; Bae et al., 2008).

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<sup>22</sup>The Nifty 50 serves as a benchmark for the Indian equity market, reflecting the overall market performance and investor sentiment. The index includes 50 stocks from varied sectors, providing a comprehensive overview of the Indian economy. Further, the index comprises close to 60% of the free float market capitalization of all stocks that are listed on India’s National Stock Exchange (NSE) (Source: <https://www.niftyindices.com/indices/equity/broad-based-indices/NIFTY-Next-50/NIFTY-50> (last accessed on July 23, 2024)).

<sup>23</sup>To test the robustness of our main results, we also conduct our analysis using the broader market index, the Nifty 500. This index encompasses the top 500 companies based on full market capitalization and accounts for approximately 92% of the free-float market capitalization of stocks listed on the NSE (Source: <https://www.nseindia.com/products-services/indices-nifty500-index> (last accessed on Nov 15, 2024)). The results remain consistent with our original analysis.

<sup>24</sup>We also test the robustness of our main results using a slightly longer window  $(-2,+2)$ . Our results remain largely similar.

<sup>25</sup>Our main results continue to hold even if we use a value-weighted CAR for the portfolio of non-event firms (see Table 10).

<sup>26</sup>Ordinary least squares (OLS) regression estimation assumes cross-sectional independence among observations.



## 4.2 Univariate results on the contagion effect of equity financing investments

Table 4 shows average three-day CAR corresponding to equity financing announcements for both event firms (represented by *Event CAR*) as well as equal-weighted portfolios of non-event firms (represented by *Non-event Portfolio CAR*). While the overall impact of the equity issuance announcement is positive, on average, for the announcing firm, there is heterogeneity in the price reaction of different firms. To address this issue, we evaluate the impact of the announcement on the affiliated firms in two different settings based on the price reaction of the issuing firm: good news and bad news announcements. An equity issuance announcement is classified as good (bad) news when the stock price reaction to the equity issuance announcement is positive (negative) for the announcing firm.

Notably, if the investors perceive the equity issuance announcement by the event firm as good news (as evident from a positive *Event CAR*), we find a positive spillover effect on the stock returns for the portfolio of non-event firms within the group. Similarly, if the investors perceive the announcement as bad news (evident from a negative *Event CAR*), we find a negative spillover effect on the stock returns for the portfolio of non-event firms.

**Insert Table 4 here**

Figure 4 indicates that the market reaction for the portfolio of non-event firms exhibits a positive association with the market reaction of the event firm for both good and bad news events. Specifically, when the market reaction for the event firm is positive (negative), the market reaction for the portfolio of non-event firms is also positive (negative). The market reaction for non-event firms, however, is smaller in magnitude, relative to that for event firms. This relationship may be attributed to the presence of internal capital markets as well as formal and informal ties among the firms in the group.

Insert Figure 4 here

### 4.3 Multivariate results on the contagion effect of equity financing investments

To test Prediction 1 that translates to finding a positive association between the stock price reaction of the event firm and that of non-event firms in the group, we use the following equation:

$$\text{Non-event Portfolio CAR} = \text{Event CAR} + \text{Controls} + \epsilon \quad (2)$$

where *Non-event Portfolio CAR* is an equal-weighted CAR of all the non-event firms in the business group.

Table 5 presents the main results of our study. While Model (1) includes only our main explanatory variable of interest, Models (2) and (3) include event firm-specific factors such as *Size*, *ROA*, *Leverage*, *M/B*, *R&D*, and *Cash* as controls. To control for the type of equity issue, we also include an indicator variable, *Rights Indicator*, that takes the value one if the issue is a right offering, and zero otherwise. Models (4) and (5) additionally control for group-level variables. For all models, except for Model (1), we include business group fixed effects to control for unobserved heterogeneity across different business groups. Models (3) and (5) also incorporate year and industry-fixed effects to account for temporal and sector-specific variations, respectively.

Importantly, in all our models, we find a positive and significant coefficient on *Event CAR*, indicating a positive association between the market reaction of the event firm and that of an equal-weighted portfolio of non-event firms in the business group. Specifically, in Model (5), we observe a coefficient of +0.272 on *Event CAR*, indicating that every 1 percentage point increase (decrease) in the market reaction to the announcement by the event firm is associated with a 27 basis points increase (decrease) in the market reaction, on average, for the portfolio of non-event firms in the business group.

This result is economically significant. Overall, we observe a contagion effect of the market reaction to an announcement by the issuing firm on the stock returns of other affiliated firms. These results are consistent with Prediction 1.

**Insert Table 5 here**

#### 4.4 The role of the event firm's relative standing within the group

Prediction 2 implies that when the lead firm within the business group announces an issue of equity, the contagion effect is more pronounced than when it is done by any other firm within the group. We test this using the following equation:

$$\begin{aligned} \text{Non-event Portfolio CAR} = & \text{Event CAR} + \text{Lead Indicator} \\ & + \text{Event CAR} \times \text{Lead Indicator} + \text{Controls} + \epsilon \end{aligned} \quad (3)$$

where *Lead Indicator* denotes an indicator variable that takes the value 1 if the issuing firm has the highest sales by value among all listed firms within the business group, and zero otherwise. This prediction translates to finding a positive and significant coefficient on the interaction between *Event CAR* and *Lead Indicator*.

Table 6 presents our results. Consistent with our prediction, we observe a positive and significant coefficient on the interaction term *Event CAR*  $\times$  *Lead Indicator* in all the models, suggesting that the contagion effect is stronger for announcements made by lead firms of business groups. In terms of economic significance, a coefficient of +0.392 on the interaction term in Model 4 suggests that for 1 percentage point increase in the market reaction to the announcement by the lead firm of the business group is associated with a 39 basis point higher increase in the market reaction for the portfolio of the group's non-event firms, relative to announcements made by non-lead firms.

**Insert Table 6 here**

## 4.5 The role of the relative issue size

We use the following equation to test Prediction 3, which states that announcements of issues with larger relative size by a group-affiliated firm will have a stronger contagion impact on the stock returns of member firms in the group:

$$\begin{aligned} \text{Non-event Portfolio CAR} = & \text{Event CAR} + \text{Large Issue Indicator} \\ & + \text{Event CAR} \times \text{Large Issue Indicator} + \text{Controls} + \epsilon \quad (4) \end{aligned}$$

where *Large Issue Indicator* represents an indicator variable that takes the value 1 when the ratio of issue size to the group market capitalization is more than the sample median, and zero otherwise. Here, the group market capitalization is the sum of the market capitalization of all the listed firms in the business group. This prediction simply boils down to finding a positively significant coefficient on the interaction between *Event CAR* and *Large Issue Indicator*.

Table 7 presents our results. We indeed find a positive and significant coefficient on the interaction term *Event CAR*  $\times$  *Large Issue Indicator*. This result, which is consistent with Prediction 3, implies that the contagion effect is stronger for larger issues than for smaller ones. Specifically, a coefficient of +0.398 on the interaction term in Model 4 indicates that for 1 percentage point increase in the market reaction to the announcement of a relatively large equity issue by the event firm is associated with a 40 basis point higher increase in the market reaction for the portfolio of the non-event firms in the business group, relative to announcements of relatively small issues.

Insert Table 7 here

## 4.6 The role of the event firm's financial constraints

Prediction 4 states that the contagion effect will be higher for equity financing announcements made by group-affiliated firms that are financially constrained. We use the HP

index as given by [Hadlock and Pierce \(2010\)](#), to identify the degree of financial constraints faced by a firm. We calculate the HP index, also known as the *size-age* index, using the following equation:  $HP\ Index = -0.737 \times size + 0.043 \times size^2 - 0.040 \times age$ , where *size* refers to the natural logarithm of the book value of total assets for the firm under consideration, and *age* refers to the number of years since its incorporation. A higher (lower) value of the HP Index is associated with a more (less) financially constrained firm.

We use the following equation to test the prediction:

$$\begin{aligned}
 Non\text{-}event\ Portfolio\ CAR &= Event\ CAR + Fin.\ Const.\ Indicator \\
 &+ Event\ CAR \times Fin.\ Const.\ Indicator + Controls + \epsilon \quad (5)
 \end{aligned}$$

where *Fin. Const. Indicator* is an indicator variable that takes the value 1 when the HP index is above the sample median (indicating higher financial constraints), and zero otherwise. This prediction translates to finding a positively significant coefficient on the interaction between *Event CAR* and *Fin. Const. Indicator*.

Our results are presented in [Table 8](#). Consistent with our prediction, we find a positive and significant coefficient on the interaction term *Event CAR*  $\times$  *Fin. Const. Indicator*, indicating that equity financing announcements made by more financially constrained firms result in a stronger contagion impact on affiliated firms within the same business group. In terms of economic significance, a coefficient of +0.301 on the interaction term in Model 4 suggests that for 1 percentage point increase in the market reaction to the announcement by a more financially constrained event firm is associated with a 30 basis point higher increase in the market reaction for the portfolio of the group's non-event firms, relative to announcements made by less financially constrained firms.

**Insert [Table 8](#) here**

## 5 Alternative explanations and robustness checks

### 5.1 Placebo test

Our results are prone to a potential endogeneity concern that they might be driven by a possible co-movement of stock prices of firms within a business group, rather than the equity issue announcement of an event firm. To address this concern, we implement a placebo (or falsification) test using pseudo-event dates (Bordeman et al., 2021; Li and Zhang, 2021), shifting announcement dates 30 days prior to actual dates. This test assesses whether our findings could be attributed to mere stock price correlation rather than the information conveyed by equity issue announcements. Table 9 displays the results of our placebo test. We observe that the coefficient on our main explanatory variable of interest, *Event CAR*, is not statistically significant. This suggests that the spillover effects of equity issue announcements are unlikely driven by chance and that these announcements provide substantial information to market participants.

Insert Table 9 here

### 5.2 Constructing portfolios of non-event firms based on value-weighting

Table 5 presents the multivariate results obtained after regressing the market reaction for an equal-weighted portfolio of non-event firms on the market reaction of the announcing firm. To ensure the robustness of our results, we also construct a value-weighted portfolio of non-event firms based on their market capitalization four weeks prior to the announcement date. Additionally, rather than using the simple average of values for group controls, we apply a weighted average, adjusted by market capitalization. For example, while *Group ROA* in Table 5 was previously calculated as the average *ROA* of all listed group firms, this revised approach considers the ratio of total net income across all listed firms within the group to the group's total assets. Our results, as shown in Table

10, remain consistent with those presented in Table 5.

**Insert Table 10 here**

### **5.3 Using an alternative measure to define lead firms**

The findings from Table 6 suggest that when the lead firm (i.e., the firm with the highest sales in the business group) announces issuing equity, it is associated with a more pronounced contagion effect. To ensure that our results are not driven due to the way we define lead firms, we develop an additional measure of the lead firm as the firm with the highest market capitalization in the group. Our results that are presented in Table 11 remain qualitatively similar.

**Insert Table 11 here**

### **5.4 Employing alternative definitions of relative issue size**

The results shown in Table 7 suggest that a larger issue size, when considered relative to group market capitalization, is positively associated with a more pronounced contagion effect. To further validate these results, we construct two continuous variables to capture relative issue size: (1) the first one defined as the ratio of issue size to book value of assets for all listed firms in the group, and (2) the second one defined as the ratio of issue size and group value, where group value is the aggregate of the group's market capitalization and the book value of its outstanding debt. We then use these continuous variables to create indicator variables, *Large Issue Indicator1* and *Large Issue Indicator2*, respectively, that take the value of one when the relative issue size is more than the sample median, and zero otherwise. Importantly, our results, as shown in Table 12, remain qualitatively unchanged to defining the relative issue size in alternative ways.

**Insert Table 12 here**

## 5.5 Using alternative definitions to measure the event firm's financial constraints

Our measure of financial constraints in Table 8 is based on the interest coverage ratio as defined by earnings before interest and tax to interest expenses. To validate the robustness of our results on contagion effects being stronger when announced by financially constrained firms, we create two additional continuous measures of financial constraints: (1) Profitability, as given by Faulkender and Smith (2016) measured as a ratio of Earnings before interest and tax to book assets, and (2) interest coverage ratio calculated as a ratio of earnings before interest and tax to interest expenses (Kaplan and Zingales, 1997).

For each continuous measure of financial constraints, we construct an indicator variable to classify firms into less and more financially constrained firms. We first define *Fin. Const. Indicator1* as one if profitability is below the sample median (indicating more financially constrained firms), and zero otherwise. Similarly, we define *Fin. Const. Indicator2* as one if the interest coverage ratio, as measured by EBIT to interest expenses, is below the sample median, and zero otherwise. Table 13 presents our results that employ our alternative measures of financial constraints. Our results remain qualitatively similar to those shown in Table 8.

Insert Table 13 here

## 6 Discussion and conclusion

The paper examines the spillover effects of equity issuance announcements by firms that are a part of Indian business groups. We find that a positive (negative) market reaction to an equity issue announcement by a group-affiliated firm leads to a positive (negative) market reaction for other affiliated firms in the group, indicating a contagion effect. We also find that the contagion effect is stronger when the issuing firm is the lead entity within the group, the issue is of a considerable magnitude, and the issuing firm faces



financial constraints. Our results are robust to several checks.

The literature on spillover effects within business groups is confined to examining announcements related to investment, financing, and other related decisions on stock prices of group-affiliated firms. Examining the spillover effects of dividend decisions, which are one of the important managerial decisions in corporate finance, remains a fruitful area of future research. Further, all prior studies on spillover effects within business groups have primarily been carried out in Asian countries. However, Asian countries differ from those in Continental Europe and Latin America in several aspects, including the degree of ownership concentration, stock market development, and other institutional features ([Faccio et al., 2001](#); [Faccio and Lang, 2002](#); [Cumming et al., 2021](#); [Aguilera et al., 2024](#)). Therefore, it may be a fruitful avenue for researchers to examine within-group spillovers in non-Asian markets.

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Figure 1: Anecdotal example

The figure presents an example of spillover of the market reaction to the announcement of the equity financing decision by a group-affiliated firm on other firms within the business group. Godrej Properties Limited is a part of Godrej Group, with four listed affiliated firms in the group - Astec Lifesciences Limited, Godrej Agrovet Limited, Godrej Consumer Products Ltd and Godrej Industries Limited. On April 30, 2019, Godrej Properties Ltd. announced a private placement of common stock for INR 25 billion (equivalent to USD 360.55 million based on the prevailing exchange rate on the date of the announcement).  $CAR$  represents the three-day cumulative abnormal return (%) centered at the equity issue announcement date and computed as follows:  $CAR_{it} = \sum_{t=-1}^{+1} (R_{it} - (\alpha + \beta_i R_{mt}))$  where,  $R_{it}$  and  $R_{mt}$  are the daily returns for the listed firms in the business group at the time  $t$  and daily market index (Nifty 50 Index) return on day  $t$ , respectively. The parameters  $\alpha_i$  and  $\beta_i$  are estimated by the Ordinary Least Square (OLS) market model regression using a 200-trading-day estimation period ending sixty days before the event day (day -260 to day -61).

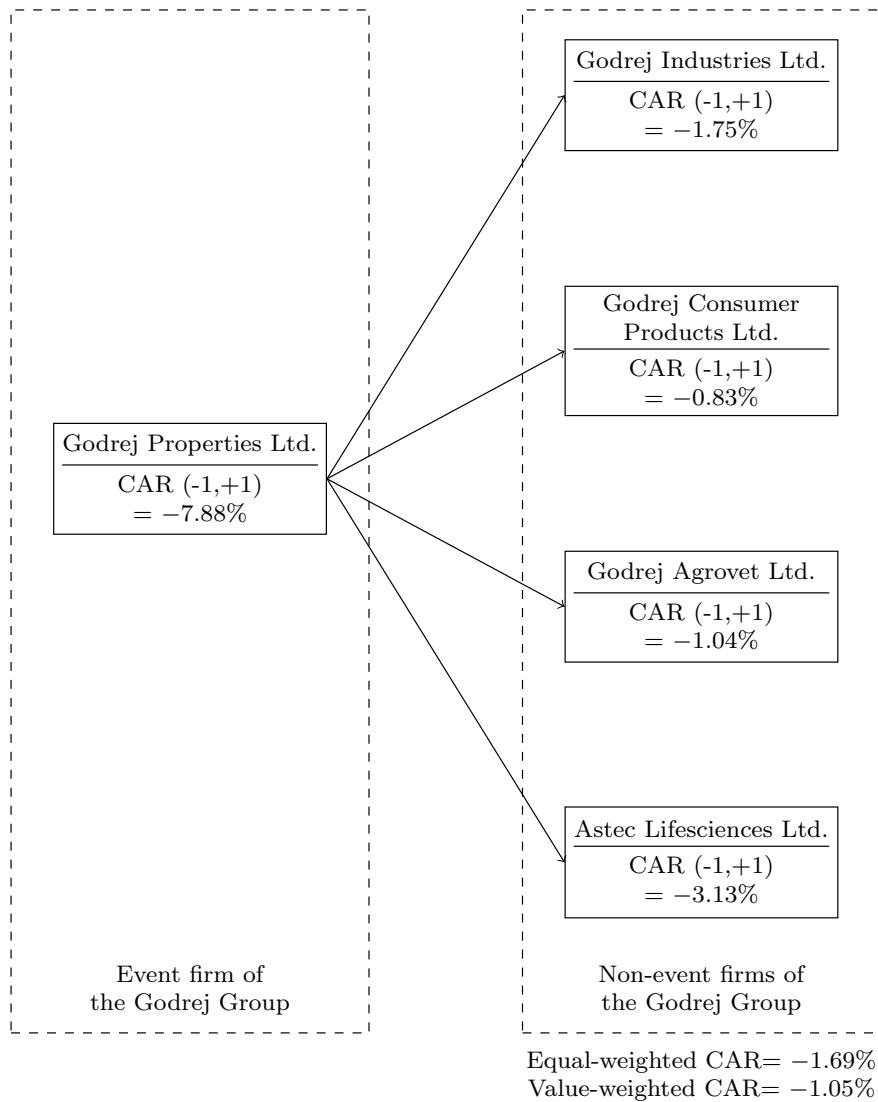


Figure 2: Types of spillovers (or information transfers)

The figure illustrates different kinds of spillovers (or information transfers) that can happen as a consequence of an action by an event firm. Specifically, an announcement by this firm can affect the market values of its supply chain partners (denoted as  $SC_1, SC_2, \dots, SC_M$ ), strategic alliance partners (represented by  $SA_1, SA_2, \dots, SA_N$ ), industry rivals (labeled as  $R_1, R_2, \dots, R_P$ ), and member firms within the same group (indicated by  $A_1, A_2, \dots, A_Q$ ).

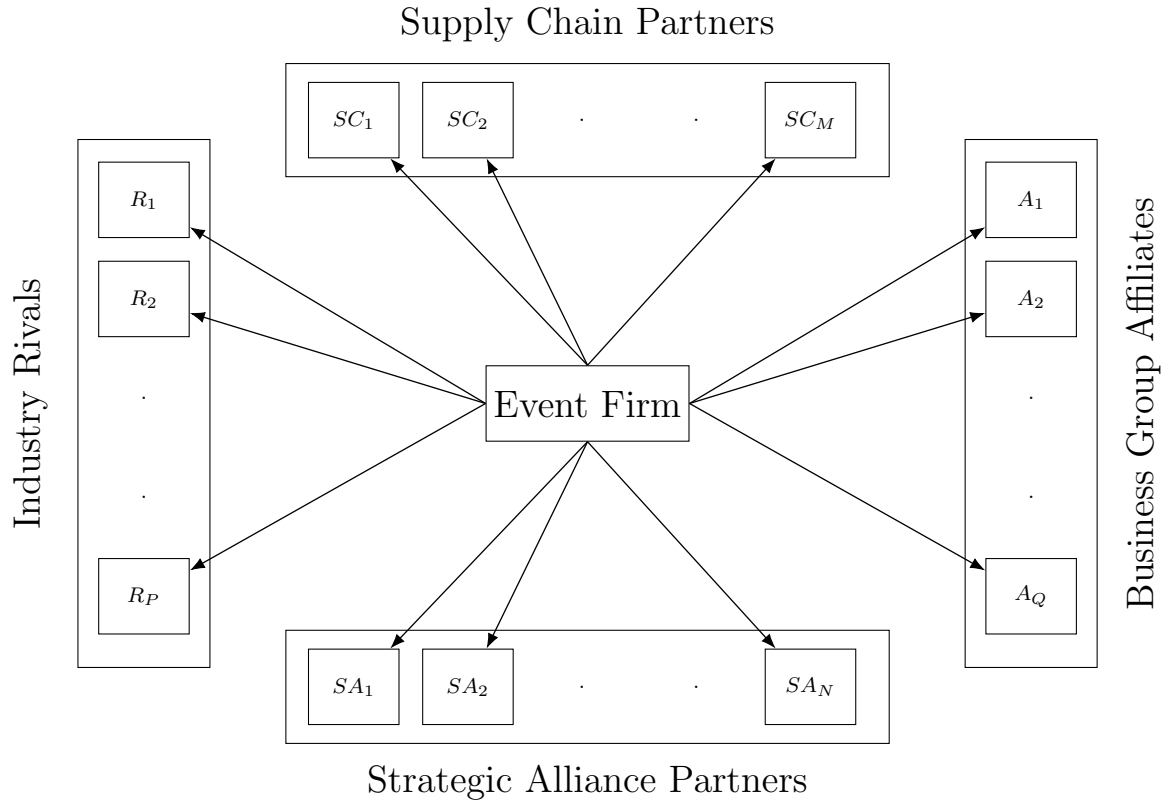


Figure 3: Distribution of equity issue announcements over the sample period

This figure shows the distribution of equity issues over the sample period. The bars (primary axis) represent the amount raised, while the line (secondary axis) reflects the number of issues.

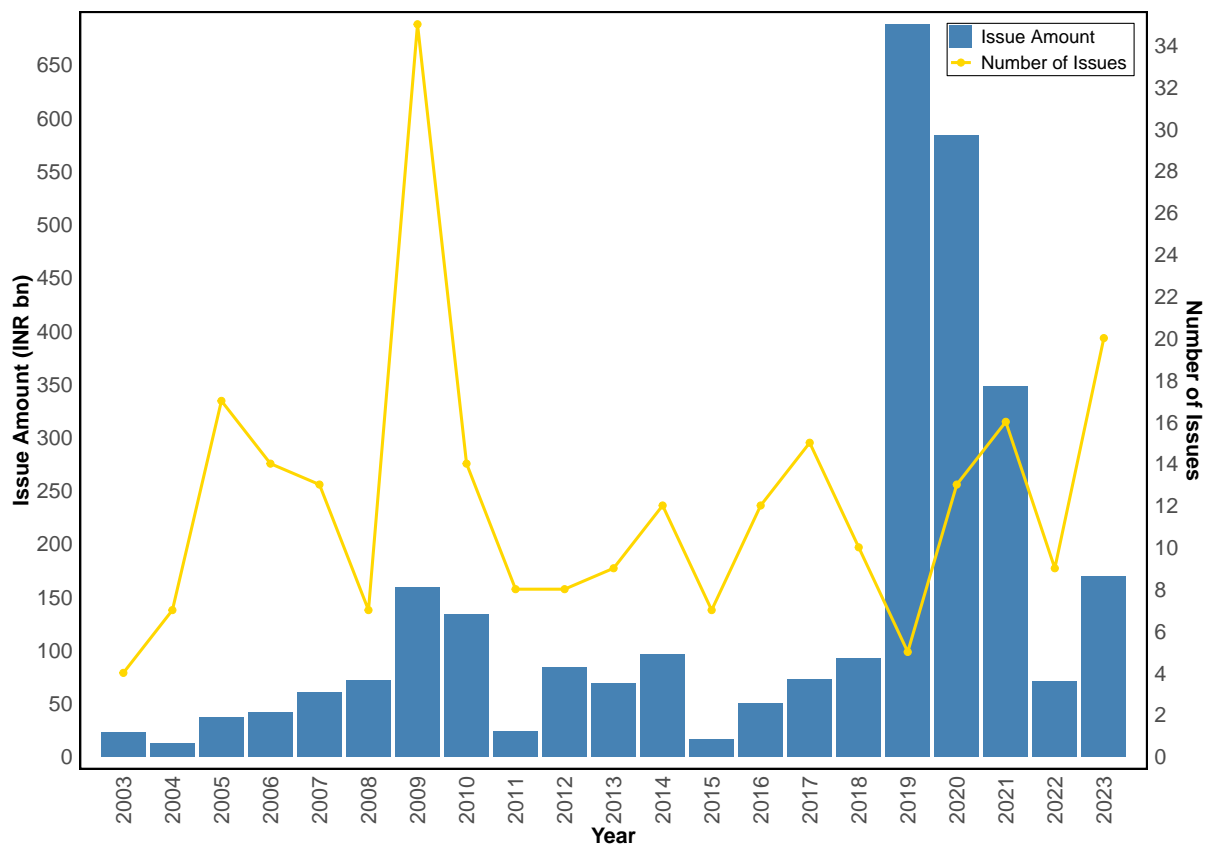


Figure 4: Market reaction to announcements of equity financing decisions for event firms and portfolios of non-event firms

This figure illustrates the market reaction to equity issue announcements, comparing the CAR (Cumulative Abnormal Return) of the event firm with an equal-weighted portfolio of non-event firms during the event window (-1,+1). The left panel shows CAR for instances where the market reaction is positive (good news), while the right panel highlights cases with negative CAR (bad news). In both scenarios, the CAR of the non-event firm portfolio is associated with that of the event firm.

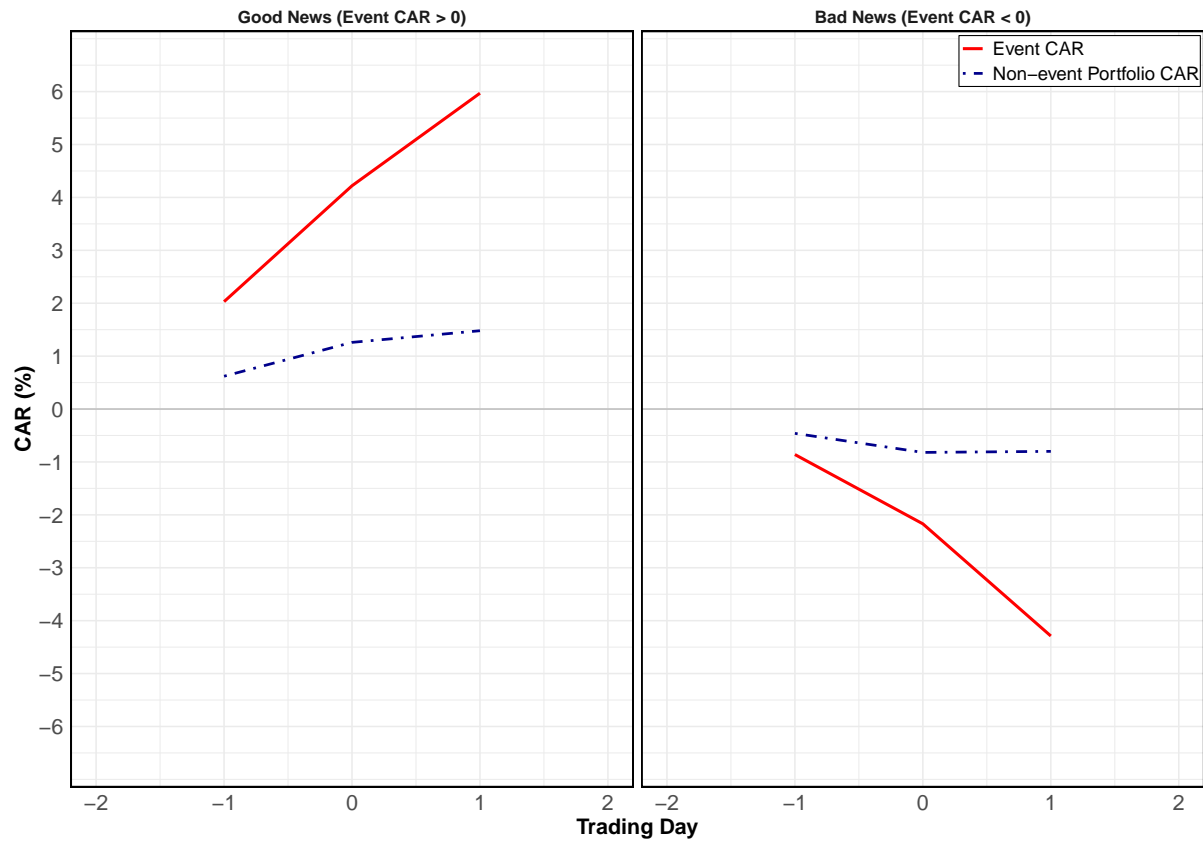


Table 1: Sample selection

This table presents the step-by-step process to arrive at the final sample of 255 equity issues.

| Particulars   | Right Offerings | Private Placements | Follow-on Public Offerings | Total |
|---|-----------------|--------------------|----------------------------|-------|
| Total Issues  | 465             | 544                | 71                         | 1080  |
| <i>Less:</i> Simultaneous and non-equity issues                               | 49              | 24                 | 0                          | 73    |
| <i>Less:</i> Return data not available  | 7               | 0                  | 0                          | 7     |
| <i>Less:</i> Group affiliation not available                                  | 1               | 1                  | 0                          | 2     |
| <i>Less:</i> Issues by Public Sector Undertaking (PSUs)                       | 4               | 15                 | 23                         | 42    |
| <i>Less:</i> Issues by non-business group companies                           | 115             | 79                 | 20                         | 214   |
| <i>Less:</i> Issues by banking and financing firms                            | 56              | 109                | 7                          | 172   |
| <i>Less:</i> Issues by firms with less than two listed firm                   | 73              | 173                | 10                         | 256   |
| <i>Less:</i> Duplicate events   | 0               | 6                  | 0                          | 6     |
| <i>Less:</i> Issues where announcement date (board approval) is not available | 18              | 0                  | 0                          | 18    |
| <i>Less:</i> Issues with inadequate return data                               | 3               | 3                  | 1                          | 7     |
| <i>Less:</i> Issues with inadequate controls data                             | 13              | 14                 | 1                          | 28    |
| Final Sample  | 126             | 120                | 9                          | 255   |

Table 2: Distribution of equity issues in the sample

This table presents the distribution of equity issues in our sample. Panel A displays the distribution across various years. Panel B details the distribution by industries, while Panel C presents the distribution across business groups.

Panel A: Distribution across time

| Year  | Rights Offerings | Private Placements | Follow-on Public Offer | Total |
|-------|------------------|--------------------|------------------------|-------|
| 2003  | 3                | 0                  | 1                      | 4     |
| 2004  | 5                | 0                  | 2                      | 7     |
| 2005  | 14               | 0                  | 3                      | 17    |
| 2006  | 6                | 7                  | 1                      | 14    |
| 2007  | 7                | 6                  | 0                      | 13    |
| 2008  | 5                | 2                  | 0                      | 7     |
| 2009  | 14               | 21                 | 0                      | 35    |
| 2010  | 2                | 11                 | 1                      | 14    |
| 2011  | 7                | 1                  | 0                      | 8     |
| 2012  | 5                | 3                  | 0                      | 8     |
| 2013  | 6                | 3                  | 0                      | 9     |
| 2014  | 3                | 9                  | 0                      | 12    |
| 2015  | 4                | 3                  | 0                      | 7     |
| 2016  | 6                | 6                  | 0                      | 12    |
| 2017  | 7                | 8                  | 0                      | 15    |
| 2018  | 5                | 5                  | 0                      | 10    |
| 2019  | 2                | 3                  | 0                      | 5     |
| 2020  | 9                | 4                  | 0                      | 13    |
| 2021  | 7                | 8                  | 1                      | 16    |
| 2022  | 5                | 4                  | 0                      | 9     |
| 2023  | 4                | 16                 | 0                      | 20    |
| Total | 126              | 120                | 9                      | 255   |

Table 2: Distribution of equity issues in the sample, continued.

## Panel B: Distribution across industries

| Industry   | Rights Offerings | Private Placements | Follow-on Public Offer | Total |
|--|------------------|--------------------|------------------------|-------|
| Accommodation and Food service activities                            | 5                | 1                  | 0                      | 6     |
| Administrative and support service activities                        | 0                | 1                  | 0                      | 1     |
| Agriculture, forestry and fishing                                    | 0                | 1                  | 0                      | 1     |
| Construction   | 15               | 23                 | 0                      | 38    |
| Electricity, gas, steam and air conditioning supply                  | 2                | 3                  | 0                      | 5     |
| Human health and social work activities                              | 1                | 2                  | 0                      | 3     |
| Information and communication  | 11               | 11                 | 0                      | 22    |
| Manufacturing  | 77               | 63                 | 7                      | 147   |
| Mining and quarrying   | 0                | 1                  | 0                      | 1     |
| Professional, scientific and technical activities                    | 3                | 1                  | 0                      | 4     |
| Transportation and storage   | 1                | 0                  | 0                      | 1     |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | 11               | 13                 | 2                      | 26    |
| Total  | 126              | 120                | 9                      | 255   |

## Panel C: Distribution across business groups (at least three issues)

| Business Group                | Rights Offerings | Private Placements | Follow-on Public Offer | Total |
|-------------------------------|------------------|--------------------|------------------------|-------|
| Tata Group                    | 7                | 2                  | 2                      | 11    |
| Birla Aditya Group            | 6                | 4                  | 0                      | 10    |
| RPG Group                     | 2                | 6                  | 0                      | 8     |
| Bajaj Group                   | 5                | 2                  | 0                      | 7     |
| Birla K.K. Group              | 4                | 3                  | 0                      | 7     |
| Network 18 Group              | 5                | 1                  | 0                      | 6     |
| Hinduja (Ashok Leyland) Group | 4                | 1                  | 0                      | 5     |
| Godrej Group                  | 2                | 3                  | 0                      | 5     |
| Mehta C.K. Group              | 1                | 4                  | 0                      | 5     |
| Raunaq Singh Group            | 2                | 2                  | 0                      | 4     |
| Ramco Group                   | 3                | 1                  | 0                      | 4     |
| Mahindra & Mahindra Group     | 2                | 2                  | 0                      | 4     |
| Hari Shankar Singhania Group  | 3                | 1                  | 0                      | 4     |
| Suzlon Group                  | 2                | 2                  | 0                      | 4     |
| Om Prakash Jindal Group       | 2                | 2                  | 0                      | 4     |
| Patel Group                   | 2                | 2                  | 0                      | 4     |
| Oberoi M.S. Group             | 3                | 1                  | 0                      | 4     |
| Minda S.L. Group              | 1                | 3                  | 0                      | 4     |
| S. Kumars Group               | 1                | 2                  | 0                      | 3     |
| UB Group                      | 2                | 1                  | 0                      | 3     |
| Birla B.K. Group              | 3                | 0                  | 0                      | 3     |
| Essel Group                   | 2                | 1                  | 0                      | 3     |
| Walchand Group                | 2                | 1                  | 0                      | 3     |
| Kalpataru Group               | 2                | 1                  | 0                      | 3     |
| Nagarjuna Group               | 1                | 2                  | 0                      | 3     |
| T.V.S. Iyengar Group          | 3                | 0                  | 0                      | 3     |
| Somany Impresa Group          | 0                | 3                  | 0                      | 3     |
| Vardhman Group                | 1                | 2                  | 0                      | 3     |
| InoxGFL Group                 | 1                | 2                  | 0                      | 3     |
| Gayatri Group                 | 1                | 2                  | 0                      | 3     |
| Jaypee Group                  | 0                | 3                  | 0                      | 3     |
| Bharti Telecom Group          | 2                | 1                  | 0                      | 3     |
| Vikas Group                   | 0                | 3                  | 0                      | 3     |

Table 3: Summary statistics

This table presents the summary statistics for the key financial variables of announcing firms in our sample. *Offer Size* indicates the amount raised by the company through the issue of common equity (INR bn), while *Mcap* represents the market value of equity of the announcing firm, prior to the issue (INR bn). *ROA*, *Leverage*, *M/B*, *R&D*, and *Cash* are calculated as the ratio of net income to total assets, the ratio of total debt to total assets, the ratio of the *Size* to the book value of equity, the ratio of R&D to total assets, and the ratio of cash to total assets, respectively.

| Variable          | Mean  | Median | Min     | Max     | SD     |
|-------------------|-------|--------|---------|---------|--------|
| <i>Offer Size</i> | 11.40 | 3.00   | 0.00    | 531.00  | 42.91  |
| <i>Mcap</i>       | 96.50 | 12.00  | 0.00    | 7056.00 | 499.32 |
| <i>ROA</i>        | 0.03  | 0.03   | -0.39   | 1.69    | 0.16   |
| <i>Leverage</i>   | 0.36  | 0.35   | 0.00    | 1.01    | 0.17   |
| <i>M/B</i>        | 3.58  | 1.65   | -180.76 | 268.78  | 21.95  |
| <i>R&amp;D</i>    | 0.01  | 0.00   | 0.00    | 1.20    | 0.09   |
| <i>Cash</i>       | 0.02  | 0.01   | 0.00    | 0.35    | 0.04   |



Table 4: Univariate results on contagion effects of equity issue announcements within business groups

This table presents the spillover effects that are driven by the market reactions of event firms. The average three-day CARs are reported for the event firms and other affiliate firms in the same business group. We classify our event samples into two subsamples according to the type of issue and how the equity issuance announcement is perceived by the investors (good news/bad news). Panel A includes announcements of rights offerings, Panel B includes announcements of private placements, Panel C includes announcements of follow-on public offerings, and Panel D includes all announcements. For each panel, we show announcements perceived as good news (as evident from positive *Event CAR*) as well as those perceived as bad news (as evident from negative *Event CAR*) by investors. \*\*\*, \*\*, and \* indicate that the coefficient estimates are significantly different from zero at the 1 percent, 5 percent, and 10 percent levels, respectively.

|  | Event Firms |          |           | Portfolio of Non-event Firms |          |         |
|--|-------------|----------|-----------|------------------------------|----------|---------|
|  | Count       | Mean CAR | t-stat.   | Count                        | Mean CAR | t-stat. |
| <b>Panel A: Rights Offerings</b>           |             |          |           |                              |          |         |
| Good News ( <i>Event CAR</i> > 0)          | 64          | 0.06     | 6.98***   | 64                           | 0.01     | 1.74*   |
| Bad News ( <i>Event CAR</i> < 0)           | 62          | -0.05    | -8.8***   | 62                           | -0.01    | -1.38   |
| All Announcements                          | 126         | 0.01     | 1.16      | 126                          | 0.00     | 0.65    |
| <b>Panel B: Private Placements</b>         |             |          |           |                              |          |         |
| Good News ( <i>Event CAR</i> > 0)          | 61          | 0.05     | 8.84***   | 61                           | 0.02     | 1.91*   |
| Bad News ( <i>Event CAR</i> < 0)           | 59          | -0.04    | -8.3***   | 59                           | -0.01    | -1.53   |
| All Announcements                          | 120         | 0.01     | 1.67*     | 120                          | 0.00     | 0.72    |
| <b>Panel C: Follow-on Public Offerings</b> |             |          |           |                              |          |         |
| Good News ( <i>Event CAR</i> > 0)          | 5           | 0.07     | 2.51*     | 5                            | 0.03     | 1.32    |
| Bad News ( <i>Event CAR</i> < 0)           | 4           | -0.04    | -2.47*    | 4                            | -0.01    | -0.5    |
| All Announcements                          | 9           | 0.02     | 0.78      | 9                            | 0.01     | 0.68    |
| <b>Panel D: All Equity Issues</b>          |             |          |           |                              |          |         |
| Good News ( <i>Event CAR</i> > 0)          | 130         | 0.06     | 10.98***  | 130                          | 0.01     | 2.76*** |
| Bad News ( <i>Event CAR</i> < 0)           | 125         | -0.04    | -12.24*** | 125                          | -0.01    | -2.13** |
| All Announcements                          | 255         | 0.01     | 2.05**    | 255                          | 0.00     | 1.07    |

Table 5: Multivariate results on contagion effects of equity issue announcements within business groups

This table reports the results of equation (2) from regressing the cumulative abnormal return (CAR) of an equal-weighted portfolio of non-event affiliated firms on the CAR of the event firm (and controls). The dependent variable, *Non-event Portfolio CAR*, represents the three-day cumulative abnormal return (%) centered at the equity issue announcement date and computed as follows:  $Non\text{-}event\ Portfolio\ CAR_{it} = \sum_{t=-1}^{+1} (R_{it} - (\alpha + \beta_i R_{mt}))$  where,  $R_{it}$  and  $R_{mt}$  are the daily returns for the equal weight portfolio of listed affiliated firms for the event firm  $i$  at the time  $t$  and daily market index (Nifty 50 Index) return on day  $t$ , respectively. The parameters  $\alpha_i$  and  $\beta_i$  are estimated by the Ordinary Least Square (OLS) market model regression using a 200-trading-day estimation period ending sixty days before the event day (day -260 to day -61). The main variable of interest, *Event CAR*, is the CAR of the equity issuing firm, computing using the methodology described above. The regression analysis incorporates specifications that account for business group fixed effects, year fixed effects, and industry fixed effects. The standard errors are reported in the parentheses. \*\*\*, \*\*, and \* indicate that the coefficient estimates are significantly different from zero at the 1 percent, 5 percent, and 10 percent levels, respectively. Variable definitions are reported in Table A.1 in the appendix.

|                                 | <i>Non-event Portfolio CAR</i> |                            |                            |                            |                            |
|---------------------------------|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|                                 | (1)                            | (2)                        | (3)                        | (4)                        | (5)                        |
| <i>Event CAR</i>                | <b>0.269***</b><br>(0.043)     | <b>0.313***</b><br>(0.058) | <b>0.261***</b><br>(0.071) | <b>0.315***</b><br>(0.060) | <b>0.272***</b><br>(0.074) |
| <i>Size</i>                     |                                | -0.00004<br>(0.003)        | 0.003<br>(0.004)           | 0.001<br>(0.004)           | 0.003<br>(0.005)           |
| <i>ROA</i>                      |                                | -0.028<br>(0.027)          | -0.023<br>(0.039)          | -0.022<br>(0.039)          | -0.015<br>(0.047)          |
| <i>Leverage</i>                 |                                | 0.002<br>(0.027)           | 0.007<br>(0.032)           | 0.010<br>(0.029)           | 0.014<br>(0.035)           |
| <i>M/B</i>                      |                                | 0.0001<br>(0.0003)         | 0.0002<br>(0.0003)         | 0.0002<br>(0.0003)         | 0.0004<br>(0.0004)         |
| <i>R&amp;D</i>                  |                                | 0.015<br>(0.168)           | -0.007<br>(0.197)          | -0.189<br>(0.469)          | -0.108<br>(0.702)          |
| <i>Cash</i>                     |                                | 0.066<br>(0.097)           | 0.062<br>(0.124)           | -0.006<br>(0.113)          | -0.002<br>(0.137)          |
| <i>Rights Indicator</i>         |                                | -0.022<br>(0.038)          | -0.015<br>(0.047)          | 0.0001<br>(0.043)          | 0.001<br>(0.052)           |
| <i>Pvt. Placement Indicator</i> |                                | -0.023<br>(0.038)          | -0.019<br>(0.047)          | 0.0003<br>(0.043)          | -0.0002<br>(0.052)         |
| <i>Affiliates</i>               |                                |                            |                            | 0.0001<br>(0.004)          | 0.001<br>(0.005)           |
| <i>Group Size</i>               |                                |                            |                            | -0.005<br>(0.006)          | -0.005<br>(0.010)          |
| <i>Group ROA</i>                |                                |                            |                            | -0.036<br>(0.094)          | -0.030<br>(0.140)          |
| <i>Group Leverage</i>           |                                |                            |                            | -0.054*<br>(0.029)         | -0.058*<br>(0.034)         |
| <i>Group M/B</i>                |                                |                            |                            | -0.001<br>(0.001)          | -0.001<br>(0.001)          |
| <i>Group R&amp;D</i>            |                                |                            |                            | 0.414<br>(0.929)           | 0.047<br>(1.467)           |
| <i>Group Cash</i>               |                                |                            |                            | 0.176<br>(0.143)           | 0.160<br>(0.187)           |
| <i>Constant</i>                 | 0.001<br>(0.003)               | -0.023<br>(0.067)          | -0.123<br>(0.108)          | 0.028<br>(0.088)           | -0.057<br>(0.144)          |
| Observations                    | 255                            | 255                        | 255                        | 255                        | 255                        |
| R-squared                       | 0.134                          | 0.591                      | 0.663                      | 0.611                      | 0.680                      |
| Group fixed effects             | No                             | Yes                        | Yes                        | Yes                        | Yes                        |
| Year fixed effects              | No                             | No                         | Yes                        | No                         | Yes                        |
| Industry fixed effects          | No                             | No                         | Yes                        | No                         | Yes                        |

Table 6: The role of the event firm's relative standing within the group

This table reports the results of equation (3) from regressing the cumulative abnormal return (CAR) of an equal-weighted portfolio of non-event affiliated firms on the CAR of the event firm (and controls). The dependent variable, *Non-event Portfolio CAR*, represents the three-day cumulative abnormal return (%) centered at the equity issue announcement date and computed as follows:  $Non\text{-}event\ Portfolio\ CAR_{it} = \sum_{t=-1}^{+1} (R_{it} - (\alpha + \beta_i R_{mt}))$  where,  $R_{it}$  and  $R_{mt}$  are the daily returns for the equal weight portfolio of listed affiliated firms for the event firm  $i$  at the time  $t$  and daily market index (Nifty 50 Index) return on day  $t$ , respectively. The parameters  $\alpha_i$  and  $\beta_i$  are estimated by the Ordinary Least Square (OLS) market model regression using a 200-trading-day estimation period ending sixty days before the event day (day -260 to day -61). The main variable of interest, *Event CAR*, is the CAR of the equity issuing firm, computing using the methodology described above. *Lead Indicator* takes the value of one if the issue is by the lead firm (i.e., the firm with the highest sales in the group), and zero otherwise. The regression analysis incorporates specifications that account for business group fixed effects, year fixed effects, and industry fixed effects. The standard errors are reported in the parentheses. \*\*\*, \*\*, and \* indicate that the coefficient estimates are significantly different from zero at the 1 percent, 5 percent, and 10 percent levels, respectively. Variable definitions are reported in Table A.1 in the appendix.

|  | <i>Non-event Portfolio CAR</i>   |                                 |                                   |                                   |
|--|----------------------------------|---------------------------------|-----------------------------------|-----------------------------------|
|  | (1)                              | (2)                             | (3)                               | (4)                               |
| <i>Event CAR</i>                         | 0.194***<br>(0.055)              | 0.190***<br>(0.055)             | 0.101<br>(0.093)                  | 0.111<br>(0.093)                  |
| <i>Lead Indicator</i>                    | -0.007<br>(0.008)                | -0.009<br>(0.008)               | -0.007<br>(0.014)                 | -0.008<br>(0.015)                 |
| <i>Event CAR</i> × <i>Lead Indicator</i> | <b>0.181**</b><br><b>(0.091)</b> | <b>0.161*</b><br><b>(0.090)</b> | <b>0.397***</b><br><b>(0.142)</b> | <b>0.392***</b><br><b>(0.143)</b> |
| Observations                             | 255                              | 255                             | 255                               | 255                               |
| R-squared                                | 0.163                            | 0.209                           | 0.689                             | 0.705                             |
| Firm controls                            | Yes                              | Yes                             | Yes                               | Yes                               |
| Group controls                           | No                               | Yes                             | No                                | Yes                               |
| Group fixed effects                      | No                               | No                              | Yes                               | Yes                               |
| Year fixed effects                       | No                               | No                              | Yes                               | Yes                               |
| Industry fixed effects                   | No                               | No                              | Yes                               | Yes                               |

Table 7: The role of the relative issue size

This table reports the results of equation (4) from regressing the cumulative abnormal return (CAR) of an equal-weighted portfolio of non-event affiliated firms on the CAR of the event firm (and controls). The dependent variable, *Non-event Portfolio CAR*, represents the three-day cumulative abnormal return (%) centered at the equity issue announcement date and computed as follows:  $Non\text{-}event\ Portfolio\ CAR_{it} = \sum_{t=-1}^{+1} (R_{it} - (\alpha + \beta_i R_{mt}))$  where,  $R_{it}$  and  $R_{mt}$  are the daily returns for the equal weight portfolio of listed affiliated firms for the event firm  $i$  at the time  $t$  and daily market index (Nifty 50 Index) return on day  $t$ , respectively. The parameters  $\alpha_i$  and  $\beta_i$  are estimated by the Ordinary Least Square (OLS) market model regression using a 200-trading-day estimation period ending sixty days before the event day (day -260 to day -61). The main variable of interest, *Event CAR*, is the CAR of the equity issuing firm, computing using the methodology described above. *Large Issue Indicator* takes the value of one if the ratio of issue size to group market capitalization is above the sample median, and zero otherwise. The regression analysis incorporates specifications that account for business group fixed effects, year fixed effects, and industry fixed effects. The standard errors are reported in the parentheses. \*\*\*, \*\*, and \* indicate that the coefficient estimates are significantly different from zero at the 1 percent, 5 percent, and 10 percent levels, respectively. Variable definitions are reported in Table A.1 in the appendix.

|  | <i>Non-event Portfolio CAR</i> |                             |                             |                             |
|--|--------------------------------|-----------------------------|-----------------------------|-----------------------------|
|  | (1)                            | (2)                         | (3)                         | (4)                         |
| <i>Event CAR</i>                                       | 0.076<br>(0.066)               | 0.069<br>(0.066)            | 0.060<br>(0.098)            | 0.064<br>(0.099)            |
| <i>Large Issue Indicator</i>                           | -0.004<br>(0.007)              | -0.005<br>(0.008)           | -0.006<br>(0.012)           | -0.004<br>(0.014)           |
| <b><i>Event CAR</i> × <i>Large Issue Indicator</i></b> | <b>0.322***<br/>(0.088)</b>    | <b>0.310***<br/>(0.088)</b> | <b>0.397***<br/>(0.129)</b> | <b>0.398***<br/>(0.132)</b> |
| Observations   | 255                            | 255                         | 255                         | 255                         |
| R-squared  | 0.193                          | 0.236                       | 0.693                       | 0.709                       |
| Firm controls  | Yes                            | Yes                         | Yes                         | Yes                         |
| Group controls   | No                             | Yes                         | No                          | Yes                         |
| Group fixed effects                                    | No                             | No                          | Yes                         | Yes                         |
| Year fixed effects                                     | No                             | No                          | Yes                         | Yes                         |
| Industry fixed effects                                 | No                             | No                          | Yes                         | Yes                         |

Table 8: The role of the event firm's financial constraints

This table reports the results of equation (5) from regressing the cumulative abnormal return (CAR) of an equal-weighted portfolio of non-event affiliated firms on the CAR of the event firm (and controls). The dependent variable, *Non-event Portfolio CAR*, represents the three-day cumulative abnormal return (%) centered at the equity issue announcement date and computed as follows:  $Non\text{-}event\ Portfolio\ CAR_{it} = \sum_{t=-1}^{+1} (R_{it} - (\alpha + \beta_i R_{mt}))$  where,  $R_{it}$  and  $R_{mt}$  are the daily returns for the equal weight portfolio of listed affiliated firms for the event firm  $i$  at the time  $t$  and daily market index (Nifty 50 Index) return on day  $t$ , respectively. The parameters  $\alpha_i$  and  $\beta_i$  are estimated by the Ordinary Least Square (OLS) market model regression using a 200-trading-day estimation period ending sixty days before the event day (day -260 to day -61). The main variable of interest, *Event CAR*, is the CAR of the equity issuing firm, computing using the methodology described above. *Fin. Const. Indicator* is an indicator variable for financial constraint measured using the HP Index, which takes the value of one if the HP Index is above the sample median (indicating more constrained) and zero otherwise. The regression analysis incorporates specifications that account for business group fixed effects, year fixed effects, and industry fixed effects. The standard errors are reported in the parentheses. \*\*\*, \*\*, and \* indicate that the coefficient estimates are significantly different from zero at the 1 percent, 5 percent, and 10 percent levels, respectively. Variable definitions are reported in Table A.1 in the appendix.

|  | <i>Non-event Portfolio CAR</i> |                            |                           |                            |
|--|--------------------------------|----------------------------|---------------------------|----------------------------|
|  | (1)                            | (2)                        | (3)                       | (4)                        |
| <i>Event CAR</i>                                       | 0.182***<br>(0.057)            | 0.180***<br>(0.056)        | 0.166*<br>(0.093)         | 0.163*<br>(0.094)          |
| <i>Fin. Const. Indicator</i>                           | 0.023**<br>(0.010)             | 0.025**<br>(0.010)         | 0.013<br>(0.016)          | 0.015<br>(0.016)           |
| <b><i>Event CAR</i> × <i>Fin. Const. Indicator</i></b> | <b>0.205**<br/>(0.088)</b>     | <b>0.185**<br/>(0.087)</b> | <b>0.275*<br/>(0.146)</b> | <b>0.301**<br/>(0.149)</b> |
| Observations   | 255                            | 255                        | 255                       | 255                        |
| R-squared  | 0.184                          | 0.232                      | 0.679                     | 0.698                      |
| Firm controls  | Yes                            | Yes                        | Yes                       | Yes                        |
| Group controls   | No                             | Yes                        | No                        | Yes                        |
| Group fixed effects                                    | No                             | No                         | Yes                       | Yes                        |
| Year fixed effects                                     | No                             | No                         | Yes                       | Yes                        |
| Industry fixed effects                                 | No                             | No                         | Yes                       | Yes                        |

Table 9: Placebo test

This table reports the results of the placebo test for equation (2) from regressing the cumulative abnormal return (CAR) of an equal-weighted portfolio of non-event affiliated firms on the CAR of the event firm (and controls). The dependent variable, *Non-event Portfolio CAR*, represents the three-day cumulative abnormal return (%) centered at the equity issue announcement date and computed as follows:  $Non\text{-}event\ Portfolio\ CAR_{it} = \sum_{t=-1}^{+1} (R_{it} - (\alpha + \beta_i R_{mt}))$  where,  $R_{it}$  and  $R_{mt}$  are the daily returns for the equal weight portfolio of listed affiliated firms for the event firm  $i$  at the time  $t$  and daily market index (Nifty 50 Index) return on day  $t$ , respectively. The parameters  $\alpha_i$  and  $\beta_i$  are estimated by the ordinary least squares (OLS) market model regression using a 200-trading-day estimation period ending sixty days before the event day (day -260 to day -61). The main variable of interest, *Event CAR*, is the CAR of the equity issuing firm, computing using the methodology described above. We assume a date 30 days before the announcement date as day 0 for the test. The regression analysis incorporates specifications that account for business group fixed effects, year fixed effects, and industry fixed effects. The standard errors are reported in the parentheses. \*\*\*, \*\*, and \* indicate that the coefficient estimates are significantly different from zero at the 1 percent, 5 percent, and 10 percent levels, respectively. Variable definitions are reported in Table A.1 in the appendix.

|                                 | <i>Non-event Portfolio CAR</i> |                |                |                |
|---------------------------------|--------------------------------|----------------|----------------|----------------|
|                                 | (1)                            | (2)            | (3)            | (4)            |
| <b><i>Event CAR</i></b>         | <b>0.112</b>                   | <b>0.088</b>   | <b>0.121</b>   | <b>0.095</b>   |
|                                 | <b>(0.087)</b>                 | <b>(0.093)</b> | <b>(0.089)</b> | <b>(0.097)</b> |
| <i>Size</i>                     | 0.0001                         | 0.001          | -0.002         | -0.0001        |
|                                 | (0.003)                        | (0.004)        | (0.004)        | (0.004)        |
| <i>ROA</i>                      | -0.015                         | 0.017          | 0.025          | 0.053          |
|                                 | (0.025)                        | (0.033)        | (0.036)        | (0.039)        |
| <i>Leverage</i>                 | -0.013                         | 0.015          | -0.014         | 0.015          |
|                                 | (0.025)                        | (0.028)        | (0.027)        | (0.030)        |
| <i>M/B</i>                      | -0.00004                       | 0.0002         | -0.0001        | 0.0001         |
|                                 | (0.0003)                       | (0.0003)       | (0.0003)       | (0.0003)       |
| <i>R&amp;D</i>                  | 0.016                          | 0.098          | -0.152         | -0.782         |
|                                 | (0.153)                        | (0.168)        | (0.430)        | (0.591)        |
| <i>Cash</i>                     | -0.024                         | 0.013          | -0.073         | -0.042         |
|                                 | (0.089)                        | (0.105)        | (0.104)        | (0.115)        |
| <i>Rights Indicator</i>         | 0.010                          | -0.010         | -0.00004       | -0.031         |
|                                 | (0.035)                        | (0.040)        | (0.039)        | (0.043)        |
| <i>Pvt. Placement Indicator</i> | 0.012                          | -0.017         | 0.006          | -0.029         |
|                                 | (0.035)                        | (0.040)        | (0.039)        | (0.043)        |
| <i>Affiliates</i>               |                                |                | 0.003          | 0.006          |
|                                 |                                |                | (0.004)        | (0.004)        |
| <i>Group Size</i>               |                                |                | 0.001          | 0.002          |
|                                 |                                |                | (0.006)        | (0.008)        |
| <i>Group ROA</i>                |                                |                | -0.158*        | -0.235*        |
|                                 |                                |                | (0.087)        | (0.119)        |
| <i>Group Leverage</i>           |                                |                | -0.012         | -0.011         |
|                                 |                                |                | (0.027)        | (0.028)        |
| <i>Group M/B</i>                |                                |                | 0.001          | 0.0003         |
|                                 |                                |                | (0.001)        | (0.001)        |
| <i>Group R&amp;D</i>            |                                |                | 0.422          | 1.884          |
|                                 |                                |                | (0.851)        | (1.243)        |
| <i>Group Cash</i>               |                                |                | 0.048          | 0.011          |
|                                 |                                |                | (0.132)        | (0.158)        |
| <i>Constant</i>                 | 0.012                          | -0.099         | 0.034          | -0.094         |
|                                 | (0.061)                        | (0.092)        | (0.080)        | (0.121)        |
| Observations                    | 255                            | 255            | 255            | 255            |
| R-squared                       | 0.562                          | 0.687          | 0.579          | 0.711          |
| Group fixed effects             | Yes                            | Yes            | Yes            | Yes            |
| Year fixed effects              | No                             | Yes            | No             | Yes            |
| Industry fixed effects          | No                             | Yes            | No             | Yes            |

Table 10: Robustness check: Constructing portfolios of non-event firms based on value-weighting

This table reports the results of equation (2) from regressing the cumulative abnormal return (CAR) of a value-weighted portfolio of non-event affiliated firms on the CAR of the event firm (and controls). The dependent variable, *Non-event Portfolio CAR*, represents the three-day cumulative abnormal return (%) centered at the equity issue announcement date and computed as follows:  $Non\text{-}event\ Portfolio\ CAR_{it} = \sum_{t=-1}^{+1} (R_{it} - (\alpha + \beta_i R_{mt}))$  where,  $R_{it}$  and  $R_{mt}$  are the daily returns for the equal weight portfolio of listed affiliated firms for the event firm  $i$  at the time  $t$  and daily market index (Nifty 50 Index) return on day  $t$ , respectively. The parameters  $\alpha_i$  and  $\beta_i$  are estimated by the ordinary least squares (OLS) market model regression using a 200-trading-day estimation period ending sixty days before the event day (day -260 to day -61). The main variable of interest, *Event CAR*, is the CAR of the equity issuing firm, computing using the methodology described above. The regression analysis incorporates specifications that account for business group fixed effects, year fixed effects, and industry fixed effects. The standard errors are reported in the parentheses. \*\*\*, \*\*, and \* indicate that the coefficient estimates are significantly different from zero at the 1 percent, 5 percent, and 10 percent levels, respectively. Variable definitions are reported in Table A.1 in the appendix.

|                                 | <i>Non-event Portfolio CAR</i>    |                                   |                                   |                                   |
|---------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
|                                 | (1)                               | (2)                               | (3)                               | (4)                               |
| <b><i>Event CAR</i></b>         | <b>0.323***</b><br><b>(0.064)</b> | <b>0.271***</b><br><b>(0.077)</b> | <b>0.338***</b><br><b>(0.066)</b> | <b>0.303***</b><br><b>(0.080)</b> |
| <i>Size</i>                     | -0.001<br>(0.003)                 | 0.002<br>(0.005)                  | 0.0003<br>(0.004)                 | 0.003<br>(0.005)                  |
| <i>ROA</i>                      | -0.031<br>(0.030)                 | -0.017<br>(0.042)                 | -0.016<br>(0.037)                 | -0.001<br>(0.046)                 |
| <i>Leverage</i>                 | -0.013<br>(0.030)                 | -0.019<br>(0.035)                 | -0.028<br>(0.035)                 | -0.023<br>(0.040)                 |
| <i>M/B</i>                      | 0.0001<br>(0.0003)                | 0.0001<br>(0.0004)                | 0.0001<br>(0.0003)                | 0.0001<br>(0.0004)                |
| <i>R&amp;D</i>                  | 0.023<br>(0.186)                  | -0.046<br>(0.214)                 | 0.053<br>(0.203)                  | -0.136<br>(0.243)                 |
| <i>Cash</i>                     | 0.052<br>(0.108)                  | 0.055<br>(0.134)                  | 0.024<br>(0.122)                  | 0.103<br>(0.144)                  |
| <i>Rights Indicator</i>         | 0.012<br>(0.042)                  | 0.030<br>(0.052)                  | 0.027<br>(0.046)                  | 0.055<br>(0.055)                  |
| <i>Pvt. Placement Indicator</i> | 0.002<br>(0.043)                  | 0.017<br>(0.051)                  | 0.017<br>(0.047)                  | 0.042<br>(0.055)                  |
| <i>Affiliates</i>               |                                   |                                   | 0.0004<br>(0.005)                 | 0.001<br>(0.006)                  |
| <i>Group Size</i>               |                                   |                                   | 0.004<br>(0.007)                  | 0.011<br>(0.011)                  |
| <i>Group ROA</i>                |                                   |                                   | 0.022<br>(0.133)                  | 0.133<br>(0.158)                  |
| <i>Group Leverage</i>           |                                   |                                   | 0.044<br>(0.066)                  | 0.069<br>(0.076)                  |
| <i>Group M/B</i>                |                                   |                                   | -0.008**<br>(0.003)               | -0.008*<br>(0.004)                |
| <i>Group R&amp;D</i>            |                                   |                                   | 0.085<br>(0.402)                  | 1.245*<br>(0.682)                 |
| <i>Group Cash</i>               |                                   |                                   | 0.094<br>(0.177)                  | -0.086<br>(0.224)                 |
| <i>Constant</i>                 | -0.040<br>(0.075)                 | -0.115<br>(0.118)                 | -0.076<br>(0.099)                 | -0.210<br>(0.161)                 |
| Observations                    | 255                               | 255                               | 255                               | 255                               |
| R-squared                       | 0.574                             | 0.663                             | 0.601                             | 0.687                             |
| Group fixed effects             | No                                | No                                | Yes                               | Yes                               |
| Year fixed effects              | No                                | No                                | Yes                               | Yes                               |
| Industry fixed effects          | No                                | No                                | Yes                               | Yes                               |

Table 11: Robustness check: Using alternative measure to define lead firms

This table reports the results of equation (3) from regressing the cumulative abnormal return (CAR) of an equal-weighted portfolio of non-event affiliated firms on the CAR of the event firm (and controls). The dependent variable, *Non-event Portfolio CAR*, represents the three-day cumulative abnormal return (%) centered at the equity issue announcement date and computed as follows:  $Non\text{-}event\ Portfolio\ CAR_{it} = \sum_{t=-1}^{+1} (R_{it} - (\alpha + \beta_i R_{mt}))$  where,  $R_{it}$  and  $R_{mt}$  are the daily returns for the equal weight portfolio of listed affiliated firms for the event firm  $i$  at the time  $t$  and daily market index (Nifty 50 Index) return on day  $t$ , respectively. The parameters  $\alpha_i$  and  $\beta_i$  are estimated by the ordinary least squares (OLS) market model regression using a 200-trading-day estimation period ending sixty days before the event day (day -260 to day -61). The main variable of interest, *Event CAR*, is the CAR of the equity issuing firm, computing using the methodology described above. *Lead Indicator1* takes the value of one if the issue is by the lead firm (i.e., the firm with the highest market capitalization in the group), and zero otherwise. The regression analysis incorporates specifications that account for business group fixed effects, year fixed effects, and industry fixed effects. The standard errors are reported in the parentheses. \*\*\*, \*\*, and \* indicate that the coefficient estimates are significantly different from zero at the 1 percent, 5 percent, and 10 percent levels, respectively. Variable definitions are reported in Table A.1 in the appendix.

|  | <i>Non-event Portfolio CAR</i> |                                |                                  |                                   |
|--|--------------------------------|--------------------------------|----------------------------------|-----------------------------------|
|  | (1)                            | (2)                            | (3)                              | (4)                               |
| <i>Event CAR</i>                                 | 0.224***<br>(0.056)            | 0.213***<br>(0.056)            | 0.099<br>(0.095)                 | 0.097<br>(0.096)                  |
| <i>Lead Indicator1</i>                           | 0.001<br>(0.008)               | 0.001<br>(0.009)               | 0.007<br>(0.016)                 | 0.006<br>(0.017)                  |
| <b><i>Event CAR</i> × <i>Lead Indicator1</i></b> | <b>0.095</b><br><b>(0.091)</b> | <b>0.090</b><br><b>(0.090)</b> | <b>0.357**</b><br><b>(0.138)</b> | <b>0.378***</b><br><b>(0.139)</b> |
| Observations                                     | 255                            | 255                            | 255                              | 255                               |
| R-squared  | 0.152                          | 0.199                          | 0.685                            | 0.705                             |
| Firm controls                                    | Yes                            | Yes                            | Yes                              | Yes                               |
| Group controls                                   | No                             | Yes                            | No                               | Yes                               |
| Group fixed effects                              | No                             | No                             | Yes                              | Yes                               |
| Year fixed effects                               | No                             | No                             | Yes                              | Yes                               |
| Industry fixed effects                           | No                             | No                             | Yes                              | Yes                               |



Table 12: Robustness check: Employing alternative definitions of relative issue size

This table reports the results of Equation (4) from regressing the cumulative abnormal return (CAR) of an equal-weighted portfolio of non-event affiliated firms on the CAR of the event firm (and controls). The dependent variable, *Non-event Portfolio CAR*, represents the three-day cumulative abnormal return (%) centered at the equity issue announcement date and computed as follows:  $Non\text{-}event\ Portfolio\ CAR_{it} = \sum_{t=-1}^{+1} (R_{it} - (\alpha + \beta_i R_{mt}))$  where,  $R_{it}$  and  $R_{mt}$  are the daily returns for the equal weight portfolio of listed affiliated firms for the event firm  $i$  at the time  $t$  and daily market index (Nifty 50 Index) return on day  $t$ , respectively. The parameters  $\alpha_i$  and  $\beta_i$  are estimated by the ordinary least squares (OLS) market model regression using a 200-trading-day estimation period ending sixty days before the event day (day -260 to day -61). The main variable of interest, *Event CAR*, is the CAR of the equity issuing firm, computing using the methodology described above. *Large Issue Indicator1* takes the value of one if the ratio of issue size to book value of group assets is above the sample median, and zero otherwise. Similarly, *Large Issue Indicator2* takes the value of one if the ratio of issue size to the group value (measured as the sum of market value of equity and book value of debt for all listed firms in the group) is above the sample median, and zero otherwise. The regression analysis incorporates specifications that account for business group fixed effects, year fixed effects, and industry fixed effects. The standard errors are reported in the parentheses. \*\*\*, \*\*, and \* indicate that the coefficient estimates are significantly different from zero at the 1 percent, 5 percent, and 10 percent levels, respectively. Variable definitions are reported in Table A.1 in the appendix.

|  | <i>Non-event Portfolio CAR</i>   |                                  |                                  |                                  |
|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
|  | (1)                              | (2)                              | (3)                              | (4)                              |
| <i>Event CAR</i>                                 | 0.064<br>(0.105)                 | 0.071<br>(0.106)                 | 0.103<br>(0.098)                 | 0.107<br>(0.099)                 |
| <i>Large Issue Indicator1</i>                    | 0.002<br>(0.016)                 | 0.003<br>(0.016)                 |                                  |                                  |
| <i>Event CAR</i> × <i>Large Issue Indicator1</i> | <b>0.362**</b><br><b>(0.140)</b> | <b>0.362**</b><br><b>(0.142)</b> |                                  |                                  |
| <i>Large Issue Indicator2</i>                    |                                  |                                  | -0.007<br>(0.013)                | -0.009<br>(0.015)                |
| <i>Event CAR</i> × <i>Large Issue Indicator2</i> |                                  |                                  | <b>0.315**</b><br><b>(0.130)</b> | <b>0.319**</b><br><b>(0.131)</b> |
| Observations                                     | 255                              | 255                              | 255                              | 255                              |
| R-squared  | 0.685                            | 0.701                            | 0.683                            | 0.700                            |
| Firm controls                                    | Yes                              | Yes                              | Yes                              | Yes                              |
| Group controls                                   | No                               | Yes                              | No                               | Yes                              |
| Group fixed effects                              | Yes                              | Yes                              | Yes                              | Yes                              |
| Year fixed effects                               | Yes                              | Yes                              | Yes                              | Yes                              |
| Industry fixed effects                           | Yes                              | Yes                              | Yes                              | Yes                              |

Table 13: Robustness check: Using alternative definitions to measure the event firm's financial constraints

This table reports the results of equation (5) from regressing the cumulative abnormal return (CAR) of an equal-weighted portfolio of non-event affiliated firms on the CAR of the event firm (and controls). The dependent variable, *Non-event Portfolio CAR*, represents the three-day cumulative abnormal return (%) centered at the equity issue announcement date and computed as follows:  $Non\text{-}event\ Portfolio\ CAR_{it} = \sum_{t=-1}^{+1} (R_{it} - (\alpha + \beta_i R_{mt}))$  where,  $R_{it}$  and  $R_{mt}$  are the daily returns for the equal weight portfolio of listed affiliated firms for the event firm  $i$  at the time  $t$  and daily market index (Nifty 50 Index) return on day  $t$ , respectively. The parameters  $\alpha_i$  and  $\beta_i$  are estimated by the ordinary least squares (OLS) market model regression using a 200-trading-day estimation period ending sixty days before the event day (day -260 to day -61). The main variable of interest, *Event CAR*, is the CAR of the equity issuing firm, computing using the methodology described above. *Fin. Const. Indicator1* is an indicator variable, which takes the value of one if the profitability of the event firm is below the sample median (indicating more constrained), and zero otherwise. Similarly, *Fin. Const. Indicator2* takes the value of one if the interest coverage ratio (measured using earnings before interest and tax to interest expense) is below the sample median (indicating higher financial constraints), and zero otherwise. The regression analysis incorporates specifications that account for business group fixed effects, year fixed effects, and industry fixed effects. The standard errors are reported in the parentheses. \*\*\*, \*\*, and \* indicate that the coefficient estimates are significantly different from zero at the 1 percent, 5 percent, and 10 percent levels, respectively. Variable definitions are reported in Table A.1 in the appendix.

|   | <i>Non-event Portfolio CAR</i>   |                                  |                                 |                                  |
|---|----------------------------------|----------------------------------|---------------------------------|----------------------------------|
|   | (1)                              | (2)                              | (3)                             | (4)                              |
| <i>Event CAR</i>  | 0.111<br>(0.103)                 | 0.110<br>(0.104)                 | 0.111<br>(0.108)                | 0.103<br>(0.110)                 |
| <i>Fin. Const. Indicator1</i>                           | 0.002<br>(0.012)                 | 0.001<br>(0.012)                 |                                 |                                  |
| <b><i>Event CAR</i> × <i>Fin. Const. Indicator1</i></b> | <b>0.303**</b><br><b>(0.142)</b> | <b>0.318**</b><br><b>(0.145)</b> |                                 |                                  |
| <i>Fin. Const. Indicator2</i>                           |                                  |                                  | 0.001<br>(0.014)                | 0.002<br>(0.015)                 |
| <b><i>Event CAR</i> × <i>Fin. Const. Indicator2</i></b> |                                  |                                  | <b>0.279*</b><br><b>(0.144)</b> | <b>0.306**</b><br><b>(0.148)</b> |
| Observations  | 255                              | 255                              | 255                             | 255                              |
| R-squared   | 0.678                            | 0.696                            | 0.676                           | 0.694                            |
| Firm controls   | Yes                              | Yes                              | Yes                             | Yes                              |
| Group controls  | No                               | Yes                              | No                              | Yes                              |
| Group fixed effects                                     | Yes                              | Yes                              | Yes                             | Yes                              |
| Year fixed effects                                      | Yes                              | Yes                              | Yes                             | Yes                              |
| Industry fixed effects                                  | Yes                              | Yes                              | Yes                             | Yes                              |

# A Appendix

## A.1 Variable definitions

| Variable                        | Definition  | Source                       |
|---------------------------------|---|------------------------------|
| <i>Non-event Portfolio CAR</i>  | Cumulative abnormal returns (%) for the window (-1,+1) for an equal-weighted portfolio of non-event firms that share the same business group as the event firm, computed using the market model with its parameters estimated using a 200-trading-day estimation period ending 60 days before the announcement date | CMIE Prowess, Prime database |
| <i>Event CAR</i>                | Cumulative abnormal returns (%) for the window (-1,+1) to the shareholders of the firm announcing an equity issue (i.e., the event firm), computed using the market model with its parameters estimated using a 200-trading-day estimation period ending 60 days before the announcement date                       | CMIE Prowess, Prime database |
| <i>Size</i>                     | Natural logarithm of the market value of the equity   | CMIE Prowess                 |
| <i>ROA</i>                      | Ratio of net income to total assets   | CMIE Prowess                 |
| <i>Leverage</i>                 | Ratio of total debt to total assets   | CMIE Prowess                 |
| <i>M/B</i>                      | Ratio of the market value of equity to the book value of equity   | CMIE Prowess                 |
| <i>R&amp;D</i>                  | Ratio of research and development expenditure to total assets   | CMIE Prowess                 |
| <i>Cash</i>                     | Ratio of cash to total assets   | CMIE Prowess                 |
| <i>Rights Indicator</i>         | An indicator variable taking the value one if the issue is a rights offering, and zero otherwise (private placement or follow-on public offering)   | Prime database               |
| <i>Pvt. Placement Indicator</i> | An indicator variable taking the value one if the issue is a private placement, and zero otherwise (rights offering or follow-on public offering)   | Prime database               |
| <i>Affiliates</i>               | Number of listed group member firms   | CMIE Prowess                 |
| <i>Group Size</i>               | Natural logarithm of the mean market value of equity of all listed firms in the business group  | CMIE Prowess                 |
| <i>Group ROA</i>                | Mean <i>ROA</i> of listed firms within a business group   | CMIE Prowess                 |
| <i>Group Leverage</i>           | Mean <i>Leverage</i> of listed firms within a business group  | CMIE Prowess                 |
| <i>Group M/B</i>                | Mean <i>M/B</i> of listed firms within a business group   | CMIE Prowess                 |
| <i>Group R&amp;D</i>            | Mean <i>R&amp;D</i> of listed firms within a business group   | CMIE Prowess                 |
| <i>Group Cash</i>               | Mean <i>Cash</i> of listed firms within a business group  | CMIE Prowess                 |
| <i>Lead Indicator</i>           | An indicator variable taking the value of one if the issue is by the lead firm (i.e., the firm with the highest sales by value among the listed firms in the group), and zero otherwise   | CMIE Prowess                 |
| <i>Lead Indicator1</i>          | An indicator variable taking the value of one if the issue is by the lead firm (i.e., the firm with the highest market capitalization in the group), and zero otherwise   | CMIE Prowess                 |
| <i>Large Issue Indicator</i>    | An indicator variable taking the value of one if the ratio of issue size to group market capitalization is above the sample median, and zero otherwise  | CMIE Prowess, Prime database |
| <i>Large Issue Indicator1</i>   | An indicator variable taking the value of one if the ratio of issue size to book value of assets for all listed firms in the group is above the sample median, and zero otherwise   | CMIE Prowess, Prime database |
| <i>Large Issue Indicator2</i>   | An indicator variable taking the value of one if the ratio of issue size to group value (measured as the sum of market value of equity and book value of debt for all listed firms in the group) is above the sample median, and zero otherwise   | CMIE Prowess, Prime database |
| <i>Fin. Const. Indicator</i>    | An indicator variable taking the value of one, if the HP Index (also known as the <i>size-age</i> index) as given by <a href="#">Hadlock and Pierce (2010)</a> is above the sample median, and zero otherwise   | CMIE Prowess                 |

| <b>Variable</b>               | <b>Definition</b>   | <b>Source</b> |
|-------------------------------|---|---------------|
| <i>Fin. Const. Indicator1</i> | An indicator variable taking the value of one if the profitability of the event firm is below the sample median (indicating more constrained), and zero otherwise                                 | CMIE Prowess  |
| <i>Fin. Const. Indicator2</i> | An indicator variable taking the value of one if the interest coverage ratio, as measured by earnings before interest and tax to interest expense, is below the sample median, and zero otherwise | CMIE Prowess  |