

The Endowment Effect in Corporate M&A Premium

Yuchen Jiang

Sino-French Institute, Renmin University of China, Beijing, 100872, China

* Corresponding Author Email: yuchenjiang@ruc.edu.cn

Abstract. The endowment effect is widespread in trading, often happened in the fact that the owner of a thing rates the thing more valuable than the non-owner. In this paper, 641 M&A events of listed companies in the United States are used as a sample to carry out multiple regression analysis to study the existence of endowment effect and its impact on M&A premium. According to the results of multiple regression an endowment effect exactly exists in the process of corporate M&A, and this effect significantly increases the M&A premium. The impact of endowment effects on M&A premiums in M&A events of companies in different industries is different. The impact of endowment effect in M&A of emerging industry companies is more prominent. It is recommended that the acquirer should fully consider the increased M&A costs due to the influences endowment effect when acquiring another company; Formulators consider the impact of endowment effect on the efficiency of industrial integration.

Keywords: Endowment effect; premium; multiple regression.

1. Introduction

Premium M&A is common in global M&A activity. Of the 641 M&A transactions that occurred in the U.S. in 2019 recorded in the prestigious Zephyr database in international M&A reserche, the average premium rate was as high as 32%.

In the past, it was believed that the premium was the result of careful consideration, precise calculation, and was due to uncertain hidden value. Examples include synergy effects and market timing theory. But with the development of theory, people found that the process of pricing is a two-sided game process. In the process, there is a potential endowment effect to affect the premium. But whether the endowment effect has an impact in this process, people still have to put a question mark.

The endowment effect is when a person owns an item or asset, and he assesses the value of the item or asset more than when he does not own the item or asset [1].

On Thaler's basis, a large number of subsequent researchers have examined the existence of endowment effects in a wider range of contexts [2,3]. However, in different scenarios, the degree of strength of the endowment effect is different, and scholars have revealed the reasons for the difference in the strength of the endowment effect from different angles, as shown in Table 1 [3-9]. In addition to classical explanations of loss aversion, the reasons for these differences include factors such as inquiry theory and other psychological mechanisms.

Table 1. The sources of differences in the strength of endowment effects and their directions

Source	Influence direction	Psychological mechanisms	Study the object
Value uncertainty	+	Gains and losses are uncertain, and negative impacts are more valued because of loss aversion	Common commodities and experimental tokens
Substitutability	-	The loss of irreplaceable goods brings greater losses	Sweets and personal health
The difficulty of the acquisition process	+	The valuation of an item depends on the memory obtained from the query	Performance rewards and lotteries
The emotion of the process	+	The emotion when getting the item affects the valuation	Souvenirs and common goods
Length of Holding	+	The sense of subjective ownership increases with the length of time you hold it	Coffee cups of different durations
Feelings when trading	+	Negative sentiment gives more weight to the potential loss of the trade	
The age of the trader	-	The older you get, the more deliberate and rational your decisions are	

Note: "+" indicates positive impact; "-" indicates a negative impact.

The literature discussing the existence of endowment effects usually adopts the experimental method, that is, in the case of control variables, to obtain estimates of both parties to the transaction.

Differences to characterize endowment response. Kahneman et al. used mugs as the subject of the transaction, and divided the test into two groups, buyer and seller, and made multiple rounds of quotations, and randomly selected one of them to compare the difference in quotations between the two sides [5]. For some items with large value and difficult to experiment to simulate the market environment, such as housing, companies, etc., regression analysis is usually used. Because endowment effects have unobservable and unmeasurable characteristics, researchers usually select proxy variables to enter the model. Suitable proxy variables have fewer other influence channels and mainly influence the dependent variable of interest through endowment effects.

2. Hypothesis

- (1). Hypothesis one: In corporate M&A, the endowment effect exists at the decision-making level of the company.
- (2). Hypothesis two: The endowment effect can explain the M&A premium and has a positive impact on the M&A premium.

3. Research Method

This article uses the method of empirical analysis to establish the regression equation through the selection of suitable variables from the data in the Watson database. Test the hypothesis based on this.

Table 2. The selection of dependent Variable

Type of the Variable	Variable	Index	Code	Units
Variable	M&A Premium	①Takeover premium calculate based on the share announcement date. ②Takeover premium calculate based on the share announcement date. ③Takeover premium price one day before the announcement date.	PW4 PW1 PD1	% %

Table 3. The selection of independent variable

TYPE OF THE VARIABLE	VARIABLE	INDEX	CODE	UNITS
Independent Variable	Endowment effect	①Whether the founder is at the decision-making level ②the length of time of the company is founded ③the length of time the CEO has been in the office ④the age of the CEO	FO STime ATime Age	Year Year Age

Table 4. The selection of control variable

Type of the variable	Variable	Index	Code	Units
Control Variable	Business Performance	Excess return on equity Price/book ratio The debt/equity ratio gap	ROE MB FS	
	Synergy Effect	Industries related	SI	
	Agency Problem	The two powers are separated Flow ratio	SR CF	
	Negotiation Ability	Revenue variance Whether other bidders	DR COM	Per million dollars
	Industry Type	Yes or No new trade	IND	

As shown in the tables 2,3&4, the dependent variable is M&A Premium. M&A premium as a dependent variable. Choosing the right fair value is key to calculating the M&A premium. Most foreign literature chooses stock prices; Domestic scholars mostly use net worth or third-party valuation [10]. Compared with stock prices, which fully reflect market supply and demand, net assets are static book value, and third-party appraisal prices are always close to the transaction price due to one or more games [11]. Therefore, this article uses the stock price as the basis for calculating the M&A premium, select the stock price four weeks ago, one week ago and the previous day to calculate the M&A premium as the dependent variable [12].

The independent variable is an endowment effect, but because the endowment effect is difficult to observe and difficult to quantify, the author represents it as a proxy variable. Referring to the endowment effects in Table 1, the source of the difference was selected as the proxy variables of the endowment effect, including whether the founder was at the decision-making level, the company's founding time, the CEO's tenure, and the CEO's age. Adams et al, in their study of the performance of companies with founders as CEOs, point out that founders and CEOs often view companies as their personal achievements and are strong in the company of influence [13]. Therefore, when a founder serves on management or a board of directors, his or her personal will can often influence the company's decisions, thus making the company's decisions more endowmental. According to Strahilevitz etc [14]. and Lichtenstein etc, the age and length of holding of decision-makers can influence the endowment effect [15]. In the M&A scenario, the age of the decision maker can be reflected in the age of the CEO; In addition, Jochen etc. pointed out that the endowment effect does not depend on the actual ownership of the individual to the item, but on the subjective sense of ownership caused by the possession of the item, so although the decision-making level does not necessarily have control of the company from the inception, their subjective sense of ownership is still related to the history of the company [16]. Therefore, the length of time a company is founded can also be used as a reflection of the subjective holding period. Other channels affecting these proxy variables have not been discussed in the general M&A premium research literature, so they can be used as suitable proxy variables for endowment effects.

To control for the impact of factors other than the endowment effect on the M&A premium, the author introduces control variables, which are: Business Performance, Synergy Effect, Agency Problem, Negotiation Ability, Industry Type. And index, codes and units are also shown in the table above.

It is worth mentioning the measurement of M&A premium. The M&A premium means that the money paid by the acquisition is divided by the value of the company. But the value of a company is difficult to measure. Here, the author uses the value of shares to measure the value of a company.

Table 5. Descriptive statistics for each indicator data.

CODE	Mean Value	Least Value	Maximum Value	Median
PW4	45.155	-27.71	196.88	36.82
PW1	39.701	-27.67	171.49	33.51
PD1	37.757	-30.31	187.5	32.18
FO	0.375	0	1	0
STime	30.524	1	235	22
Atime	11.447	1	50	9
Age	56.319	35	85	56
ROE	-0.115	-37.999	15.391	0.014
MB	3.141	-65.985	69.6	2.189
FS	-0.064	-8.712	1.418	-0.05
SI	3.296	1	4	3
SR	0.368	0	1	0
CF	2.983	0.289	27.244	2.235
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SR	0.368	0	1	0
CF	2.983	0.289	27.244	2.235
DR	12461.14	-37727.56	143514.8	2705.068
COM	0.033	0	1	0
IND	0.715	0	1	1

The above three tables are statistics made using stata.

4. Analysis and Result

To make the test more precise, the author narrowed down the sample. The author picked companies that had also acquired other companies before their own merger between 2010 and 2018 and had not changed their CEO between the two mergers.

were screened out from the sample. And an equivalent hypothetical transformation.

If the H1 does not hold, i.e., WTP (willingness to pay) = WTA (willingness to accept). If the H1 holds, i.e., Trading Value > WTA > WTP > Purchasing Value. And then the author built a regression equation:

$$P = \beta_0 + \beta_1 \text{ROE} + \beta_2 \text{MB} + \dots + \beta_9 \text{IND} \quad (1)$$

“P” represents the M&A premium.

Table 6. Benchmark regression results

Variable	Coefficient		
	Modle(I)	Modle(II)	Modle(III)
ROE	-0.852 (-1.13)	-0.273 (-0.28)	-0.173 (-0.15)
MB	-0.188 (-0.88)	-0.257 (-1.16)	-0.289 (-1.25)
FS	8.112* (1.65)	8.573* (1.46)	9.625** (2.50)
SI	-6.533** (-2.75)	-6.783*** (-2.96)	-7.612*** (-2.71)
SR	-8.211*** (-2.70)	-5.093** (-1.56)	-5.447** (-2.25)
CF	1.244 (1.28)	1.299* (1.70)	1.366** (2.65)
DR	1.324 (0.71)	2.107 (1.14)	1.684 (1.40)
COM	17.412* (1.55)	9.742 (1.04)	11.566 (1.49)
IND	0.642 (0.14)	0.883 (0.28)	0.473 (0.15)
CONS	65.686*** (6.32)	60.256*** (7.62)	61.621*** (6.70)
F	4.32	1.65	2.48

Through the regression results, we can find that the average M&A premium P1 that cannot be explained in the first M&A is -16.869%, and the average M&A premium P2 that cannot be explained in the second M&A is -5.928%. So, at a significance level of 10%, the null hypothesis can be rejected. Thus, showing that the endowment effect (Table 6).

does exist, that is, hypothesis one is true.

For the verification of hypothesis two, the author introduces an interaction term to re-establish the regression equation:

$$P = \beta_0 + \beta_1 \text{Endowment} + \beta_2 \text{CV1} + \beta_3 \text{CV2} + \dots + \beta_n + 1 \text{CV}_n \quad (2)$$

“P” represents the M&A premium, “Endowment” represents the proxy variables of endowment and “CV” represents the control variable.

Table 7. Benchmark regression results

Variable	Coefficient		
	Model I	Model II	Model III
FO	3.735 (0.87)	0.565 (0.10)	0.729 (0.74)
Stime	-0.010 (-0.26)	-0.021 (-0.42)	-0.038 (-0.46)
Atime	-0.047 (-0.42)	-0.258 (-0.94)	-0.037 (-0.36)
Age	-0.603** (-3.46)	-0.736** (-3.56)	-0.349** (-0.23)

Through the regression result, the author can find that the coefficient of “ATime” and “STime” are significantly positive. So, hypothesis two is true (Table 7).

5. Discussion

This article only examines the premium in the overall M&A environment. However, for each different industry, there is no more in-depth analysis and research at different stages of each industry. Therefore, relevant specific research can be done in the follow-up to expand the research on the impact of endowment effect on the impact of corporate M&A premium.

6. Conclusion

According to the result of multiple regression there is an endowment effect in the corporate M&A, and this effect significantly increases the M&A premium. The impact of endowment effect on M&A premium in M&A events of companies in different industries is different, and the impact of endowment effect in M&A of emerging industry companies is more prominent. It is recommended that the acquirer should fully consider the increased M&A costs due to the influences endowment effect when acquiring another company; Formulators consider the effect of endowment effects on the efficiency of industrial integration effects.

Therefore, this paper suggests that when analyzing the M&A value of potential target companies, the main and merging parties can start from the strength of the endowment effect of the decision-making level of the target company, and pay attention to the endowment effect that may have an impact on the M&A premium in addition to the rational M&A value such as synergy effect, so as to consider the M&A cost more comprehensively. In addition, the existence of endowment effects brings differences between WTA and WTP, making it impossible to make transactions that could have reached Pareto improvements, resulting in a certain degree of efficiency loss. Therefore, for industrial M&A policy makers, weakening the impact of endowment effects in various ways will lead to more effective industrial integration.

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