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Reference Price Bias and Regulations in Indian Mergers and Acquisitions

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Abstract

This paper aims to determine whether the offer price in the share acquisition deals of a listed corporation (tender offers) in India are subject to a reference price bias, indicated by the target's 52-week high price. This study in an emerging market set-up such as India is interesting since it is characterised by regulations on the minimum offer price (SEBI SAST Regulations 1997) and includes many illiquid target firms. Using a small sample of around 190 completed tender offer deals for the period 2002–2011, the paper establishes the effect of the target's 52-week price as an important anchor or reference in determining the offer prices. Among other factors, the results specifically control for the target's 26-week high price since it determines the minimum offer price and the liquidity of the target's stock. Moreover, even in the presence of the mandated 26-week high price, we find that there is significant anchoring to the 52-week high price for deals in which the 52-week high price is higher than the 26-week high price. The study also controls for deal characteristics and firm characteristics; however, the results indicate that none of these are significant.

Key words: Liquidity, Offer price, Reference point, Regulation, Tender offer

JEL Classification: G31, G34

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1 Introduction

The belief formation process of anchoring and adjustment (Tversky and Kahneman, 1974) explains the concept of a psychological reference point, as described in Prospect theory (Kahneman and Tversky, 1979). In decision making, anchoring occurs when individuals use an initial piece of information (or anchor) to make judgements and adjust the final value based on other considerations. In the literature pertaining to mergers and acquisitions (M&A), Baker et al. (2012) examined the role of the peak stock market prices of the target company as a 'psychological reference point' while determining the offer price. In particular, they showed that offer prices are highly influenced by the target's 52-week high stock price because it appears to be the most salient price that is publicly reported and available to managers, boards, and investors. Although the reference price is an irrelevant historical price, it acts as a significant anchor that influences the bargaining process and the negotiation of the final offer price. Baker et al. (2012) clarified that for bidders, it is easier to justify a valuation that corresponds to or exceeds the target's 52-week high stock price. From the target's perspective, this high price is attainable even in the absence of a merger. Therefore, targets are more likely to approve mergers in which the offer price approaches or exceeds a recent peak price. Thus, it becomes easy to satisfy the reference price from the perspective of the targets and to justify the same from the perspective of the bidders.

The significance of the reference price bias documented by Baker et al. (2012) is also ascertained in other developed markets; studies have dealt with European M&A deals (Niinivaara, 2010) as well as Japanese takeover activities (Nielsen, 2013). One could also attribute this phenomenon to high liquidity in developed markets, which facilitates price discovery, and thus allows anchoring to historical market price in the face of uncertainty surrounding M&A deals. However, the situation in emerging markets would be different, since stock markets are characterised by illiquidity, rendering the price discovery process less effective. Therefore, in this paper, we attempt to determine if the reference price bias persists for Indian M&A (open offer) deals, which becomes interesting and relevant for two important reasons. Firstly, India—being an emerging market—continues to be plagued by the lack of depth and liquidity when compared to developed stock markets. Hence, it might be appealing to test whether the reference price bias persists even after controlling for liquidity. Secondly and perhaps most importantly, the market regulator in India, the Securities and Exchange Board of India (SEBI), mandates a minimum offer price for M&A deals taking into account various relevant parameters. Hence, it may also be valuable to analyse the reference price bias for M&A deals in the light of the regulatory requirements in India.

The rest of the paper is organised as follows. Section 2 briefly discusses the psychology of reference price in M&A deals based on behavioural theories and the relevance of the SEBI (Substantial Acquisition of Shares and Takeovers) Regulations (SAST), 1997 in influencing the reference price bias in India. In Section 3, we discuss the data sources used in the study. Section 4 describes the independent and dependent variables. Section 5 presents the empirical results that suggest the reference-dependence of the offer price on the target's 52-week and 26-week high prices in Indian M&A deals in the light of a proxy that controls for the SEBI SAST Regulations, 1997, which determines the minimum offer price. In the dataset, we find many cases where the offer price was below the target's 52-week high. Hence, we also study

the effects of the offer price being greater than the reference price as compared to the cases where the offer price is lower than the reference price. We further control for deal characteristics such as the objectives of the deal—captured by consolidation, substantial holding, and change of control—and whether the deal is completed/successful or withdrawn. We also include firm characteristics such as the log of the market capitalisation of the target firm to control for firm size. We include the log of the 30-day lagged Bombay Stock Exchange Sensex (BSE-Sensex) returns to control for market volatility. We also include a measure of liquidity since we assume that offer premiums would be higher for less liquid stocks. Section 6 concludes the paper.

2 Reference Price Bias in M&A Deals

In this section, we motivate the occurrence of the reference price bias in Indian M&A deals based on psychological or behavioural theories documented in the extant literature. Further, we explain the role of the regulatory requirements mandated by the SEBI in influencing the reference price bias in Indian M&A deals.

2.1 The Psychology of Reference Price Bias

In classical theory, the appropriate offer premium is an estimate of the increased value of the combined entity based on operational and financial synergies (Gaughan, 2007). Although the offer price emphasises synergies, it is based on negotiations between the bidder and the target companies. Prior research investigated increased premiums based on larger managerial ownership (Song and Walkling, 1993; Moeller and Schlingemann, 2005), private manager benefits (Wulf, 2004; Hartzell et al., 2004), governance provisions (Subramanian, 2003; Bates et al., 2008), and product market relations (Ahern, 2012). Therefore, one could assume that classical theory rationalises relative bargaining power as the cause for unjustified offer premiums. The field of behavioural finance documents a number of other takeover motives. For instance, Roll (1986) hypothesised that the managers of bidding firms tend to overpay since they suffer from hubris. A related hypothesis by Jensen (1986) proposed that empire-building managements tend to make acquisitions rather than increase payouts to shareholders. Shleifer and Vishny (2003) argued that managers take advantage of market misvaluations and use the overvalued stock of their firms to buy relatively less overvalued targets. Rhodes-Kropf and Viswanathan (2004) argued that from a targets' perspective, merger bids tend to look more attractive when the market is overvalued. This is because target managers cannot accurately distinguish between market-specific and firm-specific components of the overvaluation. Baker et al. (2012) presented a new theory that complements these behavioural motivations in mergers and acquisitions. They hypothesised that relative bargaining power cannot be fully established, causing the appropriate offer price to be set only within a broad range. The information asymmetry between the bidder and the target, as well as a set of other complex considerations that need to be agreed upon during the negotiations, means that a single offer price cannot be set with precision. This indeterminacy suggests that offer premiums are often driven by psychological influences that reflect a reference price bias in the relative valuation of the target firm.

According to Baker et al. (2002), the motivation for the reference price bias is drawn from the belief-formation process known as the anchoring-and-adjustment heuristic (Tversky and Kahneman, 1974). While estimating unknown quantities, the strategy is to start with the information that one does know (an anchor or a reference point) and then adjust until an acceptable value is reached. In negotiations, anchoring refers to the concept of setting a

boundary that outlines the basic constraints for a negotiation. Although negotiators generally appraise an offer based on multiple characteristics, Orr and Guthrie (2005) showed that they tend to focus on only one aspect; thus, anchors greatly influence the estimated value of an object. Tversky and Kahneman (1974) found that agents use recent, salient, concrete, and personally relevant information, rather than fundamental values as a basis for anchoring in their decision-making process. Related studies from experimental stock markets support the importance of specific price levels as reference points. Huddart et al. (2009) documented that trading volume increases significantly whenever prices exceed the 52-week highs and lows. Jegadeesh and Titman (1993) and George and Hwang (2004) found that the 52-week high is a good proxy for the momentum factor. Das and Raghubir (2006) found that people perceive the local maxima and minima as salient points. Barber and Odean (2008) showed that prior returns and high turnover are the factors that most strongly influence trading activity. Shefrin and Statman (1985), Odean (1998), and Weber and Camerer (1998) proposed a model of reference-dependence to explain disposition effect—the tendency for investors in the stock market to be more willing to sell winners than losers. Investors define losers and winners by comparing the current price to an initial purchase price or a reference price. Reference points can be flexible such as the status quo (Kahneman and Tversky, 1979), aspiration level (Siegel, 1957; Tversky and Kahneman, 1991), or past observations (Baucells et al., 2011). Koszegi and Rabin (2006, 2007) argued that expectations about the future form the most natural reference point for valuing realised outcomes. In the space of M&A activity, Baker et al. (2012) hypothesized that the stock's 52-week high price, which is one of the widely cited peak prices in various financial media alongside the current market price, has the potential to act as a particularly salient reference measure in M&A deals.

2.2 Reference Price Bias and Regulatory Requirements in India

In determining the minimum offer price, the SEBI (Substantial Acquisition of Shares and Takeovers) Regulations (SAST), 1997[1] require the following parameters to be taken into consideration:

- The negotiated price under the agreement that triggered the open offer.
- The price paid by the acquirer or persons acting in concert with him/her for acquisition, if any, including by way of allotment in a public, or rights, or preferential issue during the 26-week period prior to the date of public announcement, whichever is higher.
- The average of the weekly high and low of the closing prices of the shares of the target company as quoted on the stock exchange where the shares of the company are most frequently traded during the 26 weeks or the average of the daily high and low prices of the shares as quoted on the stock exchange where the shares of the company are most frequently traded during the two weeks preceding the date of public announcement, whichever is higher.

According to the SEBI SAST Regulations, 1997, market price is relevant in order to cover the events and market functions prior to the public announcement for frequently traded stocks. Hence, the concept of the average of the weekly (daily) high and low of the closing prices during the 26 weeks (two weeks) preceding the date of announcement (whichever is higher) becomes relevant. Thus, in the Indian context, it would be interesting to analyse whether there is anchoring of the offer price to peak stock market prices, especially the 52-

[1] We consider the SEBI SAST Regulations, 1997 with the Second Amendment in 2002, since the data pertains to the period 2002–2011.

week high price of the target company, even after controlling for the price that is set through the Regulations. Such a phenomenon could be attributed mostly to the psychological influence, as argued by Baker et al. (2012). While Niinivaara (2010) discussed the role of regulation in mandated bids in Europe and the U.K. in the determination of the offer price, to the best of our knowledge, this is the first paper that looks into the role of regulations that impact the determination of the reference price and the offer price in the case of voluntary bids.

Given this backdrop, in this paper, we analyse the importance of the target's 52-week high price in determining the offer price, while controlling for the regulatory proxy in India. In the Indian context, it is apparent that the 26-week high price would be an influential anchor, given that the SEBI-mandated minimum offer price is a function of the average of the weekly high and low prices over the 26-week period prior to the announcement. It needs to be noted that the 26-week high price is a subset of the 52-week high price, resulting in a scenario where the 52-week high price could be either higher than or equal to the 26-week high price. Therefore, in the analysis, we specifically investigate whether the anchoring to the 52-week high price persists for firms where the 52-week high price is greater than the 26-week high price.

3 Data and Methodology

In this section, we describe the data sources and methodology, explaining the key characteristics of the data employed for the study. Our dataset primarily comprised important variables related to the target firms, namely, the open offer and its characteristics, the stock market prices and financial characteristics of the target firms, and the data related to the market index (i.e., BSE-Sensex). The data on open offers made by listed companies in India was taken from the SEBI website since listed firms making a tender offer to shareholders of the target company are required to inform the securities market regulator. Although the SEBI website provides data on tender offers from April 1997, information on public announcements inferred from letters of offer (LOR) was available only from April 2002. Additionally, in India, tender offer deals are regulated by the SEBI SAST Regulations, 1997. However, in October 2011, the SEBI SAST Regulations, 1997 underwent major amendments. Therefore, we restricted our dataset to the period April 2002 to September 2011.

Information on tender offers include the names of the acquiring company and the target company, the announcement date and the closing date, the offer price, the offer size, the equity percentage, the total price, the objective of the offer, and the information about the merchant banker and registrar. However, information regarding whether the deal was in cash, or stock, or both was available only for some companies. Hence, we were not able to include this in our analysis although it is an important factor. The total number of open offers in the data set was 885.

The data relating to the market prices of the stock and the financial characteristics of the firms were taken from CMIE Prowess. We matched the firms obtained from the SEBI website with the firm names in the Prowess database to obtain the trading data of the target firm stocks. In the dataset, we included only those firms for which the names in the SEBI website matched the deal names in Prowess. One limitation of the dataset was that it included many target companies' shares that were acquired by the same or different acquirers. Therefore, we included only those target firms that made the tender offer once and we considered only the latest deals where the name of the target firm matched the name in the

Prowess database. This was due to two reasons. Firstly, in Prowess, the target's name is often changed to the acquired firm's name after acquisition; hence, it is difficult to ascertain the changes in the target firm prior to the acquisition. Secondly, the trading price needs to be adjusted to account for changes in any corporate action. While acquisition is one such corporate action, there are other corporate actions that could have taken place at the same time. This led to a sample of 280 firms. We included firms that were listed on the Bombay Stock Exchange (BSE). Our dataset was further reduced to the list of firms for which information on market prices was available. Hence, the total number of target firms in the sample used for the regression analysis was 190.

Given the dataset, the analysis was divided into two parts. In Section 4, we present the descriptive statistics of the dependent and independent variables to derive testable hypotheses. In Section 5, we consider an econometric analysis to examine the hypotheses presented in the paper as we try to model the determinants of the offer premium.

4 Data Analysis

In this section, we describe the independent and the dependent variables used in the analysis. The descriptive statistics of the dependent and independent variables are given in Table 1and the correlation coefficients among these independent variables are indicated in Table 2.

Table 1: Descriptive Statistics of the Independent and Dependent Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
OfferPremium	191	0.1424	0.7442	-4.2120	3.7959
ReferencePrice52	191	0.3490	0.3540	0	2.5035
ReferencePrice26	210	0.2492	0.2542	0	1.9796
RegulatoryProxy	186	0.1845	0.2387	-0.1911	1.3707
OfferPremiumDummy52	246	0.5691	0.4962	0	1
OfferPremiumDummy × *ReferencePrice52*	225	0.2337	0.3697	0	2.5035
OfferPremiumDummy26	251	0.4701	0.5001	0	1
OfferPremiumDummy × *ReferencePrice26*	210	0.0743	0.1163	0	0.7772
52–26PriceDifferenceDummy	251	0.3625	0.4817	0	1
52–26PriceDifferenceDummy × *ReferencePrice52*	221	0.1689	0.3441	0	2.5035
52–26PriceDifferenceDummy × *ReferencePrice26*	210	0.0766	0.3711	0	4.9279
Liquidity	279	0.4264	0.6039	0.0001	4.9466
LogMarketCapitalisation	279	5.8049	2.2275	0.4264	13.2040
SensexReturn	246	0.0198	0.0789	-0.3174	0.2806
Obj_consolidation	280	0.2786	0.4491	0	1
Obj_substantial	280	0.1750	0.3806	0	1
Deals completed	250	0.9440	0.2304	0	1

Table 2: Correlation Coefficient between the Dependent and Independent Variables

	Var 1	Var 2	Var 3	Var 4	Var 5	Var 6	Var 7	Var 8	Var 9	Var 10	Var 11	Var 12	Var 13
Var 1	1												
Var 2	0.0276	1											
Var 3	0.0282	0.7784	1										
Var 4	0.3003	0.437	0.5674	1									
Var 5	-0.5203	0.3815	0.266	-0.1912	1								
Var 6	-0.1674	0.9337	0.6897	0.2485	0.608	1							
Var 7	0.5224	-0.3212	-0.308	0.1888	-0.8854	-0.5235	1						
Var 8	0.5446	-0.0492	0.0424	0.4393	-0.641	-0.3666	0.7096	1					
Var 9	0.0126	0.4014	-0.0316	-0.0379	0.2646	0.4005	-0.0803	-0.0907	1				
Var 10	0.0439	0.7243	0.1834	0.0772	0.3136	0.7179	-0.1888	-0.133	0.7634	1			
Var 11	0.0875	0.6515	0.3422	0.1429	0.2214	0.6386	-0.1959	-0.1262	0.4558	0.8157	1		
Var 12	-0.1772	-0.1211	-0.1073	-0.0972	0.0813	-0.0659	-0.1222	-0.1413	-0.0743	-0.0544	-0.0291	1	
Var 13	-0.026	-0.1577	-0.1909	-0.023	-0.1747	-0.1391	0.1971	-0.0529	0.0009	-0.0568	-0.0573	0.1983	1

Var 1: *OfferPremium*; Var 2: *ReferencePrice52*; Var 3: *ReferencePrice26*; Var 4: *RegulatoryProxy*; Var 5: *OfferPremiumDummy52*; Var 6: *OfferPremiumDummy* × *ReferencePrice52*; Var 7: *OfferPremiumDummy* × *ReferencePrice26*; Var 8: *52–26PriceDifferenceDummy*; Var 9: *52–26PriceDifferenceDummy* × *ReferencePrice52*; Var 10: *52–26PriceDifferenceDummy* × *ReferencePrice26*; Var 11: *Liquidity*; Var 12: *LogMarketCapitalisation*; Var 13: *SensexReturn*.

The dependent variable in our analysis was offer premium, which was defined as the offer price scaled by the average of the target's market price over 30 to 60 days prior to the announcement date. We considered the average market price to reduce volatility in the data. Moreover, since liquidity of stocks is a point of concern in emerging country markets such as India, taking a period of 30–60 days ensures that the traded prices are available for at least some days within the period mentioned. Lagged period prices were considered in order to control for rumours about the announcement of the open offer, which in turn might affect the prices. The 30-day lag is usually considered in the literature as the potential date for controlling rumours (see Baker et al., 2012); we made a similar assumption here. The 60-day period was chosen based on the SEBI SAST Regulations, 2011, which stipulates 60 days as the earliest date for considering the market price for the determination of the offer price.

The independent variable of interest in this paper was the 52-week and the 26-week high closing price. While determining the 52-week high closing price, we considered data of the previous 335 calendar days ending 30 days prior to the announcement date. During these 335 calendar days, we considered the day on which the price of the stock was the highest; this price was taken as the 52-week high price. Hence, the 52-week high price was defined as the 30-day lagged 52-week high price scaled by the average 30–60 days' lagged market price. Similarly, for the 26-week high price data, we considered data of the previous 150 calendar days ending 30 days prior to the announcement date, scaled to the average 30–60 days' lagged market price. A common scaling factor was considered in order to eliminate the potential problem of heteroskedasticity in the data (Baker et al., 2012). In the next section, we establish the salience of these market peak prices as a reference price.

4.1 Salience of Stock Market Peak Prices as the Reference Price

The objective of this study was to test whether stock market peak prices of the target firm are significantly related to the offer price that is determined in tender offers in India. Baker et al. (2012) argued that although the stock market peak prices are historical, they appear to be a psychological anchor since they are widely published and popular among various stakeholders of the deal. To identify the relevance of anchoring and to graphically establish the relationship between the offer price and the stock market peak prices, we plotted the frequency of the scaled offer prices relative to the scaled stock market peak prices of the target firms for the 52-week high price and the 26-week high price. It may be useful to compare the anchoring of both the peak prices, since the SEBI SAST (Second Amendment) Regulations, 2002 mandated a minimum offer price that includes the 26-week high price. Since we were interested in anchoring to the market price, the analysis for plotting the histogram was reduced to 190 firms that illustrated frequently traded stocks as described in the SEBI SAST Regulations, 2002. Figures 1 and 2 present the histograms of the percentage differences between the scaled offer price and the stock market peak prices, namely, the 52-week high price (Figure 1) and the 26-week high price (Figure 2), both scaled to the average of the market price between 30 to 60 days prior to the announcement date.

Figure 1: Histogram of Offer Pricing—52-week high price

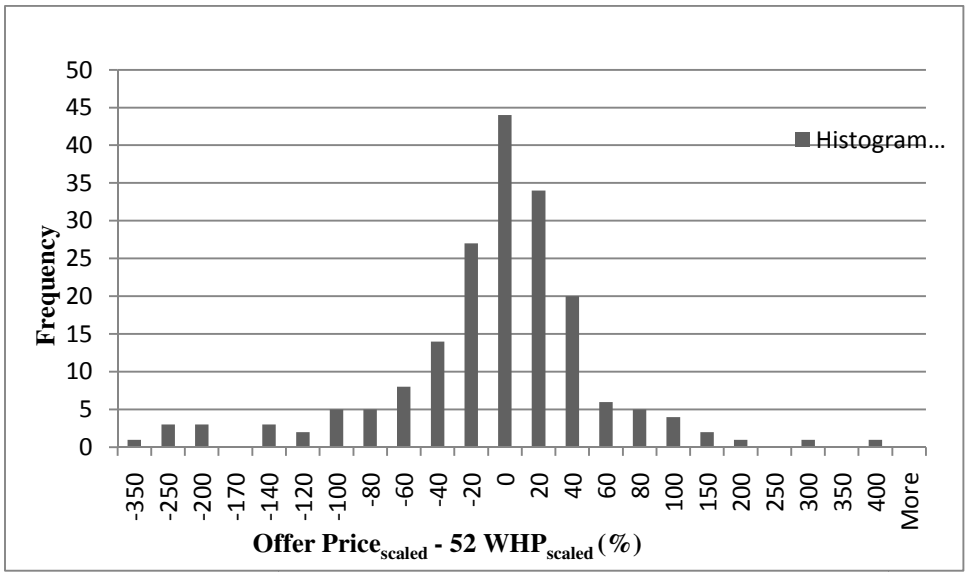


Figure 1 presents the histogram of the difference between the offer price and the target's 52-week high price, where *Offer Price*$_{Scaled}$ is the offer price from the SEBI data scaled to the average of the market price between 30 to 60 days prior to the public announcement and *52-WHPrice*$_{Scaled}$ is the high stock price of the target firm over 335 calendar days ending 30 days prior to the announcement date, scaled to the average of the market price between 30 to 60 days prior to the public announcement. The difference is expressed in percentage terms.

Figure 2: Histogram of Offer Pricing—26-week high price

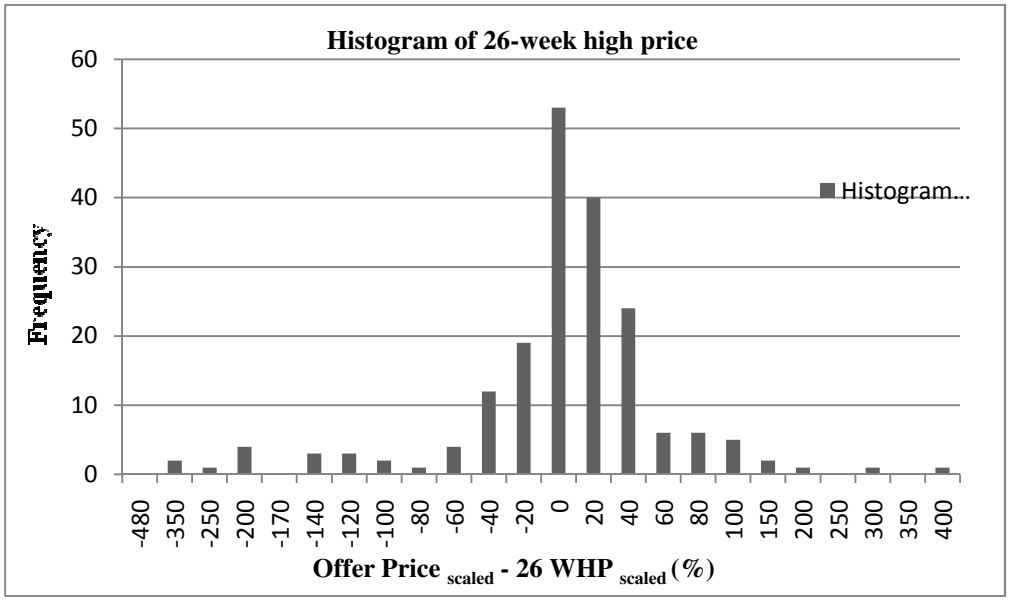


Figure 2 presents the histogram of the difference between the offer price and the target's 26-week high price, where *Offer Price*$_{Scaled}$ is the offer price from the SEBI data scaled to the average of the market price between 30 to 60 days prior to the public announcement and *26-*

$WHPrice_{Scaled}$ is the high stock price of the target firm over 150 calendar days ending 30 days prior to the announcement date, scaled to the average of the market price between 30 to 60 days prior to the public announcement. The difference is expressed in percentage terms.

In the histograms, the horizontal axis represents the percentage difference, while the vertical axis records the frequencies for each class; the value 0 signifies an offer price exactly equal to the peak price. The distribution graphically confirms a high level of anchoring around the peak prices, thereby establishing the relevance of the 52-week high price and the 26-week high price as a reference price in M&A deals. The histograms show that around 23% of the offer prices are almost equal to the 52-week high price and 27% of the offer prices are equal to the 26-week high price. Further, one could argue that since the 26-week stock market price is considered for determining the minimum offer price as stipulated in the SEBI SAST Regulations, 2002, it is obvious that there would be stronger anchoring to it. Therefore, in the further regression analysis, we tested for the significance of anchoring on those firms where the 52-week high was greater than the 26-week high price; we included the maximum of the average of the 26-week high and low prices as a control and the average of the 2-week daily closing prices prior to the date of announcement as a proxy for the regulation.

Table 3 gives the descriptive statistics of the histograms for the 52-week high price and the 26-week high price shown in Figures 1 and 2, respectively. The data shows that there were 74 firms with the premium above the 52-week high price, while there were 72 firms where the offer price was below the 52-week high price and 44 firms where the 52-week high price was equal to the offer price. In the case of the 26-week high price data, there were 53 firms with offer price equal to the 26-week high price, 86 firms with offer price above the 26-week high price, and 51 firms with offer price below the 25-week high price. The range of offer premium with respect to the 52-week high price and the 26-week high price for this dataset lay between -350% to +400%. The mode-bin of the distribution for the 52-week high price and 26-week high price was at 0, indicating a higher number of firms close to the 52-week high price. Both distributions showed a positive skew, indicating the strength of the positive premium over the 52-week (26-week) high price in the distribution. The statistics also indicate that for 65% of the data, the 52-week high price equalled the 26-week high price, specifying a strong subset of 26-week high prices in the set of 52-week high prices.

Table 3: Descriptive Statistics of the Histograms in Figures 1 and 2

Particulars	52-WHPrice	26-WHPrice
No. of Firms below 52-WHPrice	38 %	27 %
No. of Firms equal to 52-WHPrice	23 %	28 %
No. of Firms above 52-WHPrice	39 %	45 %
Total Firms	190	190
Mean of the distribution	-7.63	2.05
Mode of the distribution	0	0
Skewness of the distribution	0.23	0.21
Standard Deviation	84.05	80.44
No. of Firms with 52-WHP > 26-WHP	35% (66 firms)	
No. of Firms with 52-WHP = 26-WHP	65% (124 firms)	

4.2 Regulatory Proxy

The reference price bias in an emerging market set-up such as India is unique due to the minimum offer price mandated in the takeover regulations. The SEBI SAST Regulations, 2002 stipulated a list of factors that need to be considered while determining the minimum offer price. These factors include market price, which is the maximum of the average of the weekly (daily) high and low price of the target firm over the 26-week (2-week) period preceding the date of announcement. Since the SEBI SAST Regulations, 2002 set a minimum floor for the determination of the offer price, it is important to introduce a regulatory proxy to control for the effects of regulation on the offer price. In the current analysis, we constituted the regulatory proxy as the maximum of the average of the weekly highs and lows of the closing prices for the 26 weeks preceding the public announcement and the average of the daily closing prices for the two weeks preceding the public announcement. The regulatory proxy was further scaled by the 30–60 days' lagged average market price in order to obtain returns over the market price and to remove potential heteroskedasticity. Table 2 shows the potential collinearity between the 52-week high price and the regulatory proxy. This could be attributed to the fact that for around 40% of the firms, the 52-week high price equals the 26-week high price; therefore, the average price as the regulatory proxy was positively correlated to the 52-week reference price. However, at this point, we considered the importance of the regulatory proxy as an important determinant of the offer price, despite its multicollinearity problem. Therefore, in the final analysis, we present results that included and excluded the regulatory proxy.

4.3 Reference Price Premium

Table 3 presents cases where the offer price was higher and lower than the reference price, i.e., the target's 52-week high price. We propose that there would be an asymmetric anchoring effect on the offer price due to negative and positive premiums in the dataset. Intuitively, one could hypothesise *ex-ante* that the reference effect may be stronger for those cases where the offer price is higher than the 52-week high price than in the cases where it is lower than the 52-week high price. This could be due to the fact that if bidders identify the importance of the 52-week high price as a reference price, they might as well decide to bid slightly higher than the 52-week high price to ensure the offer's success. Therefore, in the final regression analysis, we captured the positive and negative premiums with a dummy variable that takes the value 0 if the offer price exceeds the 52-week high price and takes the value 1 if the offer price is less than the 52-week high price. However, this dummy may not be able to identify whether the anchoring is stronger when the offer price is above the reference price or vice versa. Therefore, we also introduced an interaction term where the premium dummy was interacted with the scaled 52-week high price in order to capture the asymmetry in anchoring. However, as shown in Table 2, the interaction term was perfectly linearly correlated with the scaled 52-week high reference price. Hence, in the regression analysis, we present results by including and excluding the interaction term. At the same time, we note that for the scaled 26-week high price, the corresponding interaction term did not have a high correlation. This can be attributed to the fact that in the case of the 26-week high price, the occurrence of positive and negative premiums as compared to the offer price is almost equal, as is evident from the descriptive statistics in Table 1. However, the histograms in Figures 1 and 2 indicate a positive skew for the 52-week and the 26-week data, respectively. Close to the 52-week high price, around 18% of the firms have

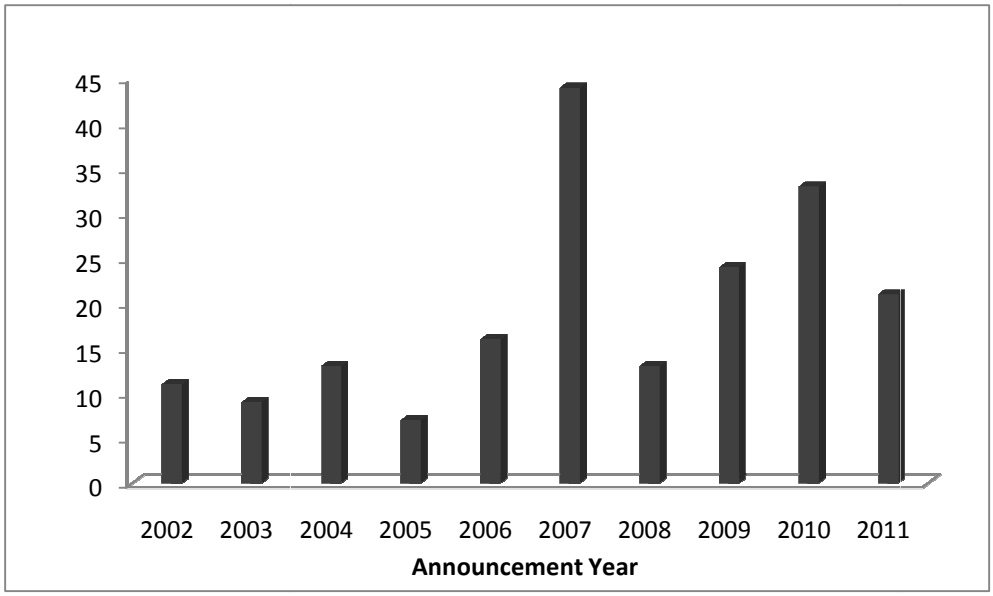
positive premiums, while 14% of the firms have negative premiums around the 20% premium range. This indicates the asymmetry between positive and negative premiums over the reference price.

4.4 Characteristics of the Offer Deal

The characteristics of a deal include the distribution of the deal across years, the nature of the acquirers, the objectives of the offer, and the deal's success. The distribution of the deals across years is shown in Figure 3. We found that the announcement of deals was on average higher for the period 2007–2011, with a peak in 2007.

The acquirers of the deal mostly involve individuals and private firms. Of the 280 deals, 136 deals involved a single acquirer while the rest involved more than one acquirer. Multiple acquirers are often referred to as 'persons acting in concert' (PAC). According to the SEBI SAST Regulations, 1997, PACs are defined as individuals, companies, or legal entities acting in concert with the purpose or objective of acquiring shares, voting rights, or exercising control through an understanding or agreement.

Figure 3: Distribution of Open Offers across Years



The acquisition of shares through an open offer involves the transfer of shares and voting rights. Hence, the objectives of an offer are divided into three categories, namely, change in control, consolidation of holdings, and substantial acquisition. Change in control involves a change in voting rights such that the control or decision-making power goes to the new shareholders. As per the SEBI SAST Regulations, 1997, 'control' includes the right to appoint the majority of the directors and/or to control the management or policy decisions. Substantial acquisition involves the acquisition of a substantial quantity of the shares or voting rights of the company. The term 'substantial' is defined as (a) 15% or more of the voting rights or (b) more than 5% but less than 15% of the voting rights, depending on the context. An acquirer who has 75% shares or voting rights of the target company can acquire further shares or voting rights only through an open offer from the shareholders of the target company. This is referred to as consolidation of

holdings. Table 1shows that among the 280 deals that were considered, 78 deals were made with the objective of consolidation, 49 deals were made with the objective of substantial acquisition, and 153 deals involved change of control. In terms of equity percentage, the minimum percentage in the data was 4.88% and the maximum was 86.57%, both of which were associated with change in control. Of the 280 deals in the sample, about 190 deals involved an equity percentage of 20%, which was distributed across all three objectives.

It should be noted that Baker et al. (2012) defined acquisition to mean change in control only. In the Indian context, however, we extend the analysis to include substantial acquisitions as well, since most of the substantial acquisition cases involved PACs as the acquirers, where the total number of shares acquired by them was equivalent to the number leading to a change in control, but individually, each individual or entity was not able to exercise control. Hence, we assume that so far as the determination of the offer price is concerned, the role of historical market prices in the case of substantial acquisitions and change in control should be similar.

Another characteristic of an offer is whether the offer has been closed, i.e., whether or not the deal was completed/successful. According to Baker et al. (2012), the variable *deal success* captures whether or not psychological factors affect the financial decisions of firms, which in our case implies the bid made by acquirers. This variable also captures how the target firm receives the bid, where the completion of the deals would imply that the bid has been well received by target firms' management, board, investors, and advisors. In our sample, only 14 deals were not completed; all the other deals had been completed (Table 1). Given the high number of successful/completed deals in our sample, we restrict our analysis to completed deals only.

4.5 Market Capitalisation

The dataset consisted of target firms with varying firm size. Therefore, to control for firm size while evaluating the effect of the 52-week high price of the target firm on the offer price, we included the logarithm of market capitalisation for target firms in the analysis.

4.6 Sensex Returns

To control for market volatility, we calculated returns from the market index. This measure is the log of the difference between the Sensex price on the date of the public announcement (PA date) of the open offers and the 30-day lagged Sensex price. The 30-day lagged scaling factor was intended to ease any upward rumours or the effect of new information on the market index.

4.7 Liquidity

The scope of the current study was to examine the effect of historical stock market peak prices on the negotiations of the offer premium. Therefore, liquidity among stocks in the dataset, which has implications for price discovery also, was important to make the study relevant. Therefore, the scope of liquidity in the analysis was to identify frequently traded stocks as described in the SEBI SAST Regulations, 2002 and also to operate as a control in the analysis since we hypothesise that less liquid stocks would demand a higher offer premium compared to more liquid stocks. The liquidity measure in the analysis was defined in terms of turnover, where the annualised turnover has to be greater than or equal to 2% for a stock to be considered as a frequently traded stock.

5 Results

The analysis in the previous section established the salience of the 52-week and 26-week high prices along with the other factors while determining the offer price, such as premium over the 52-week and 26-week high prices, the objectives of the deal, deal completion, market capitalisation, liquidity, Sensex returns, and the average of the 26-week high and low prices as a regulatory proxy. Following Baker et al. (2012), we examined the hypothesis that the target's 52-week high price influences the determination of the offer price through an econometric analysis. The results are given in Table 4a and 4b.

Table 4a: Regression Analysis

Variables	1	2	3	4	5	6
ReferencePrice52	1.1915***	0.9243***	0.6435*	0.3000***	0.1690	-0.1594
OfferPremiumDummy52	-0.2734***	-0.2570***	0.1996**	-0.4798***	-0.4109***	-0.3805***
OfferPremiumDummy × *ReferencePrice52*	-0.9516***	-0.7782**	0.8686**			
LogMarketCapitalisation	0.0047	0.0024	-0.0004	-0.0043	-0.0045	-0.0080
SensexReturn	0.2415	0.1136	0.4363	0.3099	0.1282	-0.0428
Liquidity	0.0047	-0.0483	-0.0588	-0.0353	-0.0396	-0.0469
RegulatoryProxy		0.2448*	0.4363***		0.2918**	0.4727***
52–26PriceDifferenceDummy			0.0472			
52–26PriceDifferenceDummy × *ReferencePrice52*			0.4201***			0.3411***
Constant	0.2314**	0.2411**	0.2651	0.4538***	0.4128***	0.4487***
No. of Observations	119	110	110	119	110	110
Adjusted *R*-Squared	0.4683	0.446	0.4925	0.4317	0.4265	0.4728

Dependent Variable: *OfferPremium* defined as log(offer price/30–60 days' lagged market price). **Independent Variables:** *ReferencePrice52* is log(52-week high price 30-day lagged/30–60 days' lagged market price); *OfferPremiumDummy52* is a dummy variable taking value 0 if offer price > 52-week high price and 1 otherwise; *OfferPremiumDummy* × *ReferencePrice52* is the interaction between *ReferencePrice52* and *OfferPremiumDummy52*; *LogMarketCapitalisation* is log(Market capitalisation of target stock); *SensexReturn* is log(Sensex on PA date/Sensex 30-day lagged); *Liquidity* is the annualised turnover of the target stock; *RegulatoryProxy* is log(max[average weekly high and low for 26 weeks and average of daily closing price for 2 weeks prior to announcement]/30–60 days' lagged average market price); *52–26PriceDifferenceDummy* is a dummy variable taking value 1 if the 52-week high price is greater than the 26-week high price and 0 otherwise; *52–26PriceDifferenceDummy* × *ReferencePrice52* is the interaction between *52–26PriceDifferenceDummy* and *ReferencePrice52*. *Constant* is the **intercept term**.

***, **, and * imply significance at 1%, 5%, and 10% levels, respectively.

Table 4b: Regression Analysis

Variables	1	2	3
ReferencePrice52		-0.1583	-0.0089
ReferencePrice26	-.1471		
OfferPremiumDummy52		-0.3812***	-0.3861***
OfferPremiumDummy × *ReferencePrice52*			
OfferPremiumDummy26	.3512***		
OfferPremiumDummy × *ReferencePrice52*			
LogMarketCapitalisation	-.0130	-0.0078	0.0028
SensexReturn	-.2239	-0.0332	0.1622
Liquidity	-.03163	-0.0458	-0.0394
RegulatoryProxy	.4828***	0.4728***	0.2852*
52–26PriceDifferenceDummy			
52–26PriceDifferenceDummy × *ReferencePrice52*		0.3406***	0.3062***
52–26PriceDifferenceDummy × *ReferencePrice26*	.3617***		
Obj_substantial		-0.0184	-0.0423
Constant	.0987	0.4516***	0.3399***
No. of Observations	110	110	107
Adjusted *R*-Squared	0.4599	0.4683	0.4037

Dependent Variable: *OfferPremium* defined as log(offer price/30–60 days' lagged market price). **Independent Variables:** *ReferencePrice52* is log(52-week high price 30-day lagged/30–60 days' lagged market price); *ReferencePrice26* is log(26-week high price 30-day lagged/30–60 days' lagged market price); *OfferPremiumDummy52* is a dummy variable taking value 0 if offer price > 52-week high price and 1 otherwise; *OfferPremiumDummy26* is a dummy variable taking value 0 if offer price > 26-week high price and 1 otherwise; *OfferPremiumDummy* × *ReferencePrice52* is the interaction between *ReferencePrice52* and *OfferPremiumDummy52*; *OfferPremiumDummy* × *ReferencePrice26* is the interaction between *ReferencePrice26* and *OfferPremiumDummy26*; *LogMarketCapitalisation* is log(Market capitalisation of target stock); *SensexReturn* is log(Sensex on PA date/Sensex 30-day lagged); *Liquidity* is the annualised turnover of the target stock; *RegulatoryProxy* is log(max[average weekly high and low for 26 weeks and average of daily closing price for 2 weeks prior to announcement]/30–60 days' lagged average market price); *52–26PriceDifferenceDummy* is a dummy variable taking value 1 if the 52-week high price is greater than the 26-week high price and 0 otherwise; *52–26PriceDifferenceDummy* × *ReferencePrice52* is the interaction between *52–26PriceDifferenceDummy* and *ReferencePrice52*; *52–26PriceDifferenceDummy* × *ReferencePrice26* is the interaction between *52–26PriceDifferenceDummy* and *ReferencePrice26*; *Obj_substantial* is a dummy taking value 1 if the deal objective is substantial acquisition and 0 otherwise. *Constant* is the **intercept term**.

***, **, and * imply significance at 1%, 5%, and 10% levels, respectively.

The curve-fitting process established a power function $y = ax^b$ as the best fit for analysing the data on offer premiums and the 52-week high price. In its most basic form, the regression equation is:

$$\ln(OfferPremium_{it}) = \ln(a) + b \ln(52WHPrice_{i,t-30}) + e_{it} \quad (1)$$

where ln ($OfferPremium_{it}$) is the logarithm of the offer price scaled to the target's 30–60 calendar days' lagged average market price prior to the announcement date; ln ($52WHPrice_{i,t-30}$) is the logarithm of the 52-week high reference price taken 30 days prior to the announcement date, which is also scaled to the target's 30–60 calendar days' lagged average market price prior to the announcement date. The ln ($26WHPrice_{i,t-30}$) was obtained in a similar manner.

The regression equation was further augmented by including controls that are important while determining the offer price. These control factors included offer premium dummy as well as characteristics of the deal (indicated by the objectives of the deal, such as consolidation, substantial holding, and change of control) and deal success, both expressed through dummy variables. We also included the market capitalisation of the target, liquidity, Sensex returns, and a regulatory proxy.

$$\ln(OfferPremium_{it}) = \ln(a) + b\ln(52WHPrice_{i,t-30}) + cPremium + d\ln(52WHPrice_{i,t-30}) \times Premium + esubstantial + fln(marcap) + gliquidity + hsensex + ireg \quad (2)$$

In Equation (2), $OfferPremium_{it}$ is the logarithm of the offer price scaled to the target's average 30–60 days' lagged market price; $52WHPrice_{i,t-30}$ is the logarithm of the 52-week high reference price taken 30 days prior to the announcement date, scaled to the average 30–60 days' lagged market price; *premium* is a dummy that takes a value 0 if the offer price is greater than the 52-week high price and a value of 1 if the offer price is less than the 52-week high price; *substantial* is the dummy variable for substantial acquisition and *change of control* is the control group; $ln(marcap)$ refers to the logarithm of the market capitalisation of the target company; *liquidity* is the measure of the liquidity of the target firm's stock; *Sensex* is the market return; and *reg* is the regulatory proxy. As discussed in Section 4.4, we restricted the analysis to deals that had been completed. By replacing the 52-week high price with the 26-week high price, we obtain the model for the 26-week data in Equation (3).

$$\ln(OfferPremium_{it}) = \ln(a) + b\ln(26WHPrice_{i,t-30}) + cPremium + d\ln(26WHPrice_{i,t-30}) \times Premium + esubstantial + fln(marcap) + gliquidity + hsensex + ireg \quad (3)$$

Column 1 of Table 4a presents the results corresponding to all the factors given in Equation (2) other than the regulatory proxy and *obj_substantial*. The results of the regression analysis clearly establish the effect of the 52-week high price as an important anchor or reference in determining the offer prices, thus validating the anchoring-and-adjustment bias (Tversky and Kahneman, 1974). The coefficient of the offer premium dummy turned out to be negative and significant, implying that the offer price is higher in the case of a positive premium as compared to that of a negative premium. We also ran separate regressions (not reported) for positive and negative premiums. The results showed that for a positive premium, the 52-week high closing price had a positive and significant effect, while in the case of a negative premium, the results were positive but not significant. However, since our dataset was small, we pooled the data and controlled for the positive and negative premiums by using a dummy. The premium dummy was interacted with the log of the 52-week high price scaled by the market price. The objective of introducing the interaction term was to examine whether the positive or negative premium had an implication for anchoring. This interaction term was negative but insignificant. However, this interaction

term had a very high degree of collinearity with the log of the 52-week high price. Hence, we ran the regression by including as well as excluding the interaction term. Column 4 in Table 4a gives the results without the interaction term; the results remained unchanged.

In Columns 2 and 5 of Table 4a, we introduced the regulatory proxy following the SEBI SAST Regulations, 2002. The regulatory proxy turned out to be positive and significant. This suggests that the offer price was affected by the regulatory proxy, which sets the floor for the determination of the offer price. However, once the regulatory proxy was introduced, the log of the scaled 52-week high price remained significant only when the interaction term was included in the regression (Column 2). This can be attributed to the collinearity between the log of the scaled 52-week high price and the interaction term as discussed in Section 4.3. Hence, for the rest of the analysis, we omitted the interaction term from the regressions relating to the 52-week high price.

The question then arises whether the regulatory proxy induces an anchoring around the 26-week high price, which forms one part of the proxy. We found that the log of the scaled 26-week high price was significant in the absence of the regulatory proxy but not in the presence of the regulatory proxy, thus giving the same results as the 52-week high price did (not reported). This suggests that the regulatory proxy (which includes the 26-week high as a component) outweighed the anchoring effect of the 26-week high prices both in the case of the 26-week high price as well as the 52-week high price, since the 26-week high price forms a subset of the latter. Thus, the 52-week high price was either equal to or greater than the 26-week high price.

We then hypothesised that for those firms for which the 26-week high price was equal to the 52-week high price, the anchoring to the 52-week high price would coincide with the anchoring to the regulatory proxy. Hence, with the introduction of the regulatory proxy, the anchoring to the 52-week high price would probably no longer remain significant. To investigate this, we created a dummy that took the value 1 if the 52-week high price was greater than the 26-week high price and 0 otherwise. This dummy was interacted with the log of the scaled 52-week high closing price; we included this interact term in our regression. The results corresponding to Columns 3 and 6 of Table 4a show that this interaction term was significant along with the regulatory proxy, thus supporting our hypothesis. The hypothesis was also supported in the case of 26-week high prices as evident from Column 1 in Table 4b.

The controls for firm-specific and market-specific effects (such as the target's market capitalisation, liquidity, and Sensex) turned out to be insignificant in all the specifications. The sign for liquidity was negative suggesting that more illiquid stocks could extract higher offer premiums. This is due to the hidden value in such stocks vis-à-vis liquid stocks, since in the case of the latter, the market price reflects the true value of the stock. *Sensex* turned out to be positive, implying that higher market returns led to higher offer premium. However, the sign of the log of market capitalisation was not consistent across the different specifications.

Column 2 in Table 4b includes *obj_substantial*, which turned out to be insignificant, implying that the objective(s) of the deal does not have a significant effect on the offer premium vis-à-vis change in control. In Column 3, Table 4b, we ran the regression taking the market price for scaling to be the average of the 29–31 days' lagged market price prior to the announcement. The results remained unchanged with the change in the scaling factor.

Thus, the results suggest that there is an anchoring to the 52-week high closing price and an anchoring to the 26-week high price; it could be assumed that this was induced by the regulatory

proxy. Thus, the SEBI SAST Regulations, while attempting to set a floor price in order to ensure a fair return or exit route for retail investors, also induce an anchoring to a historical price, albeit a recent one as compared to the 52-week high. The 52-week high also appears to be a reference price if the 52-week high price lies outside the 26-week high price. However, the small sample size of our data and potential multicollinearity issues restricted us from drawing strong inferences. Rather, we would like to maintain that the results of the current study are indicative.

6 Conclusion

The results contribute to the discussion by Baker et al. (2012) and establish the salience of a reference price in merger and acquisition activity in India. The study becomes interesting in an emerging market such as India since it is characterised by regulations on the offer price and includes many illiquid target firms. In the study, we focussed on the target's 52-week high price; this data is widely available and represents a salient price to investors and managers. We also studied the effects of the target's 26-week high price since it forms a part of the regulations on the offer price. Empirically, the prima facie results prove that the target's 52-week high price as well as the 26-week high price has a significant effect on the bidder's offer price. The rationale for this behaviour is described in cognitive psychology as anchoring and the adjustment method of estimation (Tversky and Kahneman, 1974) and is also explained as the reference-dependence phenomenon in Prospect theory (Kahneman and Tversky, 1979). Moreover, the significance of the 52-week high price holds even after controlling for the regulatory proxy in the case of deals in which the 52-week high price is higher than the 26-week high price. However, a limitation of the current study is the small sample size, which affects the robustness of the models. Moreover, some of the variables were laden with the problem of multicollinearity, which might restrict strong inferences from the results.

The results further illustrate that the regulatory proxy, which provides a floor to the offer price described in the SEBI SAST Regulations, 1997, turns out to be significant. Interestingly, the revised SEBI SAST Regulations, 2011 includes the market price 60 days prior to the announcement date as a consideration for determining the offer price. This suggests that perhaps the regulator implicitly acknowledges the role of regulation-induced anchoring to historical prices in setting the offer price. Therefore, the revised SEBI SAST Regulations, 2011 has evolved towards including a more recent market price than the irrelevant market prices of the past. Hence, we conclude that the results of this study also have relevance from a policy perspective. Unfortunately, our sample dataset included data for only four months after the revised regulations came into effect. Hence, the data was not sufficient to consider the effect of the new regulations. This would make for an interesting extension of the current study.

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