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# The Effect of the 52 Week Low as a Reference Point on Mergers and Acquisitions

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# Abstract

Valuation of a target firm during a merger or acquisition is a complicated and subjective process. Reference points have been shown to play a key role in simplifying this process, both for acquirers and targets. Data on a company's 52-week highs and lows are readily available and ideally suited to be used as reference points in determining the value of a firm. The use of past stock prices as reference points affects the price an acquiring firm is willing to offer during a merger or acquisition. A target company's 52-week low stock price should serve as a significant reference point in determining the success or failure of a merger or acquisition. The hypothesis is strongly supported by past literature on reference points and past peak prices. Regression analysis on mergers and acquisition data confirm that the 52-week low plays a significant role in determining offer prices. This points to the valuation process not being entirely rational, and the possibility that experienced executives fall prey to biases during important processes like mergers and acquisitions.

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# 1 Introduction

During a merger or acquisition, the target firm is evaluated by the acquiring firm. This evaluation process results in the target firm receiving an offer from the acquirer. As suggested by Baker, Parker, and Wurgler (2012), there is evidence to believe that not just the past performance of the target firm serves as a reference point that affects the bid offer from the acquiring firm, but also, the maximum and minimum stock returns reached by the target firm could play a role in the offer price formulation process. Past performance of a target firm is reflected in its 52-Week High and Low stock prices. These are the highest and lowest prices that the target company's stock reached in the year before the merger or acquisition. The 52-Week Low stock price has many characteristics that make it suitable as a reference point. It is readily available and easy to compare to the current stock price. One purpose of this study is to check whether the target's 52-Week Low stock price effects the offer price formulation in mergers and acquisitions. It is important to remember that the value of acquiring a company is rationally intended to be a function of its current value, and added value from synergies due to the merging. The paper begins by covering past literature on mergers and acquisitions, reference points, how they are formed, and how they affect mergers and acquisitions. A set of regressions and specification tests is run to determine if past data on mergers and acquisitions confirm the hypothesis of the study. Finally, I will discuss the results of the regressions, the limitations of this research, and the implications for future research. The main finding of the study confirms the hypothesis, suggesting that the 52-week low is actually a reference point in mergers and acquisitions.

## 2 Literature Review

### *2.1 Mergers and Acquisitions*

The basic concept of mergers and acquisitions is the amalgamation of two separate companies, an operation accomplished through the transference or combination of ownership. Legally, there is a difference between mergers and acquisitions. During a merger, a negotiation process takes place between both parties. The outcome is a new, distinct entity. On the other hand, during an acquisition, a negotiation process does not necessarily occur. It consists mainly of an act of purchasing, which could be partial or total, resulting in an appropriation of one company's ownership by another company. Economically, this difference is not relevant as the objectives and results of the two operations are similar. There are several reasons why a firm would want to acquire or merge with another company. Roberts & Wallace (2012) identify two distinct categories into which the motivations can be classified, namely rationales and drivers. Rationales can be divided into several sub-categories depending on the objectives of a company. These sub-categories are strategic, speculative, management failure, financial necessity, and political. The same holds for drivers, which can be subdivided into need for specialist skills or resources, national and international stock markets, globalisation, national and international consolidation, diversification, industry and sector pressures, capacity reduction, vertical integration, increased management effectiveness and efficiency, new market or customer base, entrance to a growth sector or market. Concerning the effectiveness of the transaction, Jensen and Ruback (1983) reviewed the scientific literature for corporate actions and showed "that corporate takeovers generate positive gains, that target firm shareholders benefit, and that bidding firm

shareholders do not lose." Additionally, the findings of Lang et al. (1989) prove the relationship between takeover gains and managerial performances, namely "the total takeovers gain is highest for tender offer by well-managed bidders for poorly managed targets," "well-managed bidders benefit substantially from tender offers, but more so when they take over poorly managed targets," and lastly, "well-managed targets benefit less from tender offers than poorly managed targets." On the other hand, Roll (1986) argues that Jensen and Ruback's findings (1983) could be null due to a series of considerations named "Hubris Hypothesis." Firstly, Roll argues that mergers and acquisition decisions rely on the valuation of an asset already priced by the market. Secondly, an acquirer proposes an offer when his valuation exceeds the market price. However, the valuation is subjective and can be considered as a random variable. Lastly, offer premiums consist in a random error transferred from the acquirer shareholders to the target shareholders. In addition, the resulting value of the newly-formed entity is slightly decreased when compared to the sum of the individual value of the two starting entities due to the wastefulness of resources related to the transaction's execution. To consider a merger or an acquisition completed, the outcome of the negotiation process should be a bidding price with which both parties are satisfied. In this paper, when referring to whether a corporate action is successful or not, it is intended to express if the deal is executed or withdrawn. Moreover, the terms completed, successful, or executed are used interchangeably. The object of the study does not concern the effectiveness of the transaction in the short or long term. The aim is to study how prior stock price peaks and how troughs of targets influence the dynamics of the transactions of interest. Considering the offer price as a starting point, Lang et al. (1989), and Baker et al. (2012) assert that its formulation originates from an estimate of the combined value

of both entities once the deal is concluded. It is assumed an increase in the resulting entity's value is due to "cost reductions in labour or capital equipment, supply chain reliability, debt tax shields, market power, market access and expertise, improved management, internal finance, and other economic factors" (Baker et al., 2012). The gained value is then divided among the shareholders of the two starting entities according to their bargaining power, theoretically ensuring an objective offer price to the target as well as to the acquirer (Baker et al., 2012). The valuation of a company is a complicated process, and several observable and non-observable factors could affect an offer. Considering the hubris hypothesis, the reader could be induced to think that since the asset already has a market price, the valuation process should use it. However, the assessment process assumes the transaction's completion, a scenario in which the target's conditions would change drastically and possibly improve while the market price considers the target an independent entity and does not account for possible future developments. Moreover, the valuation process can be said to be random due to its intrinsic subjectivity. Different valuations of the same company conducted by different acquirers could have different results. An important driver in the process is the fit between the acquirer and the target, which, in reality, is often difficult to identify and could lead to substantial discrepancies between valuations.

## *2.2 Reference Points*

Baker, Parker, and Wurgler (2012) show that psychological and behavioural factors also play a major role in mergers and acquisitions. They stress the influence of stock price as a reference point in the formulation of offers as well as the fact that the probability that a merger will be completed increases when the offer

exceeds the target peak price of the previous year. The idea of a reference point is introduced by Markowitz (1952) and subsequently analysed in details by Kahneman and Tversky (1979b). Kahneman and Tversky, in their seminal paper on Prospect Theory, illustrate how strongly the decision-making process can be influenced by framing and comparison to a reference point. A reference point is a source of information based on which the decision is made, acting figuratively as a means to measure and to compare different options. Yockey and Kruml (2009) define it as stimuli of known attributes that are compared to similar stimuli of unknown attributes to gain information and make decisions in a situation of uncertainty. To better understand the decision-making process and the factors influencing it, it is important to understand which reference points agents choose and why, and to consider the context under which these decisions are taken. Formulation of the reference point consists of three steps. The first is to figure out what part of the stimulus is not known. The second part is to find incentives with similar characteristics within one's memory to use as a reference point. Finding such incentives will depend on experience, effort, and memory capability. The final step is to evaluate the choice, and see if it exhibits the five dimensions of reference points (Yockey & Kruml, 2009).

### *2.3 The 52 Week High*

The role of the 52-week high has assumed increasing importance in finance. The constant posting of the 52-week high with stock prices could influence agents' decision in undertaking an investment. Interviews conducted with financial experts support Benartzi & Thaler (1995) claim that investors evaluate investments using a backward horizon of approximately one year. About stock prices, the likelihood of



employees exercising their options increases when the price exceeds a maximum, set in the previous year (Heath et al., 1999), the maximum price acting as a reference point for investors who hold options. When the reference point is surpassed, the investor is more likely to exercise the option through the buying or selling of the underlying instrument (Heath et al., 1999). Supporting these results, Core and Guay (2001) conclude that a reference point is set by option holders about the stock price levels over the prior year, and there is a significant positive relation to the 52-week high. In the context of merger and acquisitions, Baker et al. (2012) concluded that past peak prices affect offer prices, bidder announcements, deal success and merger waves in which the reference point theory can provide an explanation. They plot the density of offer prices around the 52-week high, and the results show a significant peak at the 52-week high, suggesting that the 52-week high acts as a reference point for offer prices.

#### *2.4 The 52 Week Low*

Regarding the 52-week low, there is little or almost no literature about its role in the stock market or, in our case, the context of merger and acquisition. Nevertheless, Driessen et al. (2013) show the importance of both the 52-week high and low as reference points. Their findings show that stocks' beta and the volatility of returns drop when approaching these two benchmarks and race past the breakthrough. "The breakthrough results are consistent with anchoring and the investor attention hypothesis" (Driessen et al., 2013). Their findings suggest that trading activity on stocks decreases when it reaches these two points. However, our interest in this

paper relies on its proof that investors are concerned not only with the highest point reached by stock prices but also with the lowest.

## *2.5 Reference Points effect in Financial Markets*

In financial markets, we often observe that an investor is more likely to sell a winning stock and to hold on to a losing stock (Barberis & Xiong 2009). This effect was first documented by Shefrin and Statman (1985), who identified it as the disposition effect. Prospect theory, developed in a seminal paper by Kahneman and Tversky (1979a), can explain this investors' behaviour. The theory asserts that agents evaluate probabilities and money amounts differently. More precisely, the value function is concave for gains, convex for losses, steep around the reference point, and flatter the farther it goes from that point (Kahneman & Tversky 1979a). Their findings are crucial as they suggest that, without a reference point, investors cannot rationally evaluate an outcome, and the evaluation process intrinsically depends on it.

# 3 Data

## *3.1 Data Sources and Cleaning*

The data used in the analysis are collected from Thomson One Reuters. The time horizon considers all the mergers and acquisition occurred between the years 2000 and 2015. Moreover, in the study are only take under consideration those deal in which both the acquirer and target status correspond to public. Firstly, to have access to financial data of the companies. Secondly, to have more detailed information about the companies.

The first step in the cleansing process is to remove all the observations which have missing data for the 52-week high or the 52-week low. This first step creates in our data a large discrepancy in the number of completed and withdrawn deal. However, this issue results from the status of the deal, as information for completed deals are usually more detailed than for withdrawn deals.

The second step of the process consists in removing all the observations in which the target stock price four weeks before the announcement is higher than the 52-week high or lower than the 52-week low. This step is crucial as the presence of these anomalies causes a major disruption to the way we will scale our data. Moreover, it does not make logical sense for a current stock price to be higher or lower than the 52-week high or low respectively. A logical explanation could be that the data for these companies were not update correctly or there is a discrepancy in the updating of some variables compared to other.

### 3.2 Describe Data

Once finished the data cleaning process, the next step is to take a look at our data.

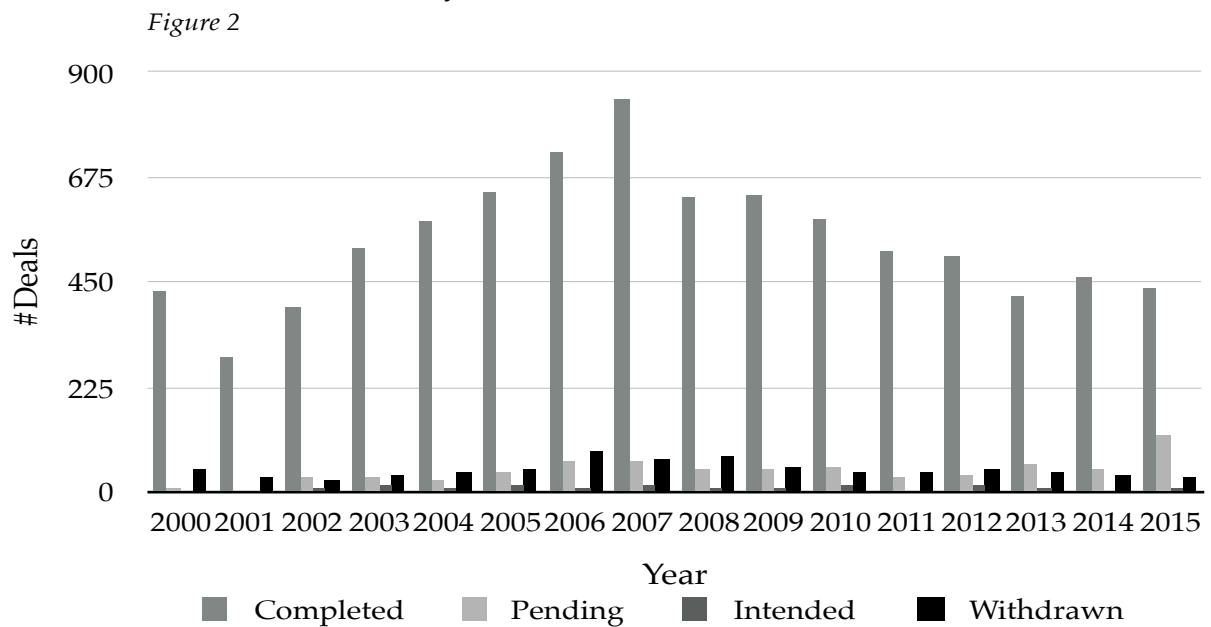
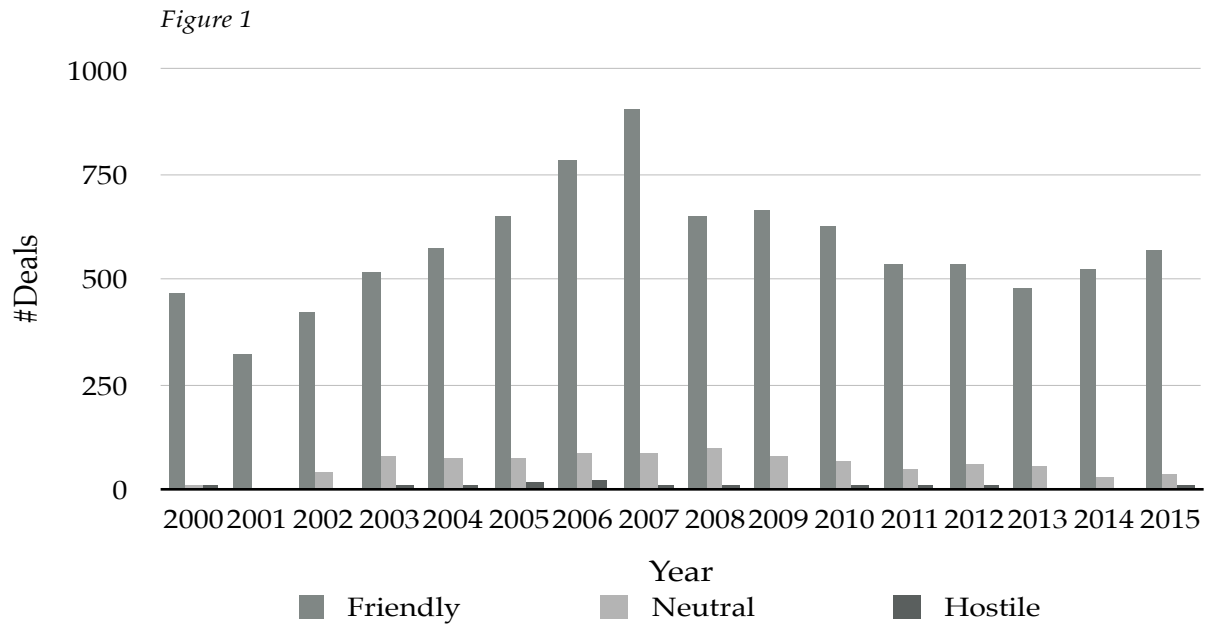
Table 1 show the number of deals by Attitude and Status per year.

**Table 1:**

The table describes the sample obtained resulting from the cleaning process. I collected 55584 deals from Thomson One Financial occurred between the 1<sup>st</sup> of January 2000 and the 31<sup>st</sup> of December 2015, where both the bidder and target are public companies. 47%, 29%, 16%, and 5% represent the percentages of Completed, Intended, Pending, and Withdrawn deals in the starting dataset. 87%, 1%, and 12% represent instead the percentages of Friendly, Hostile and Neutral deals again from the starting dataset

<i>Attitude and Status</i>								
Year	#Deals	<i>Attitude</i>			<i>Status</i>			
		Friendly	Neutral	Hostile	Completed	Pending	Intended	Withdrawn
2000	487	468	10	9	430	6	2	49
2001	327	320	3	4	290	5	0	32
2002	464	420	39	5	396	32	8	28
2003	609	520	79	10	524	34	16	35
2004	654	571	72	11	580	25	8	41
2005	745	653	74	18	645	40	12	48
2006	887	783	83	21	727	65	9	86
2007	998	903	85	10	842	65	17	74
2008	760	650	99	11	629	46	6	79
2009	746	663	79	4	636	51	6	53
2010	696	623	66	7	586	52	14	44
2011	594	536	50	8	516	32	4	42
2012	602	535	59	8	506	38	12	46
2013	533	482	51	0	422	59	11	41
2014	553	524	26	3	461	50	3	39
2015	606	567	32	7	438	125	9	34
<i>#Total</i>	10261	9218	907	136	8628	725	137	771

Figure 1 and 2 show graphically the data summarized in Table 1. Figure 1 shows the number of “Friendly”, “Neutral”, and “Hostile” deals by year. Figure 2 shows the number of “Completed”, “Pending”, “Intended”, and “Withdrawn” deals by year.



As previously mentioned, the previous table show that the percentage of Withdrawn deals is 84%, which compared to the 5% of the Completed deals is extremely high. However, when considering our starting data set the percentage of Completed, Intended, Pending and Withdrawn deals are 47%, 29%, 16% and 5% respectively.

The percentages of Completed and Withdrawn deals used in previous studies are around 70% for the former and 20% for the latter, for example Baker, Pan and Wurgler (2012) in their analysis use a sample where these percentages are 69% and 22% respectively.

However, when jointly considering the percentages of Intended and Pending deals in the starting sample, the resulting percentage correspond to 45%. It worth noticing that these deals are distributed over the whole sample time-length of 15 years. Consequently, some of them could be considered as future Withdrawn, as the farther in time the merger or acquisition was announced, the less probable is a successful outcome. In this regard, identifying a time span after which an Intended or Pending deal could be identified as Withdrawn would help to reach similar percentages as those used in previous similar studies.

After examining the sample characteristics regarding the Status and Attitude of the deals, it is of interest to investigate in which industries, over the whole sample, the mergers and acquisitions activity is more concentrated.

Table 2 shows the number of deals by industry both for target and acquirer. Moreover, the voice "Same Industry" denotes the number of deals occurred in the corresponding industry, when both target and acquirer belong to that industry.

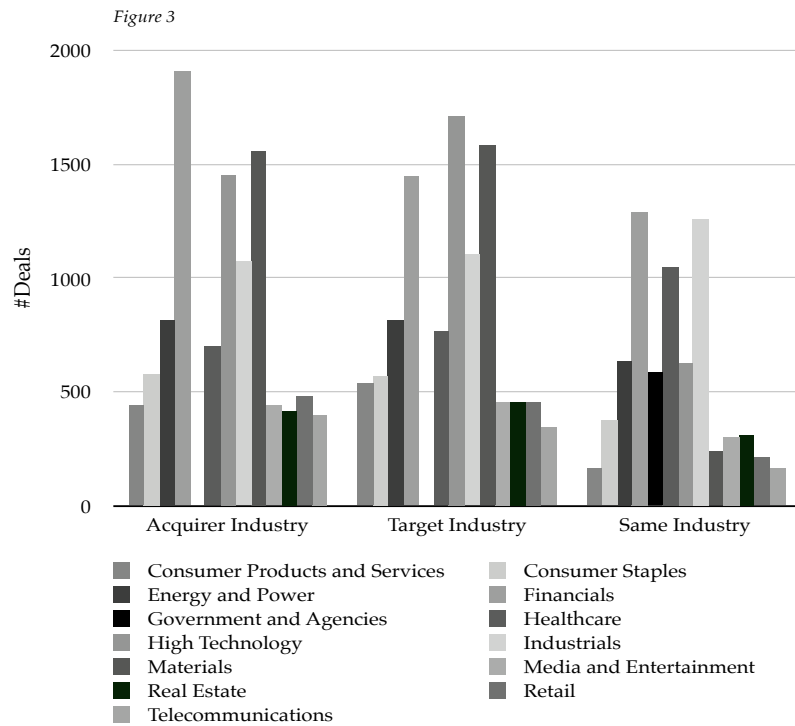
**Table 2:**

Extrapolating information from the same sample used in Table 1, the table describes the number of deals in which a firm acting as bidder or target belongs to an industry. Moreover, it represents also the number of transactions in which the bidder and the target belong to the same industry.

Industry	<i>Industry</i>		
	Acquirer Industry	Target Industry	Same Industry
<i>Consumer Products and Services</i>	440	539	168
<i>Consumer Staples</i>	580	573	374
<i>Energy and Power</i>	811	817	632
<i>Financials</i>	1906	1447	1291
<i>Government and Agencies</i>	4	2	582
<i>Healthcare</i>	697	765	1049
<i>High Technology</i>	1454	1716	627
<i>Industrials</i>	1072	1108	1258
<i>Materials</i>	1560	1584	233
<i>Media and Entertainment</i>	436	452	298
<i>Real Estate</i>	419	459	306
<i>Retail</i>	479	459	210
<i>Telecommunications</i>	403	340	168
<i>#Total</i>	10261	10261	7028

Figure 3 shows graphically the data summarized in Table 2. It is possible to notice that the sectors in which there is more mergers and acquisitions activity are the “Financials”, “High Technology”, “Industrial”, and “Material”. From the column “Same Industry”, it is possible to notice that the number of deals occurring internally in the “Industrial” sector is lower compared to the other sector in which there is more merges and acquisitions activity. This suggests that Industrial

companies acquire or are acquired more often by firms belonging from other sectors.



Another feature regarding the industry, in which we are interested, is which sector is the one where the same company, in the considered time horizon, perform more than one deal.

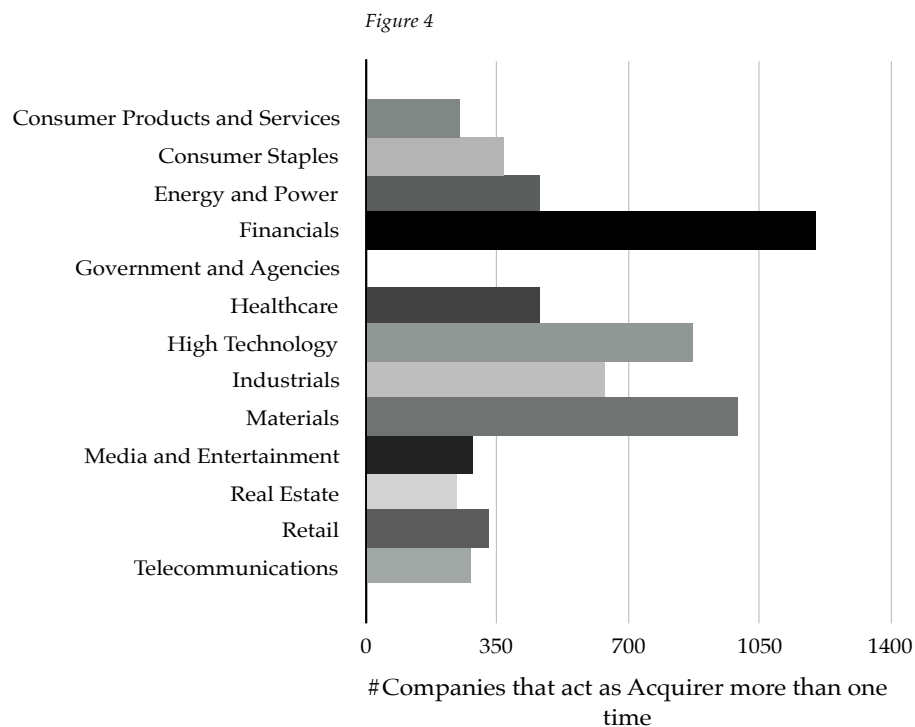
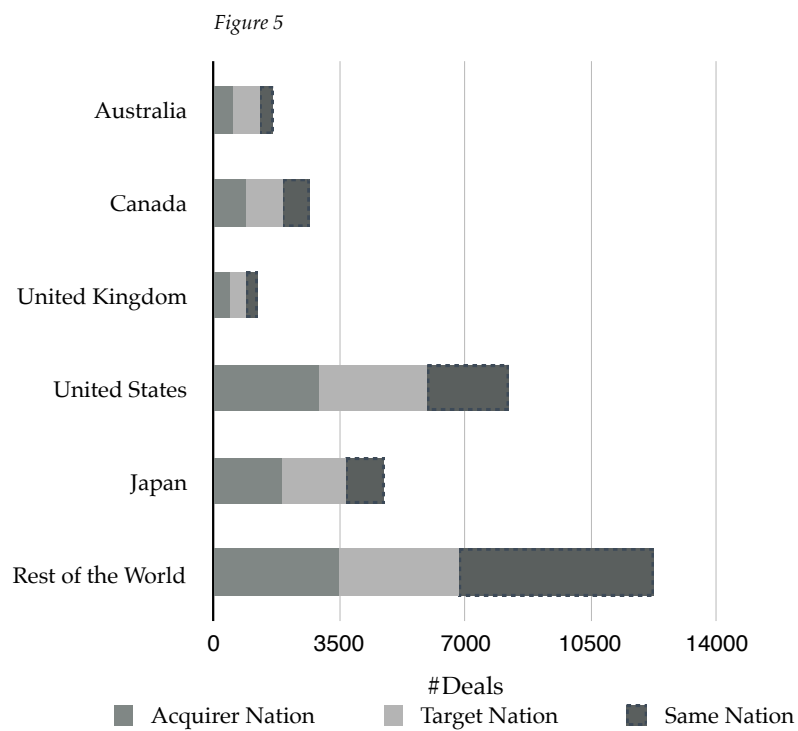




Figure 4 shows the number of companies which performed more the one deal as acquirer by sector. Also here, the “Financials”, “High Technology”, and “Materials” are those sectors where firms perform more than one deal.

Lastly, Figure 5 show in which countries merger activity is more pronounced. For simplicity the denomination “Rest of the World” include all the countries where the mergers and acquisitions activity does not reach the 5% of the total.

From the graph below, it is possible to notice that Australia, Canada, Japan, United Kingdom, and The United States of America are those countries that are more active in the mergers and acquisitions activity.



## 4 Methodology

To proceed with the methodology, a set of new variable has been created, taking the logarithm of the initial offer price, the target 52-week high, and the target 52-week low, all scaled by the target stock price four weeks before the announcement. This transformation has the purpose of normalizing the values of the initial variables. Moreover, a windsorisation process is implemented on all the financial variables at the 1st and the 99<sup>th</sup> percentiles to exclude possible outliers.

Table 3.A shows the summary statistics of the financial variables of interest for the entire samples under consideration. It was observed that from the considered 10261 observations, the mean of the natural logarithm of the offer price is 0.18 with a standard deviation of 0.43, while the mean and standard deviation for the 52-Week high variable are 0.45 and 0.54 respectively, and those for the 52-Week Low variable are -0.42 and 0.44 respectively. In addition, Table 3.B shows the same result, but subdivided for industry sector.

*Table 3.A*

In the following table are presented means, standard deviations, and extreme values for the pricing of mergers and acquisitions and control variables. Panel A shows the offer premium, the 52-week target high, and the 52-week target low. The offer premium is the offer price collected from Thomson One and expressed as a logarithmic difference from the target stock price 4 weeks before the announcement date. The 52-week target high and low are subject to the same procedure that the offer premium follows. The target stock price 4 weeks before the announcement is collected from Thomson One. Panel B shows outcome variables regarding the deal (Completed, Pending, Intended, Withdrawn). Panel C shows control variables. The Book to Market ratio, the Earning per Share ratio, as defined by Thomson One (see Appendix). The target equity and firm value expressed in logarithm terms. The acquirer attitude (Friendly, Neutral, Hostile), and the identity of the acquirer, whether is a financial institutions.

<i>Summary Statistics</i>						
<b><i>Panel A: Merger and acquisition pricing</i></b>						
	Mean	Stand. Dev.	5%	Median	95%	Windsorised
<i>Offer Premium</i>	0,18	0,43	-0,28	0,17	0,74	Yes
<i>52-Week Target High Price</i>	0,45	0,54	0,03	0,26	1,50	Yes
<i>52-Week Target Low Price</i>	-0,42	0,44	-1,19	-0,30	-0,04	Yes
<b><i>Panel B: Outcome Variables</i></b>						
<i>Completed</i>	0,84	0,36	0,00	1,00	1,00	No
<i>Pending</i>	0,07	0,25	0,00	0,00	1,00	No
<i>Intended</i>	0,01	0,11	0,00	0,00	0,00	No
<i>Withdrawn</i>	0,07	0,26	0,00	0,00	1,00	No
<b><i>Panel C: Control Variables</i></b>						
<i>Target B/M %</i>	19,52	89,31	0,05	2,70	35,96	Yes
<i>Target E/P %</i>	3,00	13,53	0,00	0,33	6,73	Yes
<i>log(Target Equity Value)</i>	5,21	2,00	2,06	5,07	8,75	Yes
<i>log(Target Firm Value)</i>	5,51	2,18	2,09	5,39	9,35	Yes
<i>Friendly</i>	0,89	0,30	0,00	1,00	1,00	No
<i>Neutral</i>	0,08	0,28	0,00	0,00	1,00	No
<i>Hostile</i>	0,01	0,11	0,00	0,00	1,00	No
<i>Financial Buyer</i>	0,18	0,38	0,00	0,00	1,00	No
<i># Obs</i>	10261					

**Table 3.B**

The following table show the means and standard deviations of the offer premium, 52-weeks target high, and 52-weeks target low per each individual industry. The variables are expressed in the same way as in Table 3.A

<b>Summary Statistics by Industry</b>							
<b>Panel A</b>	Consumer Products and Services		Consumer Staples		Energy and Power		
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	
	Offer Premium	0,23	0,47	0,18	0,42	0,16	0,33
	52-Week Target High Price	0,44	0,52	0,33	0,37	0,42	0,50
	52-Week Target Low Price	-0,41	0,45	-0,37	0,38	-0,44	0,44
# Obs	440		580		811		
<b>Panel B</b>	Financials		Healthcare		High Technology		
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	
	Offer Premium	0,15	0,44	0,29	0,37	0,22	0,41
	52-Week Target High Price	0,39	0,54	0,45	0,49	0,58	0,66
	52-Week Target Low Price	-0,36	0,41	-0,42	0,40	-0,43	0,39
# Obs	1906		697		1454		
<b>Panel C</b>	Industrials		Materials		Media&Entertainment		
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	
	Offer Premium	0,17	0,40	0,19	0,46	0,14	0,48
	52-Week Target High Price	0,36	0,39	0,53	0,53	0,49	0,64
	52-Week Target Low Price	-0,39	0,42	-0,52	0,52	-0,41	0,39
# Obs	1072		1560		436		
<b>Panel D</b>	Real Estate		Retail		Telecommunication		
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	
	Offer Premium	0,11	0,52	0,11	0,33	0,19	0,46
	52-Week Target High Price	0,32	0,44	0,40	0,54	0,52	0,65
	52-Week Target Low Price	-0,34	0,36	-0,35	0,45	-0,50	0,64
# Obs	419		479		421		

## 4.1 Regression Estimates – Specification 1

A first regression estimate is run using the following specification:

$$\begin{aligned} OfferPremium_{it} = & \beta_1 52WeekHigh_{it} + \beta_2 52WeekLow_{it} + \beta_3 52WeekHigh_{it}^2 + \beta_4 52WeekLow_{it}^2 \\ & + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \epsilon_i \end{aligned}$$

Where  $D_t$  denotes a vector of dummies indicating if acquirer and target are in the same nation and in the same country.  $F_i$  denotes a vector including the Book to market, Earnings per Share, Equity value, Firm size of the target firm  $i$ .  $S_i$  denotes a vector of dummies for each categorical value of the variable Status.  $A_i$  denotes a vector of dummies for each categorical value of the variable Attitude.  $X_i$  denotes a vector including dummy of the year, acquirer industry, target industry, a dummy variable assuming value 1 if acquirer and target are in the same industry and 0 otherwise, a dummy variable assuming value 1 if acquirer and target are in the same country and 0 otherwise, a dummy variable assuming value 1 if a target has been target more than once and 0 otherwise, a dummy assuming value 1 if an acquirer (target) has been acquirer (target) more than once and 0 otherwise, a dummy variable assuming value 1 if an acquirer (target) has been a target (acquirer) in another deal and 0 otherwise .

Table 4.A below shows the results for the regression run on the whole sample considered, using specification (1) formula. From Table 4.A Panel A, it is observed that the coefficients of the variables of interest are significantly different from 0 at the 0.01 level of significance. Nevertheless, the regression diagnostic testing presented in Table 4.A Panel B, based on the p-values of the tests (Breusch-Pagan and Ramsey Reset) for Heteroscedasticity and Specification test respectively which are less than the conventional level of significance of 5%. The results a substantial

presence of heteroskedasticity. Furthermore, the model suffers from misspecification; for this reason and in order to correctly interpret the coefficients, remedial measures need to be taken. To deal with the problem of heteroskedasticity, another regression model is fitted using not only robust standard errors, but clustering the standard errors on the variable, "Years". The reason for this adjustment is dictated by the fact that the volatility of offer price could depend on different state of the economy evolving through distinct years. The state of the economy or macroeconomic factors could influence the economy as a whole, having as a consequence also an impact on the offer price in the mergers and acquisitions.

**Table 4.A**

Panel A reports the estimated coefficients from the model:

$OfferPremium_{it} = \beta_1 52WeekHigh_{it} + \beta_2 52Weeklow_{it} + \beta_3 52WeekHigh_{it}^2 + \beta_4 52WeekLow_{it}^2 + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \epsilon_i$ . However, from the results presented are excluded those for the outcomes variables dummies due to their insignificance. The voice Year effect denotes the inclusion of a set of dummies variables for each year taken under analysis. The voice Industry effect denotes, instead the inclusion of a set of industries dummies variables both for the acquired and target. The voice Country and Global Economy Trends Effect denotes the inclusion of trends indexes indicators both for the acquirer and target nations. Additionally, a set of four variables denoting if the acquirer (target) acts as acquirer (target) more than one time or switch from being acquirer (target) to target (acquirer), on the whole sample considered, are included in the analysis, but presented in the results only when significant. Panel B reports the results for the regression diagnostics test about heteroskedasticity and specification test (Ramsey RESET test)

**Table 4.A**  
**Feedback from the target's 52-Week High and Low to the Offer Premium**

<b>Regression</b>		
<b>Panel A: Offer Premium</b>		
	<b>Coefficients</b>	<b>t-stat</b>
52-Week Target High Price	0,15**	8,98
52-Week Target Low Price	0,13**	8,01
52-Week Target High Price Squared	-0,02**	-5,27
52-Week Target Low Price Squared	0,02**	4,58
Target B/M %	0,00	1,48
Target E/P %	-0,23**	-4,25
log(Target Equity Value)	0,07**	15,63
log(Target Firm Value)	-0,5**	-12,25
Same Nation	-0,05**	-5,42
Same Industry	0,03**	3,34
Friendly	-0,11**	-3,02
Neutral	-0,17**	-4,29
Year Effect	Yes	
Industry Effect	Yes	
Country and Global Economy Trends Effect	Yes	
Firms Acting as Acquirer more than one time	Yes	
Observations	10260	
Adjusted R-Squared	0,0802	
<b>Panel B: Tests</b>		
	<b>Chi-stat/F-stat</b>	<b>p-value</b>
Heteroskedasticity Test*	232,04	0,00
Ramsey Reset Test**	9,08	0,00
*Breusch-Pagan / Cook-Weisberg test ((Null Hypothesis: Constant Variance)		
**Specification test(Null Hypothesis: No omitted variables)		

\* $p < 0,05$ ; \*\* $p < 0,01$

Table 4.B

*Feedback from the target's 52-Week High and Low to the Offer Premium*

Panel A reports the estimated coefficients from the model:

$OfferPremium_{it} = \beta_1 52WeekHigh_{it} + \beta_2 52WeekLow_{it} + \beta_3 52WeekHigh_{it}^2 + \beta_4 52WeekLow_{it}^2 + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \epsilon_i$ . The model is the same one employed in Table 4.A. However, following the results presented in Table 4.A Panel B, it is made use of robust standard errors, and precisely the standards errors are clustered on the variables Year.

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*Regression- Clustered Standard Errors on Year*

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*Panel A: Offer Premium*

	<i>Coefficients</i>	<i>t-stat</i>
<i>52-Week Target High Price</i>	0,15**	4,87
<i>52-Week Target Low Price</i>	0,13**	3,59
<i>52-Week Target High Price Squared</i>	-0,02**	-4,09
<i>52-Week Target Low Price Squared</i>	0,02*	2,36
<i>Target B/M %</i>	0,00	1,19
<i>Target E/P %</i>	-0,23**	-3,21
<i>log(Target Equity Value)</i>	0,07**	7,84
<i>log(Target Firm Value)</i>	-0,5**	-6,10
<i>Same Nation</i>	-0,05**	-5,87
<i>Same Industry</i>	0,03*	2,75
<i>Friendly</i>	-0,11*	-2,68
<i>Neutral</i>	-0,17**	-3,78
<i>Year Effect</i>	Yes	
<i>Industry Effect</i>	Yes	
<i>Country and Global Economy Trends Effect</i>	Yes	
<i>Firms Acting as Acquirer more than one time</i>	Yes	
<i>Observations</i>	10260	
<i>Adjusted R-Squared</i>	0,0802	

---

\* $p < 0,05$ ; \*\* $p < 0,01$



Table 4.B Panel A shows that after correcting for heteroskedasticity and misspecification bias, the coefficients of the first four variables of interest are still significantly different from 0 at the 1% level ( $p < 0.01$ ).

The coefficients of both the 52-Week High and Low variables are 0.15 and 0.13 respectively, meaning that, *ceteris paribus*, a unit increase in the 52-week high stock price will yield a corresponding 0.15 increase in the average offer price, and also, a unit increase in the 52-week low stock price will yield a corresponding 0.13 increase in the average offer price.

However, the squared term of the 52-week High and 52-week Low variables have opposite signs, negative for the 52-Week High and positive for the 52-Week Low; this suggests that the effect of the first on the Offer price is non-linearly decreasing, while the effect of the second is non-linearly increasing.

Table 4.B Panel B shows another interesting point. Considering the dummies for “Same Nation” and “Same Industry”, it can be inferred that when a deal occurs between two companies belonging to the same country, there is a corresponding 0.05 decrease in the Offer price, while when a deal occurs between two companies belonging to the same Industry sector, there is a corresponding 0.03 increase in the Offer price. Moreover, the coefficients of these two dummies are significantly different from 0 at the 0.01 level ( $p < 0.01$ ), suggesting that these features are of extreme importance in a mergers or acquisition deal and in the bidder’s formulation process of the Offer price.

## 4.2 Regression Estimates – Specification 2 & 3

In order to better analyse our finding in the previous section, some adjustments are applied to specification one to obtain two new specifications:

$$\begin{aligned} OfferPrice_i = & (1 - I_i)[52WeekHigh_i + 52WeekLow_i + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \\ & \epsilon_i] + I_i[52WeekHigh_i + 52WeekLow_i + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \\ & \epsilon_i] \end{aligned} \quad (2)$$

$$\begin{aligned} OfferPrice_i = & (1 - C_i)[52WeekHigh_i + 52WeekLow_i + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \\ & \epsilon_i] + C_i[52WeekHigh_i + 52WeekLow_i + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \\ & \epsilon_i] \end{aligned} \quad (3)$$

In specification (2) the dummy variable  $I_i$  denotes if the acquirer and the target belong to the same industry sector, while in specification (3) the dummy variable  $C_i$  denotes if the acquirer and the target belong to the same country.

Table 5.A shows the results for the regression run on the whole sample considered using specification (2) formula.

Table 5.A Panel A shows the coefficients of the four variables of interest when both acquirer and target are and are not in the same industry sector. The 52-Week High variable is significantly different from 0 at the 0.01 level ( $p < 0.01$ ) when the companies are in the same industry sector, while it is significantly different from 0 also at the 0.01 level ( $p < 0.01$ ) when the companies are in a different industry sector. For the coefficients of the 52-Week Low variable, the 52-Week low variable is significantly different from 0 at the 0.05 level ( $p < 0.05$ ) when the companies are in the same industry sector, while it is significantly different from 0 also at the 0.01 level ( $p < 0.01$ ) when the companies are in a different industry sector. It is also observed that the two variables each have a corresponding increase in the effect on the Offer price for both categories of “Same industry” and “Different industry”.

**Table 5.A**

Panel A reports the estimated coefficients from the model:

$$OfferPrice_i = (1 - I_i)[52WeekHigh_i + 52Weeklow_i + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \varepsilon_i] + I_i[52WeekHigh_i + 52Weeklow_i + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \varepsilon_i]$$

The variable  $I_i$  is a dummy variable which assume value 1 if the acquirer and the bidder operate in the same Industry, and 0 otherwise. This model include the same variables included in Specification (1) with the difference that the interaction terms  $(1 - I_i)$  and  $I_i$  allow to see the difference in the coefficients of the variables of interest in two different situations and consequently test them. Panel B reports the results of the Wald test for the equality of the coefficients. The estimated coefficients of Same Industry dummy, Outcomes dummies are not presented due to their insignificancy. However, the estimated coefficients for the Firms Acting as Acquirer more than one time dummy, Acquirer Firms Becoming Target more than one time dummy, Firms Acting as Target more than one time dummy, and Target Firms Becoming Acquirer more than one time dummy are presented even if the first is never significant.

<b>Regression - Clustered Standard Errors - Same Industry</b>				
<b>Panel A: Offer Premium</b>	<i>Same Industry</i>		<i>Different Industry</i>	
	<i>Coefficients</i>	<i>t-stat</i>	<i>Coefficients</i>	<i>t-stat</i>
52-Week Target High Price	0,14**	3,61	0,17**	3,11
52-Week Target Low Price	0,14*	2,88	0,16**	3,26
52-Week Target High Price Squared	-0,03**	-3,22	-0,02*	-2,34
52-Week Target Low Price Squared	0,03*	2,20	0,02*	2,17
Target B/M %	0,04	0,33	0,20	1,45
Target E/P %	-0,23**	-3,13	2,35**	-1,99
log(Target Equity Value)	0,07**	8,77	0,07**	5,49
log(Target Firm Value)	-0,05**	-6,96	-0,04**	-4,05
Same Nation	-0,04**	-5,78	-0,07	-3,27
Friendly	0,06**	3,66	0,04	1,88
Hostile	0,20**	4,33	0,10	1,19
F. acting as A. more than once	0,0007	0,46	-0,0024**	-3,30
A. Becoming T. more than once	0,01	1,15	-0,02	-1,77
F. acting as T. more than once	-0,02**	-3,88	-0,01	-2,03
T. Becoming A. more than once	-0,04**	-4,93	-0,03*	-2,94
Year Effect	Yes		Yes	
Industry Effect	Yes		Yes	
C. and G. Economy Trends Effect	Yes		Yes	
Observations	7027		3233	
Adjusted R-Squared	0,08		0,09	
<b>Panel B: Tests</b>				
			<b>F-stat</b>	<b>p-value</b>
$\beta(\text{same})52\text{-Week Target High Price} = \beta(\text{different}) 52\text{-Week Target High Price}$			0,35	0,54
$\beta(\text{same}) 52\text{-Week Target Low Price} = \beta(\text{different}) 52\text{-Week Target Low Price}$			0,27	0,62
(Null: difference of betas = 0)				

---

\* $p < 0,05$ ; \*\* $p < 0,01$

Considering the squared terms of the 52 week high and 52 week low variables, the two variables are significant at the 0.01 level ( $p < 0.01$ ) under the two categories of "Same industry" and "Different industry". Also, we observed a negative contribution of the squared term of 52-week high variable to the Offer price under the two categories of "Same industry" and "Different industry" but the opposite was observed for the squared term of 52-week low variable.

Even though the findings in the previous section would suggest that the formulation of the Offer price changes if the acquirer and the target belong to or not belong to the same industry sector when considering the coefficients, Table 5.A Panel B shows that the impact of the 52-Week High and Low on the Offer price does not change. From the F-test of difference of betas for both 52-week High and 52-week Low, the F value of 0.35 and 0.27 respectively are not significant ( $p > 0.05$ ). It is therefore not possible to reject the Null hypothesis that the coefficients for the 52-Week High and 52-Week Low for the same industry sector and for different industry sectors are equal.

Table 5.B shows the results for the regression run, on the whole sample considered, using specification (3) formula.

**Table 5.B**

Panel A reports the estimated coefficients from the model:

$$OfferPrice_i = (1 - C_i)[52WeekHigh_i + 52Weeklow_i + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \varepsilon_i] + C_i[52WeekHigh_i + 52Weeklow_i + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \varepsilon_i]$$

The variable  $C_i$  is a dummy variable which assume value 1 if the acquirer and the bidder operate in the same country, and 0 otherwise. This model include the same variables included in Specification (1) with the difference that the interaction terms  $(1 - C_i)$  and  $C_i$  allow to see the difference in the coefficients of the variables of interest in two different situations and consequently test them. Panel B reports the results of the Wald test for the equality of the coefficients. The estimated coefficients of Same Industry dummy, Outcomes dummies are not presented due to their insignificancy. However, the estimated coefficients for the Firms Acting as Acquirer more than one time dummy, Acquirer Firms Becoming Target more than one time dummy, Firms Acting as Target more than one time dummy, and Target Firms Becoming Acquirer more than one time dummy are presented even if the first two are not significant.

**Regression - Clustered Standard Errors - Same Country**

<b>Panel A: Offer Premium</b>	<i>Domestic Deals</i>		<i>Foreign Deals</i>	
	<i>Coefficients</i>	<i>t-stat</i>	<i>Coefficients</i>	<i>t-stat</i>
<i>52-Week Target High Price</i>	0,14**	4,75	0,21**	4,04
<i>52-Week Target Low Price</i>	0,13**	3,60	0,11*	2,18
<i>52-Week Target High Price Squared</i>	-0,02**	-3,97	-0,04*	-2,84
<i>52-Week Target Low Price Squared</i>	0,02*	2,36	0,01	0,55
<i>Target B/M %</i>	0,01	1,81	-0,02	-1,42
<i>Target E/P %</i>	-0,28**	-4,15	0,00	1,24
<i>log(Target Equity Value)</i>	0,08**	8,03	0,05	2,08
<i>log(Target Firm Value)</i>	-0,05**	-6,10	-0,03	-1,65
<i>Same Industry</i>	0,03*	2,94	0,00	0,37
<i>Friendly</i>	-0,07	-2,12	-0,17	-1,96
<i>Neutral</i>	-0,11**	-3,53	-0,25*	-2,63
<i>F. Acting as A. more than one time</i>	0,00	0,24	-0,00	-0,45
<i>A. Becoming Target more than one time</i>	0,00	0,46	0,01	0,81
<i>F. Acting as T. more than one time</i>	-0,02**	-3,85	-0,00	-1,03
<i>T. Becoming A. more than one time</i>	-0,03**	-4,34	-0,04*	-2,65
<i>Year Effect</i>	Yes		Yes	
<i>Industry Effect</i>	Yes		Yes	
<i>Country and Global Economy Trends Effect</i>	Yes		Yes	
<i>Observations</i>	7866		2394	
<i>Adjusted R-Squared</i>	0,08		0,09	

**Panel B: Tests**

	<i>F-stat</i>	<i>p-value</i>
$\beta(\text{domestic})52\text{-Week Target High Price} = \beta(\text{foreign}) 52\text{-Week Target High Price}$	1,35	0,27
$\beta(\text{domestic}) 52\text{-Week Target Low Price} = \beta(\text{foreign}) 52\text{-Week Target Low Price}$	1,17	0,29

(Null: difference of betas = 0)

\* $p < 0,05$ ; \*\* $p < 0,01$

Table 5.B Panel A shows the coefficients of the four variables of interest when both acquirer and target belong to the same country or not, allowing for the classification of the merger or acquisition as domestic or foreign.

The coefficients of the 52-Week High variable are all significantly different from 0 at 0.01 level ( $p < 0.01$ ) both at the domestic and foreign levels except for the coefficient of the 52-Week Low which is significant at the 0.05 level ( $p < 0.05$ ) at the domestic level. It is also observed that the two variables each have a corresponding increase in the Offer price for both categories of "Foreign" and "Domestic".

Moreover, the coefficient of the squared terms of the 52-Week High and 52-Week low are all significant ( $p < 0.05$ ) at both levels of foreign and domestic except for the coefficient of the 52-Week low variable at the foreign level which happens to be insignificant ( $p > 0.05$ ).

Also, we observed a negative contribution of the squared term of 52-week high variable to the offer price under the two categories of "Foreign" and "Domestic" but the opposite was observed for the squared term of 52-week low variable.

Even though the findings in the previous section would suggest that the formulation of the offer price changes if the acquirer and the target belong to or not belong to the same industry sector when considering the coefficients, Table 5.A Panel B shows that the impact of the 52-Week High and Low on the Offer price does not change. From the F-test of difference of betas for both 52-week High and 52-week Low, the F value of 0.35 and 0.27 respectively are not significant ( $p > 0.05$ ). It is therefore not possible to reject the Null hypothesis that the coefficients for the 52-Week High and 52-Week Low for the same industry sector and for different industry sectors are equal.

### 4.3 Regression Estimates – Specification 4 & 5

To study the impact of the 52-Week High and Low in relation to the Attitude and the Status of the Mergers, another adjustment is done to the specification (1) formula to obtain specification (4) and specification (5):

$$\begin{aligned} OfferPrice_i = A[52WeekHigh_i + 52Weeklow_i + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) \\ + \epsilon_i] \end{aligned} \quad (4)$$

$$\begin{aligned} OfferPrice_i = S[52WeekHigh_i + 52Weeklow_i + \varepsilon(D_t) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) \\ + \epsilon_i] \end{aligned} \quad (5)$$

In the specification (4) formula A denotes a categorical variable assuming values “Hostile”, “Neutral”, “Friendly”. In This way, it is possible to obtain in the same regression the coefficient of the four variables of interest for each category of the Attitude variable and test them jointly.

The same process is followed for the formula in specification (5), where S denotes a categorical variable assuming values “Withdrawn”, “Pending”, “Intended”, and “Completed”.

Table 6.A Panel A shows that the coefficients of the 52-Week High price for “Hostile” and “Neutral” attitudes are positive but not significantly different from 0 ( $p > 0.05$ ), except for the category of “Friendly” attitude whose coefficient of the 52-Week High price is significantly different from 0 at the 0.01 level ( $p < 0.01$ ). We can therefore say that under a “Friendly” attitude, the 52-week high price have a positive significant impact on the Offer price.

It is also observed that the coefficients of the 52-Week low price for “Hostile” and “Neutral” attitudes are not significantly different from 0 ( $p > 0.05$ ), except for the category of “Friendly” attitude whose coefficient of the 52-low High price is significantly different from 0 at the 0.01 level ( $p < 0.01$ ) and positive. We can therefore

say that under a friendly attitude, the 52-week low price have a positive significant impact on the Offer price.

The coefficient of the squared term of the 52-Week High is negative and significant at the 0.01 level ( $p < 0,01$ ) when the Attitude is “Friendly”, while at the other categories of attitude, the coefficient is not significant. This implies that the Squared term of the 52-Week High has a negative impact on the offer price under a friendly attitude unlike its linear term counterpart.

The coefficient of the squared term of the 52-Week Low is only significant at the 0.05 level when the Attitude is “Friendly”, while at the other categories of attitude, the coefficient is not significant. This implies that the Squared term of the 52-Week low price has a negative impact on the offer price under a “Friendly” attitude just like its linear term counterpart.

Table 6.A Panel B shows some interesting findings. From the F-tests for the difference of the 52-Week High coefficients, Panel B shows that the impact of the 52-Week High on the Offer price does not change. From the F-test of difference of betas for 52-week High, the F value of 1.71 are not significant ( $p > 0.05$ ). It is therefore not possible to reject the Null hypothesis that the coefficients for the 52-Week High are the same regardless of the category of “Attitude”.

From the F-test of difference of betas for 52-week low, the F value of 5.01 is significant ( $p < 0.05$ ). It is therefore possible to reject the Null hypothesis that the coefficients for the 52-Week low are the same regardless of the category of attitude and conclude that the category of attitude has a significant impact on how the 52-Week low price affects the offer price.



**Table 6.A**

Panel A reports the estimated coefficients from the model:

$$OfferPrice_i = A[52WeekHigh_i + 52WeekLow_i + \varepsilon(D_i) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \epsilon_i]$$

The variable  $A$  is a categorical variable which assume value "Hostile", "Neutral", or "Friendly" depending on the bidder attitude in the deal. This model include the same variables included in Specification (1). Through the categorical values is possible to study the effect of the variables of interest depending on the attitude of the bidder. Panel B reports the results of the Wald test for the equality of the coefficients. The estimated coefficients of Outcomes dummies are not presented due to their insignificance. Moreover, in the table are only presented the result for the Firms Acting as Acquirer more than one time dummy, and Target Firms Becoming Acquirer more than one time dummy as the other dummies are not significant..

<b>Regression - Clustered Standard Errors - Categorical Attitude</b>						
<b>Panel A: Offer Premium</b>	<i>Hostile</i>		<i>Neutral</i>		<i>Friendly</i>	
	<i>Coefficients</i>	<i>t-stat</i>	<i>Coefficients</i>	<i>t-stat</i>	<i>Coefficients</i>	<i>t-stat</i>
52-Week Target High Price	0,55	1,62	0,10	1,21	0,16**	4,34
52-Week Target Low Price	-0,54	-1,13	0,09	1,57	0,14**	3,85
52-Week Target High Price Squared	-0,13	-1,62	-0,01	-0,46	-0,03**	-4,06
52-Week Target Low Price Squared	-0,11	-0,84	0,01	0,81	0,02*	2,50
Target B/M %	-2,30	-0,72	-0,03	-1,35	0,14	1,30
Target E/P %	8,38	1,09	0,22	0,90	-2,51**	-3,40
log(Target Equity Value)	-0,06	-1,16	0,04	1,56	0,08**	7,88
log(Target Firm Value)	0,05	1,46	-0,03	-1,33	-0,05**	-5,87
Same Nation	-0,26	-1,78	-0,01	-0,63	-0,05**	-5,92
Same Industry	0,17	1,42	0,01	0,57	0,03*	2,32
F. Acting as T. more than once	-0,01	-0,51	0,02	-0,50	-0,03**	-4,12
T. Becoming A. more than once	0,00	0,19	-0,05	-0,68	-0,03**	-4,61
Financial Buyer	0,57	0,77	0,00	-1,18	0,22*	2,59
Financial Seller	-0,89	-1,15	0,09		-0,32**	-4,59
Year Effect	Yes		Yes		Yes	
Industry Effect	Yes		Yes		Yes	
C. and G. Economy Trends Effect	Yes		Yes		Yes	
Observations	136		907		9217	
Adj. R-Squared	0,46		0,07		0,08	

<b>Panel B: Tests</b>	<i>F-stat</i>	<i>p-value</i>
$\beta(\text{hostile})$ 52-Week High= $\beta(\text{neutral})$ 52-Week High= $\beta(\text{friendly})$ 52-Week High	1,71	0,21
$\beta(\text{hostile})$ 52-Week Low= $\beta(\text{neutral})$ 52-Week Low= $\beta(\text{friendly})$ 52-Week Low	5,01	0,02
$\beta(\text{hostile})$ 52-Week High Squared= $\beta(\text{neutral})$ 52-Week High Squared= $\beta(\text{friendly})$ 52-Week High Squared	3,19	0,07
$\beta(\text{hostile})$ 52-Week Low Squared= $\beta(\text{neutral})$ 52-Week Low Squared= $\beta(\text{friendly})$ 52-Week Low Squared	3,53	0,05

(Null: difference of betas = 0)

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*\*p < 0,05; \*\*p < 0,01*

It was also revealed that the impact of the squared terms of the 52-Week High and Low on the Offer price does not change. From the F-test of difference of betas for both squared 52-week High and 52-week Low, the F value of 3.19 and 3.53 respectively are not significant ( $p > 0.05$ ). It is therefore not possible to reject the Null hypothesis that the coefficients for the squared 52-Week High and squared 52-Week Low for are equal regardless of the category of Attitude.

Table 6.B Panel A shows that the coefficients of the 52-Week High variable is positive and significant at the 0.05 and 0.01 level for the “Withdrawn” and “Completed” status respectively. This implies that 52-week high price has a positive significant impact on offer price under the withdrawn and completed status.

It was also revealed that the coefficients of the 52-Week low variable are positive for all the categories of status and significant at the 0.01 level ( $p < 0.01$ ) except for status category “Pending” whose coefficient is negative but not significant ( $p > 0.05$ ). This implies that 52-week low price has a positive significant impact on offer price under the withdrawn, pending and completed status.

From the F-test of difference of betas in Table 6.B Panel B, for 52-week high price, the F value of 1.00 is not significant ( $p > 0.05$ ). It is therefore not possible to reject the Null hypothesis that the coefficients of the 52-Week High are different for each value assumed by the categorical variable ‘Status’. This is however not true for all the 52-week low as the coefficients of the 52-Week low are different for each value assumed by the categorical variable ‘Status’ having reported a F value of 6.66 and significant at the 0.01 level ( $p < 0.01$ ).

**Table 6.B**

Panel A reports the estimated coefficients from the model:

$$OfferPrice_i = S[52WeekHigh_i + 52WeekLow_i + \varepsilon(D_i) + \gamma(F_i) + \vartheta(S_i) + \theta(A_i) + \omega(X_i) + \varepsilon_i]$$

The variable  $S$  is a categorical variable which assume value "Withdrawn", "Pending", or "Intended" or "Completed" depending on the outcome of the deal. This model include the same variables included in Specification (1). Through the categorical values is possible to study the effect of the variables of interest depending on the outcome of the deal. Panel B reports the results of the Wald test for the equality of the coefficients. The estimated coefficients of Outcomes dummies are not presented due to their insignificancy. Moreover, in the table are only presented the result for the Firms Acting as Acquirer more than one time dummy, and Target Firms Becoming Acquirer more than one time dummy as the other dummies are not significant.

<i>Regression - Clustered Standard Errors - Categorical Status</i>								
<i>Panel A: Offer Premium</i>	<i>Withdrawn</i>		<i>Pending</i>		<i>Intended</i>		<i>Completed</i>	
	$\beta$	<i>t-stat</i>	$\beta$	<i>t-stat</i>	$\beta$	<i>t-stat</i>	$\beta$	<i>t-stat</i>
<i>52-Week High</i>	0,14*	2,17	0,03	0,29	0,29	0,89	0,16**	5,13
<i>52-Week Low</i>	0,24**	3,29	0,20**	3,33	-0,24	-0,63	0,12**	3,33
<i>52-Week High Sq.</i>	-0,02	-1,15	0,01	0,38	0,10	0,66	-0,03**	-5,08
<i>52-Week Low Sq.</i>	0,07**	3,29	0,04	1,99	-0,21	-0,90	0,02*	2,15
<i>Target B/M %</i>	-0,16**	-3,15	0,03	1,50	-0,09	-0,20	0,02	2,01
<i>Target E/P %</i>	0,21	0,95	0,28	-1,25	-0,76	-1,30	0,27**	-3,25
<i>log(T. Equity Value)</i>	0,07*	2,64	0,05	1,93	0,23*	2,33	0,07**	7,19
<i>log(T. Firm Value)</i>	-0,06*	-2,50	-0,06**	-3,58	-0,19*	-1,24	-0,05**	-5,17
<i>Same Nation</i>	-0,07*	-2,45	-0,04	-1,31	-0,16	-1,17	-0,05**	-4,95
<i>Same Industry</i>	0,03	0,68	0,01	0,49	-0,12	-0,98	0,03**	3,06
<i>F. Acting as T. more than once</i>	-0,00	-0,27	-0,02	-1,13	0,06	1,15	-0,02**	-3,77
<i>T. Becoming A. more than once</i>	-0,00	-0,26	0,00	0,11	-0,04	0,41	-0,04**	-4,37
<i>Year Effect</i>	Yes		Yes		Yes		Yes	
<i>Industry Effect</i>	Yes		Yes		Yes		Yes	
<i>C. and G. Economy Trends Effect</i>	Yes		Yes		Yes		Yes	
<i>Observations</i>	770		725		137		8628	
<i>Adj. R-Squared</i>	0,12		0,09		0,58		0,09	

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**Panel B: Tests**

	<i>F-stat</i>	<i>p-value</i>
52Weeks High: $\beta(\text{Withdrawn})=\beta(\text{Pending})=\beta(\text{Intended})=\beta(\text{Completed})$	1,00	0,41
52Weeks Low: $\beta(\text{Withdrawn})=\beta(\text{Pending})=\beta(\text{Intended})=\beta(\text{Completed})$	6,66	0,00**
52Weeks High Squared: $\beta(\text{Withdrawn})=\beta(\text{Pending})=\beta(\text{Intended})=\beta(\text{Completed})$	0,92	0,45
52Weeks Low Squared: $\beta(\text{Withdrawn})=\beta(\text{Pending})=\beta(\text{Intended})=\beta(\text{Completed})$	4,53	0,01*

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(Null: difference of betas = 0)

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\* $p < 0,05$ ; \*\* $p < 0,01$

## 5 Discussion and Conclusion

Theoretically, past stock returns should not really play a role in determining the merger offer price. However, this study suggests as well as already established papers show that the 52-Week High and Low do indeed influence the formulation process in a merger or acquisition. The implications of this are that managers are not immune to behavioural biases and do not always behave rationally.

Heuristics exist to help agents' decision making process smoother. However, the formulation of the offer price is a complex procedure in which rationality should dominate behavioural biases.

In order to correctly interpret the parameters, particular attention needs to consider remember that our variables are scaled on the stock price four weeks before the announcement date. The values of the 52-Week High assume positive or zero values, while those for the 52-Week Low assume negative or zero values. This means that an increase in the values of the 52-Week High will result in an increase of the offer price, while an increase in the value of the 52-Week Low will result in a decrease of the offer price. These hypotheses are supported in all the regression, with the exceptions for the categorical attitude and status regression where the hypotheses are supported only for the "Friendly" and "Completed" cases. This result could be a consequence of the limited number of observations for the aforementioned cases. Another interesting finding is that the squared coefficient of the 52-Week High assumes negative values, meaning that the increase in the offer price caused by the 52-Week High is a decreasing effect.

Moreover, other two findings regard the fact that the offer price is negatively influenced if the two firms operating it belong to the same country, while it is positively influenced if the two firms operating it belong to the same industry.

Even though the results about the importance of the 52-Week Low are interesting, some limitations of this study must be taken into consideration. For future studies, it may have been beneficial to include more control variables and explanatory variables in the regressions to have a more holistic approach about the effects of these reference points in the mergers and acquisitions. In particular, it was not possible to retrieve information regarding the kind of payment of the deal, which is an extremely important factor in these kinds of deals. Moreover, the collected data is from the 2000 to the 2015 period which also includes the financial crisis. The effect of the financial crisis on the mergers and acquisition was not studied and it could have influenced the results. Firms could have offered less premiums as the state of the economy was declining.

The goal of the study was to prove that the 52-Week Low is in fact a reference point and that it influences the offer price in merger or the acquirer offer for the target firms. The data analysis showed significant results for the 52-Week Low being a reference point.

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# Appendix

Definition of Book to Market, Earnings per Share, Equity Value and Firm Value as defined by Thomson One Web help guide:

"Ratio of Price to Book Value, 4 Weeks Prior to Announcement Date: Target stock price 4 weeks prior to announcement date of the transaction divided by target book value as of the date of the most current financial information prior to the announcement of the transaction."

"Earnings per Share Last 12 Months: Adjusted earnings divided by fully diluted shares outstanding for the 12 months ending on the date of the most current financial information prior to the announcement of the transaction (\$ per share). Earnings are adjusted based on the conversion of all convertible securities at the beginning of the year."

"Equity Value at Announcement Date: Calculated by multiplying the actual number of target shares outstanding from the most recent source available by the offer price per share plus the cost to acquire convertible securities, stated in millions"

"Firm Value: Enterprise Value plus Minority Interest (\$mil). Enterprise value is calculated by multiplying the number of actual target shares outstanding from its most recent balance sheet by the offer price and then by adding the cost to acquire convertible securities, plus short-term debt, straight debt, and preferred equity minus cash and marketable securities. Minority Interest is the balance sheet value from consolidation of subsidiary financial statements, representing claims against assets by minority shareholders of subsidiary at DFIN. This data item is for the firm

value of 100% of the company based on the offering price, regardless of how much was actually acquired in the transaction."