Risk and Incentive Analysis on Valuation Adjustment Mechanism: The Mergers and Acquisitions of A-Shares During 2018-2022

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Abstract: This paper examines the Value Adjustment Mechanism (VAM) for A-shares that announced Mergers and Acquisitions (M&As) during 2018-2022. It explores the relationship between the promised profit and the compensation method in the commitment agreement. The results suggest an inverted U-shape relationship, meaning that an appropriate increase in the growth rate of the target company can motivate management to achieve better performance. However, the incentive effect of this commitment performance declines after achieving an optimal level. When comparing to cash compensation, the incentive effect of equity compensation is more profound. In addition, it shows that low carbon efficient M&A has a higher opportunity achieving better performance commitments than its peers. However, due to presence of information asymmetry, earnings management, and related transactions between M&A, the inherent risk can reduce the incentive of the promised commitment. Consequently, the promised performance target might deviate from rational expectation.

Keywords: Valuation Adjustment Mechanism, Incentive Effect, Mergers and Acquisitions, Carbon Efficient Investment

1. Introduction

The Value Adjustment Mechanism (VAM) is an agreed-upon mechanism enabling "two-way" valuation adjustments between acquirers and target firms. It is often labeled as "gambling," The VAM in the Chinese acquisition market shares some commonalities to the "earnout" provision of the developed financial market, as they both incorporate some portion of payment that is contingent upon predetermined performance [1]. However, the VAM in China is a separate contra signed between acquirers and target firms in addition to the negotiated prices of the transaction, and it serves as a "two-direction-payment" mechanism: under the VAM contract, when the target cannot deliver the promised level of performance (e.g., net profits), the seller has to repay part of the deal value back to the acquiring firm. Therefore, this mechanism is particularly pivotal in mergers and acquisitions (M&As) because Chinese financial market typically has limited information on a private target. Moreover, the uncertainty is often in relation to acquirer-specific information revelations, especially when the acquirers are small [2].

The examination of the VAM framework in China holds intrigue. The betting agreement encapsulates its function, inherent risks, and primary influencers. Moreover, not only does the betting contract offer incentives to entrepreneurs, but these incentives also vary depending on specific betting objectives. Regrettably, in China, mutual "gambling" is scarce. More frequently, private investment institutions unilaterally assess founders. These assessments predominantly center on repercussions should future objectives remain unmet. Acquirers typically slash valuations but seldom concur on valuation escalations. Furthermore, relative to cash compensations, the equity compensation approach wields a more profound incentive impact. Yet, much of the existing research contrasts parameter shifts post-performance commitment, aiming to gauge performance commitment's economic implications both theoretically and empirically. Still, the tangible economic repercussions of performance commitments beckon deeper exploration. This study delves into the private placement M&A incidents involving A-share listed companies with performance commitments from 2018 to 2022. It aims to determine the valuation of these commitments and their influence on private placement price deviations. The inflated appraisal of target assets arises from the paltry default cost within current performance commitment contracts, epitomized as a "costless commitment." Such revelations spotlight gaps in China's M&A regulations, especially concerning performance commitment stipulations.

This paper amplifies the extant literature in several significant dimensions. Firstly, it harnesses a distinctive dataset spanning 46 A-share entities that heralded corporate restructuring or back-door listings from 2018 through 2022. This period is instrumental as it mirrors the repercussions of the COVID-19 pandemic on diverse sectors. Within this backdrop, the betting agreement's multifaceted traits—including its essence, role, associated risks, and chief influencers—become pivotal. Secondly, our inquiry employs advanced analytical tools, encompassing nonlinear regression and the fixed effects model, to isolate both annual and sector-specific repercussions. Such a methodology outstrips current techniques. Our insights affirm that the net profit growth rate of the target company can invigorate management towards fulfilling performance commitments. However, this drive inevitably caps and stabilizes. Thirdly, we illuminate the Carbon efficiency effect, emphasizing industries showcasing elevated carbon efficiency ratings. By juxtaposing these with their less efficient counterparts, we glean insights germane to the green economy. In conclusion, M&As come bundled with inherent risks tied to incentives, including earnings management, information gaps, and intra-party transactions in M&As, meriting future probes.

2.   Literature Review and Hypotheses

One core element of VAM is the valuation of the subject company. Specifically, the company must make a performance commitment. If the performance target set earlier is not achieved after one year, the target company is obligated to compensate the investment organization. Typically, both parties predict future profits based on the target company's industry environment, competitive landscape, operational capabilities, and financial health. These predictions then shape the performance commitment. If the target company surpasses the set performance targets, they earn specific incentives from the investment organization. This reward and penalty system naturally incentivizes the target company's management. Several studies have delved into this incentive effect. Chen spearheaded the VAM study by focusing on case studies of two private equity financing enterprises in China, comparing and analyzing their processes based on the betting agreement [3]. The research aims to encapsulate the lessons from these companies' successes and failures. Furthermore, Pan et al. explored the incentive effects of performance-based compensation promises [4]. Their findings indicate that performance compensation commitments indeed motivate improvements in corporate performance. Interestingly, the incentive effect exhibits a nonlinear relationship with the performance growth rate. Additionally, they found that both one-way and two-way performance

commitments produce similar incentive effects, suggesting that the penalty aspect of performance commitment also influences firm performance. Rao et al. studied the influence of performance-based compensation promises on subject companies using a dataset of SMEs and GEM A-shares from 2010-2014 [5]. Unlike prior studies, their research indicates a more pronounced incentive effect from two-way performance commitments. In cases where performance commitments fall short, share-based compensations offer stronger incentives compared to cash compensations. More recently, Liu and Li highlighted the growing use of performance commitments to protect investors and motivate companies in private placement M&A. Empirical data suggests that a higher value of performance commitment corresponds to a higher M&A premium, especially evident in share-based payments. Conversely, a higher commitment value results in a lower fixed increment discount, more pronounced in non-share-based payments. However, Feng et al. proposed that the performance target and incentive effect might share a nonlinear relationship [6]. Excessively high performance promises can dilute the incentive effect. If the growth rate of promised performance grossly exceeds the company's capabilities or the industry benchmark, and the target company foresees an inability to meet the commitment, the motivating effect wanes. Based on these findings, this study posits the following hypotheses:

Hypothesis 1: There is a nonlinear relationship between committed performance incentive and the target firm revenue growth rate.

The primary compensation methods can be classified into cash compensation and share compensation. Share compensation presents a stricter penalty for the target company compared to cash compensation. When the share compensation approach is used and if the promised performance isn't achieved, the managerial shareholders of the target company will see a decrease in the number of shares they own in the publicly traded company. As a result, even if the company's performance improves in the future, the shareholder's earnings will decrease proportionally with the reduction in shares [7]. On the other hand, with the cash compensation method, if the target company does not meet its performance commitment, the compensating party only loses the cash equivalent to the unmet performance segment. This will not result in an equity reduction or a loss of managerial rights. As such, the threat posed by the cash compensation method is relatively milder in comparison. This suggests that managerial shareholders of the target company would view equity compensation more gravely. Consequently, equity compensation can motivate the attainment of performance commitments more effectively, limit the damages from potentially unmet profit projections, and facilitate the realization of those commitments. For mergers and acquisitions and restructuring deals, employing the share compensation method proves to be pragmatic. Based on these considerations, this paper hypothesizes that:

Hypothesis 2: Equity compensation has a greater incentive effect on management than cash compensation during the performance commitment period.

China officially launched the electricity sector's national carbon emissions trading market in 2021, positioning itself as the world's largest compliance carbon market. Han and Wang advocate for the application of an official incentive framework centered on "working effort" to enhance the effectiveness of corporate governance [8]. However, due to the delayed development of its carbon market, China has ceded its pricing power in the global carbon trading landscape. Contributing factors to this shift include excessive state intervention, the prevailing role of state-owned enterprises (SOEs), and the state's control over public utility pricing, leading to a systematic distortion in China's financial sector [9]. In analyzing the quality of a project, this study introduces the intricacies of the Chinese emissions trading mechanism (ETM). Given the vast disparities in regional economic development in China, it's recognized that a singular Emissions Trading System (ETS) may not adequately cater to all sectors. Drawing from prior research, the study delves into two main areas: Firstly, it examines the impact of structural roles on the carbon market. This is

based on the premise that the carbon market is influenced by indirect production demand in the industrial chain. It suggests that effective carbon emissions reduction should address both direct and indirect connections in the production process [10]. Secondly, the study employs a spatial econometric model to assess the spatial concentration effect of carbon emissions across different regions [11]. In conclusion, the study posits that well-executed projects should be devoid of related transactions and exhibit high carbon efficiency.

Hypothesis 3: Carbon efficient Projects are mor likely to achieve a greater incentive effect on the performance commitment of the target company.

In summary, entrepreneur incentive is affected by the entrepreneurs' efforts or talent, the project quality, and the condition of market. The research framework is illustrated as follows in Figure 1.
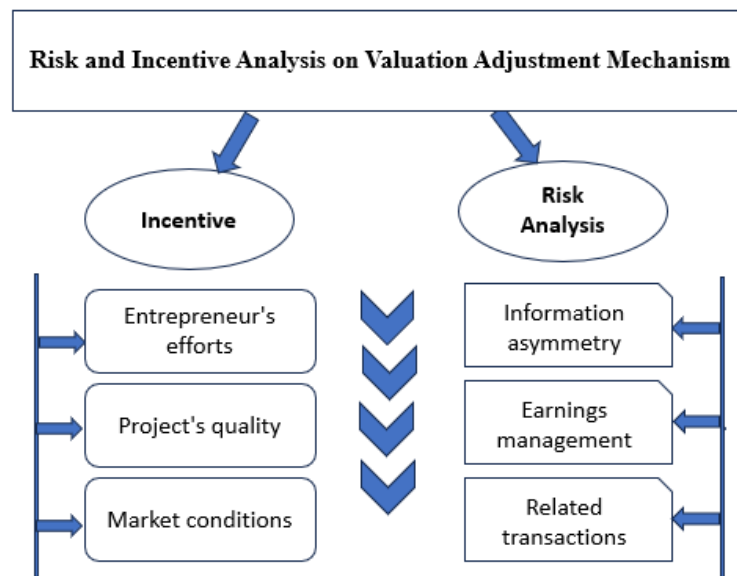

Figure 1: The research framework.

3. Data and Methodology

This study analyzes a sample of 46 A-shares that announced corporate restructuring or back-door listings from 2018 to 2022. By adopting a nonlinear statistical model to explore the role of equity incentives, the research delves into the relationship between the growth rate of promised profit and the chosen compensation method in performance commitment agreements. The empirical findings indicate that a moderate increase in the growth rate of the target company can motivate management to achieve a higher performance commitment target. However, there is an optimal threshold for this incentive effect. When comparing compensation methods, the research found that equity compensation has a more distinct incentive effect, especially when performance commitments are met. This incentive is also evident in the carbon-efficient industry, suggesting a higher likelihood of achieving desired outcomes post-merger and acquisition. Nevertheless, factors such as information asymmetry, earnings management, and related transactions in M&A activities can affect the promised commitment's incentive impact. The study also highlights that shifts in sectoral coverage can influence the ETS market, with the interaction between the carbon price effect and allocation effect potentially leading to positive impacts in both low and high coverage areas, promoting reduced emissions and enhanced operational efficiency.

This study gathers data from all publicly listed A-share companies on both the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE) spanning January 2015 to December 2022. The primary focus of the sample is on A-Shares that underwent corporate restructuring and

back-door listings between 2018 and 2022. Financial firms (those with GICS codes starting with 40) are excluded due to their distinct regulated characteristics. Additionally, the study removes firms with inactive statuses, specifically those marked as Special Treatment (ST), Pause Transaction (PT), or those that are delisted. Data points with missing values or labeled as "-95" are also excluded. To manage the impact of extreme outliers, each chosen variable undergoes a winsorization process at both the 1% and 99% levels. This data set is aligned with annual reports of Chinese public companies and harmonizes with the China Center for Economic Research (CCER) database, also known as the SinoFin Database available at http://www.ccerdata.cn/. Renowned among international academic researchers, this database offers formatted data on both financial statements and stock market performances of Chinese public firms.

The dependent variable in this study is the Incentive. It represents the relationship between a company's actual net profit and its promised net profit during the performance commitment period. If the Incentive is 100% or above, it indicates that the target company has met its performance commitment. Other independent variables are defined in the Table 1 below. Additionally, the industry (labeled as Industry) and year (denoted as Year) effects are also controlled.

Table 1: Variables Definitions.

Dependent Variable	
Incentive	The ratio of the target company's actual annual net profit to the committed net profit during the performance commitment period.
Independent Variable	
Growth	Annual growth rate of the net profit promised by the acquiring company in the commitment agreement.
Equity	Equity dummy variable, if the compensation is paid by equity, the variable takes the value of 1; if compensation is paid by cash, the value takes 0.
Green	Carbon efficient merge. the variable is set to 1 if the merger involves a carbon-efficient industry; otherwise, it takes the value of 0.
Location	Based on the spatial analysis and classification of the Emission Trading Scheme (ETS), locations with extensive coverage in reducing emissions and high energy efficiency are assigned a value of 1; all other locations receive a value of 0.
Control Variables	
Size	The logarithm of the target company's total assets at the onset of each year.
Leverage	The ratio of the target company's total liabilities to its total assets at the beginning of each year.
NI	The ratio of the target company's annual net profit to its total sales revenue.
Turnover	The ratio of the target company's annual sales revenue to average total assets.

This study employs the ordinary least squares (OLS) method, which is a linear regression technique that is used to estimate the unknown parameters in a model. The method minimizes the sum of squared residuals between the actual and predicted values. It is a common technique for estimating coefficients of linear regression equations, which describe the relationship between one or more independent quantitative variables and a dependent variable.

4. Empirical Results

4.1. Descriptive Statistics

Table 2 provides a descriptive statistics overview of the selected variables. Throughout the sample period, the average performance commitment financial ratio stands at 17.71, peaking at 705.52 and dipping to a low of -70.64. The mean growth rate clocks in at 1.914, with an upper limit of 672.43 and a floor value of -1. The average firm size, when expressed in logarithmic form, is 21.63 with a standard deviation of 1.39. The mean ERET, however, is negative, registering at -0.57, and has a skewness of -0.68. Within the observed period, the logarithmic firm size reaches a maximum of 25.89 and a nadir of 17.07. The pronounced standard deviations in PCFR, growth, and NI underscore that operational scenarios vary significantly across companies. Notably, most firms do not achieve their anticipated performance targets post-signing a betting agreement; however, those who do see substantial benefits. It's evident that corporate takeovers manifest pronounced liquidity effects, as highlighted by the significant volatility in the growth rate and net income ratio among Chinese firms. On the whole, Table 2 infers that the model design's assumption of a normal distribution is tenable.

Table 2: Descriptive Statistics.

	N	Mean	Median	St Dev	Min	Max	Skewness	Kurtosis
Incentive	1436	17.76	0.65	106.52	-70.64	705.52	6.17	40.00
Growth	1396	1.91	0.47	22.69	-1.00	672.43	23.06	609.57
Equity	1448	0.54	0.00	0.66	0.00	2.00	0.81	2.57
Size	1446	21.61	21.53	1.39	17.07	25.89	0.37	3.25
Leverage	1446	0.50	0.43	0.91	0.03	19.01	17.42	346.06
NI	1442	-0.53	0.03	8.08	-168.74	144.87	-5.94	236.67
Turnover	1445	0.39	0.24	0.55	0.00	7.16	6.16	59.16
Green	1448	0.62	1.00	0.49	0.00	1.00	-0.49	1.24
GL	1448	0.54	1.00	0.50	0.00	1.00	-0.15	1.02

4.2. Correlation Matrix

Table 3 reports the correlation matrix between each selected pair of variables. Further examination of the correlation matrix in Table 3 illustrates that *Incentive* and *Growth* are relatively highly correlated (0.1303). At the same time, incentive has a strong negative correlation with equity (-0,1257), while *Green* has a weaker negative correlation with *Incentive* (-0.2077). The data show that *Incentive* in Chinese public firms are associated with firm's growth and other firm characteristics, such as carbon efficient merge and equity compensation. The table also shows that leverage and turnover ratio are negatively associated with Incentive. There are no significant coefficients exceeding 0.5, implying that multicollinearity should not be a problem in the model specification. The asterisk * denotes the significance at the .05 level in the Table.

Table 3: Correlation Matrix.

	Incentive	Growth	Equity	Leverage	NI	Turnover	Green
Incentive	1						
Growth	0.1303*	1					
Equity	-0.1257*	-0.0135	1				
Size	0.0198	0.0054	0.1188*				
Leverage	-0.0055	0.0095	0.0539*	1			
NI	0.0122	0.0033	0.0556*	0.0528*	1		
Turnover	-0.0037	0.0197	0.0698*	-0.0136	0.0483	1	
Green	-0.2077*	-0.0569*	-0.1390*	0.0218	0.0715*	-0.009	1
Location	0.1815*	0.0326	-0.1939*	-0.0432	-0.047	0.1003*	-0.1625*

4.3. The Incentive Effect on Growth Rate

Table 4 presents the regression analysis outcomes for "Incentive" with robust standard errors. The analysis reveals a nonlinear relationship between the Growth rate and Incentive, suggesting that the target company's income growth rate significantly and positively influences management incentive. This suggests that an entrepreneur's capabilities are manifested not only through monetary compensation but also through other non-monetary factors. Both Model 3 and Model 4, which control for time and industry effects respectively, display significant non-linear coefficients of 0.003 for the growth rate. This suggests that, for every unit increase in a firm's net income growth rate, the average total compensation for the management team increases by approximately 0.3%.

Additionally, a merger involving a carbon-efficient project typically results in superior post-merger performance and, consequently, increased incentives. The data reveals that the estimated coefficients of -44.86 and -39.83 in Model (1) and Model (2), respectively, are significant at the 1% level. After accounting for industry effects, the analysis also underscores the considerable influence of green finance on executive compensation. Furthermore, there's a pronounced relationship between management incentives and the geographical location of a company, indicating that low-carbon efficient firms tend to fulfill their performance commitments more consistently.

In summary, the empirical research corroborates all three hypotheses at the 1% significance level. It's important to note that specific factors related to a firm play a pivotal role in shaping management incentives in M&As. Specifically, the data indicates that both firm size and net profit margin significantly and positively impact executive incentives.

Table 4: Regression Analysis.

	Model (1)	Model (2)	Model (3)	Model (4)
Dependent Variable: Incentive				
Growth	-0.848***	-0.861***	-0.848***	-0.900***
	(-4.13)	(-4.51)	(-4.19)	(-4.54)
Growth2	0.003***	0.003***	0.003***	0.003***
	(8.28)	(9.13)	(8.40)	(8.78)
Equity	-22.096***		-22.310***	-29.496***
	(-5.33)		(-5.37)	(-5.71)
Size	2.703	2.152	3.195*	3.999**
	(1.24)	(0.99)	(1.70)	(2.09)
Leverage	4.455	-4.342	4.712	2.441
	(1.14)	(-1.21)	(1.20)	(0.58)

Table 4: (continued).

NI	0.472*	0.408*	0.464*	0.582*
	(1.91)	(1.85)	(1.92)	(1.95)
Turnover	-2.066	-4.121	-2.424	2.137
	(-0.67)	(-1.33)	(-0.74)	(0.67)
Green	-44.854***	-39.838***	-44.860***	-14.727***
	(-6.13)	(-6.09)	(-6.13)	(-4.03)
Location	25.562***	32.219***	25.554***	27.182***
	(7.60)	(7.41)	(7.60)	(7.58)
Time			-0.000	-0.000
			(-0.92)	(-0.86)
Industry				0.000***
				(5.68)
Adj. R^2	0.094	0.088	0.103	0.127
F	105.653	104.951	102.211	138.969

4.4. The Incentive Effect on Return on Stock Price

Companies employ a diverse range of performance metrics. For example, Core et al., evaluated firm performance using both an accounting measure (net income growth rate) and a market performance measure (return on stock price) [12]. Other specific firm factors can also influence executive incentives. Firms with more substantial growth opportunities tend to have higher executive incentives, while shifts in capital structure denote a more significant change in agency costs, leading to a more pronounced informational effect on firm value. It's posited that managers, having more knowledge about expected future cash flows than investors, might have objectives that diverge from those of the investors. In addition, Ma et al. examined the effect of increased private ownership on the financial leverage, asset quality, and profitability of State-Owned Enterprises (SOEs) [13]. Their findings indicate that heightened private ownership can reduce financial leverage but elevate a firm's profitability. To ensure the rigor of the results, this study also employs return on stock price as an independent variable for hypothesis testing.

Table 5 provides the regression analysis outcomes for "Incentive" in relation to return on stock price. This underscores the notion that management's expertise and effort manifest not only in monetary rewards but also in other forms of non-monetary compensation. When accounting for time and industry effects in Model 7 and Model 8 respectively, both present significant non-linear coefficients of 0.001 concerning stock return. This implies that for every unit rise in a firm's stock market return, the overall compensation for the management team escalates by approximately 0.1%. Additionally, mergers centered on carbon-efficient projects tend to demonstrate enhanced post-merger outcomes, leading to heightened incentives. After adjusting for industry effects, the analysis further attests to the profound influence of green finance on executive incentives. Furthermore, the findings illustrate a notable relationship between management incentives and a firm's geographical location, indicating that low-carbon efficient companies tend to consistently fulfill their performance promises. Broadly speaking, the empirical analysis corroborates all three propositions at the 1% significance threshold.

Table 5: Robustness Check.

	Model (5)	Model (6)	Model (7)	Model (8)
Dependent Variable: Incentive				
ROS	0.001	0.001	0.001	0.001
	1.16	1.42	1.21	0.83
ROS^2	0.001***	0.001***	0.001***	0.001*
	2.16	2.25	2.15	1.6
Equity	-22.733***		-22.922***	-30.134***
	(-5.54)		(-5.56)	(-5.90)
Size	1.897	0.891	2.316	3.542
	(0.77)	(0.36)	(1.03)	(1.56)
Leverage	7.277*	-1.056	7.543*	4.449
	(1.73)	(-0.28)	(1.78)	(1.04)
NI	0.474*	0.409*	0.466*	0.586**
	(1.91)	(1.84)	(1.91)	(1.96)
Turnover	-2.974	-5.290*	-3.28	1.491
	(-0.99)	(-1.75)	(-1.04)	-0.49
Green	-45.455***	-40.231***	-45.449***	-15.246***
	(-6.31)	(-6.26)	(-6.31)	(-4.21)
Location	26.209***	33.044***	26.206***	27.789***
	(7.83)	(7.65)	(7.83)	(7.79)
Time			0.001	0.001
			(-0.92)	(-0.86)
Industry				0.001***
				-5.8
Adj. R^2	0.08	0.063	0.08	0.103
F	102.36	101.95	103.41	137.89

4.5. The Risk of Incentive Effect on M&A

In the domain of VAM agreements, information asymmetry between the involved parties is often a given. information asymmetry can lead to adverse selection, in that the buyer offers too low a price due to valuation risks. Thus, good-quality sellers exit the M&A market while poor-quality companies of questionable value remain [14]. In contrast, an acquiree, eager to attract the investor, might over-promise by setting ambitious performance targets. Cheng and Liu delved into the VAM pricing mechanism in M&A and the restructuring of listed firms [15]. Their work, using quantitative analysis and dynamic simulation, aimed to curtail errors in pricing listed company shares and the valuation of acquired assets, minimizing human-induced biases. They found that in M&As and company restructurings, pricing is predominantly influenced by market conditions. Feng et al. introduced a theoretical utility model for M&A parties from 2006 to 2020, considering market information asymmetry [6]. They deduced that a more stringent commitment in performance agreements corresponds to a higher price premium and a more significant relative performance size. Ning underscores the crucial question of reaching a consensus on the valuation of transactional assets in a public reorganization company [16]. The study posits that the performance compensation system serves as a legal tether ensuring fair pricing between transactional parties. Additionally, Li et al. probe into the repercussions of performance commitments during M&A activities on the prospective bankruptcy susceptibility of the purchasing entity [17]. Their findings spotlight a more

intensified manifestation of this trend in transactions between related parties. Such observations also shed light on the inadequacies and lacunae of China's regulatory framework governing M&As, specifically in terms of performance commitment stipulations. Consequently, a high-caliber project is pivotal in gauging an entrepreneur's surplus expectations and, by extension, the vigor they invest in their business endeavors. Collectively, these insights suggest that the efficacy of incentives is modulated by market conditions, especially when elements like informational disparity, related transactions, and earnings management come into play.

5.   Conclusion

This study analyzes a sample of 46 A-shares that announced corporate restructuring or back-door listings from 2018 to 2022. By adopting a nonlinear statistical model to explore the role of equity incentives, the research delves into the relationship between the growth rate of promised profit and the chosen compensation method in performance commitment agreements. The empirical findings indicate that a moderate increase in the growth rate of the target company can motivate management to achieve a higher performance commitment target. However, there is an optimal threshold for this incentive effect. When comparing compensation methods, the research found that equity compensation has a more distinct incentive effect, especially when performance commitments are met. This incentive is also evident in the carbon-efficient industry, suggesting a higher likelihood of achieving desired outcomes post-merger and acquisition. Nevertheless, factors such as information asymmetry, earnings management, and related transactions in M&A activities can affect the promised commitment's incentive impact. The study also highlights that shifts in sectoral coverage can influence the ETS market, with the interaction between the carbon price effect and allocation effect potentially leading to positive impacts in both low and high coverage areas, promoting reduced emissions and enhanced operational efficiency.

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