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Keywords: Valuation Adjustment Mechanism (VAM), Mergers and Acquisitions (M&A), Myopia
JEL Classification: L12, G32

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* Preliminary draft, please do not distribute.

1. Introduction

Since 2015, the number of disclosed M&A deals involving Chinese listed companies has stabilized at more than 6,300 each year. In 2021, 7,493 M&A deals have been disclosed, a year-on-year increase of 12.36%. Among them, 5,545 deals were disclosed, and the total transaction amount was US$415.323 billion, up 1.19% year-on-year. To effectively reduce information asymmetries and provide incentives for both parties to the transaction, Valuation Adjustment Mechanism agreements are often used as a commonly used tool in M&A cases. A Valuation Adjustment Mechanism agreement is a set of terms agreed between the parties to a financing transaction to ensure their interests in the face of future uncertainty. For example, the M&A party require an amount of compensation or an exit price based on the reduction in the underlying valuation. Existing research has shown that VAM agreements can, to some extent, facilitate effective information disclosure, reduce risk for both parties to the transaction, provide effective signals to the market, protect small and medium-sized investors, and provide incentives and constraints on corporate management (Xu, Nianxing et al. 2008; Lv, Changjiang and Han, Huibo, 2014; Sun, Yuanfei et al. 2015). With the rapid development of the Chinese M&A market, currently, more than 90% of domestic M&A deals include VAM agreements.

The classic Valuation Adjustment Mechanism agreement includes a so-called 'performance compensation undertaking', whereby the acquired firm undertakes to achieve a certain level of profit within a certain number of years after the completion of the M&A transaction, and to compensate the acquiring company for the agreed amount if the undertaking is not met by the end of the term.[1] Existing studies have focused on the positive effects of performance commitments, such as providing effective incentives to the management of the target company (Kohers and Ang, 2000), enhancing information transfer to outsiders to increase the success rate of the transaction (Huang Bo et al., 2015), etc. However, little literature focused on the negative effects and implications of performance compensation commitments. In this paper, we hand collected VAM data of M&A transactions of Chinese listed companies from 2010-2019 and find that pressure of high performance targets have induced myopia by firm managers. The acquiring firms focused excessively on performance in the short term at the expense of

[1] For example, on 5 December 2015, Shenzhen Sangda Industrial Company Limited (000032) announced the acquisition of 100% equity interest in Wuxian Tongxun for RMB 60,154.3 million. According to the valuation report issued by China Enterprise China, Wuxian Tongxun has committed that the actual net profits of the subject assets after deducting non-recurring gains and losses in 2015, 2016 and 2017 will not be less than RMB 38,363,000, RMB 49,938,100 and RMB 55,496,200 respectively, or a total of not less than RMB 143,797,300. If the performance target is not met within the commitment period, the target firm's shareholders are required to make up the amount in cash within 30 working days after the announcement.

improving the long term competitiveness of the company. In addition, we suspect that there is collusion motives by shareholders holders from both acquiring and target firms. The shareholders intentionally set high performance targets to achieve personal benefits. Supportive evidences include that, in M&A cases with over-committed VAM, the target company shareholders obtained high premium, and the acquiring firm shareholders increased equity pledge.

In order to measure the extent to which performance commitments are unachievable and unsustainable, this paper proposes to measure the degree of 'over commitment' by the ratio of the subject company's promised net profit in the first year to the company's actual realised in practice net profit in the year prior to the commitment period, and defines the observations with a performance commitment ratio in the top 20% of the full sample set as 'over committed' transactions. It should be noted that the net profit of the subject company is not collated and disclosed in a public database, and this part of the data sample set is manually collected and matched.

Based on the measure of 'over commitment', this paper first explores the performance reversal and myopia (shortsightedness) effects of the acquiring companies. We find that the performance of acquisitions with high commitments declines significantly after the end of the commitment period, as the return on total assets (in other words ROA) and return on total assets growth rate of the over committed group decline by 787% and 244% respectively after the end of the commitment period compared to the level before the end of the commitment period, indicating that the over committed performance does not bring sustainable performance improvement to the company. There is a strong myopia effect as the investment horizon is distorted.

The second part examines the collusion motives of both parties to the transaction to engage in unachievable commitments and the means by which each respective party realises benefits from this. We measure the profit motive of the acquired company and the acquiring company through using the acquisition premium rate and the incremental market value of the equity pledge after the start of the commitment period, respectively. The empirical results show that the acquired party can obtain a higher premium acquisition payment by utilising excessive commitments in the transaction, while the acquirer can obtain more free cash flow through equity pledge financing after completing the transaction with excessive commitments, which also effectively circumvents the policy constraint of shareholders' shareholding reduction in

listed companies. Both parties to the transaction are strongly motivated by self-interest, using high commitment value Valuation Adjustment Mechanism agreements as a vehicle for signaling and taking advantage of insiders' control and confidence to gain their respective benefits.

In an extended section, we explore the characteristics of companies prone to pledging excessive commitments in M&A transactions, and we conclude that: first, acquirers with prominent majority shareholder interests and higher equity concentration are more likely to accept excessive commitment pledges; second, excessive commitment is more likely to occur in cross industry M&A transactions, especially in cross industry deals of companies in light-asset industries by traditional industry players; and third, acquirers with higher valuations but poorer earnings growth are more likely to accept over commitment.

This paper contributes to the literature from three dimensions.

The rest of the chapter is structured as follows: Part II introduces the design of the empirical test, detailing the data and specific variables used, Part III analyses the performance reversal and the short-sighted investment horizon effects of excessive commitments, Part IV explores the collusive motives of the parties involved in the transaction and the ways in which the benefits are realised, and Part V further analyses, as an extension, the characteristics of companies that engage in over commitment transactions.

2. Data and variables

2.1. Sample selection

This paper selects a sample set of M&A transactions by listed Chinese companies with performance compensation commitment provisions during the period 2010-2019, covering the Shanghai and Shenzhen Main Board, Small and Medium Enterprise (SME) Board and GEM trading markets.

In 2008, the Securities Association of China adopted the Measures for the Administration of Major Assets Reorganization of Listed Companies, which implemented relevant regulations on performance undertakings. After 2009, the number of M&A deals of listed companies containing performance undertakings gradually increased; therefore, the year 2009 was one of the most important moments when we determine the sample set for the empirical test. In

addition, the time window of this paper covers the three stages of performance commitment: before the commitment period, during the commitment period, and after the commitment period, requiring the data of the research subjects to be available within all three stages. In order to ensure that companies have disclosed at least one year of financial data after the end of the commitment period, the end year of the commitment period should be earlier than 2020. Based on this, we select the completed M&A deals with announcements after January 1st 2010 and end of the commitment period by 31 December 2019 as the sample set for the study. Information on major asset restructuring and financial and stock data and corporate governance data of listed companies were obtained from the CSMAR database, and data on performance commitments were manually collated and matched. In addition to this, the sample set was screened out in this paper based on the following criteria:

1) A sample set of transactions where the percentage of equity acquisition is less than 10%; 2) A sample set of transactions where the acquirer is a financial enterprise; 3) A sample set of transactions where the purpose is to list using a shell firm; 4) A sample set of transactions where there is missing information on performance commitments or financial data; 5) A sample set of transactions where the actual realised in practice net profit of the subject company in the year prior to the commitment period is negative, or where the promised net profit in the first year of the commitment period is not positive[2]; 6) A sample set of transactions where the ratio of the promised net profit in the first year of the commitment period to the actual realised in practice net profit in the year prior to the commitment period exceeds 100 times.[3]

In the case of simultaneous M&As of multiple subject companies on the same day, we consider all the subjects as one asset package and all the transactions within that asset package as a sample set of transactions to be studied. The valid sample set comprises a total of 1,144 transactions involving 856 listed companies, of which 643 companies have made only one acquisition and the remaining 501 M&A transactions were completed by 213 companies. In addition, extreme values (highest and lowest percentile) have been replaced with the 99th percentile and 1st percentile respectively, from all continuous variables based upon the above criteria.

To facilitate the identification of key time points, this paper defines the time when a firm

[2] Since the commitment of performance should be non-negative numbers. If the actual net profit in the year before the commitment period is negative or the committed net profit is zero in the first year of the deal, the commitment ratio calculated according to the calculation method defined in this paper will be negative or zero. , which will bias subsequent regressions. Therefore, in order to ensure the rigor of the regression results, only the positive commitment ratio is reserved in the empirical research part of this paper.

[3] Transactions with commitment ratios above 100 are treated as extreme cases and therefore excluded from the full sample.

completes a M&A deal (*id est* M&A announcement) as t_0, and the first year of the commitment period as t_0+1. Generally firms will make performance commitments which range from two to three years in length, and this paper defines the year in which the performance commitment ends as t_1. The performance reversal study revolves around t_1, three or five years before and after.

2.2. Definition of variables

2.2.1. Performance commitment ratio (or simply 'ratio')

Based on the analysis of actual realised in practice M&A cases, we find that most M&A transactions are paid for installments and are highly correlated with performance in the first year. Most of the subject companies tend to start raising the performance bar in the first year of the commitment period due to short term interest considerations and over commit in order to inflate the valuation of the company. Thus, we propose a quantitative measure of the level of performance commitment, calculated by dividing the subject company's committed net profit in the first year of the commitment period by the subject company's actual realised in practice net profit in the year prior to the commitment period, and the resulting ratio is defined as the 'Commitment ratio', which can also be used to measure the degree of over commitment when the use of the Valuation Adjustment Mechanism agreement has been distorted. In addition, the ratio of the average value of the acquired company's committed annual net profit for the first three years of the commitment period divided by the average value of the acquired company's actual realised in practice annual net profit for the first two years of the commitment period was used as a proxy variable for the commitment ratio to test the robustness of the empirical findings.

The data on performance commitments were collected manually and were sourced from announcements made by listed companies regarding each M&A disclosure. The mean value of the performance commitment ratio for the sample set of 1,144 transactions studied in this chapter is 3.202 with a standard deviation of 5.513, and the specific descriptive statistics are shown in Table 1.

[Insert Table 1 about here]

In our selected sample set for the study, the ratios of performance commitments have a Poisson distribution (as shown in Figure 1), with most ratios concentrated in the (0,3) interval and a few deals with commitment ratios exceeding three times. The vertical line in Figure 1 indicates

the threshold that places the sample set in the top 20% of the full sample set from high to low, *id est* the 80% quantile, which corresponds directly to the ratio of 3.027. As shown in the figure, the top 20% of the sample set have significantly larger commitment ratios, so we define the top 20% of the sample set as 'over committed deals'. The dummy variable *Over commitment* is set to 1 if the observation is 'over committed', in other words excessive commitment, otherwise it is set to 0. It is noteworthy that of the 213 firms that have made multiple acquisitions, 86 have made both 'over committed' acquisitions and relatively reasonably committed acquisitions (acquisitions with an M&A ratio contained within the bottom 80%).

As the focus of this paper is on over commitment transactions and their impact, the dummy variable *Over commitment* is used as the main regression variable in the empirical part of the study.

[Insert Figure 1 about here]

2.2.2. Firm performance

Corporate performance is the relative efficiency of a company's inputs and outputs over time and is generally measured in the literature using return on total assets (Return on Assets (ROA)) and return on total assets growth (Return on Assets (ROA) growth). Companies that maintain high levels of Return on Assets (ROA) and Return on Assets (ROA) growth rates have a steadily increasing ability to continue to grow and their operating performance should be expected to continue to improve.

As most of the acquired parties are unlisted companies, financial data is not available using public platforms. The acquisition announcements of the acquiring company generally disclosed net profit data of the subject company for 2-3 years prior to the acquisition, with some announcements disclosing net profit data of the subject company ranging from 1-5 years after the completion of the acquisition, but data on the total assets of the subject company were generally not available. We manually collected all available net profit data of the subject companies in our sample set, and based upon 1102 transactions (96.32% of the aforementioned total sample set data), we calculated that the acquired company's average net profit contribution to the acquiring company during the commitment period amounted to 168%, *id est* the net profit of the subject company was to a certain extent also used to subsidise the losses incurred by the other businesses of the acquiring company, which shows that in our M&A sample set the significance of the acquisition to profit contribution of the listed company is large, and the

profit fluctuation of the acquiring company comes to a great extent from the fluctuation of the profit of the acquired company.

Taking into account the significant impact of the acquired company on the performance of the acquiring company and the publicly available financial data of the acquiring company, the empirical part of this chapter takes the performance of the acquirer listed company as the main consideration of this study, with corporate performance and financial data obtained from the CSMAR database. In this paper, the Return on Assets (ROA) data of the acquirers were selected for empirical analysis for each transaction for three years before and after the end of the commitment period and five years before and after the end of the commitment period respectively. As shown in Table 1, the mean and median Return on Assets (ROA) for the full sample set during the five year window before and after the end of the commitment period were 2.355 and 4.036 respectively, indicating that most acquirers had positive firm performance during the time horizon under study, while the mean and median Return on Assets (ROA) growth rates were -0.996 and -0.133 respectively, indicating that most acquirers had declining levels of performance and sluggish growth over the time horizon under study.

2.2.3. Motivation for collusion, and how each party benefits

This paper will empirically investigate the profit motive of ‘over commitment’ in mergers and acquisitions by both the acquiring company and the acquired company. For the target (acquired) party, the company obtains a ‘high valuation’ through ‘high performance commitments’, which in turn result in a ‘high acquisition premium’ in the asset transaction, so we use the ‘acquisition premium’ as a measure of the target company's collusive interest motive, which is calculated as the ratio of the actual realized in practice acquisition price divided by the book value of the subject company's assets. Acquisition premium (labeled ‘Premium’) data was available for a total of 1093 transactions (95.54% of the aforementioned total sample set data) with a mean value of 8.566 and a standard deviation of 12.265.

For the acquirer, according to the signaling theory, the company uses the ‘high promise’ of the subject assets for the future and the ‘high valuation’ given by the appraisal agency as good news to release positive signals of high growth to the market, thereby pushing up the share price of the acquirer or enhancing investor confidence, so that the major shareholder can use the equity pledge financing to obtain more free funds. This paper therefore measures the collusion profit motive for acquirers to accept excessive commitments from the perspective of equity pledges, specifically the ‘Pledge value increase’, which is calculated as the difference

between the annual average value of the market value of the acquirer's pledged equity in the three years following the completion of the acquisition and the annual average value of the company's pledged equity in the three years prior to the completion of the acquisition, divided by the size of the company in the year prior to the acquisition. The difference in the three-year averages is due to the fact that the vast majority of the data in the sample set are for major asset acquisitions, all of which have long negotiation and approval cycles; after the completion of the acquisition, the process of a directed share issue to accompany the acquisition takes longer and varies significantly between cases. In addition, controlling shareholders of companies generally adjust their equity pledges gradually, and less frequently adjust them substantially within a short period of time after an acquisition, so we use a medium to long term mean measure that better reflects the trend characteristics of equity pledges. The reason for using market value of equity pledges rather than the number of equity pledges is that it is more representative of the free cash flow available to shareholders of listed companies due to individual differences in share prices. From a practical point of view, when shareholders pledge their equity in securities, banks and other financial institutions, banks generally assess the value of the equity to be pledged based on a moderate "discount" to determine the amount of financing, so the market value of the equity pledge represents, to some extent, the maximum amount of free funds available to shareholders of listed companies. Data are available for the full sample set of equity pledged market value increase (labelled Pledge value increase), with a mean and variance of 0.565 and 1.156 respectively for this variable.

2.2.4. Control variables

With reference to the empirical study conducted by Zhang Qin (2020) on performance commitment, this paper controls for factors that may affect Merger and Acquisition and firm performance in three main aspects of the empirical test: financial characteristics of listed firms, corporate governance and characteristics of the transaction, in order to enhance the reliability of the empirical results. The specific control variables include firm size, capital structure, firm growth, equity checks and balances, institutional investor ownership, relative transaction size, related transactions dummy, cash payment dummy, and financial report audit opinion dummy. The specific definitions of the variables are shown in Appendix 1. In the empirical regressions, all control variables are lagged by one period to exclude the effect of causal inversion.

3. Myopia: the reversal of performance

Valuation Adjustment Mechanism agreements were originally introduced to reduce transaction risk and to motivate management to commit to the long term development of the business, but if a company makes performance commitments in a VAM agreement that exceed what is achievable for normal development, the management, dominated by the controlling shareholder, may resort to a variety of means to achieve performance targets in the short term and overspend on future development in order to avoid compensation for the performance difference. The short-sighted management approach that results from such unjustified, excessive commitments means that it is difficult to deliver sustainable performance improvements for the firm, with the consequence that the firm's performance falls back and reverses after the end of the commitment period. Therefore, the core hypothesis of this paper is that firms that engage in over commitment transactions experience a more pronounced reversal in performance at the end of the commitment period.

In order to examine the possible negative effects of excessive performance commitments, in particular the issue of reversal of company performance after the completion of the transaction, we have compared the company performance of the acquirer and the acquired party during the three window periods before, during, and after the commitment period of the Merger and Acquisition transaction respectively. Subject to the availability of data, we selected the two years prior to the start of the commitment period, the three years during the commitment period and the two years after the end of the commitment period, totalling seven years, as the time windows for longitudinal comparisons.

As the subject party is not obliged to disclose separate financial information upon completion of the transaction, data such as its total assets are not available from public platforms, so we measure its performance using the value of annual net profit available. Figure 2 illustrates the trend in the average annual net profit the acquired firm committed to achieve and the net profit achieved in reality by the acquired firm over the stated period, with the sample set selected from transactions for which the subject company's data was available for that seven-year period (510 transactions in total, representing 44.58% of the aforementioned total sample set data). Figure 2 shows the trend of the average annual net profit promised and actually achieved in reality by the acquired firm during the stated period, the sample set was selected from the acquired firm. Broadly speaking, the value of the acquired firm’s promised net profit showed an upward trend year by year. However, in terms of actual realised in practice attained net profits, except for the first year of the commitment period in which there was a significant

increase in net profit compared with the previous year, from the second year of the commitment period, the actual realised in practice net profit of the acquired firm showed a decreasing trend each year, especially after the end of the commitment period. Essentially, it almost fell back to the firm level of performance before the beginning of the commitment period. In terms of the completion of the performance pledge, the actual realised in practice net profit in the first year of the commitment period far exceeded the pledged value, but the actual realised in practice completion value in the second and third years was only slightly higher than the pledged value, and with the end of the commitment period, the net profit value continued to fall; it can be seen that the target firm, in order to get most of the high premium payment, put more operational focus on the completion of the pledged performance in the first year, and analysing it from a long term perspective, the initial level of high profit growth is not sustainable.

[Insert Figure 2 about here]

The acquirers we focus on are publicly listed companies with publicly available financial data such as total assets and so on. From a performance evaluation perspective, we focus on the trend of their return on total assets (Return on Assets (ROA)) to enhance the comparability of the results. Figure 3 illustrates the trend of the Return on Assets (ROA) on total assets of the acquiring company over the seven years before, during and after the commitment period. The graph shows a clear reversal effect in the company's performance after the start of the commitment period, with a declining trend year on year and a significant drop to the negative range at the end of the commitment period.

Based on the availability of total assets and control variables, in the empirical test section, we focus on changes in the performance of acquirer-listed companies to test the specific impact of the overcommitment ratio on the acquirer's return on total assets Return on Assets (ROA). We develop the following fixed benefit OLS regression model.

$$ROA_{jt} = \beta_1 * Over\_commitment_i + \beta_2 * Over\_commitment_i * Post_t + \beta_3 * Controls_{jt-1} + Firm_j + Year_t + \varepsilon_{ijt} \quad (1)$$

The explanatory variable ROA_{jt} is the return on total assets of acquirer *j* in year *t*, ranging from three years before and after the end of the commitment period for transaction *i* (completed by listed company *j*), and the explanatory variables $Over\_commitment_i$ and $Post_t$ are both dummy variables. When year *t* is the year after the end of the commitment period, $Post_t$ takes

on the value of 1, otherwise it takes on the value of 0. The control variables are selected as shown in Table 1, with $Firm_j$ and $Year_t$ denoting firm and year fixed effects to capture the fixed characteristics of the control firms and the common year shock to all deals. In addition, 213 (33%) of the firms in the sample set appeared to have made multiple mergers and acquisitions, so in further regressions we included deal fixed effects $Deal_i$ based on the unique number of each deal to strictly exclude the effect of fixed characteristics of the same deal.

The results of the impact of over commitment on the return on total assets (Return on Assets (ROA)) of the acquiring company are shown in Table 2. Columns (1) - (3) in Table 2 are selected for regression testing for three years before and after the end of the commitment period (t_1). The results in column (1) show that the coefficient of the $Over\ commitment * Post$ cross product term is -6.874, which is significantly less than zero, indicating that the Return on Assets (ROA) level of the over commitment group (*id est* the sample set with the top 20% of the performance commitment ratio) in the three years after the end of the commitment period compared to the end of the commitment period) declined by 6.874 percentage points and hence a negative reversal in firm performance occurred. The regression in column (2) includes Deal FE to capture the impact of fixed effects of the same deal. Since each deal corresponds directly to only one *Commitment ratio*, the *Over commitment* dummy cannot be estimated in the regression, and the coefficient on the $Over\ commitment * Post$ cross product is similar to that of the baseline regression in the first column, suggesting that even for firms with multiple Merger and Acquisition deals (within firm), over commitment will lead to a larger reversal in performance.

[Insert Table 2 about here]

On this basis, with the inclusion of control variables in the regression in column (3), the cross product term remains significant at the 1% level but takes on a value of -2.9, indicating that the level of Return on Assets (ROA) for the over committed group falls by 2.9 percentage points in the three years following the end of the commitment period compared to the end of the commitment period. As can be seen from Table 1, the average Return on Assets (ROA) of the companies in the sample set is only 2.355% and the negative effect of the reversal of performance due to over commitment is 1.23 times the average Return on Assets (ROA).

As a robustness test, we selected data from regressions for five years before and after the end of the commitment period to test whether there is a performance reversal effect over a longer time window. As shown in column (4), the regression coefficient of the cross product term is

significantly negative at the 1% level and the coefficient is similar to that estimated in column (3), validating the hypothesis. To further demonstrate the robustness of the results, we replaced the dummy variable *Over commitment* with the original value of *Commitment ratio* for the regression, and the coefficient of the cross product term of the variable *Ratio* and *Post* remained significantly negative, see Appendix 2 for the results.

Figure 4 visualises the key findings from Table 2, where we have divided all deals into two main groups, the over commitment group and the other deals group, based on the size of their performance commitment ratios, with the grouping threshold being the 20% quantile of the full sample set. The comparison chart shows that the average Return on Assets (ROA) of the acquirers in the over commitment group fell more sharply after the completion of the transaction, with the average Return on Assets (ROA) falling into negative territory in the first year after the end of the commitment period and the reversal effect of the company's performance becoming more pronounced.

[Insert Figure 4 about here]

In addition to examining changes in acquirer ROA, we further explore whether over commitment affects the level of ROA growth rates.

The regression model in Table 3 is similar to Equation (1), except that the dependent variable is replaced with ROA growth rate from ROA and the remaining variables remain unchanged. As can be seen from the results, the over commitment group shows a reversal in ROA growth rate three years after the end of the commitment period. After controlling for control variables and transaction fixed benefits (column 3), the ROA growth rate of the over commitment group decreases by 0.83 percentage points in the three years after the end of the commitment period compared to the end of the commitment period, which accounts for up to 83% of the mean ROA growth rate (-0.996). The robustness of the findings is confirmed by the fact that column (4) of the regression test is still significant for the five years before and after the end of the commitment period. We thus find that not only does the over commitment group show a downward trend in ROA at the end of the commitment period, but the ROA growth rate also decreases significantly.

[Insert Table 3 about here]

4. Motives for collusion

Based on the analysis in the previous section, both parties to the transaction exhibit significant performance reversals as well as characteristics of short shortsightedness at the end of the commitment period, as measured from a long term investment perspective, which is contrary to previous academic studies on the incentive effect of performance compensation commitments and the synergistic effect brought about by Merger and Acquisition transactions. Therefore, in this section we delve into the reasons as to why both parties enter into the transaction, as insiders with control and information advantages, voluntarily enter into an over committed Merger and Acquisition transaction despite the greater likelihood of judging the long term performance of the underlying assets to be declining. How is this achieved? We then analyse and interpret this empirically.

4.1. Acquisition premium

Asset valuation of the target firm is required in Merger and Acquisition restructuring to inform the pricing of major asset acquisitions. The acquisition premium ratio refers to the ratio of the actual realised in practice price paid for the final transaction to the book value of the target firm. The higher the ratio, the stronger the willingness of the acquirer to buy, the higher the likelihood of the target agreeing to the transaction, and the higher the future earning capacity of the subject assets and the possible synergies arising from the transaction. The prices of Merger and Acquisition transactions in the market are mostly determined based on asset valuations provided by valuers, which rely on forecasted earnings data for future periods after the completion of the project, particularly in the case of the predominantly income approach to valuation, where there is a high degree of consistency between the results of performance commitments and earnings forecasts. Generally speaking, high performance commitments demonstrate the better asset quality of the subject company and the greater synergies that can be generated by the project in the future, resulting in higher valuation of the assets given by the relevant valuer and the finalised transaction price. Excessive performance commitments can therefore have a direct impact on asset pricing and acquisition premiums, allowing the target company to achieve higher returns through the acquisition.

We developed the following regression model, with the acquisition premium rate as the explanatory variable and *Over commitment*, a dummy variable for whether it is overcommitted, as the explanatory variable. OLS regression was used here to investigate the quantitative relationship, and the regression results are shown in Table 4.

$$Premium_i = \beta_1 * Over\_commitment_i + \beta_2 * Control_{jt_{0-1}} + +Industry_k + Year_t + \varepsilon_i \quad (2)$$

The acquisition premium ratio *Premium* is the ratio of the actual realised in practice acquisition price of the *i*th transaction (completed by listed company *j* in year t_0) to the book value of the underlying company's assets. The independent variable is the dummy variable *Over commitment*, which indicates whether the performance commitment ratio of the transaction is in the top 20% of the full sample set, *id est* whether it is an over committed transaction. The control variables selected are consistent with Table 1 and the time period is one year prior to the announcement of the Merger and Acquisition transaction (t_0) by the acquiring company. As the premium rate for each Merger and Acquisition is unique to a single deal and does not constitute panel data to include deal fixed effects, industry fixed effects or further firm fixed effects are included for firms to control for the general effect of industry characteristics or firm characteristics on acquisition prices.

[Insert Table 4 about here]

Table 4 presents the results of the estimation of this section, where column (2) with the inclusion of control variables and industry fixed effects, the coefficient of *Over commitment* is significantly positive with a figure of 6.62 at the 1% level, representing 77% of the mean (8.57). This represents a 6.62-fold increase in the level of takeover price premiums in transactions where over commitments are made compared to other transactions, *id est* listed companies are willing to pay a higher price for these highly committed companies. Columns (3)-(4) include firm fixed effects, and firms that have only done one Merger and Acquisition are automatically excluded, so the regression observations are substantially reduced. With the inclusion of firm control variables, the regression results are significant only at the 15% level, but in terms of coefficient order differences, they represent a more than 3-fold increase in the premium for over committed deals compared to other deals, even for the same firm.

[Insert Figure 5 about here]

Figure 5 visualises the results in Table 4, showing the average takeover premium for the over commitment group of deals and the average takeover premium for the other deals, with the average premium for the over commitment group being 14.52 times, significantly higher than

the premium levels for the other deal groups.

4.2 Equity pledge

High performance commitments reflect the higher value that the underlying company is expected to generate in the future, and therefore can also release positive signals of high growth to the market, attracting investors to enter and thus pushing up the share price and overall valuation of the listed company. Controlling shareholders of most listed companies will use equity pledges to raise free cash flow and to circumvent regulatory constraints on the number of large shareholders who can reduce their holdings, as well as transferring the risk of share price volatility to the financing institutions. As a result, the controlling shareholders of the acquirer have a strong incentive to accept Merger and Acquisition transactions with high performance commitments in order to obtain more free cash flow, backed by marketable equity pledges to finance the transaction, and to present a 'better' corporate outlook to the market.

To measure the impact of over commitment on acquirers' equity pledges, we take the increase in market value of equity pledges (*Pledge value increase*) as the dependent variable and bring it into equation (2) for regression testing. *Pledge value increase* is calculated as the difference between the annual average value of the market value of the equity pledged by the acquirer in the three years following the completion of the acquisition and the annual average value of the market value of the equity pledged by the company in the three years prior to the completion of the acquisition divided by the size of the company in the year prior to the acquisition, a variable that is unique for each transaction. The remaining variables are consistent with equation (2).

[Insert Table 5 about here]

As shown in the regression results in Table 5, controlling for the control variables and industry fixed effects (column 3), the coefficient on *Over commitment* is significantly positive with a value of 0.18 at the 1% significance level, indicating that the incremental increase in the mean market value of equity pledged by acquirers that entered into excessive commitment transactions three years after the completion of the transaction compared to companies that entered into non-over commitment transactions resulted in an 18% increase in their market value, in other words or 33% of the mean (with nominal value 0.57). The regression results remain significant with the inclusion of firm fixed effects in the regression and the coefficients are of similar magnitude, indicating that even for the same firm, the total market value of pledged equity increased significantly after the transaction in which the over commitment was undertaken.

[Insert Figure 6 about here]

Figure 6 visualizes the results in Table 5, showing the increase in market value of pledged equity in listed companies in the over committed group (deals in the top 20% of performance commitments) compared to the other groups, with the increase measured as the difference between the annual average value of the market value of equity pledged by the acquirer in the three years following the completion of the acquisition and the annual average value of the market value of equity pledged by the company in the three years prior to the completion of the acquisition, divided by the size of the company. It can be seen that the increment for the over commitment group is 0.66 units, which is higher than the 0.54 units for the other groups.

5. Characteristics of over-committed firms/transactions

In this section, we will further analyse over committed Merger and Acquisition deals, delving into the characteristics of companies that are more likely to accept or make over commitments. As most of the subject companies are unlisted and financial indicators are not compulsorily required to be disclosed after the completion of Merger and Acquisition, the data available on the subject companies is limited. Our main research subjects are the acquiring companies, specifically from three aspects: equity concentration, industry classification of the company, and market valuation and operating conditions of the company.

5.1. Equity concentration

In section 5.2, we conclude from regression tests that the market value of equity pledges of firms with high performance commitments rises significantly after the completion of the transaction, and that the higher the concentration of equity, the greater the scope for large shareholders to realize profits through, for example, equity pledges, and the higher the gains that can be made by accepting excessive commitments. On the other hand, in corporate governance, if a company wants to carry out a major asset restructuring, it usually requires more than a certain percentage of shareholders to vote in favour of the plan before it can be further implemented. Thus, the higher the shareholding of the majority shareholder, the more power it has and the less likely it is that the asset restructuring will be blocked by other shareholders. We therefore believe that the higher the acquirer's equity concentration, the more likely it is to accept an over committed Merger and Acquisition deal. In our empirical tests, we measure equity concentration as one hundred times the shareholding of the top ten shareholders of the acquiring company in the year prior to the announcement of the Merger and Acquisition transaction (t_0), with larger values of *Top10Holding* indicating higher equity concentration in

the company.

This paper performs a logit regression test by constructing the following equation (3) shown below:

$$prob(Over\_commitment_i) = \beta_1 * Top10Holding_{jt_{0-1}} + \beta_2 * Control_{jt_{0-1}} + Industry_k + Year_t + \varepsilon_i \quad (3)$$

The dependent variable is the dummy variable *Over commitment*, which indicates whether the deal has a performance commitment ratio in the top 20% of the full sample set, *id est* whether it is an over committed deal. The control variables selected are consistent with Table 1 and the time period is one year prior to the announcement of the Merger and Acquisition transaction (t_0) by the acquiring company. This part of the regression controls only to the industry fixed variable level as it is difficult to include firm fixed variables due to the small change over time in the top ten shareholder holdings of the same firm.

[Insert Table 6 about here]

The results of this part of the regression are shown in Table 6, with or without the inclusion of control variables and industry fixed variables, the coefficient on *Top10Holding* is equal to around 1.014 at the 1% significance level, indicating that for every 1% average increase in the acquirer's shareholding in the top ten shareholders in the three years prior to the acquisition, the likelihood of the ratio of performance commitments being in the top 20% increases to 2.757 times the original. Meanwhile, we replaced the dummy variable *Over commitment* with the original value of *Commitment ratio* for robustness testing using OLS regression and obtained similar regression results, indicating that companies with prominent majority shareholder interests and high equity concentration are more likely to accept over committed Merger and Acquisition. The robustness regression results are shown in the Appendix 3.

5.2. Cross-industry transactions

It is a common business strategy for companies to enter new business areas through mergers and acquisitions of existing companies of a large-scale in the process of development. This is less risky and has a shorter cycle time than independent research and development, and therefore the acquirer is more accepting of risk when undertaking cross industry mergers and acquisitions than in the same industry, and is more able to accept high performance commitments with high investment risks and high returns. In addition, when a company enters a new industry through a cross industry acquisition, it needs to release some positive signals regarding their entrance into a new industry to the market in order to give investors more

confidence, and high performance commitments can precisely provide a wide scope of quantitative performance indicators expected to show that the underlying assets can bring the company high growth performance expectations and sustainable growth development prospects, so we assume that acquirers are more inclined to make over committed transactions when making cross industry acquisitions.

Statistically, 23.2% of the transactions in the total sample set were cross industry acquisitions, with large variations when different industries crossed borders with each other. The asset light industries, including but not limited to software development, film and media, and communication services, are more volatile in terms of returns, have a wide scope for imagination and are prone to explosive growth, and are more likely to yield high returns with higher investment risks. For example, in the wave of digitalisation, many internet giants have been able to quickly capture new markets and acquire new customer groups under the innovative model of "Internet Plus", which has led to rapid growth in revenue and users in a short period of time. Traditional industries, on the other hand, have a high proportion of tangible assets and less volatility in the industry, making the overall development more stable and offering more limited scope for investors' imagination than asset light companies. When such traditional industry players acquire emerging asset light industry players through asset restructuring, the subject company is more able to make high performance commitments due to the need for high valuations and the possibility of high returns for the company itself. On the other hand, for acquirers, the acquisition of asset light companies is a breakthrough into new areas, and high performance commitments can give investors more room for imagination, so we believe that traditional industry companies are more likely to accept relatively over committed deals when acquiring companies in asset light industries, with this type of deal accounting for about 11.2% of the entire sample set.

We construct regression models (4) and (5) to test the effect of cross industry transactions on over commitment:

$$prob(Over\_commitment_i) = \beta_1 * Cross\_industry_i + \beta_2 * Control_{jt_{0-1}} + Year_t + \varepsilon_i \quad (4)$$

$$prob(Over\_commitment_i) = \beta_1 * Cross_i + \beta_1 * Cross\_Tranditional\_Light_i + \beta_3 * Control_{jt_{0-1}} + Year_t + \varepsilon_i \quad (5)$$

The independent variables $Cross\_industry_i$ and $Cross\_Tranditional\_Light_i$ are both dummy variables indicating whether transaction i is a cross industry Merger and Acquisition and whether it is a cross industry Merger and Acquisition of a light-asset company by a

traditional company, respectively. $Cross\_industry_i$ is equal to 1 if transaction i is a cross industry deal, otherwise equal to 0. $Cross\_Tranditional\_Light_i$ equal to 1 if transaction i is the acquisition of a company in an asset light industry by a company in a traditional industry, otherwise equal to 0. The remaining variables are the same as in equation (3). This section examines cross industry Merger and Acquisition. Only a small number of companies (42) have made both cross industry and same-industry Merger and Acquisition, so this section does not consider company-fixed variables, but only examines up to the level of industry-fixed variables.

[Insert Table 7 about here]

As shown in Table 7, columns (1)-(3) show the regression results for the cross industry univariate. After controlling for control variables and industry fixed effects, the regression coefficient for *Cross* is significantly 2.05 at the 1% level, indicating that the probability of making an over commitment is 7.73 times higher than the probability of an equivalent transaction which does not conform to this paper's definition of 'over commitment' when the transaction is a cross industry Merger and Acquisition. The regressions in columns (4)-(6) include the variable $Cross\_Tranditional\_Light_i$ and the regression results show that the effect of cross industry mergers and acquisitions on overcommitment mainly originates from mergers and acquisitions of traditional firms to firms in asset light industries, and after controlling for control variables and industry fixed effects, the coefficient of this variable is 1.72 and the t-value is 1.639, which is close to the 10% significance level, indicating that traditional firms are 5.57 times more likely to be overcommitted in cross industry Merger and Acquisition transactions with light-asset firms than in other cross industry transactions.

5.3. Firm valuation

Different valuation levels reflect the market's different expectations for the company's future performance, and the pressure to maintain market valuation for the development of enterprises is also different. In order to continue to maintain high valuation levels, highly valued companies are more inclined to select counter-parties that are expected to perform better in the future, and high performance commitments made by the target firm can give confidence to the acquirer and release positive signals to the market to maintain high growth development expectations. At the same time, the stock premiums of highly valued companies are even higher, and based on the 'controlling shareholder tunnelling theory', if the Merger and Acquisition payments are made in 'inflated' shares, the acquirer is more tolerant of the risk of the

underlying assets and is willing to acquire a company with high performance commitments at a high premium. For all highly valued listed companies, not all companies need to rely on the good performance of the underlying assets to solidify market confidence and attract investors. The poorer the performance and growth potential of the company itself, the more difficult it is to maintain better valuations and market expectations through its own operations, and therefore the greater the need to rely on the external business it acquires to improve its performance levels, and the underlying assets that make high commitments are more attractive to such an acquirer. Combining the above analyses, we believe that companies with high valuations and poor performance in the market are more likely to accept over committed deals.

To examine the impact of the acquirer's valuation level and operating conditions on over commitment, we measured the valuation level in terms of the mean PE value of the listed company in the three years prior to the transaction, and the operating conditions and earnings growth potential of the company in terms of the mean growth rate of total profits. Using a logit model and conducting a regression test according to the following equation:

$$prob(Over\_commitment_i) = \beta_1 * PE\_top_{jt_{0-3,0}} + \beta_2 * \Delta\text{NetIncome\_bottom}_{jt_{0-3,0}} + \beta_3 * PE\_top_{jt_{0-3,0}} * \Delta\text{NetIncome\_bottom}_{jt_{0-3,0}} + \beta_4 * Control_{jt_{0-1}} + Industry_k + Year_t + \varepsilon_i \quad (6)$$

If the acquirer in the three years prior to the transaction has profit growth $\Delta\text{NetIncome}_{jt_{0-3,0}}$ which is below the median of the full sample set of observations, then $\Delta\text{NetIncome\_bottom}_{jt_{0-3,0}}$ equals 1, otherwise it equals zero. The independent variable representing high PE $PE_top_{jt_{0-3,0}}$is 1 if the mean value of the acquirer's PE in the three years prior to the transaction is above the median of the full sample set of observations. is 1, otherwise it is 0. In this study, the focus of our attention is on the cross-product term $PE\_top_{jt_{0-3,0}} * \Delta\text{NetIncome\_bottom}_{jt_{0-3,0}}$, both for firms with high valuations but low profit growth, with such firms accounting for 23.18% of the full sample set. The remaining variables are consistent with the above section, with year fixed effects and industry fixed effects added to capture common annual and industry shocks to trading as required by the regression.

[Insert Table 8 about here]

The regression results are shown in Table 8. The regression coefficient of the cross product in column (1) is significantly equal to 2.396 at the 1% level, indicating that when the acquirer is

a "high valuation low growth" company, the probability of accepting an over commitment deal increases to 10.979 times the probability of acceptance by other acquirers.

The regression in column (2) includes control variables and the regression in column (3) adds industry fixed effects to the inclusion of control variables. The regression coefficients for the cross product term $PE\ top * \Delta NetIncme\ bottom$ in the results are all significantly positive at the 1% level and the regression coefficients do not vary significantly in size. To further verify the robustness of the results, we replaced the 'high valuation low growth' measure from PE above the median and profit growth below the median to PE in the top 20% (also measuring 30% / 40%) and profit growth in the bottom 20% (also measuring 30% / 40%) of the full sample set, and the regression results remained significant, indicating that "high valuation low growth" firms are more likely to accept over commitment.

6. Conclusion

In view of the explosive growth of Merger and Acquisition transactions in China and the widespread application of Valuation Adjustment Mechanism agreements, this paper provides an in depth study of the performance compensation commitments in VAM agreements. Using Merger and Acquisition transactions in China from 2010 to 2019 as a research sample set, this paper study the economic consequences of over promised Valuation Adjustment Mechanism agreements and the motivations of the counter-parties' participation through empirical tests, and summarize the characteristics of the companies involved in such transactions. The main conclusions that emerge from the analysis in this paper are as follows:

Firstly, excessive performance commitments have not resulted in sustained gains in performance for both parties to the acquisition transaction, which contrasts with the positive incentive effect of performance compensation commitments in traditional studies. Although the performance of the subject company improves in the short term under the incentive effect of the Valuation Adjustment Mechanism agreement within one to two years after the completion of the Merger and Acquisition transaction, the companies overdraw their future development potential in advance due to the high commitments made, resulting in a reversal of performance and a significant decline in profitability indicators for both parties to the transaction within a medium to long term time window of three to five years.

Secondly, in M&A transactions, both parties to the transaction have a strong incentive to enter into excessive performance commitments: the acquired firm obtains a high takeover premium by making high performance commitments, and the acquirer uses the M&A event and the high commitment value made by the subject company to send positive signals to the market and increase the market value of the shareholder's pledged financing equity, thereby generating greater free cash flow.

Thirdly, by focusing our analysis on transactions where over commitments were made, we found that: 1) acquirers with high equity concentration were more likely to accept over commitments; 2) in cross industry transactions, especially in cross industry mergers and acquisitions of companies in asset light industries by companies in traditional industries were more likely to sign over commitments; and 3) acquirers with high valuations and low earnings growth were more likely to accept over commitments.

References

Figures and Tables

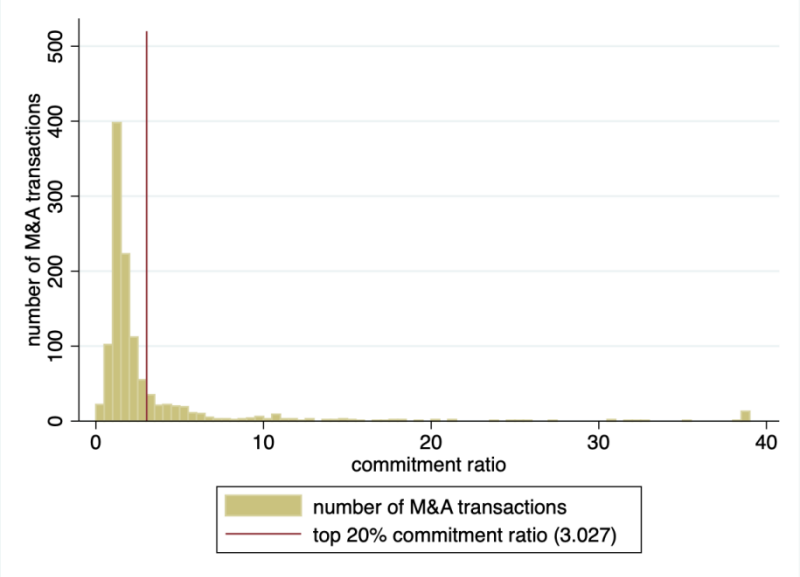

Figure 1. Distribution of the frequency of commitment ratio intervals

Notes: This graph shows the distribution of the commitment ratios of 1,144 M&A deals of Chinese listed companies between 2010 to 2009. The commitment ratio is the ratio of the target firm's commitment to achieve the annual profit required in the first year after completion of the acquisition (year t+1) divided by the subject company's realized annual profit in the year before the acquisition took place (year t-1). The width of the interval is defined as 0.5. The y axis is the number of M&A transactions of each commitment ratio interval. The vertical line indicates the threshold value of 3.027, corresponding to the top 20% of the commitment ratio in the full sample set. A transaction is defined as overcommitted when its commitment ratio exceeds this threshold value.

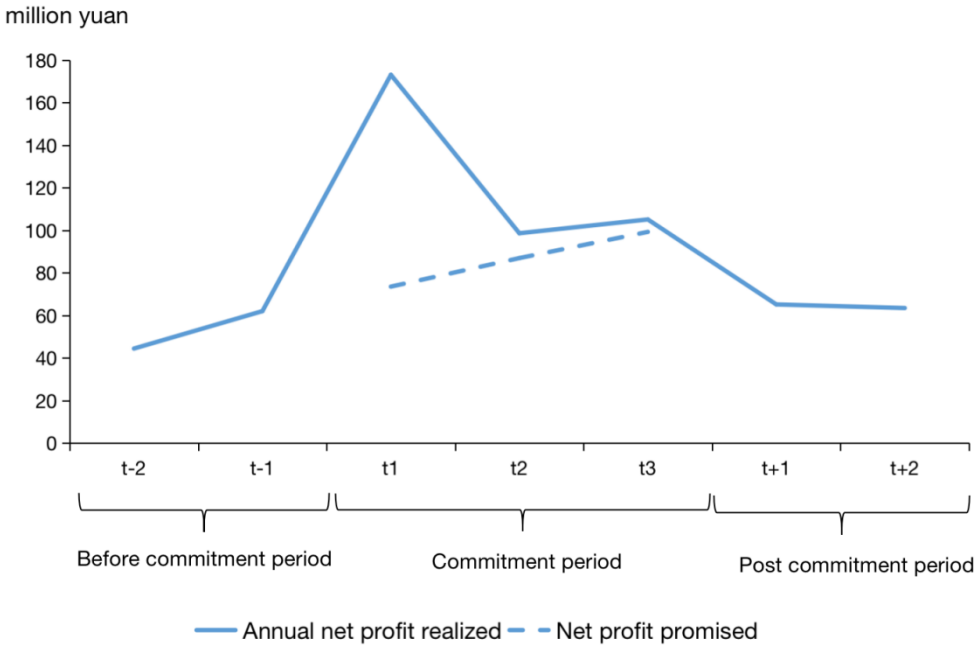

Figure 2. Average annual profit trend of the acquired firm

Notes: This chart shows the realized annual profits (solid line) and the committed annual profits (dotted line) of the acquired firms. The window spans from the two years prior to the beginning of the commitment period, the three years of the commitment period itself (VAM agreements typically include a commitment period of 3 years), and the two years after the end of the commitment period. The starting year (t1) of the commitment period is stated in each M&A transaction announcement. The pictorial sample set was selected from transactions for which the subject company's data was available for that seven-year period (510 transactions in total, representing 44.58% of the total sample set data).

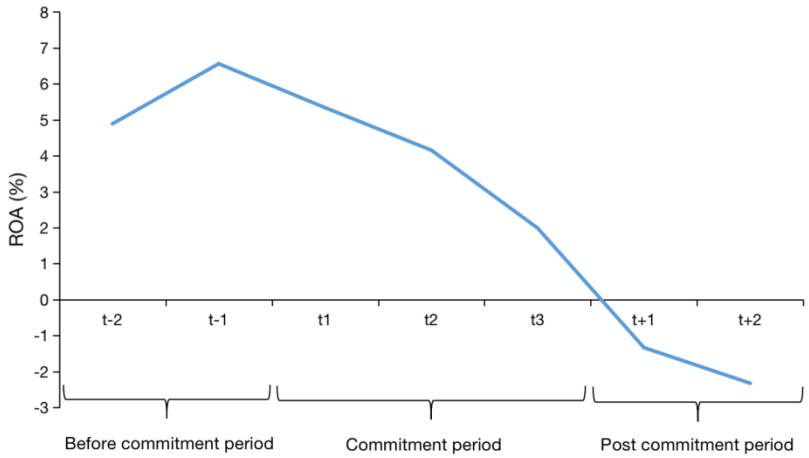

Figure 3. Return on Assets (ROA) of the acquiring firm

Notes: The chart shows the realized ROA of the acquiring firm for the seven years. Window spanning from two years before the commitment period to two years after the commitment period. The starting year (t1) of the commitment period is set based on M&A deal announcement. The sample set is drown from the entirety of the sample set, containing a total of 1,144 transactions from XXX firms.

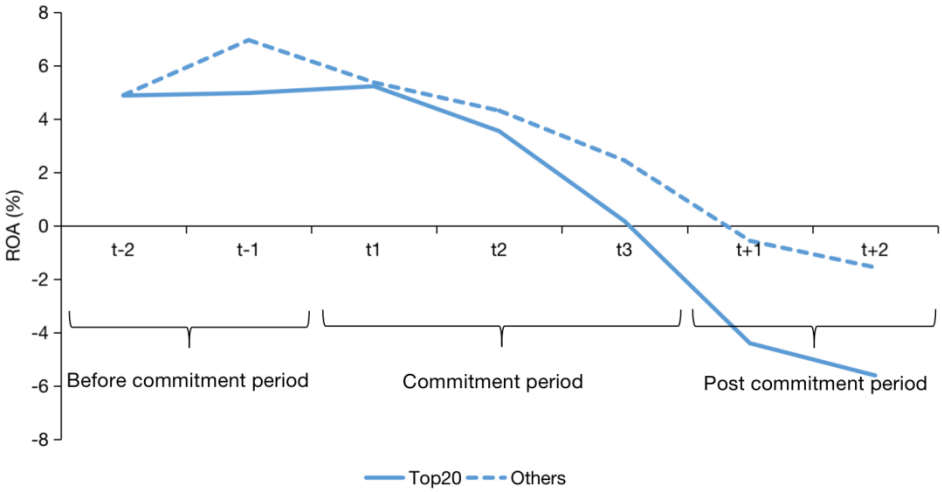

Figure 4. Acquirer's ROA group trend

Notes: This graph compares ROA of the acquiring companies between the over commitment group and the control group. The sample spans over a total of seven years before, during and after the commitment period. The starting year of the commitment period is set based on M&A deal announcement and the sample drawn is a sample set of all transactions considered (1,144 transitions).

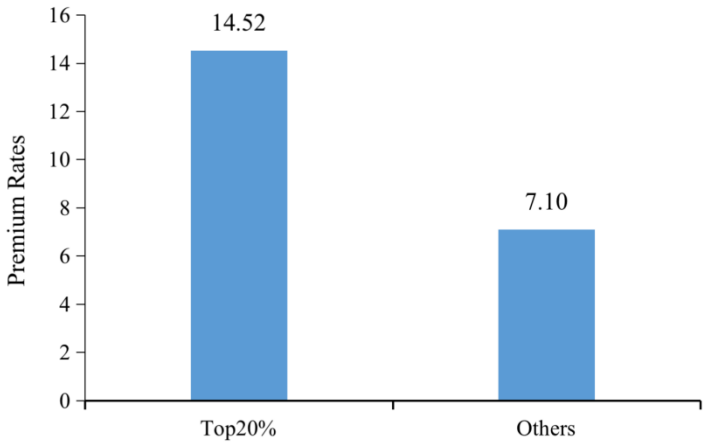

Figure 5 Graph showing the difference in acquisition premiums

Notes: This graph shows the mean takeover premiums for the over commitment group and the control group. The over commitment group refers to deals with a commitment ratio in the top 20% of the full sample set, while the control group refers to deals with a commitment ratio in the bottom 80% of the full sample set. Based on data availability, the drawn sample contains 1093 deals (95.54% of the aforementioned total sample set).

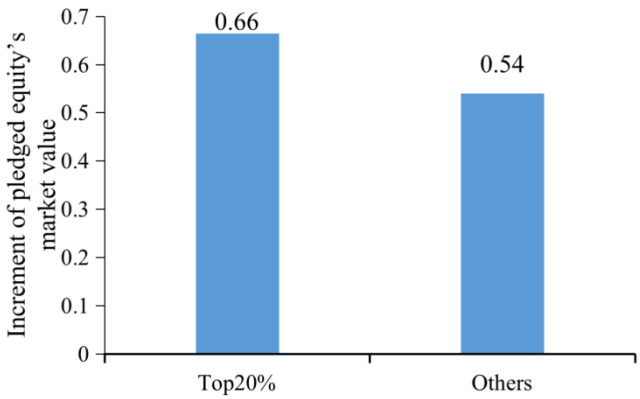

Figure 6. Variance chart for incremental market value of equity pledges

Notes: This graph shows the mean of the increase in market value of equity pledged by the acquirer in the over commitment group and the other transaction group, as well as the difference between the two groups. The increase in market value of equity pledged is the difference between the annual average of the market value of equity pledged by the acquirer in the three years following the completion of the acquisition and the annual average of the market value of equity pledged by the company in the three years prior to the completion of the acquisition, adjusted for company size. The over commitment group and the other transactions group are set as Figure 5, and the difference is obtained by subtracting the other transactions group from the over commitment group. Total drawn sample set contains 1144 deals.

Table 1 Summary Statistics

Variable	Obs.	Mean	STD	Min	10%	50%	90%	Max
Commitment ratio	1,144	3.202	5.513	0.262	0.989	1.594	5.519	38.962
Over commitment	1,144	0.200	0.400	0	0	0	1	1
Premium	1,093	8.566	12.265	0.326	1.690	5.098	17.296	90.120
Return on Assets (ROA)	8,706	2.355	9.765	-42.912	-6.009	4.036	9.833	22.102
Return on Assets (ROA) growth	8,518	-0.996	4.832	-32.898	-2.213	-0.133	0.781	9.442
Pledge value increase	1,144	0.565	1.156	-0.651	-0.085	0.198	1.504	7.776
Top10Holding	1,138	61.074	14.353	24.820	40.807	62.893	77.160	91.370
Cross_industry	1,144	0.232	0.422	0	0	0	1	1
Cross_Traditional_Light	1,144	0.112	0.315	0	0	0	1	1
Controls								
Size	1,127	21.256	0.941	19.098	20.201	21.139	22.507	24.029
Leverage	1,127	1.844	1.245	1.013	1.112	1.465	2.850	9.422
Growth	1,126	0.015	2.451	-11.989	-1.140	0.067	1.358	11.800
Balance	1,127	0.690	0.168	0.352	0.462	0.702	0.909	0.981
Institution holding	1,120	0.372	0.238	0.004	0.058	0.361	0.703	0.843
Relative size	1,144	0.463	0.955	0.008	0.049	0.221	0.781	7.122
Related transaction	1,144	0.406	0.491	0	0	0	1	1
Cash	1,144	0.784	0.411	0	0	1	1	1
Audit opinion	1,127	0.983	0.129	0	1	1	1	1

Table 2. Over-commitment and ROA

This table examines the impact of excessive commitment on the return on total assets of an acquiring company. *Over commitment* is represented by a dummy variable of 1 if the commitment ratio for the transaction is in the top 20% of the sample set and 0 otherwise, where we define *Commitment ratio* as the ratio of the annual profit that the target company has committed to achieve in the first year after the acquisition is completed, then divided by the actual realised in practice annual profit of the subject company in the year prior to the acquisition. *Post* is a time dummy variable, which is 1 after the end of the commitment period and 0 otherwise. control variables which are considered include acquirer firm size, capital structure, firm growth, equity checks and balances, institutional investor shareholding, relative deal size, type of Merger and Acquisition, payment method, and audit opinion on financial results. Columns (1)-(3) are sampled with data from three years before and after the end of the commitment period for each sample set of transactions, and column (4) is regressed with data from five years before and after. Values in parentheses are firm-level adjusted t-values. ***, ** and * indicate significant levels at the 1%, 5% and 10% levels respectively; hence a coefficient which is followed by three stars (***) is thus considered to significant at the 1% level.

	ROA $[t_1\text{-}3,t_1+3]$			ROA $[t_1\text{-}5,t_1+5]$
	(1)	(2)	(3)	(4)
Over commitment	2.884***			
	(6.18)			
Over commitment *Post	-6.874***	-6.980***	-2.904***	-2.560***
	(-8.07)	(-8.12)	(-3.52)	(-3.22)
Controls				
Size			-5.417***	-4.295***
			(-16.61)	(-16.63)
Leverage			1.108***	0.366
			(3.71)	(1.43)
Growth			0.159**	0.174***
			(2.55)	(3.66)
Balance			0.077	0.823
			(0.04)	(0.54)
Institution holding			8.029***	9.538***
			(3.92)	(6.58)
Audit opinion			3.174**	5.13***
			(2.14)	(4.14)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes			
Deal FE		Yes	Yes	Yes
Adjusted R2	0.231	0.193	0.293	0.286
Observations	6160	6160	6133	8581

Table 3. Over-commitment ratios and ROA growth rate

The definition of the over commitment ratio and the variable *Post* are the same as in Table 2, and control variables as previously mentioned include acquirer firm size, capital structure, firm growth, equity checks and balances, institutional investor ownership, relative deal size, type of Merger and Acquisition, payment method, and audit opinion on earnings. In this study, regressions were first conducted on a sample set of each transaction for three years before and after the end of the commitment period, and then regressions were conducted using data for five years before and after to demonstrate the robustness of the results. Values in brackets are firm-level adjusted t-values. ***, ** and * indicate significant at the 1%, 5% and 10% levels respectively.

	ROA growth $[t_1\text{-}3,t_1\text{+}3]$			ROA growth $[t_1\text{-}5,t_1\text{+}5]$
	(1)	(2)	(3)	(4)
Over commitment	0.469**			
	(2.35)			
Over commitment *Post	-1.444***	-1.474**	-0.831**	-0.574*
	(-3.91)	(-3.96)	(-2.17)	(-1.68)
Constant	-1.033***	-0.940***	27.257***	20.163***
	(-35.37)	(-30.99)	(7.00)	(6.83)
Control Variables			Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes			
Deal FE		Yes	Yes	Yes
Adjusted R2	0.058	0.013	0.042	0.033
Observations	6138	6138	6133	8581

Table 4. Over commitment and takeover premiums

The acquisition premium is the ratio of the actual realised in practice acquisition price to the book value of the underlying company's assets. The over commitment ratio is defined as in Table 1. control variables include the acquirer's firm size in the year prior to the acquisition, capital structure, firm growth, equity checks and balances, institutional investor ownership, relative deal size, type of acquisition, method of payment, and audit opinion on financial results. Values in brackets are company-level adjusted t-values. ***, **, * and + indicate significant at the 1%, 5%, 10% and 15% levels respectively.

	Premium			
	(1)	(2)	(3)	(4)
Over commitment	7.387***	6.619***	3.769**	3.027^{+}
	(5.88)	(5.46)	(2.00)	(1.53)
Control Variables		Yes		Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes		
Firm FE			Yes	Yes
Adjusted R2	0.103	0.131	0.194	0.208
Observations	1068	1061	460	450

Table 5. Over commitment and equity pledge

The dependent variable *Pledge value increase* is the difference between the annual average value of the market value of the equity pledged by the acquirer in the three years following the completion of the acquisition and the annual average value of the market value of the equity pledged by the company in the three years prior to the completion of the acquisition, adjusted for the size of the company. The over commitment ratio is defined as above. Control variables include acquirer firm size, capital structure, firm growth, equity checks and balances, institutional investor shareholding, relative deal size, type of acquisition, method of payment, and audit opinion on financial results. Values in brackets are company-level adjusted t-values. ***, ** and * indicate significant at the 1%, 5% and 10% levels respectively.

	Pledge value increase			
	(1)	(2)	(3)	(4)
Over commitment	0.206**	0.184***	0.202*	0.222**
	(2.45)	(2.84)	(1.80)	(2.31)
Control Variables		Yes		Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes		
Firm FE			Yes	Yes
Adjusted R2	0.119	0.367	0.455	0.632
Observations	1118	1110	506	494

Table 6. Equity concentration and over-commitment

The independent variable Top10Holding is the average shareholding of the top ten shareholders of the acquiring company in the three years prior to the announcement of the acquisition. The dependent variable is the dummy variable 'over commitment', which is 1 if the subject's over commitment ratio is in the top 20% of the study sample set and 0 otherwise. Control variables include acquirer firm size, capital structure, firm growth, equity checks and balances, shareholding of institutional investors, relative deal size, type of acquisition, method of payment, and audit opinion on earnings. Values in brackets are firm-level adjusted t-values. ***, ** and * indicate significant at the 1%, 5% and 10% levels respectively

	Over commitment (Logit)		
	(1)	(2)	(3)
Top10Holding	1.015***	1.014**	1.014**
	(2.84)	(2.53)	(2.33)
Control Variables		Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE			Yes
Pseudo R2	0.018	0.028	0.056
Observations	1129	1121	1041

Table 7: Cross-industrial transactions and over-commitment

The table shows the impact of whether the transaction is a cross industry acquisition, whether the acquiring company is in a traditional industry and whether the subject company is in an asset light industry on the over commitment ratio. The industry of the company is based on the information disclosed in the acquisition announcement. If the industry of both parties does not belong to the same broad category, the variable "Cross industry" is 1, otherwise it is 0. The variable "Cross Traditional-Light" is 1 if a company in a traditional industry acquires a company in an asset light industry, otherwise it is 0. The traditional industries are manufacturing and processing industries, agriculture, forestry, animal husbandry and fishery, extractive industries, construction, electricity, transportation, real estate, etc. The light asset industries are film and media, internet (non-hardware manufacturing), software, education, business services, and communication. The dependent variable is the dummy variable "Over commitment", which is 1 if the ratio of over commitment of the study population is in the top 20% of the study sample set and 0 otherwise. Control variables include acquirer firm size, capital structure, firm growth, equity checks and balances, shareholding of institutional investors, relative deal size, type of acquisition, method of payment, and audit opinion on earnings. Values in brackets are firm-level adjusted t-values. ***, **, * and + indicate significant at the 1%, 5%, 10% and 15% levels respectively.

	Over commitment (Logit)					
	(1)	(2)	(3)	(4)	(5)	（6）
Cross industry	1.744***	1.882***	2.045***	1.118	1.316	1.540+
	(3.47)	(3.73)	(3.54)	(0.50)	(1.19)	(1.64)
Cross Traditional-Light				2.35***	1.958**	1.718+
				(3.07)	(2.31)	(1.64)
Control Variables		Yes	Yes		Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE			Yes			Yes
Pseudo R2	0.020	0.053	0.081	0.028	0.058	0.083
Observations	1135	1109	1029	1135	1109	1029

Table 8. Company valuation and over-commitment

The independent variables "high PE (PE top)" and "low profit growth ΔNetIncme bottom " are both dummy variables. The variable "high PE" is 1 if the mean PE value of the acquirer in the first three years of the transaction is higher than the median of the study sample set, otherwise it is 0. The dependent variable is the dummy variable "Over commitment", which is assigned a value of 1 if the average value of total profit growth of the acquirer in the first three years of the transaction is below the median of the study sample set and 0 otherwise. If the commitment ratio is in the top 20% of the sample set, the dummy variable "Over commitment" is 1, and 0 otherwise. Control variables include acquirer firm size, capital structure, firm growth, equity checks and balances, shareholding of institutional investors, relative deal size, type of acquisition, method of payment, and audit opinion on earnings. Values in parentheses are firm-level adjusted t-values. ***, ** and * indicate significant at the 1%, 5% and 10% levels respectively.

	Over commitment (Logit)		
	(1)	(2)	(3)
PE top	0.842	0.663*	0.719
	(-0.86)	(-1.90)	(-1.40)
ΔNetIncme bottom	0.655*	0.649*	0.696
	(-1.76)	(-1.74)	(-1.36)
PE top*ΔNetIncme bottom	2.396***	2.859***	2.496***
	(2.89)	(3.36)	(2.68)
Control Variables		Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE			Yes
Pseudo R2	0.019	0.033	0.058
Observations	1134	1112	1032

Appendix

Table A1. Variable definition

Variable	Definition
Size	Natural logarithm of the total assets of the acquiring company
Leverage	Leverage ratio of the acquiring company, in other words total assets or owner's equity
Growth	(Current year amount of net profit - Prior year amount of net profit) / (Prior year amount of net profit)
Balance	Percentage of shares controlled by the largest shareholder of the acquiring company divided by the sum of the shareholding of the next three largest shareholders
Institution holding	Shareholding ratio of institutional investors
Relative size	Merger and Acquisition transaction price / acquirer's total assets in the year prior to the transaction
Related transaction	1 if the merger or acquisition is a related transaction, 0 otherwise
Cash	A value of 1 if the payment method involves cash, otherwise a value of 0
Audit opinion	Audit opinion on the financial statements of the acquiring company, with a value of 1 for a standard unqualified opinion and 0 otherwise
Commitment ratio	The level of performance commitment, calculated by dividing the target company's committed net profit in the first year of the commitment period by the target's actual net profit in the year prior to the commitment period
Over commitment	Equal to 1 if the commitment ratio of the deal belongs to top 20% of the full sample, otherwise 0.
Premium	The ratio of the price paid for the transaction to the book value of the target firm.
Pledge value increase	Calculated as the difference between the average market value of the acquirer's pledged equity in the three years following the completion of the deal and the annual average market value of the company's pledged equity in the three years prior to the completion of the deal, divided by the size of the company in the year prior to the acquisition.
Top10Holding	One hundred times the shareholding of the top ten shareholders of the acquiring company in the year prior to the announcement of the Merger and Acquisition transaction (t0)
Cross_industry	Equal to 1 if transaction i is a cross industry deal, otherwise equal to 0.
Cross_Traditional_Light	Equal to 1 if transaction i is the acquisition of a company in an asset light industry by a company in a traditional industry, otherwise equals to 0.

Table A2. Commitment ratio and ROA

This table examines the impact of commitment ratio on the return on total assets (Return on Assets (ROA)) of an acquiring company. We define *Commitment ratio* is the ratio of the annual profit that the target company has committed to achieve in the first year after the acquisition is completed divided by the actual realised in practice annual profit of the subject company in the year prior to the acquisition. *Post* is a time dummy variable, which is 1 after the end of the commitment period and 0 otherwise. control variables which are considered include acquirer firm size, capital structure, firm growth, equity checks and balances, institutional investor shareholding, relative deal size, type of Merger and Acquisition, payment method, and audit opinion on financial results. Columns (1)-(3) are sampled with data from three years before and after the end of the commitment period for each sample set of transactions, and column (4) is regressed with data from five years before and after. Values in parentheses are firm-level adjusted t-values. ***, ** and * indicate significant levels at the 1%, 5% and 10% levels respectively; hence a coefficient which is followed by three stars (***) is thus considered to significant at the 1% level.

	ROA $[t_1\text{-}3,t_1\text{+}3]$			ROA $[t_1\text{-}5,t_1\text{+}5]$
	(1)	(2)	(3)	(4)
Commitment ratio	0.098***			
	(5.12)			
Commitment ratio*Post	-0.598***	-0.618***	-0.282***	-0.206***
	(-4.80)	(-4.74)	(-3.09)	(-4.19)
Control Variables			Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes			
Deal FE		Yes	Yes	Yes
Adjusted R2	0.2293	0.207	0.416	0.404
Observations	6138	6138	6133	8581

Table A3. Commitment ratio and takeover premium

The acquisition premium is the ratio of the actual realised in practice acquisition price to the book value of the underlying company's assets. The *Commitment ratio* is defined as in Appendix 2. control variables include the acquirer's firm size in the year prior to the acquisition, capital structure, firm growth, equity checks and balances, institutional investor ownership, relative deal size, type of acquisition, method of payment, and audit opinion on financial results. Values in brackets are company-level adjusted t-values. ***, **, * and + indicate significant at the 1%, 5%, 10% and 15% levels respectively.

	Premium			
	(1)	(2)	(3)	(4)
Commitment ratio	0.522***	0.484***	0.293**	0.278*
	(3.88)	(3.62)	(1.97)	(1.87)
Control Variables		Yes		Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes		
Firm FE			Yes	Yes
Adjusted R2	0.103	0.134	0.203	0.221
Observations	1068	1061	460	450

Table A4. Commitment ratio on equity pledges

The dependent variable *Pledge* value increase is the difference between the annual average value of the market value of the equity pledged by the acquirer in the three years following the completion of the acquisition and the annual average value of the market value of the equity pledged by the company in the three years prior to the completion of the acquisition, adjusted for the size of the company. The *Commitment ratio* is defined as above. Control variables include acquirer firm size, capital structure, firm growth, equity checks and balances, institutional investor shareholding, relative deal size, type of acquisition, method of payment, and audit opinion on financial results. Values in brackets are company-level adjusted t-values. ***, ** and * indicate significant at the 1%, 5% and 10% levels respectively.

	Pledge value increase			
	(1)	(2)	(3)	(4)
Commitment ratio	0.009	0.009*	0.010*	0.016***
	(1.42)	(1.80)	(1.67)	(3.76)
Control Variables		Yes		Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes		
Firm FE			Yes	Yes
Adjusted R2	0.116	0.364	0.453	0.634
Observations	1118	1110	506	494