

DO FIRMS' LEVERAGE DEVIATIONS AFFECT OVERCONFIDENT CEOs' ACQUISITION DECISIONS?

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Abstract

In this paper, we examine how an overconfident manager makes an acquisition decision based on whether or not her/his firm is excessively deviated from the target capital structure. In specially, we find that when her firm is overleveraged, overconfident CEO's are likely to merge relatively smaller firms. Conditional on making acquisitions, overconfident CEOs are less likely to use stock to finance the acquisition, contrary to previous capital structure literature. Furthermore, when her firm is overleveraged, the overconfident CEO is likely to make value enhancing acquisition, since the market reaction, the average 3-day as well as 5-day cumulative abnormal return of the deal announcement, is significantly positive. Overall, our study improves the understanding of the interdependence between capital structure and investment decisions in the present of a managerial behavioural bias. And our study also shows that over-leverage may mitigate the unfavorable effects of managerial overconfidence traits.

Keywords: Leverage, Overconfidence, CEO, Acquisition

JEL Codes: G34, G32, M12

1. INTRODUCTION

Previous literatures such as Hartford, Klasa and Walcott (2009) and Uysal (2011) find that the degree of the deviation from the target capital structure will affect firms' ability to raise capital, particularly debt, so that it influences the managers to make merger and acquisitions decisions. But little attention is drawn on whether or not the leverage deviation influence behavioural biased managers, e.g. overconfident managers, to make the same decisions.

Overconfident CEOs perceive that cost of external financing, especially equity financing, is unduly high, and conditional on external financing, they incline to financing their investment projects with debt rather than stock (Heaton, 2002, and Malmendier, Tate and Yan, 2011). Based on this behavioural characteristic, overconfident CEOs should be likely to conduct more acquisitions when the degree of leverage deviation does not restrict their firms to issue debt. On the other hand, their reluctance of issuing stocks determines that overconfident CEOs are less likely to issue equity when they foresee a high likelihood of acquisitions, and also they are less likely to pay for their deals with stock, even though their firms are overleveraged.

Next, we are also interested in how the degree of leverage deviation affects the acquisition performance of firm with overconfident managers, since the leverage deviation would affect the acquisition frequency. Malmendier and Tate (2008) conclude that 'if the overconfident managers

increase the merger frequency, it also lower the average deal quality.....'; however, Sunder, Sunder and Tan (2010) find that firms managed by overconfident CEOs face tighter debt restrictions, which are partially mitigated when such firms have greater information transparency, better performance records, and investment opportunities. Based on the previous works, we predict that if the leverage deviation put off the overconfident CEOs' acquisitiveness, the deal quality will be not value-destroying or even value increasing.

To test those above predictions, we study 1432 acquisitions²¹ announced and complete between 1993 and 2011. Our (primary) measure of overconfidence is based on the timing of CEO option exercise following Malmendier and Tate (2005 and 2008), Campbell et al. (2011), Malmendier, Tate and Yan (2011), Ahmed and Duellman (2012), and Hirshleifer, Low, and Teoh (2012). Generally, A CEO should exercise her options and sell shares obtained from exercising options to minimize her exposure to idiosyncratic risk. However, an overconfident CEO believes that firm value will continue to increase and thus chooses to delay exercise and hold options that are deep in-the-money. We create a dummy variable 'Over67' as the proxy of CEO overconfidence. Over67 equals one when a CEO as being overconfident if the average intrinsic value of her exercisable unexercised options exceeds 67% of the average exercise price twice over our sample period.

²¹ We require the relative size of the target to the bidder is at least 5% as Malmendier and Tate (2008)

Over67 equals zero when a CEO does not meet this criterion.

On the other hand, to examine the role of leverage deviation, we use the same regression as Uysal (2011) to estimate the target leverage ratio on a yearly basis, and we calculate the leverage deviation for each firm every year as the difference between its actual leverage ratio and its predicted leverage ratio. Following Uysal (2011), firms whose leverage deviations fall in the largest leverage deviation quartile are label as 'overleveraged' firms and firms whose leverage deviations fall in the smallest leverage deviation quartile are label as 'underleveraged' firms.

The results indicate that the degree of leverage deviation shows effect on overconfident CEOs' acquisition decisions. Firstly, we find that the degree of leverage deviation shows effect on overconfident CEOs' acquisition activities. If the firm is overleveraged, overconfident CEOs are likely to bid smaller firm, although, as it in the previous literatures, they are more acquisitive and bid larger size than their peers. Secondly, Conditional on making acquisitions, we find that overconfident CEOs are unlikely to finance the deal with stock when their firms are overleveraged. Finally, we also find that the market reacts positively to overconfident CEOs' announcement of merger and acquisition when their firm is overleveraged. This implies high leverage deviation can restrict overconfident CEOs making value-destroying deals.

This study relates to the research on the interdependence of financing and investment decisions. For example, Harford, Klasa, and Walcott (2009) find that deviations from a firm's target capital structure affect financing decisions around acquisition. Uysal (2011) also find overleveraged firms bid less and smaller target, and are likely to use stock to as the payment method. Our study goes beyond the previous studies by investigating the combined effect of both CEO overconfidence and the degree of leverage deviation on firm's ability to bid. Especially, the lower likelihood of making acquisitions for overconfident CEO managed firms which are overleveraged, suggests that high and positive leverage deviation is a solution to reduce the acquisitiveness of overconfident managers. Furthermore, overleveraged firms with overconfident CEOs do not likely to make value-destroying acquisitions. Overall, these findings suggest that reducing firms' debt capacity is a method to restrict overconfident CEOs' investment distortion including bad acquisitions.

Our findings also improve our understanding of how overconfident CEOs choose their capital structures. For example, Harford, Klasa, and Walcott (2009) find that the capital structure cash acquirers adjust to their target leverages. Uysal (2011) find that overleveraged firms are more likely to issue equity and to reduce leverage deviation when they have a high likelihood of undertaking an acquisition, and overleveraged firms are more likely to finance the deal with stock. Our results show that overconfident CEOs are unlikely to involving the capital structure rebalancing activity. Overconfident CEOs still likely to issue debt rather stock when have high

likelihood of acquisitions and they are less likely to pay for the deal with cash. Thus, this study consistent with Malmendier, Tate and Yan (2011) that overconfident CEOs are likely to issue debt to finance for their investment projects. On the other hand, our study provides evidence that managerial overconfidence is a factor which delays the capital structure adjusting towards target.

Finally, this study is related to studies on CEO overconfidence literatures. Previous studies report that overconfident CEOs overbid, and are likely to make low quality acquisitions e.g. Roll (1986) and Malmendier and Tate (2008). Our study provides a solution to mitigate the acquisitiveness and value-destroying cause by CEO overconfidence. And we also provide the consequence of debt contract restriction, reported by Sunder, Sunder and Tan (2010), on overconfident CEOs' investment activity.

The remaining of the paper is organized as follows. Section 2 provides details of sample selection and descriptive statistics of the data. Section 3 explains the determinants and estimation procedure of the target leverage ratio. Section 4 examines the empirical findings of the second-stage regressions. Section 5 draws conclusions based on the findings.

2. SAMPLE AND METHODOLOGY

In this part, we report our sample and variable construction, including the predicted market leverage and leverage deviation, the definition of CEO overconfidence.

2.1. Data and full sample construction

The construction of the full sample is from the Security Data Corporation (SDC) database and we match the sample to Center for Research in Security Prices (CRSP) and Compustat. The procedure of sample selection is detailed in the following five steps.

First, we require the acquisitions are announced and complete between the beginning of 1993 and the end of 2011. We also require no missing data in Value of Transaction (SDC: VAL) which is defined as 'the total value of consideration paid by the acquirer, excluding fees and expenses'. Following Fuller, Netter and Stegemoller (2002) and Uysal (2011), we exclude financial firms (6000-6999) and utilities firms (4900-4999).

Second, we require the relative size of target to bidder is at least 5%, which is following Malmendier and Tate (2008), since CEO may not involve the acquisition of 'small units of another company'. The Relative Size is calculated as Value of transaction divided by the market capitalization, calculated as share price (CRSP: PRC) multiplies the number of shares outstanding (CRSP: SHROUT), of the bidder one fiscal year prior to the announcement date. Third, in order to study the proportion of bids paid in cash or stock, we exclude deals whose payment are coded in 'cash only' and 'stock only' but their corresponding percentage of cash or stock are missing or unequal to 100. And we also exclude those coded in 'cash and stock combination' but the sum of percentage of cash and stock is unequal to 100.

Fourth, we require that, during the year prior

to the acquisition, bidders have necessary Compustat and Center for Research in Security Prices (CRSP) data. Finally, all the deals can match to ExecuComp database using GVKEY. The full sample of our study is 1432 deals.

2.2. Identification of overconfident CEOs

In the previous literature, Malmendier and Tate (2005) define an overconfident CEO as the one that left unexercised exercisable options at least twice. They selected options that are at least 67% in the money using detailed data on the CEO's options holdings and exercise prices for each option grant. Also, Malmendier and Tate (2008) revise their definition of an overconfident CEO as she exhibit the late exercise behavior once only. Campbell et al. (2011), Ahmed and Duellman (2012) and Hirshleifer, Low, and Teoh (2012) use CEO option holding information in ExecuComp database to determine overconfident or optimist CEOs.

Because of no detailed data on the CEO's personal option portfolios, it is defined whether or not a CEO is overconfident according to the high or

low moneyness of each CEO personal options holding data recorded in ExecuComp database. We use exactly the same method as Campbell et al. (2011) and Hirshleifer, Low, and Teoh (2012) to calculate average moneyness of each CEO's option portfolio for each year. For each CEO year, I calculate the average realizable value per option by (ExecuComp: OPT_UNEX_EXER_EST_VAL) divided by the number of exercisable options (ExecuComp: OPT_UNEX_EXER_NUM). The estimated strike price is calculated as the fiscal year end stock price (Compustat: PRCCF) minus the average realizable value. The average moneyness of the options is then calculated as the stock price divided by the estimated strike price minus 1.

Following Ahmed and Duellman (2012), an overconfident CEO is defined as a CEO that does not exercise exercisable options that are at least 67% in the money twice. And if a CEO is identified as overconfident by this measure, she/he remains so for the rest of the sample period, consistent with the notion that overconfidence is a persistent trait. We design a dummy variable labelled as Over67 that takes 1 meaning overconfidence, and 0 otherwise.

Table 1. The number of overconfident CEOs

The table gives the yearly number of CEOs, the number of overconfident CEOs, and percentage of overconfident CEOs as well in our sample. The sample of CEOs is from Execucomp for the 1992-2010 periods. Following Uysal (2011), financial and utility firms are deleted and all firms in our sample have relevant data from Compstat and CRSP.

Year	Number of CEOs	Number of Overconfident CEOs	Percentage of Overconfident CEOs
1992	633	132	20.9%
1993	750	217	28.9%
1994	834	250	30.0%
1995	888	312	35.1%
1996	955	372	39.0%
1997	960	426	44.4%
1998	978	450	46.0%
1999	966	442	45.8%
2000	922	443	48.0%
2001	936	458	48.9%
2002	1016	461	45.4%
2003	1079	519	48.1%
2004	1080	546	50.6%
2005	1048	530	50.6%
2006	1086	542	49.9%
2007	1099	519	47.2%
2008	1084	486	44.8%
2009	1081	449	41.5%
2010	1085	425	39.2%
Total	18480	7979	43.2%

Table 1 shows the frequency of overconfident CEOs in our sample from 1992 to 2010. The table gives the yearly number of CEOs, the number of overconfident CEOs, and percentage of overconfident CEOs as well in our sample. Following Uysal (2011), financial and utility firms are deleted. We also require that firms have accounting data from Compustat, CEO overconfidence from Executive Compensation data from Compustat

We find nearly 43% CEOs in our sample are classified as overconfidence. For robustness purposes, the same method as the options-based measure in Hirshleifer, Low, and Toh (2012) is used. The frequency of overconfident CEOs in our sample also shows the similar pattern of Hirshleifer, Low, and Teoh (2012). Once a CEO is identified as

overconfidence in any year remains so throughout the sample period. This mechanically tends to induce an increase in the fraction of overconfident managers over the sample period and owing to increased CEO turnover activity after the acquisition, the fraction of overconfident CEOs decreases in the post acquisition years.

2.3. Estimation of Target market leverage

We follow the method of previous literatures such as Fama and French (2002), Flannery and Rangan (2006) and Uysal (2011) to estimate the firms' target market leverages, excluding financial firms (6000-6999) and regulated utilities (4900-4999), and calculate the market leverage deviations as the

actual market leverage minus the predicted market leverage. We use firms covered in Compustat and the Center for Research in Security Prices (CRSP) from 1992 to 2010 to estimate the target debt ratio. Following previous studies, I drop firms with sales less than \$10 million in 1992 dollars. To eliminate the effect of outliers, all variables are winsorized at 1% and 99%. The target leverage ratio is estimated for 52, 379 firm-years over the sample period by running annual regressions of leverage ratios on the main determinants of capital structure considered in prior studies. For the purpose of concise, we have not reported the results of the regressions.

3. METHODOLOGY

3.1. Estimation target market leverage and identification of over- and underleveraged firms

We follow previous studies (e.g., Fama and French, 2002, and Uysal, 2011) to utilize a two-step estimation procedure. The target capital structure is estimated by using the exact method and variables as in Uysal (2011). We running yearly regressions of market leverage on the determinants of capital structure and all variables are winsorized at 1% and 99%. The fitted value of this regression is defined as the target leverage ratio. Based this variable, we construct a leverage deviation defined as the actual leverage ratio minus the estimated target leverage ratio. We also follow Uysal (2011) to define underleveraged (overleveraged) firm whose market leverage deviation falls in the lowest (highest) quartile. An underleveraged (overleveraged) dummy takes a value of one if the firm meets the definition of 'Underleveraged' ('Overleveraged').

3.2. Research predictions

In the second step, we link the leverage deviation dummies (the Overleveraged dummy or Underleveraged dummy) to the CEO overconfidence and its joint effect to merger and acquisition decisions. Overconfident CEOs overestimate their firms' value, comparing to equity, they prefer to use debt to finance their investment, since they perceive

the cost of equity is high (Heaton 2002, and Malmendier, Tate and Yan, 2011). Thus, the degree of positive leverage deviation would show effect to prevent overconfident CEOs from overinvesting. So, I predict that, firstly, overconfident CEOs they would either reduce the enthusiasm of making acquisitions and/or acquire smaller firms when their firm is overleveraged, and, secondly, overconfident CEOs would be less likely to pay for the deal with stock or large fraction of stock if their firm is overleveraged. Based on the findings of Sunder and Tan (2010), overconfident CEOs face more strict debt contract, except for those has better performance, better information transparency and good investment opportunities, thus, we hypothesize that in the case of over-leverage, overconfident CEOs are likely to make value-enhancing acquisitions.

4. RESULTS

4.1. Summary statistics

Table 2 reports the summary of firm characteristics of both overconfident CEO managed firms and rational CEO managed firms. The major differences between overconfident CEO managed firms and rational CEO managed firms are market leverage, leverage deviation, market to book ratio, acquisition activity and target size. The market leverage and leverage deviation in the subsample of overconfidence are lower than the other sample. Overconfident CEOs are debt conservatism measured by 'kink', Malmendier, Tate and Yan (2011). Also, overconfident CEO managed firms has higher market to book ratio. Finally, overconfident CEOs are likely to make deals for which the deal size is averagely larger than their peers. Table 3 reports the summary of deal characteristics of both overconfident CEO managed firms and rational CEO managed firms. The most obvious difference is the payment method. Comparing to their peers, overconfident CEOs are less like to finance the deal with all stock and they are likely to use cash to pay for the deal.

Table 2. Summary Statistics of Firm characteristics

Variables	N	Mean	Stdev	Min	Max
Over67=0					
Market leverage	10501	0.373	0.221	0.005	1.196
Market leverage deviation	10501	-0.004	0.092	-0.644	0.618
Market to Book ratio	10501	1.834	1.189	0.369	16.993
Profitability	10501	0.138	0.103	-0.881	0.949
R&D ratio	10501	0.030	0.055	0.000	0.870
Tangibility	10501	0.301	0.214	0.001	0.970
Deal value/ Acquirer market value	10501	0.022	0.175	0.000	7.651
Acquirer	10501	0.052	0.223	0.000	1.000
over67=1					
Market leverage	7979	0.294	0.202	0.002	1.117
Market leverage deviation	7979	-0.015	0.092	-0.661	0.525
Market to Book ratio	7979	2.307	1.710	0.401	39.119
Profitability	7979	0.159	0.100	-0.641	0.902
R&D ratio	7979	0.035	0.056	0.000	0.601
Tangibility	7979	0.283	0.222	0.002	0.958
Deal value/ Acquirer market value	7979	0.033	0.337	0.000	22.538
Acquirer	7979	0.068	0.252	0.000	1.000

Table 3. Summary Statistics of Firm characteristics

Variables	N	Mean	Stdev	Min	Max
Over67=0					
Target is a public firm	733	0.372	0.484	0	1
Target is a Private firm	733	0.314	0.465	0	1
All cash offer	733	0.599	0.491	0	1
All stock offer	733	0.238	0.426	0	1
over67=1					
Target is a public firm	699	0.351	0.478	0	1
Target is a Private firm	699	0.33	0.471	0	1
All cash offer	699	0.611	0.488	0	1
All stock offer	699	0.218	0.413	0	1

4.2. Does leverage deviation affect the overconfident CEOs' acquisitiveness?

Figure 1 reports the frequency of completing an acquisition for both overconfident CEOs (green) and the remaining CEOs (red). Overconfident CEOs are likely to make deals and they seem to be regardless

of the degree of leverage deviation, but the remaining CEOs are likely to follow the leverage deviation to make more or less acquisitions. From Figure 1, the pattern of the remaining CEOs' acquisition activity is similar to that of Uysal (2011); that is, acquirer prediction based leverage deviation works only in rational CEO managed firms.

Figure 1. The frequency of completing an acquisition

The frequency is calculated as the number of CEOs who complete at least one deal divided by the total number of CEOs in that subgroup in a given year. This

calculation is exactly the same as Malmendier and Tate (2008). Following Uysal (2011), 1 (or 4) is the lowest (or highest) quartile of leverage deviation

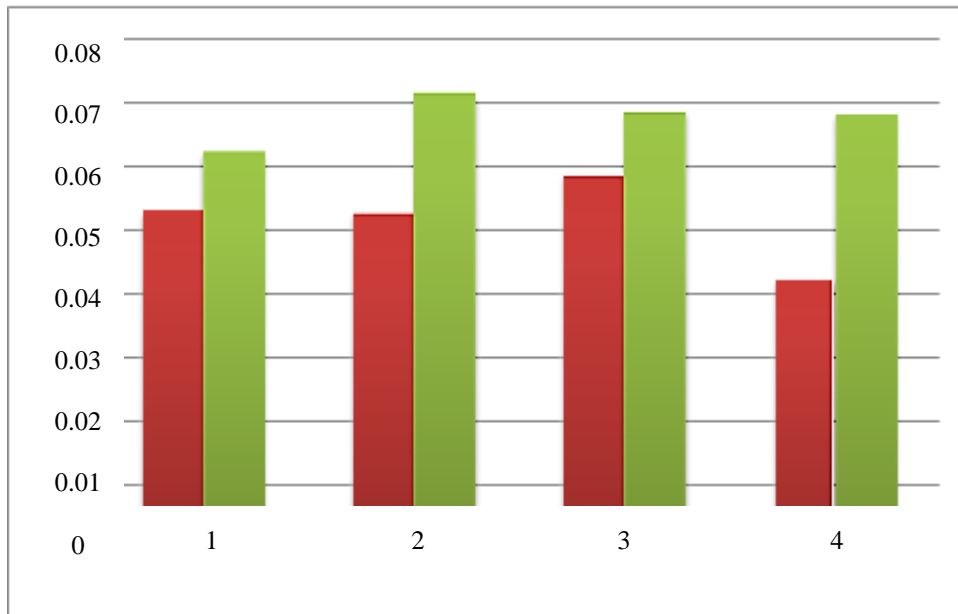
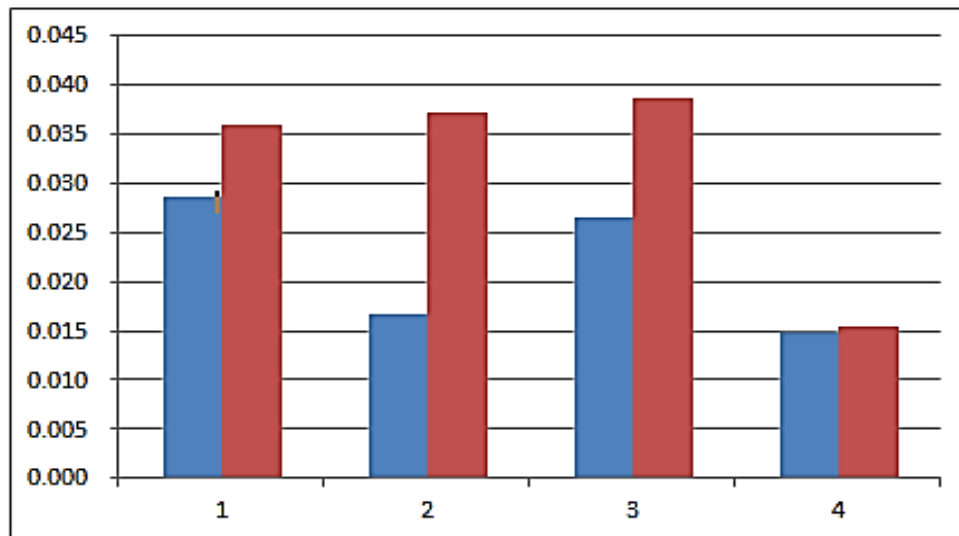


Figure 2 reports the per-year value of a firm's acquisition to its market value. The overconfidence CEOs (red) make deal with the same per-year value of a firm's acquisition to its market value as the

remaining CEOs (blue). Figure 2 suggests that when their firm is overleveraged, overconfident CEOs are likely to make smaller deals.

Figure 2. The per-year value of a firm's acquisition to its market value 1 (or 4) is the lowest (or highest) quartile of leverage deviation**Table 4.** CEO overconfidence, leverage and acquisition activity

Variables	Model 1	Model 2	Model 3	Model 4
Over67	0.129 (0.000)***	0.084 (0.051)*	-0.011 (0.857)	0.082 (0.300)
CEO stock ownership	0.000 (0.241)	-0.001 (0.078)*	0.000 (0.863)	0.000 (0.739)
CEO vested options	0.000 (0.572)	0.000 (0.408)	0.000 (0.190)	0.000 (0.206)
CEO tenure in month	0.000 (0.012)**	0.000 (0.113)	-0.001 (0.002)***	-0.001 (0.002)***
Over67* Overleveraged Dummy		0.162 (0.055)*		-0.389 (0.031)**
Over67* Overleveraged Dummy		-0.039 (0.604)		-0.158 (0.261)
Overleveraged Dummy	-0.178 (0.000)***	-0.155 (0.009)***	-0.077 (0.409)	0.121 (0.364)
Underleveraged Dummy	0.039 (0.267)	-0.009 (0.870)	0.192 (0.010)*	0.276 (0.008)***
Average Market Leverage	-0.434 (0.000)***	-0.002 (0.986)	-0.168 (0.421)	-0.176 (0.399)
Insales87	-0.048 (0.000)***	-0.056 (0.000)***	-0.112 (0.000)***	-0.112 (0.000)***
Market to Book ratio	0.029 (0.004)***	-0.002 (0.902)	0.110 (0.000)***	0.108 (0.000)***
Profitability	-0.032 (0.839)	0.074 (0.671)	0.373 (0.245)	0.361 (0.265)
Stock return	0.051 (0.004)***	0.017 (0.426)	-0.013 (0.715)	-0.010 (0.795)
Industry M&A Liquidity	0.000 (0.179)	0.000 (0.171)	0.000 (0.132)	0.000 (0.208)
Herfindahl Index	-0.314 (0.007)***	-0.273 (0.023)**	-0.452 (0.085)*	-0.448 (0.089)*
Observation	18480	18480	18480	18480

*, **, *** are significant at 10%, 5% and 1% level.

The figures do not account for important explanatory and control variables. In Table 4, following Usual (2011), we implement probit regressions analysis (Model 1 and 2) to estimate the likelihood of making an acquisition, as well as tobit regressions analysis (Model 3 and 4) to estimate relative size (at least 5%) of transaction value to acquirer firm's market value of assets at the fiscal year prior to the acquisition announcement. The dependent variable of the probit regressions is set 1 if the firm makes a deal with a relative size being at least 5% and 0 otherwise. The dependent variable of tobit regressions analysis are censored at zero, since firms that either make no acquisition or the relative size is less than 5% are set at 0. All the models include year dummies.

Model 1 shows significant effects of CEO overconfidence on acquisition activity, the coefficient of variable Over67 is 0.129 (significant at 1%), this result is consistent to Malmendier and Tate (2008), and overconfident CEOs like to make deals. Like Usual (2011), Model 1 also shows the over-leverage decreases the likelihood of making acquisitions, represented by the coefficient of -0.178 of Overleveraged dummy (significant at 1%). In Model 2, the coefficient of the interaction variable of overconfidence and Overleveraged dummy is positive and significant at 10%. And the coefficient of interaction variable of overconfidence and Underleveraged dummy is negative; but, insignificant. This partially explains that the degree of leverage deviation does not give or reduce the

enthusiasm of overconfident CEOs to make mergers and acquisitions.

On the other hand, from Model 3, no significant result shows overconfident CEOs care about the relative size of the firm they bid. However, we find underleveraged firms are likely to bid larger target. In Model 4, the interaction variable of Over67 and Overleveraged dummy shows that overconfident CEOs are likely to merge smaller firms when their firms are overleveraged, shown by the coefficient -0.389 (significant at 5%).

Other explanatory variables, lagged one year, in the probit and tobit regressions are following previous studies such as Harford (2005), Malmendier and Tate (2008), Uysal (2011). Including Sales as a measure of acquirer firm size, Harford (1999) concludes that large firms are more likely to make M&A decisions. Apart from Uysal (2011) variables, i.e. Average Market Leverage, Market-to-Book, EBITDA/TA, Industry M&A Liquidity and Herfindahl Index, we also include stock return as the control variable for Over67 (Hirshleifer, Low, and Teoh, 2012). Findings are similar to the previous literature. The three-year Average Market Leverage level is negatively associated with the likelihood of acquisition activity, and also profitable firms are likely to conduct acquisitions. Firms with higher Market to Book ratio are likely to involve in merger and acquisitions and it is also likely to merge with larger firms.

In sum, the results of this section show that overconfident CEOs are likely to make deals; but if

their companies are overleveraged, they incline to acquire smaller firms.

4.3. Does leverage deviation affect the overconfident CEOs' method payment?

This section presents results of the relationship between deal financing method and overconfidence and its interaction to leverage deviation. In the sample of acquisitions, Table 5 reports the probit analysis of the likelihood of an all-stock offer in odd-numbered columns, and even-numbered columns display the tobit analysis on the percentage of cash used in the offer. Following Malmendier and Tate (2005 and 2008) and Malmendier, Tate and Yan (2011), CEO Stock Ownership and CEO Vested Options are included as the control variables. Since Malmendier, Tate, and Yan (2011) and Hirshleifer, Low and Teoh (2012) show that the CEO overconfidence proxy 'works well after controlling for past stock return performance', we also include Stock Return in the multivariate analyses. Furthermore, following Hartford, Klasa and Walcott (2009) and Uysal (2011) which show a number of factors influence the method of payment in acquisitions, including acquirer firm size, profitability, market-to-book ratio, relative size of the target to the acquirer, target firm public status, and dummy variables for cross-industry acquisitions and competent bidders. Besides, Following Uysal (2011), Industry M&A Liquidity and Herfindahl indexes are also included in the multivariate analyses. In all regressions, dummies account for the macroeconomic changes.

Table 5. CEO overconfidence, leverage and acquisition payment

Variable	Model 1	Model 2	Model 3	Model 4
Over67	0.132 (0.181)	0.217 (0.095)*	-0.178 (0.169)	-0.383 (0.024)**
CEO stock ownership	0.001 (0.271)	0.001 (0.292)	-0.001 (0.536)	-0.001 (0.527)
CEO vested options	0.000 (0.252)	0.000 (0.229)	0.001 (0.087)*	0.001 (0.075)*
CEO tenure in month	-0.001 (0.175)	-0.001 (0.184)	0.001 (0.076)*	0.001 (0.097)*
Over67* Overleveraged Dummy		-0.448 (0.069)*		0.640 (0.050)**
Over67* Overleveraged Dummy		0.009 (0.969)		0.332 (0.258)
Overleveraged Dummy	0.354 (0.007)***	0.570 (0.002)***	-0.446 (0.011)**	-0.750 (0.002)***
Underleveraged Dummy	0.012 (0.916)	0.005 (0.978)	0.060 (0.692)	-0.109 (0.610)
Average Market Leverage	-0.089 (0.791)	-0.139 (0.682)	0.111 (0.796)	0.052 (0.903)
Sales	-0.100 (0.013)**	-0.096 (0.017)**	0.199 (0.000)***	0.198 (0.000)***
Market to Book ratio	0.144 (0.000)***	0.141 (0.000)***	-0.249 (0.000)***	-0.257 (0.000)***
Profitability	-1.832 (0.000)***	-1.847 (0.000)***	3.514 (0.000)***	3.668 (0.000)***
Stock return	-0.053 (0.409)	-0.055 (0.387)	0.100 (0.259)	0.101 (0.254)
Target is a public firm	1.513 (0.000)***	1.515 (0.000)***	-2.224 (0.000)***	-2.240 (0.000)***
Target is a Private firm	0.973 (0.000)***	0.986 (0.000)***	-1.323 (0.000)***	-1.337 (0.000)***
More than one bidder	-0.802 (0.016)**	-0.808 (0.015)**	1.055 (0.017)**	1.174 (0.008)***
Industry M&A Liquidity	0.000 (0.523)	0.000 (0.494)	0.000 (0.696)	0.000 (0.650)
Herfindahl Index	-0.425 (0.360)	-0.411 (0.375)	0.389 (0.485)	0.533 (0.340)
Observation	1432	1432	1432	1432

*, **, *** are significant at 10%, 5% and 1% level.

The results in Table 5 indicate that the Overleveraged dummy and its interaction with CEO overconfidence significantly affect the payment method. In Model 2, overleveraged firms are 57% (significant at 1%) likely to offer an all-stock deal. In Model 4, the tobit regression explains the fraction of the deal paid for with cash. The coefficient of -0.75 (significant at 1%) for Overleveraged dummy shows when a firm is overleveraged, it has a lower propensity to pay for an acquisition with cash or a mix of cash. However, the coefficients of 45.7% (Model 1) and 63.9% (Model 2) for the interaction of Overleveraged dummy and Over67, both coefficients are significant at 10% but just slightly higher than 5%. These results show that when a overleveraged firms is managed by an overconfident CEO, it is less likely to offer an all-stock deal and it is likely to pay for the deal with higher proportion of cash. Neither Model 1 nor Model 2 shows that Underleveraged dummy and its interaction to Over67 do not have statistically significant estimates in this regression. Although in Model 2 and 4, Over67 dummy alone represents overconfident CEOs are likely to finance the acquisition by stock, it shows insignificant results in Model 1 and 3.

Collectively, these findings indicate that the joint effect of CEO overconfidence and the degree of leverage deviation influence the method of acquisition financing. In general, overleveraged firms incline to pay for the deal with all stock or increase the stock component in their acquisition deals, supporting Hartford, Klasa and Walcott (2009) and Usual (2011). If an overleveraged firm is managed by an overconfident CEO, it would unlikely to pay for the investment by stock or increase the cash component in their acquisition deals, however. This finding supports Heaton (2002) and Malmendier, Tate and Yan (2011) reporting that overconfident managers are less likely to use stock as the financing method. Furthermore, like Usual (2011), we do not find that underleveraged firms necessarily offer a higher fraction of cash in their deals. Therefore, these findings suggest that the target leverage concept is not considered by overconfident CEOs, for whom it seem less difficult to raise cash or debt for acquisitions. Therefore, CEO overconfidence plays an important role in how acquirers structure their deals.

As to other variables, firms character variables such as Market to Book ratio, profitability, acquirer firm size show significant effect on the a merger financing method. Large firms and profitable firms are less likely to finance deals with stock and they are likely to pay for the deal with larger fraction of cash. However, firms with higher Market to Book ratio are likely to finance the acquisition with stock and they are likely to pay for the deal with larger fraction of stock. For those firms, deal character variables, target public status and the number of bidders also have significant effect on merger payment. Consistent with Usual (2011), we also find that firm pay for the deals by including a larger fraction of cash when there are multiple bidders for the target. These findings support cash acquisition strategy to deter bidders (Berkovitch and Narayanan, 1990). Also, these findings are consistent with positive effects of growth opportunities on stock acquisitions (as reported in Martin, 1996) and stock overvaluation (Shleife and

Vishny, 2003), that firms are likely to use stock to finance their acquisition projects once their Market to Book ratios are high.

4.4. Does leverage deviation affect the overconfident CEOs' acquisition performance?

This section studies whether the degree of leverage deviation has a significant effect on the quality of the acquisition made by overconfident CEOs. We use three-day-window and five-day-window Cumulative Abnormal Return (CAR) to exam market reactions to acquisition announcements. Table 6 presents mean CAR values for the whole sample and various subsamples.

To demonstrate the influence of CEO overconfidence and leverage deviation, multivariate regressions are used to show the relation between interaction with CEO overconfidence and CAR. Following Hartford, Klasa and Walcott (2009) and Usual (2011), we include Stock Return and Market-to-Book variables and variables that control for acquirer, target, deal, and industry characteristics. Table 6 reports the coefficient estimates of regressions of CAR on leverage deviation, annual dummies, and control variables. The models have an R² of 5.3% for all acquisitions, 7.8% for firm acquisitions, and 4.8% for asset acquisitions. These are comparable to CAR regressions in previous studies.

The interaction of Over67 and Overleveraged dummy is positively associated with 3-day-window CAR. The coefficient of the interaction variables of Over67 and Overleveraged dummy is 0.021 (significant at 10%) (for Model 1), 0.024 (significant at 5%) (Model 3) and 0.012 (significant at 5%) (Model 4). The coefficients of the interaction variables of Over67 and Overleveraged dummy are insignificant. The findings show that if the overleveraged firms are managed by overconfident CEOs, they are not likely to make value-destroying acquisitions.

A 5-day-window CAR is also used as the dependant variable in Model 5. The coefficient of the interaction variable of Over67 and Overleveraged dummy is 0.023 (significant at 5%). Also, the coefficient of the interaction variables of Over67 and Overleveraged dummy is -0.004, but it is insignificant. This result enhances that if the overleveraged firm is managed by an overconfident CEOs, it is not likely to make value-destroying an acquisition.

This result also provides another explanation to Usual (2011), which find overleveraged firms are seeking value-adding acquisitions. Furthermore, as Malmendier and Tate (2008) find that overconfident managers do bad jobs in mergers and acquisitions, the current research provides a method to mitigate this problem by using firm's capital structure design and also to make overconfident CEOs facing tighter debt restrictions, which in their turn may 'force' CEOs to seek better investment opportunities. Besides, both 3-day-window and 5-day-window CARs are negatively related to the Market-to-Book ratio, which is consistent with Masulis, Wang, and Xie (2007). Also, according to our findings, if the target is a public firm, the acquirer firm's value is destroyed, supporting the findings of Fuller, Netter, and Stegemoller (2002).

Table 6. CEO overconfidence, leverage, acquisitions and market reaction

<i>Parameter</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>
Over67	-0.002	0.001	-0.005	-0.002	-0.004
	(0.674)	(0.836)	(0.416)	(0.721)	(0.571)
CEO stock ownership				0.000	0.000
				(0.516)	(0.377)
CEO vested options				0.000	0.000
				(0.585)	(0.686)
CEO tenure in month				0.000	0.000
				(0.870)	(0.512)
Over67* Overleveraged Dummy	0.021		0.024	0.026	0.028
	(0.066)*		(0.046)**	(0.035)**	(0.033)**
Over67* Overleveraged Dummy		0.002	0.008	0.001	-0.004
		(0.819)	(0.433)	(0.897)	(0.739)
Overleveraged Dummy	-0.010		-0.010	-0.008	-0.012
	(0.212)		(0.231)	(0.370)	(0.221)
Underleveraged Dummy		0.003	0.000	0.000	0.002
		(0.724)	(0.990)	(0.963)	(0.814)
Average Market Leverage				-0.002	-0.012
				(0.903)	(0.490)
Sales				-0.002	-0.003
				(0.336)	(0.203)
Market to Book ratio				-0.008	-0.008
				(0.000)***	(0.000)***
Profitability				0.059	0.071
				(0.021)**	(0.010)***
Stock return				0.005	0.009
				(0.124)	(0.011)**
Target is a public firm				-0.035	-0.041
				(0.000)***	(0.000)***
Target is a Private firm				-0.004	-0.009
				(0.516)	(0.153)
More than one bidder				0.002	0.003
				(0.891)	(0.893)
Hostile				0.008	0.002
				(0.721)	(0.934)
All cash offer				-0.001	-0.004
				(0.792)	(0.449)
Industry M&A Liquidity				0.000	0.000
				(0.032)**	(0.008)***
Herfindahl Index				0.024	0.019
				(0.237)	(0.393)
Observation	1377	1377	1377	1377	1289

*, **, *** are significant at 10%, 5% and 1% level.

4.6. Robustness

This subsection examines alternative variables that could explain the findings reported in the paper. We follow Hirshleifer, Low, and Teoh (2012) to identify Overconfident CEOs as a CEO exercises exercisable options which are at least 67% in the money once only.

In the robustness test of probit and tobit regressions for acquisition activities, the coefficient of the interaction variable of CEO overconfidence and overleveraged dummy is 0.170 and is marginal insignificant, meaning although overconfident CEO is acquisitive, but no evidence they are pose the same when their firms are overleveraged, the results is similar to that in section 4.2. The coefficient of the interaction variable is 0.3894, significant at 5%, indicating that if the firm is overleveraged, overconfident CEOs are less likely to make large deals. This result is also the same as in section 4.2.

In the robustness test of probit and tobit regressions for acquisition payment, the coefficients of the interaction variable of CEO overconfidence and overleveraged dummy for probit and tobit regression is, respectively, -0.735, significant at 5%, but very close to 1% and 0.715, significant at 5%. The robustness check of merger

and acquisition payment highlights the results in section 4.3 and represent overconfident CEOs are less likely to pay for their investment project with all stock or larger proportion of stock.

The market reaction is measured by 3-day event window and 3-day event window CAR. The coefficients of the interaction of overconfidence and overleveraged dummy are 0.0172 significant at 10% for the 3-day event window CAR, and 0.009, marginal insignificant, for the 5-day event window CAR. The reason for the marginal significant is that the lower of requirement to the define CEO overconfidence, the consequence of which is nearly 60% of CEOs in our sample are identified as overconfidence, Thus the results is relatively noisy.

On the other hand, following Campbell et al. (2011) and Ahmed and Duellman (2012), the 'firm level of investment' overconfidence to run the same regressions, as Campbell et al. (2011) state that 'firm investment may also contain information about CEO optimism. We classify CEOs as having low (high) optimism if their firm is in the bottom (top) quintile of firms sorted on industry-adjusted investment rates for two consecutive years'. This overconfidence proxy works well in the probit regression on acquisitiveness and payment, but the results tobit regression of merger size and fraction of cash in the payment are statically insignificant.

And the result of market reaction using this proxy is also getting the insignificant. This proxy is an indirect measurement of CEO overconfidence and it also increase the number of 'overconfident CEOs' in my sample and make more noise in the results.

5. CONCLUSION

This paper goes beyond the previous studies on the interdependence of financing and investment decisions, such as Harford, Klasa, and Walcott (2009) and Uysal (2011). Therefore, this research contributes to studies on the role of CEO overconfidence and capital structure and their joint effect on firms' investment decisions. Although no solid evidence shows that high positive leverage deviation reduces likelihood of making acquisitions for overconfident CEOs, it does restrict overconfident CEOs to make larger targets. On the other hand, unlike the previous studies, overconfident CEOs are less likely to use stock to finance the deal, because of their biased underestimation on their firm's value.

This study also contributes to the merger and acquisitions studies by comparing overleveraged and underleveraged firms. Overleveraged firms managed by overconfident CEOs are not likely to make value-destroying acquisitions. This finding suggests that to restrict overconfident CEOs' investment distortion, the capital structure design can be a method, since high positive leverage deviation can reduce the capacity of raise debt so that reduce the chance that overconfident CEOs making bad acquisitions.

Finally, this study is related to studies on CEO overconfidence literatures. Previous studies report that overconfident CEOs are likely to make low quality acquisitions; e.g. Roll (1986) and Malmendier and Tate (2008). Suggestions are made for mitigating the value-destroying effect coming from the CEO overconfidence. Our suggestions are related to the link between the consequences of debt contract restrictions and the overconfident CEOs' investment activity; as initiated by Sunder Sunder and Tan (2010).

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