The 52 Week High Reference Price Effect on Indian Mergers and Acquisitions: Does the Regulatory Environment Matter? **

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Abstract

The paper establishes the effect of the target's 52-week high price as an important anchor or reference price in determining the offer premium in Mergers and Acquisition (tender offer) deals, as in Baker, Pan and Wurgler (2012), in the light of regulatory requirements in India. The Takeover regulation in India, the Substantial Acquisition of Shares and Takeovers (SAST) 1997 (with amendments in 2002 and 2011) mandates a minimum offer price which also includes the target's historical peak prices. In SAST 2002, there is a reference to a 26 week high price which is changed to 60 day high price in SAST 2011. The results show that the reference effect is positive and significant even after controlling for regulation induced anchoring that includes other historical peak market prices, which is a subset of the 52 week reference price under study. Specifically, the reference effect is positive and significant for deals when the offer price exceeds the 52 week high price. Incremental changes in the regulation in 2011 to include a more recent market price, i.e. 60 day high price, does not change the effect of the 52 week high price as a psychological anchor. Among firm characteristics, the offer premium significantly reduces for firms with higher PE valuation. Further, the offer premium is significantly higher when the objective of acquisition is change of control.

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1   Introduction

Empirical finance focuses on a stock's 52 week high price that has the potential to act as a particularly salient reference price. Heath et al. (1999) and Core and Guay (2001) find strong and robust evidence that employee stock option exercises exceeds (decreases) when the firm's current stock price exceeds its previous 52 week high. Numerous studies report that past price extremes influence investor's trading decisions (Grinblatt and Keloharju, 2001; Barber and Odean, 2008; Huddart, Lang and Yetman, 2009). George and Hwang (2004) find that the 52 week high price largely explains the profits from momentum investing. These studies inform the individuals' tendency to set reference points with respect to stock price highs and lows. In decision making, the concept of a psychological reference point is described as a belief formation process of anchoring and adjustment (Tversky and Kahneman, 1974) where individuals use an initial piece of information (or anchor) to make judgements and adjust the final value based on other considerations. In the context of mergers and acquisitions (M&A), Baker, Pan and Wurgler (2012) examine 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 show 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 for bidders since 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 and hence, 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 as well as justify the same to the bidders.

The significance of the reference price effect documented by Baker et al. (2012) is persistent in other markets as well, such as, European M&A deals (Niinivaara, 2010) and Japanese takeover activities (Nielsen, 2013). A similar study is relevant as well as interesting in India since the market regulator, the Securities and Exchange Board of India (SEBI), mandates a minimum offer price for M&A deals taking into account various relevant parameters, which also includes the target's historical market prices. Particularly, the SEBI Regulation

(Substantial Acquisition of Shares and Takeovers (SAST) 1997 with amendments in 2002 and 2011) makes a reference to the target's twenty six week high price in SAST 2002, which is amended to sixty day high price in SAST 2011. Therefore in this paper, we attempt to determine the salience of the 52 week high reference price for Indian M&A (tender offer) deals while taking into account the regulatory requirements in India, which might serve as an alternative non-psychological explanation influencing the reference price effect. The period of the study is from 2002 – 2014, accounting for the change in SAST regulation in 2011 and the dataset results in 169 completed tender offer deals. The results show that the reference effect is positive and significant for deals specifically when the offer price exceeds the 52 week high price. These results are persistent even after controlling for regulation induced anchoring that includes other historical peak market prices, which is a subset of the 52 week reference price under study. Incremental changes in the regulation in 2011 to include a more recent market price, i.e. 60 day high price, does not change the effect of the 52 week high price as a psychological anchor. Among firm characteristics, the offer premium significantly reduces for firms with higher PE valuation. Further, the offer premium is significantly higher when the objectives of acquisition is change of control.

The rest of the paper is organised as follows. Section 2 briefly discusses the psychology of a reference price in M&A deals based on behavioural theories and the relevance of the SEBI Regulations (Substantial Acquisition of Shares and Takeovers) (SAST), 1997 (with amendments in 2002 and 2011) in influencing the reference price effect 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 establishes the effect of the target's 52-week high price as an important anchor or reference price in determining the offer premium as in Baker et al. (2012), while controlling for regulatory requirements in India which include various other historical peak market prices. The other controls included in the analysis are deal characteristics indicated by the objectives of the deal, firm specific factors such as market capitalisation, PE, PB and Sensex returns as a control for market specific effects. Section 6 concludes the paper and reports avenues for further extensions.

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 Effect

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 investigates 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) proposes that empire-building managements tend to make acquisitions rather than increase payouts to shareholders. Shleifer and Vishny (2003) argue that managers take advantage of market mis-valuations and use the overvalued stock of their firms to buy relatively less overvalued targets. Rhodes-Kropf and Viswanathan (2004) argue 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) present a new theory that complements these behavioural motivations in mergers and acquisitions. They hypothesise 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 anchoring to a reference price in the relative valuation of the target firm.

According to Baker et al. (2002), the motivation for a reference price 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 stock markets support the importance of specific price levels as reference points. Shefrin and Statman (1985), Odean (1998), and Weber and Camerer (1998) propose 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. George and Hwang (2004) find that the 52 week high is a good proxy for the momentum factor, while Das and Raghubir (2006) propose that people perceive the local maxima and minima as salient points. Barber and Odean (2008) show that prior returns and high turnover are the factors that most strongly influence trading activity. Huddart et al. (2009) document that trading volume increases significantly whenever prices exceed the 52-week highs and lows. 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) argue 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) hypothesize 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 Effect and Regulatory Requirements in India

The Securities and Exchange Board of India (SEBI) Takeover Regulation, Substantial Acquisition of Shares and Takeovers (SAST), 1997 mandates a minimum offer price for M&A deals while taking into account various relevant parameters. We consider the SEBI SAST Regulations, 1997 with the second amendment in 2002 and a further amendment in 2011, since the data under study pertains to the period 2002–2011. The SEBI (Substantial Acquisition of Shares and Takeovers) (Second Amendment) Regulations, 2002, w.e.f. 9-9-2002, mandates that the minimum offer price shall be the highest of the following:

a) The negotiated price under the agreement that triggered the open offer;

b) The highest 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;

c) the price paid by the acquirer under a preferential allotment made to him or to persons acting in concert with him at any time during the twelve months period up to the date of closure of the offer;

d) 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[1] 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.

In case of the SEBI (SAST) Amendment in 2011, w.e.f. 01-11-2011 the offer price shall be the highest of;

a) the highest negotiated price per share of the target company for any acquisition under the agreement attracting the obligation to make a public announcement of an open offer;

b) the volume-weighted average price paid or payable for acquisitions, whether by the acquirer or by any person acting in concert with him, during the fifty-two weeks immediately preceding the date of the public announcement;

c) the highest price paid or payable for any acquisition, whether by the acquirer or by any person acting in concert with him, during the twenty six weeks immediately preceding the date of the public announcement;

d) the volume-weighted average market price of such shares for a period of sixty trading days immediately preceding the date of the public announcement as traded on the stock exchange where the maximum volume of trading in the shares of the target company are recorded during such period, provided such shares are frequently traded;

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[1] According to SEBI (SAST) 2002 and 2011 the shares of the target company will be deemed to be infrequently traded if the annualized trading turnover in that share during the preceding 6 calendar months prior to the month in which the PA is made is less than 5% (by number of shares) of the listed shares. If the said turnover is 5% or more, it will be deemed to be frequently traded. For disinvestment of government shareholding in listed Public Sector Undertakings (PSUs), the date on which the Central Government opens the financial bids would be the reference date for classifying the shares of the company as frequently or infrequently traded.

e) where the shares are not frequently traded, the price determined by the acquirer and the manager to the open offer taking into account valuation parameters including, book value, comparable trading multiples, and such other parameters as are customary for valuation of shares of such companies

According to the SEBI takeover Regulations, among other factors, a market price is relevant in order to cover the events and market functions prior to the public announcement for frequently traded stocks. Hence, there is a reference to the average of the weekly (daily) high and low of the closing prices during the 26 weeks (two weeks) preceding the date of public announcement (whichever is higher) in SEBI (SAST) 2002, and the volume-weighted average market price of frequently traded shares for a period of sixty trading days immediately preceding the date of the public announcement, in SEBI (SAST) 2011. 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-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 prices in India. In the Indian context, it is apparent that the 26-week, 60-day and a two week high price would be an influential anchor, given that regulatory requirements pertaining to the minimum offer price. It needs to be noted that each of these peak prices 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 peak prices. 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 regulatory peak prices.

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 comprises important variables related to the target firms, namely, the open offer and its characteristics, the

regulatory prices based on SAST regulations, 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 is 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 and regulatory prices 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 2002 and 2011, the SEBI SAST Regulations, 1997 underwent major amendments. Therefore, we restricted our dataset to the period September 2002 to March 2014. 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. Data on regulatory prices is collected from the letter of offers (LOF) downloaded from the SEBI website. Therefore, the total number of open offers in the data set was 885 firms.

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 name 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. Further, we included firms that were listed on the Bombay Stock Exchange (BSE) and the 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 is 169 for the period 2002 – 2014, accounting for the change in SAST regulation in 2011. Given the dataset, the analysis is 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 1 and the correlation coefficients among these independent variables are shown in Table 2, placed in the Appendix.

4.1   Offer Premium

The dependent variable in our analysis is offer premium, which is defined as the offer price scaled by the target's 30 day[2] lagged market price prior to the announcement date. The 30-day lag is usually considered in the literature as the potential date for controlling rumours (see Baker et al., 2012). However, we may not be able to make a similar claim in developing markets where liquidity and price discovery are matters of concern (Bekaert, Harvey, & Lundblad, 2007). Hence we also run the analysis using a 30-60 day[3] lagged market price which could perhaps address the concern of an appropriate time lag for controlling rumors in developing markets, as well as increase the possibility of traded stocks. Moreover, a recent SEBI SAST Regulation, 2011, stipulates 60 days as the earliest date for considering the market price for the determination of the offer price. To sum up, we consider the 30-day/60-day lagged market price to reduce volatility in the data, as well as control for rumours about the announcement of the open offer, which in turn might affect the market price.

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[2]We consider the highest price between 29 -31 days prior to the date of public announcement since liquidity of stocks is a point of concern in emerging markets such as India, hence taking a range ensures that the traded prices are available for at least some days within the period mentioned.

[3] Similarly for the 60-day lagged market price, we consider the highest price between 30 – 60 days prior to the date of public announcement.

4.2 Stock Market Peak Prices

The independent variable of interest in this paper is the target's 52-week high closing price. While determining the 52-week high closing price, we consider data of the previous 335 calendar days ending 30 days prior to the announcement date. During these 335 calendar days, we consider the day on which the price of the stock is the highest and such a price is taken as the 52-week high price. Hence, the 52-week high price is defined as the 30-day lagged 52-week high price scaled by the 30-day (60-day) lagged market price. The other market prices that have a correspondence in regulation are the 26 week high price, 60 day high price and the two-week high price prior to the date of public announcement. For the 26-week high price data, we consider data of the previous 150 calendar days ending 30 days prior to the announcement date; for the 60 day high price data, we consider data of the previous 30 calendar days ending 30 days prior to the announcement date; and the two-week high price is calculated by considering 15 calendar days prior to the date of public announcement. All the peak prices are scaled by a 30-day (60 day) lagged market price, a common scaling factor is considered in order to eliminate the potential problem of heteroskedasticity in the data (Baker et al., 2012). To continue the discussion of various independent variables, we first establish the salience of these market peak prices as a reference price in the next section.

4.2.1 Salience of Stock Market Peak Prices as the Reference Price

Baker et al. (2012) argue that although the 52 week high prices are historical and irrelevant for determining the offer price, they appear to be a psychological anchor since they are widely published and popular among various stakeholders of the deal. The regulatory environment for tender offers in India mandates a minimum offer price which among other factors, could be a result of twenty six weeks (or two weeks) high price or sixty days high price due to the SEBI SAST Regulations 2002 and 2011 respectively. Therefore, to identify the relevance of anchoring and to graphically establish the relationship between the offer price and the stock market peak prices, we plot the frequency of the scaled offer prices relative to the scaled stock market peak prices of the target firms for the fifty two-weeks, twenty six-weeks and sixty days. It may be useful to compare the anchoring of various peak prices, since the SEBI SAST Regulations mandates a minimum offer price that includes these historical peak prices. The dataset for plotting the histogram comes from 169 firms that are reported as frequently traded[1 above] according to SAST regulations. Since the dataset involves a change in the SAST regulation in 2011, we present histograms for two periods, 2002 - 2011

(October), and 2011 (November) and 2014. Figure 1 and 2 presents the histograms of the percentage differences between the scaled offer price and the scaled stock market peak prices, namely, the 52-week high price (Figure 1) for two periods 2002 – 2011, and 2011 – 2014, and Figure 2 compares the histogram for the 26-week high price for period 2002 – 2011, and the 60-day high price for period 2011 - 2014.

Figure 1: Histogram of Offer Price – 52 week high price

Figure 1 presents the histogram of the difference between the offer price and the target's 52-week high price divided among periods 2002-2011, and 2011-2014, where *Offer Price* is the offer price from the SEBI data scaled by the 30-day lagged market price prior to the public announcement and *52-WHPrice* is the high stock price of the target firm over 335 calendar days ending 30 days prior to the announcement date, scaled by the 30-day lagged market price prior to the public announcement. The difference is expressed in percentage terms.

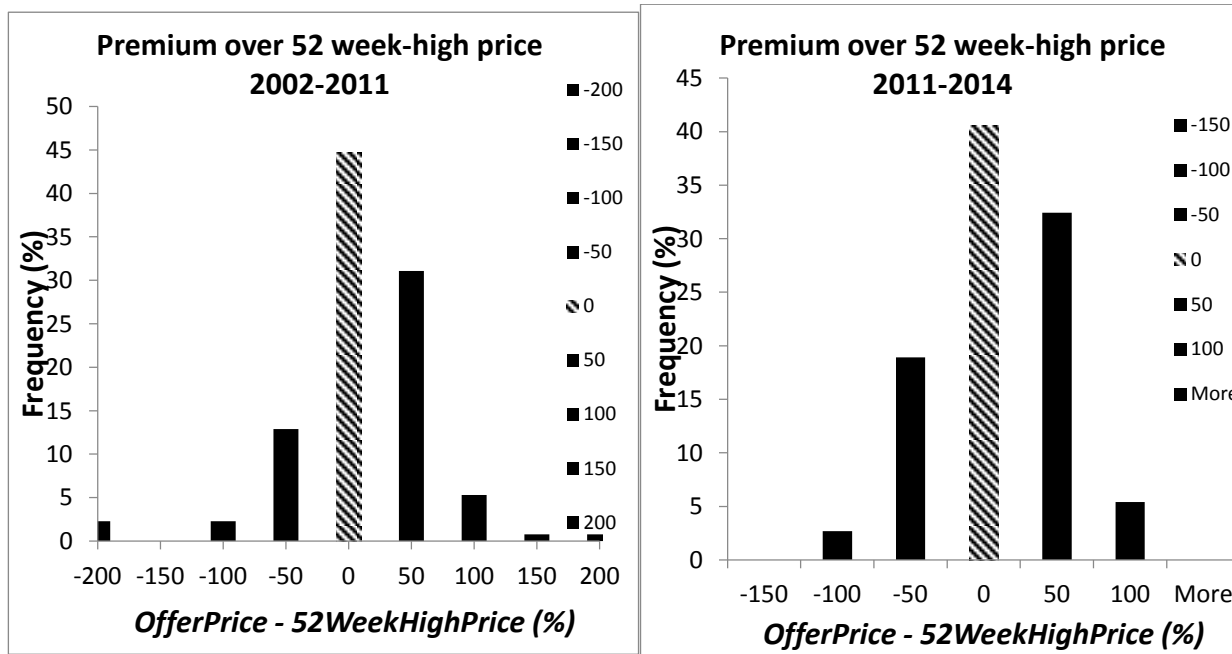**Figure 2: Histogram of Offer Premium for 26 week high price and 60-day high price**
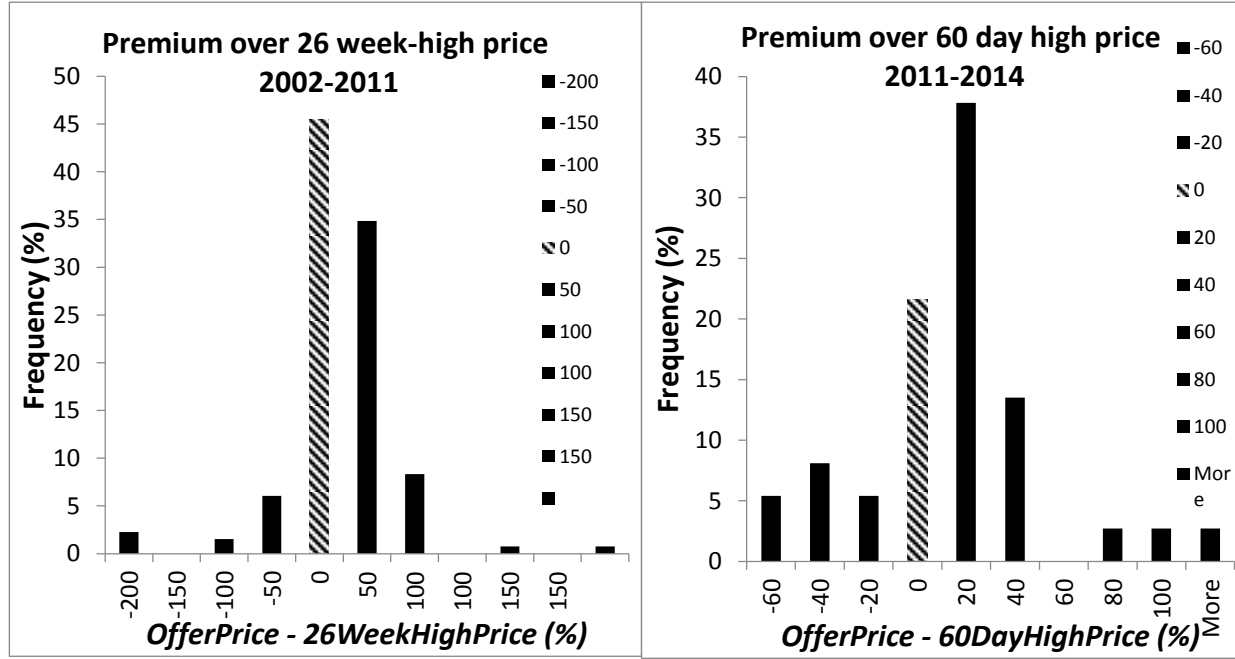
Figure 2 presents histograms of the difference between the offer price and the target's 26-week high price for the period 2002-2011, and the difference between the offer price and the target's 60-day high price for the period 2011-2014, where *Offer Price* is the offer price from the SEBI data scaled by the 30-day lagged market price prior to the public announcement. The *26-WeekHighPrice* is the high stock price of the target firm over 150 calendar days ending 30 days prior to the announcement date, scaled by the 30-day lagged market price prior to the public announcement. The *60-dayHighPrice* is the high stock price of the target firm over 30 calendar days ending 30 days prior to the announcement date, scaled by the 30-day lagged market price 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 equal to the peak price. The distribution graphically confirms a high level of anchoring around the peak prices, especially the 52-week high price and the 26-week high price. One could contend that since the 26 week high price is one of the parameters stipulated by the SEBI SAST Regulations, 2002 for determining the minimum offer price, there appears a strong anchoring towards it. However, it does not seem the same for the 60-day high price, which could be due to smaller sample of data. The histograms show that around 44% of the offer prices are almost equal to the 52-week high price for the period ranging from 2002 – 2014, 60% of the offer prices are equal to the 26-week high price for the period 2002-2011, while 22% of the offer price equals the 60-day high price for the period 2011 – 2014.

Table 3 gives the descriptive statistics of the histograms for the 52-week high price, 26-week high price and the 60-day high price as shown in Figures 1 and 2, respectively. The data shows that there are 64 (38%) firms with offer price above the 52 week high price, while 105 (62%) firms with offer price below the 52 week high price, of which around 44% the offer price almost equals the 52 week high peak price. For the 26-week peak price data, around 60% of the firms the offer price equals the peak price, while 59% of the firms the offer price exceed the 60 day high price for the period 2011 – 2014. The mode-bin of the distribution for the 52-week high price and 26-week high price is at 0, indicating a higher number of firms close to the respective peak prices, while the mode-bin is at 20 for the 60-day high price. The distributions pertaining to the 52 week high price and the 26 week high price show a negative skew, indicating the strength of the negative premium over the 52-week (26-week) high price in the distribution. The statistics also indicate that for 61% of the data, the 52-week high price equals 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 (2002-2014)	26-WHPrice (2002-2011)	60-DHPrice (2011-2014)
No. of Firms below peak prices	18 %	13 %	19 %
No. of Firms almost equal to peak prices	44 %	60 %	22 %
No. of Firms above peak prices	38 %	59 %	59 %
Total Firms	169	132	37
Mean	-15.01	-5.61	2.26
Standard Deviation	53.90	53.54	36.81
Skewness	-0.85	-1.38	0.42
Mode-bin	0	0	20
No. of Firms with 52-WHP > Peak Price	-	39% (51 firms)	73% (27 firms)
No. of Firms with 52-WHP = Peak Price	-	61% (81 firms)	27% (10 firms)

4.4   Regulatory Proxy

The reference price effect 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 and 2011 stipulate a list of factors that need to be considered while determining the minimum offer price (details in Section 2.2). Since the SEBI SAST Regulations 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 identify the relevant regulatory parameters from the letter of offers that pertains to the SEBI SAST Regulations for 2002 and 2011, and control for that regulatory price in the regression analysis. The regulatory proxy captures the effects of regulation on the offer premium. The regulatory proxy is based on highest of market and non-market factors that includes negotiated and past acquisition prices of the target's stocks. A positive coefficient of the regulatory proxy would imply higher the prices in the regulation, higher will be the offer premium. The regulatory proxy is further scaled by the 30-day lagged market price in order to obtain returns over the market price and also to remove potential heteroskedasticity. Since the regulation lists market as well as non-market prices, we include a dummy to capture whether the regulatory proxy is specifically a market price. The dummy (regulatory proxy) takes a value 1 when regulatory proxy is equal to the market price and 0 elsewhere. As discussed in Section 2.2, the regulation on offer price is based on the market price, i.e. the average 26

week (or 2 week) high in case of SAST 2002 and the 60 day high in case of SAST 2011. As per the regulation, the offer price should be based on the highest of the different components. The dummy as described above captures whether this highest price is based on a market price and or non market price. A positive (negative) sign of the coefficient of the dummy would imply that the offer price based on market price would yield higher (lower) offer premium. Further, we also introduce a dummy to capture change in SAST regulation in 2011. This dummy takes a value 1 if the public announcement of the deal occurs post November 2011 and zero if the public announcement date is before November 2011. The dummy is defined to capture whether change in regulation has any impact on the offer premium. A positive (negative) sign would mean the 2011 SAST changes yield a higher (lower) offer premium.

4.5   Reference Price Premium

Table 1 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 capture the positive and negative premium 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 introduce an interaction term where the premium dummy is interacted with the scaled 52-week high price in order to capture the asymmetry in anchoring. However the inclusion of the premium dummy as well as the interaction term could infuse an endogenity problem since the premium dummy and consequently the interaction term are based on information of the offer premium itself. As shown in Table 2, the interaction term was highly correlated with the scaled 52-week high reference price. Hence, in the regression analysis, we present results by including and excluding the interaction term, as well as dividing the datasets into positive and negative premiums.

4.6 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 success. The distribution of the deals across years is shown in Figure 3. We find that the announcement of deals is on average higher for the period 2005–2008, with a peak in 2007, corresponding to the SAST Regulation period of 2002 to 2011. Post 2011 period which signifies the changed SAST Regulation, there is a peak at 2012, though lesser than 2007. The acquirers of the deal involve individuals and private firms as well as multiple acquirers. 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 Announcement Years
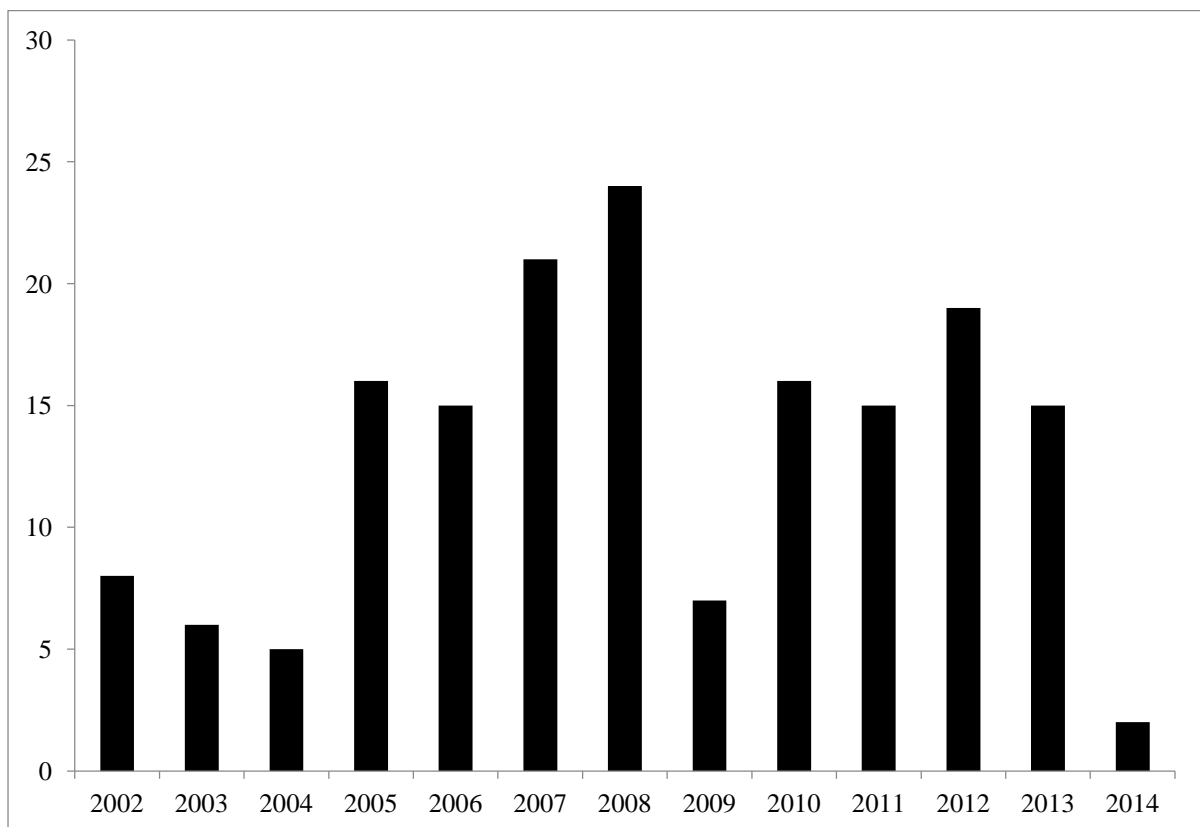
The acquisition of shares through an open offer involves the transfer of shares and voting rights. Hence, the objectives of an offer are divided into three categories, namely, change in control, consolidation of holdings, and substantial acquisition. Change in control involves a change in voting rights 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 1 shows that among the 169 deals that were considered, 50 deals were made with the objective of consolidation, 34 deals were made with the objective of substantial acquisition, and 85 deals involved change of control.

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 both consolidation of holdings and substantial acquisitions along with the change of control. We include substantial acquisition deals since most of the substantial acquisition cases involved PACs as the acquirers, where the total number of shares acquired by them is equivalent to the number leading to a change in control, but individually, each individual or entity is 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. The inclusion of consolidation of holdings is mainly to avoid further loss of data given the smallness of our sample. As we will discuss later, inclusion and exclusion of deals with consolidation of holdings do not change our results in general.

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, we have information about the deal completion status of 109 deals since post 2010, the SEBI website has stopped giving information about the status of the deals. Of the 109 deals there are only 5 deals which are not completed. Due to non-availability of information of the deal completion for the entire sample, we are unable to consider this as an independent variable in our

analysis. However, given the high number of successful/completed deals in our sample, we can assume that this variable may not have a significant effect on the offer premium.

4.7   Firm Specific Effects

The dataset consists 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 include the logarithm of market capitalisation for target firms in the analysis. To control for firm specific effects, we also include PE and PB estimates of the target firm in the regression analysis.

4.8   Market Specific Effects

To control for market volatility, we calculate 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 is intended to ease any upward rumours or the effect of new information on the market index.

5   Results

The analysis in the previous section establishes the salience of the 52 week high price along with the other factors while determining the offer price, such as, the regulatory proxy which is a price mandated in the SEBI (SAST) Regulations 2002 and 2011, whether the regulatory proxy is a market price, change in SAST regulation in 2011, premium over the 52 week high price, the objectives of the deal, market capitalisation, PE, PB and Sensex returns. Following Baker et al. (2012), we examine the hypothesis that the target's 52-week high price influences the determination of the offer price through an econometric analysis.

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

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

where $\ln(OfferPremium_{it})$ is the logarithm of the offer price scaled by the target's 30 calendar days' lagged market price prior to the announcement date; $\ln(52WHPrice_{i,t-30})$ is the logarithm of the target's 52-week high price taken 30 days prior to the announcement

date, which is also scaled by the target's 30 calendar days' lagged market price prior to the announcement date.

The regression equation is further augmented by including controls that are important while determining the offer price. These control factors include a 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) expressed through dummy variables. We also included the market capitalisation, PE, PB ratios of the target, Sensex returns, a regulatory proxy which is a price mandated in the SEBI (SAST) Regulations 2002 and 2011, whether the regulatory proxy is a market price and effects of change in SAST regulation in 2011.

$$\ln(OfferPremium_{it}) = \ln(a) + b\ln(52WHPrice_{i,t-30}) + c52WHPremium + d\ln(52WHPrice_{i,t-30}) \times Premium + esubstantial + fconsolidation + g\ln(marcap) + hPE + iPB + jsensex + kreg + lreg\_marketprice + mSAST2011 \tag{2}$$

In Equation (2), $OfferPremium_{it}$ is the logarithm of the offer price scaled by the target's 30-day lagged market price; $52WHPrice_{i,t-30}$ is the logarithm of the target's 52-week high price taken 30 days prior to the announcement date, scaled by the 30 day lagged market price; 52WH*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; $\ln(52WHPrice_{i,t-30}) \times 52WHPremium$ is an interaction between the 52 week high price and the premium dummy; *substantial* is the dummy variable for substantial acquisition and *change of control* is the control group; *consolidation* is the dummy variable for consolidation and *change of control* is the control group; $ln(marcap)$ refers to the logarithm of the market capitalisation of the target company; *PE and PB* are firm specific measures of the target firm's stock; *Sensex* is the market return; and *reg* is the regulatory proxy for mandated prices in the SEBI (SAST) Regulations; $reg\_marketprice$ is a dummy that takes the value 0 if the regulatory proxy is not a market price, else 1; and $SAST2011$ is a dummy to capture the change in regulation in 2011 (October). Since SEBI-mandated minimum offer price is a function of various other peak prices, i.e. average of the weekly (daily) high and low of the closing prices during the 26 weeks (two weeks) preceding the date of public announcement (whichever is higher) in SEBI (SAST) 2002, and the volume-weighted average market price for a period of sixty trading days immediately preceding the date of the public announcement, in SEBI (SAST) 2011. We replace the 52-week high price with the other peak prices, i.e. 26-

week high, two-week high and the 60-day high, to understand the effects of regulation induced anchoring on the offer premium. Hence the model to capture this phenomenon is explained in Equation (3).

$$\ln(OfferPremium_{it}) = \ln(a) + b\ln(RegPrice_{i,t-30}) + c\,substantial + d\,consolidation + e\ln(marcap) + f\,PE + g\,PB + h\,sensex + i\,reg + j\,reg\_marketprice + k\,SAST2011 \tag{3}$$

In equation (3), $RegPrice_{i,t-30}$ are the prices that have a reference in the regulation, defined as, *26-week high price* which is the logarithm of the target's 26-week high price taken 30 days prior to the announcement date, scaled by the 30 day lagged market price; *2-week high price* is the logarithm of the target's 2-week high price, scaled by the 30 day lagged market price; and 60-day high price is the logarithm of the target's 60-week high price taken 30 days prior to the announcement date, scaled by the 30 day lagged market price. The other variables are the same as explained above. The results are given in Table 4a and 4b, and discussed in the following sections.

In the multivariate analysis, we consider the effect of the 52 week high closing price on the offer premium. The return from offer price i.e. the offer premium, and the 52 week high price are scaled by the 30-day lagged (and 30-60 day lagged[4]) market price. We control for firm characteristics captured by market capitalization, PE and PB; deal characteristics like the objectives of the acquisition. We also control for SEBI (SAST) regulation by including a regulatory proxy, whether the regulatory proxy is based on market price, and the effect of change in SAST regulation in 2011. To control for market specific effects, we consider Sensex returns for 30 day lagged period prior to the public announcement date. Further to understand the effects of regulation induced anchoring, we analyse the effect of 26-week high, two-week high and the 60-day high prices on the offer premium.

The results are given in Table 4a and 4b. In column 1 we consider the 52 week high price, the firm and market specific factors as independent variable. We also include a dummy to control for the fact whether the offer price is higher or lower than the 52 week high price. The results suggest that the 52 week high price has a positive and significant effect on the offer premium. The premium dummy has a negative and significant effect, suggesting that the offer premium is higher when the offer price is greater than the 52 week high price, than when it is lower

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[4] We also perform the analysis using the 30-60 day lagged market price (See section 4.1 for discussion). However, we do not find any drastic changes in the results discussed above, hence we would be glad to share the results specific to 30-60 day lagged market price on request.

than the 52 week high price. This may not be surprising since higher the offer price, higher is the offer premium. However, to test if anchoring is stronger when the offer price is above the reference price, in column 2, we add an interaction term between the 52 week high price and the premium dummy. The results remain same with the interaction term turning out to be positive and significant, implying that anchoring is stronger when the offer price is greater 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. The controls for the objective of acquisition suggest that the offer premium is significantly higher in case of change in control. Among firm specific characteristics of the target firm, we find the offer premium significantly reduces with increase in PE values, this implies that firms with higher PE are perceived to be overvalued by the acquirer and hence the offer premium turns out to be lesser. The market capitalization and PB do not seem to have any significant effect on the offer premium. With respect to market specific characteristics, the results denote that offer premium is less as returns on Sensex increases.

In column 3, we introduce the regulatory proxy which is a price mandated in the SEBI (SAST) Regulations 2002 and 2011. Since the regulatory proxy includes market as well as non-market prices, we introduce a dummy capturing whether the regulatory proxy is based on the market price and a time dummy capturing the impact of change in regulation in October 2011. The results show that the regulatory proxy is positive and significant, implying that there is an anchoring of the offer price around the regulatory proxy. The 52 week high price is still significant suggesting that even in the presence of regulatory proxy there is prevalence of anchoring to 52 week high price. The dummy variable capturing whether regulatory proxy is based on market or non-market price appears negative and significant, suggesting that when the regulatory proxy is a market price, it reduces the offer premium. Further, the change in SAST regulation in 2011, does not have any significant effect on the offer premium.

One of the problems with the exercise as discussed above is that the premium dummy is significantly correlated with the 52 week high price and the variable itself has an endogenity effect. Thus, we divide the data into two separate subsamples, on the basis of whether the offer price is higher or lower than the 52 week high price known as positive premium or negative premium, indicated in column 4 and 5. The results show that in case of positive premium, the 52 week high price is positive and significant, however in case of negative premium, the 52 week high price although positive is not significant (at 1% levels). This is

consistent with our univariate analysis and also with Baker et al. (2012) paper which only considers the effect of positive premium prices. Though this may be a solution to the endogenity problem in model, the sample size of firms in the positive and negative premium subset reduces considerably, however the effort is indicative of the fact that there is an anchoring to the 52 week high price, specifically when it is higher than the offer price.

The definition of mergers and acquisitions in Baker et al. (2012) does not include consolidation of holdings where an entity increases stake in a company. Hence, we repeat the analysis by removing acquisitions whose objective is consolidation, and we focus on deals that are termed as change in control or substantial, indicative in column 6. The results remain the same, however only Sensex becomes significant.

The results show that there is a 52 week high reference price effect as in Baker et al. (2012) in the presence of a regulatory framework, more strongly in case where offer price is greater than the 52 week high price. While there is an anchoring to the regulatory proxy which is obvious since it sets the floor for the determination of the offer price, incremental changes in the regulation does not have any effect. Since the regulatory proxy includes other peak market prices, i.e. 26-week high, two-week high and the 60-day high, the natural question then arises whether the regulation itself induces anchoring. Hence, in the next section (Table 4b) we further analyze the effect of other peak prices mentioned in regulation, i.e. 26-week high, two-week high and 60-day high prices, and their effect on the offer premium. As positive and negative premium has proved to be an important factor driving the offer premium, we present the results for the complete dataset (Full data), as well as dividing the data into positive (if peak price > offer price) and negative premium (if peak price < offer price). However, we do not divide the data based on the period of regulation, since it would further lead to loss of observations, and the endeavour is to broadly understand the persistence of anchoring to the prices mentioned in the regulation. Another important caveat to be noted here is that each of these peak prices are subset of others, i.e. the 60 week high price is a subset of the 26 high week price, which is further a subset of the 52 week high price. However, this is not the case for the two week price since we do not lag that variable. Therefore, it may be interesting to recognise whether the effect of the 52 week high price, as a reference price, on the offer premium, is due to peak prices mentioned in the regulation, which are subsets of the 52 week high prices. Therefore, we also include in the analysis a dummy variable (52whpdummy) that indicates if the 52 week high price is greater than the

regulation induced peak prices, so that we can draw inferences on whether the 52 week high reference effect persists even after controlling for regulation induced anchoring.

The results in Table 4b clearly show a positive and significant effect of the regulatory peak prices on offer premium especially when the peak prices are higher than the offer price. In particular, for the 26 week and 60 day high prices, while the full sample doesn't show any significant effect, the positive premium indicates an impact. As mentioned earlier, the 26 week high and sixty day high prices are subsets of the 52 week high prices and the data shows that out of 169 observations in our data set there 105 cases when the 52 week high price is either equal to 26 week high price (97 cases) or equal to the sixty day high price (8 cases). Then the question arises whether anchoring to the 52 week high price is a consequence of anchoring to the 26 week high and sixty day high prices only. To capture this, we try to consider the effect of the 52 week high price on the offer premium after controlling for the regulation induced anchoring by introducing the 52whpdummy as defined above. We find that the dummy is positive and significant across all samples (full, positive and negative), while the 52 week high price is significant only for the positive premium sample. The significance of the dummy indicates that the offer premium is higher when the 52 week high price is greater than the other peak prices, i.e. 26 week high and 60 week high price. However, only in case of the positive premium sample (offer price > 52 week high price), the 52 week high price has a persistent effect on offer premium over and above the regulation induced anchoring. However it should be noted that the *52whpdummy* captures only that part of the regulation which is a subset of the 52 week high price. As discussed, the SAST 2002 regulation also comprises of a 2 week high price which particularly is not a subset of the 52 week high price. In Table 4c, Column 1, 2, 3 shows results for the 2 week high price. The results indicate that there is anchoring to 2 week high price for the full sample and the positive premium sample. Next, we analyze whether the reference to the 52 week high price persists when we consider the effect of the 2 week high price. The results show that the 52 week high price has a persistent effect in all three samples, but the dummy which controls for the two week effect is not significant. Interestingly, the two week prices are very close to the announcement date and best reflects the current state of the firm, which could perhaps have been the reason for SEBI to include 2 week market price as part of the regulation. At the same time, it might be contaminated by the information effect of the announcement which may or may not result in higher prices, depending on how the market perceives the acquisition. However, in the current sample there are 120 cases, where the 52 week price is

greater than the 2 week high price of which 56 cases are such where the 52 week high price equals the 26 high price and in the rest 64 cases, the 52 week high price is higher than the 26 week high price. This is indicative of two things. Firstly, the announcement effect does not seem to increase the price of the target stock much, this could be because the information on announcement does not reach the market or the market does not perceive the acquisition optimistically. Secondly, anchoring to 52 week high price is yielding higher price to the investor as compared to the regulatory price, although it does not quite reflect the current state of the firm and is in fact an irrelevant historical price. Whether this higher price yields better return for the investors can be validated only with a post-acquisition performance study which is beyond the scope of the current study.

6   Conclusion

The paper attempts to determine if the offer price is subject to the 52 week high reference price effect for mergers and acquisitions (tender offers) in India, as discussed by Baker et al. (2012). The rationale for the 52 week high as a psychological anchor is due to its' wide publicity in the financial press that is common across stakeholders. However, there are regulatory differences between the U.S. markets and India, specifically since the SEBI mandates a minimum offer price which also includes various other historical peak market prices, i.e. 26 week (or two week), and 60 day high price according to SEBI (SAST) 2002 and 2012. Therefore, this study is a relevant contribution to the literature on reference price effect pertaining to takeover activity, since we evaluate the effect of the 52 week high psychological anchor while controlling for regulatory actions that might serve as an alternative non-psychological explanation to the anchoring paradigm. We consider for the following factors in the analysis, such as, a regulatory proxy which is a price mandated in the SEBI (SAST) Regulations 2002 and 2011, whether the regulatory proxy is a market price, effect of change in SAST regulation in 2011, premium over the 52 week high price, deal characteristics indicated by the objectives of the deal, firm specific factors such as market capitalisation, PE and PB, and Sensex returns as a control for market specific effects. The period of study is from 2002 to 2014, accounting for the change in SAST regulation in 2011, resulting in 169 completed tender offer deals, due to numerous illiquid target firms as defined in SEBI (SAST) regulation.

The results clearly establish the salience of the 52 week high price as a psychological reference price, even in the light of regulatory requirements in India. Specifically, the

anchoring is stronger and significant for deals when the offer price is greater than the 52 week high price. This may 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 higher than the 52 week high price. An important phenomenon unique to India is the SEBI regulation which sets the floor for determination of the offer price for M&A deals. It is worthy to note that the regulation consists of market as well as non-market prices that determine the minimum offer price. The results of the study suggests that the effect on the offer premium is significant for market based regulatory prices, however, only when the offer price is greater than the 52 week high price. Anchoring to the regulatory prices may seem apparent, however the study attempts to understand the interaction of the regulatory environment on the 52 week high reference price. This is because the regulation makes a reference to other peak market prices, i.e. 26-week high and the 60-day high price, which is a subset of the popular reference price in literature, the 52 week high price. Hence, it is important to analyse whether the 52 week high price has a persistent effect on the offer premium after controlling for the regulation induced anchoring. The results suggest that the significance of the 52-week high reference price holds even after controlling for regulation induced anchoring in the case of deals where the 52-week high price is higher than the offer price. We further reflect on the SEBI (SAST) 2002 regulation with respect to the two week price, which is not a subset of the 52 week high price. This price is important since it reflects the current state of the target firm, and could have the rumour effect. The results suggest that the 52 week high price still has a positive and significant effect on the offer premium, even after controlling for the two week effect.

These results surmise the saliency of the 52 week high price as an important psychological anchor and reference price while determining the offer premium, even after controlling for the regulatory environment. The rationale for this behaviour is described in cognitive psychology (Tversky and Kahneman, 1974) and also explained as the reference-dependence phenomenon in Prospect theory (Kahneman and Tversky, 1979). Incremental changes in the regulation in 2011 to include a more recent market price, i.e. 60 day high price, than historical market prices of the past, did not change the effect of the 52 week high price as a psychological anchor. Unfortunately, the limitations of the current study is the small sample size, especially for the period 2011 – 2014, which might affect the robustness of the models. Further we do not have data for the period without any regulation, which could have formed a control group for the study. However, we conclude that the results of this study would be relevant from a policy perspective, and also increase the significance of behavioural research

in public policy. Scope for an interesting extension of the current study would be to analyse the post-acquisition performance of the target firms which have a significant reference price effect. Such an extension could validate that the 52 week high price dominates and improves upon the forecasting power of past returns (George and Hwang, 2004).

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Appendix A

Table 1: Descriptive Statistics of the Independent and Dependent Variables

Variables	Obv.	Mean	Std. Dev.	Min	Max
offerpremium_30daylag	169	0.15	0.45	-2.45	2.18
offerpremium_60daylag	169	0.05	0.48	-2.40	2.12
52week high return_30day	169	0.30	0.35	-0.86	1.97
52week high return_60day	169	0.20	0.32	-0.89	1.89
26 week high return_30day	169	0.19	0.27	-0.86	1.97
26 week high return_60day	169	0.09	0.25	-0.89	1.89
2 week high return_30day	169	0.12	0.18	-0.31	0.90
60 day high return_30day	169	0.10	0.15	-0.19	0.83
Regulatory Proxy_30day	167	-0.08	0.81	-5.02	2.18
Regulatory Proxy_60day	167	-0.18	0.83	-5.15	2.12
Regulatory Proxy_Market Price	169	0.54	0.50	0.00	1.00
SAST2011	169	0.22	0.41	0.00	1.00
52WHPremium	169	0.62	0.49	0.00	1.00
Interaction_30day	169	-0.15	0.48	-4.56	0.94
Interaction_60day	169	-0.11	0.42	-4.38	0.84
Obj_consolidation	169	0.30	0.46	0	1
Obj_substantial	169	0.20	0.40	0	1
Deals Completed	109	0.96	0.19	0	1
Sensex Return on PA date	169	9.46	0.53	8.00	9.97
Sensex Return _30day	167	9.46	0.53	8.00	9.97
Log_MarketCap	169	7.18	2.21	1.24	14.03
PE	115	39.65	71.76	0.64	575.67
PB	162	3.19	4.10	0.27	33.47

offerpremium_30daylag is log(offer price/30 day lagged market price); *offerpremium_60daylag* is log(offer price/60 day lagged market price); *52week high return_30day* is log(30 day lagged 52-week high price/30day lagged market price); *52week high return_60day* is log(30 day lagged 52-week high price/60day lagged market price); *26 week high return_30day* is log(30 day lagged 26-week high price/30day lagged market price); *26 week high return_60day* is log(30 day lagged 26-week high price/60day lagged market price); *2 week high return_30day* is log(2-week high price/30day lagged market price); *60 day high return_30day* is log(30 day lagged 60 day high price /30day lagged market price); *Regulatory Proxy_30day* is the log(regulatory price mandated by the SEBI (SAST) Regulations as taken from the letter of offers/30day lagged market price); *Regulatory Proxy_60day* is the log(regulatory price mandated by the SEBI (SAST) Regulations as taken from the letter of offers/60day lagged market price); *Regulatory Proxy_Market Price* is a dummy variable that takes the value 0 if the regulatory proxy is not a market price among the various parameters mentioned in the SEBI (SAST) Regulations 2002 and 2011, else 1; *SAST2011* is the dummy variable to capture change in SAST regulation, which takes the value 0 for SAST 2002- 2011, and the value 1 for SAST 2011-2014; 52WH*Premium*

is a dummy variable taking value 0 if offer price > 52-week high price and 1 otherwise; *Interaction_30day is* the interaction between *52week high return_30day*and 52WH*Premium*; *Interaction_60day is* the interaction between *52week high return_60day*and 52WH*Premium*; *obj_consolidation* is a dummy variable taking the value 0 if the objectives of the offer = consolidation and 1 is change of control; *obj_substantial* is the dummy variable taking the value 0 if the objectives of the offer = substantial and 1 is change in control; *Deals Completed* is a dummy variable taking the value 0 for success of deals, and 1 otherwise; Sensex Return on PA date is the log(Sensex returns on the date of public announcement); *Sensex Return_30day* is log(Sensex on PA date/Sensex 30-day lagged); *Log_MarketCap* is log(Market capitalisation of target stock); *PE and PB* are Price to Equity and Price to Book ratios of the target stock;

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 14	Var 15	Var 16	Var 17	Var 18
Var 1	1.00																	
Var 2	0.01	1.00																
Var 3	-0.50	0.39	1.00															
Var 4	0.32	-0.73	-0.27	1.00														
Var 5	0.01	0.79	0.26	-0.73	1.00													
Var 6	0.40	-0.02	-0.38	0.09	-0.02	1.00												
Var 7	0.00	0.36	0.26	-0.07	0.39	-0.07	1.00											
Var 8	-0.14	0.13	-0.03	-0.17	0.06	-0.02	0.07	1.00										
Var 9	-0.05	-0.05	0.10	0.07	-0.04	-0.06	-0.06	-0.37	1.00									
Var 10	-0.27	0.02	0.18	-0.10	-0.11	-0.22	-0.04	0.07	0.00	1.00								
Var 11	0.03	-0.16	-0.21	-0.03	-0.06	0.10	-0.11	0.08	0.07	-0.02	1.00							
Var 12	-0.23	0.00	-0.04	-0.05	0.03	0.07	-0.02	-0.03	-0.16	0.04	-0.14	1.00						
Var 13	-0.12	-0.10	-0.11	-0.09	0.02	0.13	-0.02	-0.01	-0.02	-0.02	0.36	0.14	1.00					
Var 14	0.54	-0.16	-0.28	0.27	0.00	0.24	-0.14	-0.08	0.08	-0.19	0.02	-0.08	-0.06	1.00				
Var 15	0.01	0.01	-0.05	0.02	-0.13	-0.10	-0.08	0.12	0.18	0.38	0.05	-0.12	-0.04	0.08	1.00			
Var 16	-0.15	0.00	0.07	0.10	0.06	-0.08	0.19	0.10	0.02	-0.10	0.06	0.14	0.12	0.02	-0.11	1.00		
Var 17	0.13	0.36	0.21	-0.03	0.03	-0.05	0.03	0.10	0.00	0.22	-0.09	-0.09	-0.18	-0.06	0.44	-0.17	1.00	
Var 18	-0.16	0.47	0.55	-0.18	0.34	-0.49	0.28	0.11	-0.04	0.05	-0.25	-0.01	-0.13	-0.16	-0.01	0.03	0.34	1.00

Var 1 = offerpremium_30daylag, Var 2 = 52week high return_30day, Var 3 = 26 week high return_30day, Var 4 = 2 week high return_30day, Var 5 = 60 day high return_30day, Var 6 = offer price > 52 week high price_30day, Var 7 = offerpremium_30daylag* offer price > 52 week high price_30day, Var 8 = Sensex Returns_30 day, Var 9 = Objective_consolidation, Var 10 = Objective_substantial, Var 11 = market capitalization, Var 12 = PE, Var 13 = PB, Var 14 = Regulatory Proxy_ 30 day lag, Var 15 = SAST2011, Var 16 = Regulatory Proxy = market Price, Var 17 = 52whpmpdummy, Var 18 =2whpmpdummy

Table 4a: Regression Analysis

Table 4a	Benchmark model (Col 1)	with interaction (Col 2)	with regulation (Col 3)	positive premium (Col 4)	negative premium (Col 5)	removing obj_consol (Col 6)
52week high return_60day	0.3543***	1.0274***	0.9910***	0.8139***	0.1993**	1.1923***
52WHPremium	-0.4908***	-0.4886***	-0.4065***			-0.4141***
Interaction		0.5750***	0.5289***			1.0349***
obj_consolidation	-0.2024***	-0.1660***	-0.1289***	-0.0422	-0.1649**	
obj_substantial	-0.1117	-0.1154*	-0.1142*	-0.1230	-0.1307	
logsense_3~l	-0.1040*	-0.0657	-0.0443	-0.1212*	-0.0002	-0.1079***
Market capitalization	-0.0077	0.0071	0.0106	-0.0287	0.0100	0.0123
PE	-0.0015***	-0.0013***	-0.0011***	-0.0003	-0.0027***	-0.0003
PB	-0.0112	-0.0024	0.0003	0.0146	-0.0103	0.0002
Regulatory Proxy_30day			0.1732***	0.3168***	0.1302***	0.0614*
SAST2011			-0.0325	0.0184	-0.0130	-0.0356
Regulatory Proxy = Market Price			-0.1178***	-0.0983	-0.0464	-0.1351***
Constant	1.5864***	0.9513**	0.7252*	1.6375***	0.1251	1.2364***
Adjusted R squared	0.3965	0.5962	0.7039	0.6192	0.4454	0.7843
No. of observations	112	112	111	46	65	72

Dependent Variable: *OfferPremium* defined as log (offer price/30 day lagged market price).
Independent Variables: *52week high return_30day* is log(30 day lagged 52-week high price/30day lagged market price); 52WH*Premium* is a dummy variable taking value 0 if offer price > 52-week high price and 1 otherwise; *Interaction is* the interaction between *52week high return_30day*and *OfferPremium_Dummy52*; *obj_consolidation* is a dummy variable taking the value 0 if the objectives of the offer = consolidation and 1 otherwise; *obj_substantial* is the dummy variable taking the value 0 if the objectives of the offer = substantial and 1 otherwise (the control group for both the dummies is change in control); *Sensex Return_30day* is log(Sensex on PA date/Sensex 30-day lagged); *Log_MarketCap* is log(Market capitalisation of target stock); *PE and PB* are Price to Equity and Price to Book ratios of the target stock; *Regulatory Proxy_30day* is the log(regulatory price mandated by the SEBI (SAST) Regulations as taken from the letter of offers/30day lagged market price); *SAST2011* is the dummy variable to capture change in SAST regulation, which takes the value 0 for SAST 2002- 2011, and the value 1 for SAST 2011-2014; *Regulatory Proxy_Market Price* is a dummy variable that takes the value 0 if the regulatory proxy is not a market price among the various parameters mentioned in the SEBI (SAST) Regulations 2002 and 2011, else 1. *Constant* is the intercept term. ***, **, and * implies significance at 1%, 5%, and 10% levels, respectively.

Table 4b: Regression Analysis

Table 4b	Full data_26 week highprice	Positive prem_26week highprice	Negative prem_26 week highprice	Full data_60 day highprice	Positive prem_60 day highprice	Negative prem_60dayhighprice	Full data_52week highprice	Positive prem_52week highprice	Negative prem_52week highprice
52week high return_30day							0.2083*	0.5661***	0.1659
26weekhigh return_30day	0.0262	1.2238***	0.0588						
60day high return_30day				0.3066	1.3067***	. 05081			
obj_consolida-tion	-0.1408	-0.1724**	-0.1418*	-0.1423*	-0.0893	-0.1133	-0.1477**	-0.0223	-0.1656**
obj_substan-tial	-0.1887	-0.2467**	-0.1102	-0.1841**	-0.2164***	-0.0231	-0.1944**	-0.0443	-0.1310
Sensex Return _30day	-0.1467	-0.1228*	-0.0075	-0.1448*	-0.1774	0.1026	-0.1423**	-0.1289	0.0114
Market capitalization	0.0095	-0.0204	-0.0056	0.0115	-0.0201	-0.0043	0.0103	-0.0320	0.0117
PE	-0.0010	0.0000	-0.0023***	-0.0010**	0.0000	-0.0027***	-0.0010**	-0.0005	-0.0026***
PB	-0.0079	0.0130	-0.0025	-0.0078	0.0128	-0.0056	-0.0072	0.0117	-0.0075
Regulatory Proxy_30day	0.2541***	0.1368***	0.2791***	0.2611***	0.1513***	0.2247***	0.2608***	0.3277	0.1337***
SAST2011	0.0613	0.1052	-0.0623	0.0621	0.0899	-0.1284	0.0788	-0.1315	-0.0532
Regulatory Proxy = Market	-0.0960	-0.1328*	-0.0964	-0.1110*	-0.0962	-0.0213	-0.0944	-0.0540	-0.0375

Price									
52whpdummy								0.2288***	0.0859
Constant	1.6705	1.6587***	0.3461	1.6225***	2.1241***	-0.8511	1.6352***	1.6946***	-0.0440
Adjusted R squared	0.3545	0.5339	0.55	0.4208	0.4109	0.5885	0.3699	0.6613	0.4469
No. of observations	111	56	55	111	72	39	111	46	65

Dependent Variable: *OfferPremium* defined as log (offer price/30 day lagged market price). **Independent Variables:** *26week high return_30day* is log(30 day lagged 26-week high price/30day lagged market price); *60day high return_30day* is log(30 day lagged 60 day high price/30day lagged market price); *52week high return_30day* is log(30 day lagged 52-week high price/30day lagged market price); *obj_consolidation* is a dummy variable taking the value 0 if the objectives of the offer = consolidation and 1 otherwise; *obj_substantial* is the dummy variable taking the value 0 if the objectives of the offer = substantial and 1 otherwise (the control group for both the dummies is change in control); *Sensex Return_30day* is log(Sensex on PA date/Sensex 30-day lagged); *Log_MarketCap* is log (Market capitalisation of target stock); *PE and PB* are Price to Equity and Price to Book ratios of the target stock; *Regulatory Proxy_30day* is the log(regulatory price mandated by the SEBI (SAST) Regulations as taken from the letter of offers/30day lagged market price); *SAST2011* is the dummy variable to capture change in SAST regulation, which takes the value 0 for SAST 2002- 2011, and the value 1 for SAST 2011-2014; *Regulatory Proxy_Market Price* is a dummy variable that takes the value 0 if the regulatory proxy is not a market price among the various parameters mentioned in the SEBI (SAST) Regulations 2002 and 2011, else 1; and 52whpdummy is a dummy variable which takes the value 1, if 52 week high price is greater than the 26 week high price for the period 2002 to October 2011, and if 52 week high price is greater than the 60 day high price for the period November 2011 – 2014, else 0. *Constant* is the intercept term.

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

Table 4c: Regression Analysis

Table 4c	Full data_2week highprice	Positive prem_2week highprice	Negative prem_2week highprice	Full data_52week highprice	Positive prem_52week highprice	Negative prem_52week highprice
52week high return_30day				0.2393**	0.8685***	0.1802*
2 week high return_30day	0.6887***	0.8851***	0.0042			
obj_consolidation	-0.1415**	-0.0474	-0.1651*	-0.1455**	-0.0356	-0.1621**
obj_substantial	-0.1724**	-0.1041	-0.1452	-0.1882**	-0.1126	-0.1148
Sensex Return _30day	-0.1097*	-0.2057***	-0.0105	-0.1419**	-0.1220*	0.0009
Market capitalization	0.0051	-0.0099	0.0137	0.0077	-0.0272	0.0149
PE	-0.0012***	-0.0001	-0.0025***	-0.0010**	-0.0003	-0.0027***
PB	-0.0114	-0.0009	-0.0061	-0.0074	0.0143	-0.0116
Regulatory Proxy_30day	0.2196***	0.1085**	0.2297***	0.2581***	0.3148	0.1300***
SAST2011	0.0714	0.0848	-0.0704	0.0556	0.0097	-0.0256
Regulatory Proxy = Market Price	-0.0635	0.0089	-0.0953	-0.0910	-0.1047	-0.0444
52whpdummy				-0.1219	-0.0332	0.0900
Constant	1.2739**	2.2286***	0.2970	1.663***	1.6406***	0.0039
Adjusted R squared	0.4291	0.4674	0.5149	0.3780	0.6094	0.4412
No. of observations	111	63	48	111	46	65

Dependent Variable: *OfferPremium* defined as log (offer price/30 day lagged market price). **Independent Variables:** *2 week high return_30day* is log (2-week high price/30day lagged market price); *52week high return_30day* is log(30 day lagged 52-week high price/30day lagged market price); *obj_consolidation* is a dummy variable taking the value 0 if the objectives of the offer = consolidation and 1 otherwise; *obj_substantial* is the dummy variable taking the value 0 if the objectives of the offer = substantial and 1 otherwise (the control group for both the dummies is change in control); *Sensex Return_30day* is log(Sensex on PA date/Sensex 30-day lagged); *Log_MarketCap* is log (Market capitalisation of target stock); *PE and PB* are Price to Equity and Price to Book ratios of the target stock; *Regulatory Proxy_30day* is the log(regulatory price mandated by the SEBI (SAST) Regulations as taken from the letter of offers/30day lagged market price); *SAST2011* is the dummy variable to capture change in SAST regulation, which takes the value 0 for SAST 2002- 2011, and the value 1 for SAST 2011-2014; *Regulatory Proxy_Market Price* is a dummy variable that takes the value 0 if the regulatory proxy is not a market price among the various parameters mentioned in the SEBI (SAST) Regulations 2002 and 2011, else 1; and 52whpdummy is a dummy variable which takes the value 1, if 52 week high price is greater than the 2 week high price, else 0. *Constant* is the intercept term.

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