Digital Transformation, Manipulation of Asset Evaluation and M&A Performance: Discussion on the Intermediary Effect of Internal Control

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Abstract

Purpose - The purpose of this study was to examine the internal relevance between digital transformation, manipulation of asset evaluation and corporate M&A performance and further explores the impact path of manipulation of asset valuation on corporate M&A performance.
Design/methodology/approach - This study based on the financial data of A-share listed companies in Shanghai and Shenzhen Stock Exchanges from 2013 to 2021.
Findings - First, manipulation of asset evaluation is negatively correlated with M&A performance. Second, Digital transformation significantly weakens the negative correlation between manipulation of asset evaluation and corporate M&A performance. Third, The effectiveness of internal control plays a partially intermediary role in the process of manipulation of asset evaluation affecting M&A performance.
Research implications or Originality - Enriching the existing literature on the subject, the study can also provide useful reference for improving the performance of corporate mergers and acquisitions, regulating asset valuation, promoting the digital transformation of enterprises and improving internal control mechanisms, with both theoretical and practical implications.

Keywords: Digital Transformation, Internal Controls, Manipulation of Asset Evaluation, M&A Performance
JEL Classifications: G12, M41

Ⅰ. Introduction

As an important measure to expand scale, achieve diversification strategy and seek breakthrough in efficiency, mergers and acquisitions(M&A) has become a common development strategy for listed companies in China, and the number of M&A and restructuring transactions in China's capital market has been rising year by year since 2013. M&A is the most complex of transactions and their level of performance is disturbed by many factors. The valuation

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of the assets of the target company is an important part of an M&A restructuring. The use of asset valuation methods and the value of the information reported are key to the external market's access to information relating to the M&A and directly determine the extent of the M&A premium. In the capital market, there is a problem of manipulation of asset valuation of M&A and restructuring companies. On the one hand, major shareholders may use manipulation of asset evaluation to the detriment of the interests of small and medium shareholders, i.e. major shareholders dilute the shares of small and medium shareholders by emptying or transferring them, reducing their dividends and regulatory capacity; on the other hand, manipulation of asset evaluation may further affect the relationship between the valuation results of assets and the transaction price at the time of M&A. So, how does manipulation of asset evaluation affect M&A performance? And through what channels does it affect M&A performance? At the same time, advanced information technologies such as Internet, Internet of Things and cloud computing continue to permeate every aspect of business operations and management, digital resources have become an important endowment resource for enterprise development and digital transformation has become a trend. Digital transformation is the identification of environmental changes and market opportunities by listed companies based on digital technology, and the use of computing, communications, connectivity and information to drive the internal integration and external expansion of old and new resources and capabilities, which will drive innovation in business activities, capability change and business models, enabling companies to remain in an advantageous position in a highly competitive market. What is the impact of the implementation of digital transformation on manipulation of asset evaluation and economic consequences in the M&A process? In order to explain the above questions, we take A-share listed companies in Shanghai and Shenzhen Stock Exchanges as the research object, empirically examine the mechanisms and paths of manipulation of asset evaluation on corporate M&A performance, and further investigate the impact of digital transformation on asset valuation and its moderating effect on the relationship between asset valuation and corporate M&A performance in addition, we also examine the mediating role of internal control between the above two.

II. Literature Review

In studies related to the influencing factors and economic consequences of manipulation of asset evaluation Post and Vliet (2006), Bhabra and Huang (2013), Cui and Yang (2017) found that M&A transactions in the Chinese capital market with a high value-added asset valuation generated a more negative market reaction, i.e., the market's acceptance of a high value-added asset valuation was low, and that manipulation of asset valuation was influenced by factors such as the M&A payment method, asset valuation method and the reputation of the valuation agency. Peng, Wei and Yang (2011) and Guiral, Ruiz and Choi (2014) found that high-quality asset valuation helps to promote the smooth implementation of M&A transactions, mainly because high-quality asset valuation can significantly reduce the information asymmetry between the M&A parties by enhancing the content of incremental information, better monitoring of the management and major shareholders of the M&A parties, and facilitating the integration and efficient use of key resources after the M&A, thus improving M&A

performance. Song and Zhai (2014), Wang, Xu and He (2020) found that manipulation of asset valuation has become an important means for listed companies to encroach on the legitimate rights and interests of small and medium shareholders by major shareholders in M&A and restructuring, and that manipulation of asset valuation is widespread among listed companies in China, which can have a serious negative impact on the high-quality development of enterprises. Baccouche, Hadriche and Omri (2014) found that the introduction of high quality external audits, especially national audits, can significantly curb manipulation of asset valuation by major shareholders and can improve the quality of asset valuation and provide a better investment environment for external investors, because the main reason for manipulation of asset valuation is the existence of significant information asymmetry between stakeholders, and the introduction of high quality external audits can improve the transparency of accounting information and mitigate information asymmetry through external governance.

In studies related to the economic consequences of digital transformation of enterprises, Nambisan, Lyytinen and Majchrzak (2017) and Liu, Dong and Ding (2020) found that under the fourth industrial revolution represented by digital technology innovation, digital resources have become the most important resources for high-quality development of enterprises, and digital transformation of enterprises can improve their information integration and processing capabilities, deepen the mining and more effective use of inherent innovation resources, thus promoting the efficiency of technological innovation. Quinton, Canhoto and Molinllo (2016) and Chen, Wang and Wan (2021) found that digital transformation of enterprises has a significant peer effect in the region, and the peer effect is more significant in enterprises with relatively better resource base and dynamic capabilities, and further found that network embedding and marketization level have a significant impact on the degree of peer effect of digital transformation. Li (2020) and Xiao et al. (2021) found that digital transformation can drive the innovation of enterprise business models, the main reason for this is that digital transformation can significantly improve the knowledge management of enterprises, so that enterprises can make full use of information technology to obtain valuable information, thus enabling better resource allocation and value creation, and further found that high-level entrepreneurs can significantly weaken the driving effect of digital transformation on enterprise business model innovation.

Ⅲ. Theoretical Analysis and Research Hypothesis

1. The Impact of Manipulation of Asset Valuation on M&A Performance

The result of asset valuation is the basis for the price setting of M&A transactions, which has a direct impact on the M&A premium, and thus on the M&A performance. The main purpose of asset valuation is to provide an accurate assessment of the assets of the target company in the M&A process, which can greatly alleviate the information asymmetry that exists between the parties to the M&A and prevent the M&A from becoming a tool for the majority shareholder to carry out benefit transfer and other tunneling behaviors. Manipulation of asset valuation can affect the performance of M&A through the following channels: Firstly, the shareholding of listed companies in China is relatively concentrated and the phenomenon of "one share

dominates" is common. As the most complex transaction of enterprises, the key information of M&A is often only grasped by the major shareholders of both enterprises, resulting in serious information asymmetry between the insiders and external stakeholders, major shareholders and small and medium shareholders, and management and major shareholders, which can be used by major shareholders to manipulate asset evaluation, making M&A a key vehicle for tunneling benefits. Secondly, the manipulation of asset valuation is often accompanied by surplus management, thus exacerbating the level of surplus management of enterprises and reducing the ability of resource integration and allocation after M&A, resulting in increased resource redundancy and negatively impacting M&A performance. Finally high quality asset valuation can curb the goodwill bubble, enhance the reasonableness of M&A prices and ensure better M&A performance. When there is manipulation of asset valuation in the M&A process, it will exacerbate the information asymmetry between the M&A parties, resulting in the actively-merging enterprises being unable to make a reasonable valuation of the assets of the target company, which will generate a higher M&A premium and also increase the probability of the majority shareholder using the M&A for benefit transfer, negatively impacting the M&A and market reaction, and the M&A performance cannot be effectively safeguarded. Based on the above analysis, it can be seen that manipulation of asset valuation can significantly reduce the transparency of accounting information, exacerbate information asymmetry and principal-agent problems, and it is easier for major shareholders or management to commit opportunistic behaviors such as benefit transfer through manipulation of asset valuation, which will have a negative impact on corporate M&A performance, and therefore the following hypothesis is proposed:

H1: Manipulation of asset valuation is significantly and negatively correlated with corporate M&A performance.

2. The Moderating Effect of Digital Transformation on the Relationship between Manipulation of Asset Valuation and M&A Performance

In the fourth industrial revolution represented by digital technology, the new generation of digital technology has penetrated all aspects of socio-economic development and surpassed land, capital and labor to become the key engine to promote high quality socio-economic development. Technological revolution will lead to economic revolution. The essence of digital transformation strategy is that enterprises apply digital technology to production, operation, management and service, which can greatly reduce duplication of labor and improve the efficiency of key resources, while transforming analogue information into digital information and natural language into machine language, reducing the possibility of information manipulation and improving the transparency of information. The fundamental reason for manipulation of asset valuation in M&A is that there is serious information asymmetry between the two parties. The implementation of digital transformation can reduce the degree of information manipulation through digital information, which can effectively curb various opportunistic behaviors including surplus management and have an impact on M&A performance through the following ways: Firstly, digital transformation can improve enterprise resilience, mainly because it can lead to a more active technological innovation strategy, improve the efficiency of the output

of exploratory innovation and utilization innovation, significantly promote the core competitiveness of enterprises, and fundamentally inhibit manipulation of asset valuation. Secondly, digital transformation has a significant "Anti-Driving Effect" on corporate accounting information disclosure, the continuous improvement in the quality of corporate accounting information disclosure driven by digital transformation can greatly reduce the space for manipulation of asset valuation, thus making manipulation of asset valuation have a high information transmission effect and the negative impact on M&A performance is greatly reduced. Finally, digital transformation can effectively resolve the principal-agent problem among various stakeholders, reduce agency costs and have a better monitoring and restraining effect on manipulation of asset valuation. Based on the above analysis, it can be seen that the implementation of digital transformation strategy can reduce the inhibiting effect of manipulation of asset valuation on M&A performance by improving the quality of accounting information, alleviating the principal-agent problem and enhancing corporate resilience in various ways, and therefore the following hypothesis is proposed:

H2: Digital transformation can significantly weaken the negative correlation between manipulation of asset valuation and corporate M&A performance.

3. The Impact Path of Manipulation of Asset Valuation on M&A Performance

Any operation and management of an enterprise cannot be performed without the support of the internal system. As an important internal system of an enterprise, the effectiveness of the internal control system is crucial. The exertion of the internal control depends to a large extent on the information environment, that is, the quality of accounting information disclosure of enterprises has a direct impact on the effectiveness of internal control, while the manipulation of asset valuation needs to cover up many key financial information, which will aggravate the information asymmetry among all stakeholders and inhibit the exertion of the internal control. The ultimate goal of internal control is to optimize the internal control system of the enterprise, improve the operating efficiency and promote the realization of the development strategy. M&A can help enterprises achieve the deep integration of many key resources such as market, management and technology, and promote synergy to enhance core competitiveness. Therefore, high-quality internal control has a direct impact on the smooth implementation of M&A and the achievement of M&A performance. At the same time, when there is manipulation of asset valuation in M&A, due to the influence of manipulation, information asymmetry will be aggravated, which will make the management or major shareholders manipulate the internal control accordingly, thus reducing the role of internal control in monitoring and restraining the M&A process and the integration of key resources after the M&A. That is, manipulation of asset valuation will inhibit the internal control function in the M&A and increase the degree of M&A premium, and also cause redundant allocation of key resources after the M&A, reducing the synergy effect created by the M&A and failing to safeguard the M&A performance. Based on the above analysis manipulation of asset valuation will inhibit the exertion of the internal control function of the enterprise and thus have a negative impact on the M&A performance. Therefore, the following hypotheses are proposed:

H3: Manipulation of asset valuation is significantly and negatively related to the effective-ness of corporate internal controls

H4: Internal control plays a significant mediating role in the process of the impact of ma-nipulation of asset valuation on corporate M&A performance.

Ⅳ. Variable Description and Model Design

1. Variable Selection and Description

1.1. Dependent Variable

The symbol BGJX is used to denote corporate M&A performance. Short-term M&A perform-ance, mid-term M&A performance and long-term M&A performance are set up to explain corpo-rate M&A performance, drawing on the research method of He and Ma (2021).

Short-term M&A performance: the symbol is CAR(-5,5), which is the cumulative excess return on the shares of the target company held within 5 trading days before and after the announce-ment of M&A, calculated as follows:

First, the 150 trading days prior to the date of the first announcement of the M&A to the 30 trading days prior to the first announcement were taken as the estimation window, and the individual stock returns of the sample companies during the window period were taken as the dependent variables and the market returns as the independent variables, and regressions were fitted based on the least squares method to obtain the regression coefficients α and β.

Second, the obtained regression coefficients α and β are brought into the following model for short-term M&A performance.

$$CAR_{i,t} = \sum R_{i,t} - (\alpha_i + \beta_i R_{m,t}) \tag{1}$$

In the above model $R_{i,t}$ is the actual return of sample firm i at day t; $R_{m,t}$ is the market return at day t; $\alpha_i + \beta_i R_{m,t}$ is the expected return of sample firm at day t. $CAR_{i,t}$ is the cumulative sum of daily excess returns during the short-term window of the M&A, and CAR(-5,5) can be obtained by setting the short-term window to (-5,5).

Mid-term M&A performance: symbolised as BHAR12, is the cumulative excess return on holdings in the target company's shares over the 12 months following the date of the initial announcement of the M&A, calculated as shown in Model (2).

$$BHAR_{i,T} = \prod_{t=0}^{T}(1 + R_{i,t}) - \prod_{t=0}^{T}(1 + R_{p,t}) \tag{2}$$

In the above model, $R_{i,t}$ is the actual rate of return of the sample firm in month t after the M&A; $R_{p,t}$ is the market rate of return in month t after the M&A. The long-term M&A perform-ance of the sample firms, BHAR12, is obtained by assigning a value of 12 to T.

Long-term M&A performance: symbolised as BHAR36, is the cumulative excess return on holdings in the target company's shares over the 36 months following the date of the initial announcement of the M&A, the formula is the same as Model (2).

1.2. Independent Variable

This paper draws on the method of Ye et al. (2018) to construct a model for measuring normal value-added rate(VAR) of asset, where the residual in the model is the non-normal value-added rate, which is used as a proxy variable for manipulation of asset valuation, with the symbol ABREV. Lu's (1998) study on value-add of asset valuation found that the factors influencing the value-added rate included the proportion of fixed assets and the return on total assets. Xie and Zhang (2013) found that there were also differences in value-added rate of asset valuation when different valuation methods were used. Therefore, this paper in-corporates these factors in the calculation of normal value-added rate of asset valuation. In addition, the variability in market capitalisation of firms in different industries affects the VAR, and therefore the industry average P/E ratio, which captures the aforementioned differences, is chosen as the variable. The price index also varies from year to year, and value-added rate of asset valuation varies considerably under different levels of inflation, so annual variables are included in the model. The symbols for the above variables are as follows: PERC is the percentage of fixed assets; AREA is the level of marketization process; ROA is the return on total assets; INPE is the average P/E ratio of the industry in which the enterprise is located; MET1, MET2 and MET3 are dummy variables that take the value of 1 when the cost approach is used for valuation and 0 otherwise, 1 when the income approach is used for valuation and 0 otherwise, and 1 when the market approach is used for valuation and 0 otherwise, re-spectively; and Year is an annual dummy variable.

$$VAR = \alpha_0 + \alpha_1 PERC + \alpha_2 AREA + \alpha_3 ROA + \alpha_4 INPE + \alpha_5 MET1$$

$$+ \alpha_6 MET2 + \alpha_7 MET3 + \sum Year + \epsilon$$

(3)

The residual term obtained from the regression analysis of the above model is the non-normal value-added rate of asset valuation, which has positive and negative values indicating the direc-tion of manipulation of asset valuation. For the purpose of measurement, the residual is taken as an absolute value to indicate the non-normal value-added rate of asset valuation, with a larger absolute value indicating a higher non-normal value-added rate and a higher degree of manipulation of asset valuation. A positive residual indicates that the asset is overvalued, while a negative residual indicates that the asset is undervalued.

1.3. Moderating Variable

The symbol DI is used to represent the digital transformation of enterprises. Drawing on the research method of Yuan et al. (2021), the text analysis method of machine learning is used to build indicators for measuring the degree of digital transformation of enterprises based on the establishment of a relatively complete digital dictionary. The specific process is as fol-lows: First, a dictionary of enterprise digital transformation is constructed. By searching the

official websites of the People's Government of China and the Ministry of Industry and Information Technology, and based on important national policy documents related to the digital economy, we collected the keywords of enterprise digital transformation, and obtained 197 related words with the word frequency greater than 5. Secondly, a text analysis is conducted on the relevant parts of the annual reports of the sample companies. A text analysis of "management discussion and analysis" in the annual reports of the sample companies is carried out to find the frequency of words appearing in the dictionary based on 197 terms for digital transformation. Finally, a digital transformation metric is constructed. The degree of digital transformation is measured by multiplying the ratio of the total number of words related to digital transformation and the length of the "management discussion and analysis" of the annual reports of the sample companies by 100, with a higher value indicating a higher degree of digital transformation. The specific approach is to collect keywords related to digital trans-formation from recent policy documents (Artificial Intelligence, Internet of Things, Cloud Computing and other information technology terms), and use Python language to count the frequency of keywords in the "management discussion and analysis" section of the sample companies' annual reports. The following rules are followed during statistics: if the keywords are preceded by negative words such as "no" or "not", the keywords will not be counted; if the profiles of suppliers and customers contained keywords, the keywords are also not counted. For example, the number of words in the "management discussion and analysis" of the 2020 annual report of "Digital China", a listed company, is 20062, and the total number of word frequencies of 197 keywords is 781, so the degree of digital transformation of the company in 2020 is 3.893 ((781/20062)×100).

1.4 Intermediary Variable

The symbol ICQ is used to characterise the effectiveness of internal control, and the internal control index of listed companies in DIB database is used to measure the effectiveness of internal control of enterprises, drawing on the research method of Shao, Ding and Bao (2022). The index is compiled under the organization and leadership of Accounting Society of China. It takes into account the current situation of the implementation of internal control system in Chinese listed companies, and adopts the principal component analysis method to summarise the effectiveness of internal control as the degree of achievement of five major objectives: compliance, internal control report, asset security, operation and strategy, and on this basis, basic internal control index is designed. Internal control deficiencies are then used as correction variables to amend the basic internal control index, resulting in an internal control index that comprehensively reflects the level of internal control and risk management capability of listed companies. The value of the index is in the (0,1000) range, for the purpose of the study, its order of magnitude is converged with other variables, so the index is divided by 100.

1.5 Control Variable

M&A is one of the most complex transactions of enterprises and its performance is affected by many factors. Based on previous relevant studies, enterprise size, growth, nature of owner-ship, size of M&A, M&A payment method, internal control deficiencies, net operating cash flow, management shareholding, institutional shareholding and gearing ratio are selected as

control variables to better explain the relationship between the main variables, while annual dummy variable and industry dummy variable are set.

The description of all variables is shown in 〈Table 1〉

Table 1. Variable Selection and Description

Variable Type	Variable Name	Variable symbol	Definition and Assignment
Dependent Variable	M&A Performance	BGJX	Short-term M&A performance: symbolized as CAR (-5,5), which is the cumulative excess return of holding the shares of the target company within 5 trading days before and after the announcement of the M&A, calculated using Model 1; Mid-term M&A performance: symbolized as BHAR12, which is the cumulative excess return of holding the shares of the target company within 12 months after the date of first announcement of the M&A, calculated using Model 2 Long-term M&A performance: symbolized as BHAR36, which is the cumulative excess return of holding the shares of the target company within 36 months after the date of first announcement of the M&A, calculated using Model 2
Independent Variable	Manipulation of Asset Valuation	ABREV	The non-normal value-added rate is used as the proxy variable for manipulation of asset valuation, which is the absolute value of the residual after regression in Model 3
Moderating Variable	Digital Transformation	DI	Constructing indicators for measuring the degree of digital transformation of enterprises based on a relatively complete digital dictionary using machine learning text analytics
Intermediary Variable	Effectiveness of Internal Control	ICQ	Measured by the internal control index of listed companies in DIB database, which is divided by 100
Control Variable	Enterprise Size	Size	Natural logarithm of total assets at the end of the period
	Growth	GRO	Growth rate of main business income
	Nature of Ownership	State	1 for state ownership, 0 otherwise
	Size of M&A	BS	Total M&A transactions/total assets of the year before M&A
	M&A Payment Method	PM	1 if payment method includes cash, 0 otherwise
	Internal Control Deficiency	ICC	1 in case of internal control defect, 0 otherwise
	Net Operating Cash Flow	CFO	Net cash flow from operations/total assets at the end of the period
	Management Shareholding	MHS	Total management shareholding
	Institutional Shareholding	CHS	Total shareholding of institutional investors
	Leverage	Lev	Total liabilities at the end of the period/total assets at the end of the period
	Year	Year	Dummy variable
	Industry	Indus	Dummy variable

2. Model Design and Description

2.1. Main Effect Model

To test hypothesis H1, the following model is constructed:

$$BGJX = \eta_0 + \eta_1 ABREV + \eta_2 Size + \eta_3 GRO + \eta_4 State + \eta_5 BS + \eta_6 ICC + \eta_7 CFO$$
$$+ \eta_8 MHS + \eta_9 CHS + \eta_{10} Lev + \eta_{11} PM + \sum Year + \sum Indus + \epsilon_1 \qquad (4)$$

2.2. Moderating Effect Model

To test hypothesis H2, the following model is constructed:

$$BGJX = \beta_0 + \beta_1 ABREV + \beta_2 DI + \beta_3 DI \times ABREV + \beta_4 Size + \beta_5 GRO + \beta_6 State + \beta_7 BS$$
$$+ \beta_8 ICC + \beta_9 CFO + \beta_{10} MHS + \beta_{11} CHS + \beta_{12} Lev + \beta_{13} PM + \sum Year + \sum Indus + \epsilon_2 \quad (5)$$

2.3. Intermediary Effect Model

To test hypothesis H3 and H4, the following model is constructed:

$$ICQ = \gamma_0 + \gamma_1 ABREV + \gamma_2 Size + \gamma_3 GRO + \gamma_4 State + \gamma_5 BS + \gamma_6 ICC + \gamma_7 CFO$$
$$+ \gamma_8 MHS + \gamma_9 CHS + \gamma_{10} Lev + \gamma_{11} PM + \sum Year + \sum Indus + \epsilon_3 \qquad (6)$$

$$BGJX = \lambda_0 + \lambda_1 ABREV + \lambda_2 ICQ + \lambda_3 Size + \lambda_4 GRO + \lambda_5 State + \lambda_6 BS + \lambda_7 ICC$$
$$+ \lambda_8 CFO + \lambda_9 MHS + \lambda_{10} CHS + \lambda_{11} Lev + \lambda_{12} PM + \sum Year + \sum Indus + \epsilon_4 \quad (7)$$

3. Sample Selection and Data Source

Taking A-share listed companies with M&A transactions in Shanghai and Shenzhen Stock Exchanges from 2013 to 2018 as the research object, due to long-term M&A performance is observed over a 36-month period, the actual research interval is 2013-2021. In order to ensure the robustness of the research conclusion, the following enterprises are excluded: (1) financial and insurance enterprises with significant differences in accounting characteristics; (2) Enterprises that have implemented M&A but have not completed it; (3) Enterprises involved in M&A are related parties; (4) ST and *ST enterprises(ST means that the enterprise has suffered continuous losses in recent two years; *ST means that the enterprise has suffered continuous losses in recent three years and has delisting risk); (5) Enterprises with abnormal leverage

ratio; (6) Enterprises with missing key financial indicators. After a rigorous selection process, 2304 samples are finally obtained for the study. In terms of data sources, data related to M&A performance and digital transformation are obtained from the annual reports of the sample companies, data related to effectiveness of internal control are obtained from the DIB Internal Control and Risk Management database, and the rest of the data are obtained by querying the CSMAR database. At the same time, all continuous variables are winsorized at top and bottom 1% of the distribution.

V. Empirical Test and Analysis of Results

1. Descriptive Statistics and Correlation Test

1.1. Descriptive Statistics

〈Table 2〉 shows the descriptive statistics of the variables in the full sample, which yield the following key information: (1) Among the three indicators of M&A performance, the mean value of short-term M&A performance(CAR(-5,5)) is 0.033 and the mean value of mid-term M&A performance(BHAR12) is -0.041, while the mean value of long-term M&A performance(BHAR36) is only -0.352, indicating that the sample firms will obtain better short-term M&A performance after the M&A transaction occurs, but there is great room for improvement in long-term M&A performance. There is a large degree of dispersion between the maximum and minimum values of three indicators, indicating that the M&A performance varies widely across the sample. (2) The mean value of manipulation of asset valuation(ABREV) is 0.015,

Table 2. Descriptive Statistics of Variables

Variable	N	Mean	Std. Dev.	Min	Median	Max
CAR (-5,5)	2304	0.033	0.110	-0.268	0.031	0.607
BHAR12	2304	-0.041	0.109	-1.082	-0.038	1.909
BHAR36	2304	-0.352	0.633	-2.787	-0.294	3.290
ABREV	2304	0.015	0.132	0.004	0.011	0.503
DI	2304	3.724	2.314	2.123	3.827	6.755
ICQ	2304	5.492	1.326	0.089	5.323	8.414
Size	2304	19.688	2.002	17.104	19.440	24.286
GRO	2304	0.229	0.385	-0.246	0.221	2.839
State	2304	0.432	0.505	0	0	1
BS	2304	0.317	0.114	0.071	0.309	3.357
PM	2304	0.160	0.289	0	0	1
ICC	2304	0.229	0.103	0	0	1
CFO	2304	0.458	0.380	0.165	0.452	1.335
MHS	2304	0.095	0.208	0	0.089	0.902
CHS	2304	0.186	0.334	0	0.179	0.627
Lev	2304	0.473	0.401	0.032	0.464	0.834

indicating that manipulation of asset valuation in M&A transactions has become a regular phe nomenon; the minimum value is 0.004 and the maximum value reaches 0.503, indicating that there are significant differences in the degree of manipulation of asset valuation in the M&A process among the sample companies. (3) The mean value of Digital Transformation (DI) is 3.724, indicating that the sample companies are generally implementing digital transformation strategies; the minimum value is only 2.123 and the maximum value is 6.755, indicating that there are significant differences in the degree of digital transformation among the sample companies. As mentioned above, in order to avoid the impact of outliers, "winsorize" has been used for 99% and 1% percentile tail reduction processing for major variables.

1.2 Correlation Test

〈Table 3〉 shows the correlation test results of the main variables, and the following con clusions can be drawn: (1) Manipulation of asset valuation(ABREV) is significantly negatively correlated with three indicators of M&A performance: short-term M&A performance(CAR(-5,5)), mid-term M&A performance(BHAR12) and long-term M&A performance(BHAR36), indicating that manipulation of asset valuation significantly inhibits corporate M&A performance, and the hypothesis H1 of this paper is initially tested. (2) Digital transformation (DI) is significantly positively correlated with three indicators of M&A performance, indicating that digital trans formation significantly contributes to the improvement of corporate M&A performance. (3) There is a significant negative correlation between manipulation of asset valuation(ABREV) and effectiveness of internal control(ICQ), and this paper's hypothesis H3 is initially tested. Considering that the correlation coefficient between some variables is greater than 0.5, in order to avoid multicollinearity problems, the paper tests the variance inflation factor, and the result is 3.4, indicating that there is no multicollinearity in the constructed model.

Table 3. Correlation Test of Main Variables

Variable	CAR(-5,5)	BHAR12	BHAR36	ABREV	DI	ICQ	Size	GRO
CAR(-5,5)	1							
BHAR12	0.564***	1						
BHAR36	0.388***	0.557***	1					
ABREV	-0.330***	-0.379***	-0.435***	1				
DI	0.206***	0.178**	0.063**	-0.241***	1			
ICQ	0.085***	0.070***	0.042***	-0.187***	0.254***	1		
Size	0.033*	0.025	0.069	-0.131**	0.362***	0.145**	1	
GRO	0.239***	0.094**	0.052**	-0.120*	0.047	0.108**	0.266***	1
State	0.162**	0.185*	0.091	-0.348	0.159***	0.270*	-0.173***	0.089***
BS	0.191**	0.232**	0.102*	-0.155***	0.007	-0.015	0.241***	0.030***
PM	-0.067***	-0.058***	-0.013*	0.363***	-0.221**	-0.194	0.037**	0.123***

ICC	-0.276***	-0.351***	-0.370***	0.525***	-0.306***	-0.618***	-0.114**	-0.037
CFO	0.011	0.030	0.005	0.064**	0.143	-0.082*	0.201***	0.156***
MHS	0.128***	0.075***	0.013*	-0.250***	0.029	-0.165***	-0.090**	0.132*
CHS	0.268***	0.327***	0.359***	-0.192***	-0.057*	0.226***	0.135***	-0.006
Lev	-0.044*	-0.036**	-0.110**	0.175***	-0.245**	-0.071***	0.342***	0.014

Variable	State	BS	PM	ICC	CFO	MHS	CHS	Lev
State	1							
BS	0.251***	1						
PM	0.196	0.177***	1					
ICC	-0.321***	-0.287**	0.034***	1				
CFO	0.158***	0.263***	0.404***	-0.195*	1			
MHS	-0.170***	0.084***	-0.168**	-0.220***	0.231***	1		
CHS	0.056***	0.104***	0.049	-0.025***	-0.146*	-0.587***	1	
Lev	-0.162***	-0.205***	-0.133***	0.346***	-0.086***	0.045	-0.009	1

Notes: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

2. Regression Test and Result Analysis of Main Effect Model

〈Table 4〉 shows the regression test results of model (4) and the following main research conclusions can be drawn: Manipulation of asset valuation(ABREV) is significantly negatively related to three indicators of M&A performance(BGJX): short-term M&A perform-ance(CAR(-5,5)), mid-term M&A performance(BHAR12) and long-term M&A perform-ance(BHAR36), indicating that manipulation of asset valuation not only has a negative impact on short-term M&A performance, but also has a dampening effect on long-term M&A perform-ance, and in terms of coefficient, the dampening effect of manipulation of asset valuation on M&A performance is greater over time, the hypothesis H1 of this paper is tested.

Table 4. Regression Test Results of Main Effect

Variable	BGJX		
	CAR(−5,5)	BHAR12	BHAR36
Con_s	−0.344***	−0.360***	−0.709***
	(−3.73)	(−4.21)	(−6.28)
ABREV	−0.216***	−0.283***	−0.535***
	(−3.49)	(−3.87)	(−5.90)
Size	0.098	0.152*	0.194*
	(1.32)	(1.70)	(1.86)
GRO	0.299**	0.221*	0.078*
	(2.47)	(1.92)	(1.71)
State	0.020*	0.003	0.002
	(1.69)	(0.51)	(0.24)
BS	0.035**	0.082*	0.030
	(2.16)	(1.77)	(0.16)
PM	−0.301***	−0.154	−0.027
	(−3.63)	(−1.06)	(−0.53)
ICC	−0.357***	−0.420***	−0.638**
	(−4.34)	(−4.05)	(−2.39)
CFO	0.057	0.092	0.064
	(0.88)	(1.04)	(0.98)
MHS	0.145***	0.123**	0.075
	(3.31)	(2.39)	(1.33)
CHS	0.226**	0.194**	0.461***
	(2.08)	(2.30)	(3.35)
Lev	−0.360	−0.290*	−0.312
	(−1.47)	(−1.88)	(−0.86)
Adj_R^2	0.214	0.198	0.193
N	2304	2304	2304
Year		control	
Indus		control	

Notes: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

3. Regression Test and Result Analysis of Moderating Effect Model

⟨Table 5⟩ shows the results of the regression test of Model (5), which leads to the following main conclusions: manipulation of asset valuation(ABREV) is significantly negatively correlated with three indicators of M&A performance(BGJX): short-term M&A performance(CAR(-5,5)), mid-term M&A performance(BHAR12) and long-term M&A performance(BHAR36), which again confirms the hypothesis H1 of this paper. After the introduction of the cross product term DI×ABREV, the cross product term is significantly and positively correlated with M&A perform-ance(BGJX). Together with the findings of Model (4), shows that digital transformation sig-nificantly weakens the negative impact of manipulation of asset valuation on corporate M&A performance, and digital transformation plays a moderating role. However, it should also be noted that the coefficient of the cross product term is largest when dependent variable is short-term M&A performance, and smallest when dependent variable is long-term M&A per-formance, indicating a diminishing effect of digital transformation, possibly because the factors influencing long-term M&A performance are more complex and the effect of digital trans-formation is not sustainable.

Table 5. Regression Test Results for Moderating Effects

Variable	BGJX		
	CAR(-5,5)	BHAR12	BHAR36
Con_s	0.252***	0.389***	0.506***
	(3.91)	(4.24)	(4.73)
ABREV	-0.195***	-0.247***	-0.668***
	(-3.60)	(-4.13)	(-4.49)
DI	0.328***	0.275***	0.092**
	(5.26)	(4.69)	(2.56)
DI×ABREV	0.163***	0.120**	0.041*
	(3.52)	(2.17)	(1.90)
Size	0.114*	0.190*	0.209**
	(1.81)	(1.76)	(2.25)
GRO	0.283**	0.212**	0.063*
	(2.37)	(2.08)	(1.68)
State	0.036	0.012	0.007
	(1.44)	(0.33)	(0.31)
BS	0.049**	0.085*	0.033
	(2.10)	(1.72)	(0.08)
PM	-0.340***	-0.158	-0.029
	(-2.95)	(-0.66)	(-0.36)
ICC	-0.276**	-0.293**	-0.380*
	(-2.41)	(-2.28)	(-1.85)
CFO	0.062	0.104	0.071
	(0.91)	(0.98)	(0.88)
MHS	0.180**	0.155**	0.079
	(2.34)	(2.20)	(1.15)
CHS	0.223**	0.247***	0.521***
	(1.98)	(2.93)	(3.16)
Lev	-0.348*	-0.303*	-0.271
	(-1.70)	(-1.84)	(-0.53)
Adj_R^2	0.236	0.211	0.205
N	2304	2304	2304
Year		control	
Indus		control	

Notes: *** p<0.01, ** p<0.05, * p<0.10

4. Regression Test and Result Analysis of Intermediary Effect Model

〈Table 6〉 shows the regression test results of model (6) and model (7), and the following research conclusions can be drawn:

In the regression test of model (6) manipulation of asset valuation(ABREV) is significantly and negatively related to the effectiveness of internal control(ICQ), i.e. manipulation of asset valuation significantly inhibits the effectiveness of internal control. Hypothesis H3 of this paper is tested, and this result also provides the premise for the verification of the mediating role of effectiveness of internal control in model (7). The main reason for this is that the higher the effectiveness of internal control, the better it is for effective control of potential risks and mitigating principal-agent problems, but its function is influenced by management or major shareholders. When there is manipulation of asset valuation, large shareholders and their management will engage in opportunistic behavior such as higher levels of surplus management

in order to reap more benefits, thus making M&A a vehicle for large shareholders to infringe on the rights and interests of minority shareholders. The use of manipulation of asset valuation to extract excess benefits is premised on the inhibition of the functioning of internal controls, i.e. manipulation of asset valuation can have a significant inhibiting effect on the effectiveness of internal control.

In the regression test of model (7) effectiveness of internal control(ICQ) and three indicators of M&A performance(BGJX): short-term M&A performance(CAR(-5,5)), mid-term M&A performance(BHAR12) and long-term M&A performance(BHAR36) are significantly positively correlated. Combining the regression results of model (4) and model (6), it can be seen that the effectiveness of internal control plays a significant intermediary role in the process of manipulation of asset valuation inhibiting corporate M&A performance. At the same time, manipulation of asset valuation(ABREV) and three indicators of M&A performance(BGJX) are significantly negatively correlated. It can be seen that internal control plays a partially mediating role in the relationship between manipulation of asset valuation and corporate M&A performance, i.e. manipulation of asset valuation can reduce corporate M&A performance by inhibiting the effectiveness of internal control, and the hypothesis H4 of this paper is tested.

Table 6. Regression Test Results of Intermediary Effect

Variable	ICQ	BGJX		
		CAR(-5,5)	BHAR12	BHAR36
Con_s	-0.428**	-0.210***	-0.249***	-0.378***
	(-2.36)	(-3.15)	(-3.43)	(-4.02)
ABREV	-0.189***	-0.187***	-0.261***	-0.523***
	(-4.64)	(-3.81)	(-3.95)	(-4.33)
ICQ	/	0.152***	0.116**	0.060***
		(3.27)	(2.41)	(3.79)
Size	0.054**	0.090	0.065	0.138*
	(2.29)	(1.28)	(1.01)	(1.83)
GRO	0.277**	0.194*	0.130	0.037
	(2.45)	(1.72)	(0.91)	(0.80)
State	0.022*	0.014	0.005	0.001
	(1.68)	(1.21)	(0.37)	(0.42)
BS	0.080	0.142*	0.149	0.016
	(0.76)	(1.83)	(1.35)	(0.04)
PM	-0.043	-0.269***	-0.093	-0.024
	(-0.55)	(-3.32)	(-0.72)	(-0.30)
ICC	-0.616***	-0.305***	-0.390***	-0.523***
	(-5.04)	(-4.18)	(-4.04)	(-3.21)
CFO	0.032	0.047	0.060*	0.072
	(0.18)	(0.51)	(1.67)	(0.43)
MHS	0.465**	0.194**	0.215*	0.082
	(2.21)	(2.46)	(1.93)	(1.10)
CHS	0.073***	0.241***	0.293***	0.570***
	(3.85)	(3.40)	(3.28)	(3.66)
Lev	-0.442*	-0.319	-0.284*	-0.255
	(-1.85)	(-1.25)	(-1.77)	(-0.96)
Adj_R^2	0.273	0.252	0.224	0.221
N	2304	2304	2304	2304
Year		control		
Indus		control		

Notes: *** p<0.01, ** p<0.05, * p<0.10

5. Robustness Test

In this paper, the robustness test is conducted by changing the measurement method of main variables.

First, following the research method of Zhang and Zhang (2021), the incremental return on net assets(ROA) is used to measure M&A performance, calculated as (ROA in the year of M&A - ROA in the year prior to M&A)/ROA in the year prior to M&A, with a larger value indicating higher M&A performance.

Second, drawing on the research method of Yuan and Wang (2021), two indicators, M&A market performance and M&A operating performance are set to explain the firm's M&A performance. Among them M&A market performance is symbolized as △TBQJ, which is measured by the difference of Tobin's Q value in the year before and after the M&A announcement date, and Tobin's Q value is calculated as (number of outstanding shares × stock price + number of non-marketable shares × net assets per share + book value of liabilities)/total assets; M&A operating performance is symbolized as △ROE, which is the difference of return on net assets in the year before and after the M&A announcement date.

Bringing the M&A performance into the model again after changing the measurement method the regression results still support the findings of this paper indicating that the conclusions of this paper are robust.

VI. Conclusion

Taking the M&A performance of the actively-merging firms in M&A transactions as the main subject of the study, the relationship between manipulation of asset valuation and M&A performance and the micro-action mechanism are examined based on the financial data of A-share listed companies in Shanghai and Shenzhen Stock Exchanges from 2013 to 2021 and the moderating effect of digital transformation on the relationship between manipulation of asset valuation and M&A performance is further explored. The main findings from the empirical tests are as follows: (1) Manipulation of asset valuation is significantly negatively related to corporate M&A performance; (2) Digital transformation significantly weakens the negative correlation between manipulation of asset valuation and corporate M&A performance; (3) Effectiveness of internal control plays a partially mediating role in the process of manipulation of asset valuation affecting corporate M&A performance. Based on the above findings, the following recommendations are made to improve the M&A performance of listed companies: First, the M&A performance of listed companies varies depending on the existence and extent of manipulation of asset valuation, so both parties to the M&A should actively enhance the transparency of accounting information during the M&A process to alleviate the information asymmetry between them and reduce the probability of both parties gaining more private benefits through manipulation of asset valuation. Second, digital transformation not only directly improves M&A performance, but also significantly weakens the negative correlation between manipulation of asset valuation and M&A performance. Therefore, enterprises should actively implement digital transformation strategies and apply more advanced digital technologies to M&A transactions, which can be achieved by appropriately deploying IT facilities, improving digital integration and focusing

on the systematic development of digital transformation. Finally, manipulation of asset valuation can inhibit M&A performance by reducing the effectiveness of internal controls. Therefore enterprises should continuously improve their internal control mechanisms and set scientific development strategies and objectives, which can be achieved by comprehensively fostering an internal control culture clarifying the responsibilities and authority of relevant department and personnel, building an atmosphere of full participation in internal controls and introducing high-quality external audits.

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