Proceedings of the 7th International Conference on Economic Management and Green Development
DOI: 10.54254/2754-1169/44/20232195

The Endowment Effect in Corporate Mergers and Acquisitions and Its Impact on Merger Premiums

Gou Zhengyang[1,a,*]

[1]*The University of Sheffield Department:Management School*
a. 18754633207@163.com
**corresponding author*

Abstract: Ignoring income effects and transaction costs, the price individuals are willing to pay for an item should be equal to the price they are willing to sell it for. However, Professor Thaler discovered some "anomalous" phenomena in real life where individuals assign higher value to the items they possess, leading to inconsistency between the "willingness to pay" and "willingness to sell" prices. This phenomenon is often used in the analysis of behavioural economics and is linked to the theory of loss aversion. Thaler explained these anomalies using loss aversion from prospect theory and referred to this phenomenon as the endowment effect. The paper conducts a multiple regression analysis to investigate the existence of the endowment effect and its impact on the M&A premium, using a sample of 425 M&A events in which both parties were US-listed companies from 2010-2018. The results show that the endowment effect exists in the M&A process and significantly increases the M&A premium; the impact of the endowment effect on the M&A premium varies across M&A events in different industries, and the impact of the endowment effect is more prominent in the M&A of companies in emerging industries. It is recommended that acquirers should fully consider the increased M&A costs due to the endowment effect when evaluating target companies; industrial policy makers should consider the impact of the endowment effect on the efficiency of industrial integration.

Keywords: Endowment effect; M&A premium; Multiple regression

1. Introduction

In real-life transactions, asymmetry is often observed. For instance, trading volume tends to be lower when stock prices are declining compared to when they are rising. Housing properties tend to stay on the market for a longer period when housing prices are falling compared to when they are increasing. Established companies often have more inefficient institutional arrangements than new companies, making it difficult to downsize unnecessary departments, workshops, or sell unprofitable production lines that have been operating for years[1].These asymmetric phenomena share a common microeconomic foundation known as the Endowment Effect. The Endowment Effect leads to a higher valuation of goods among those who own them compared to those who do not. In the market, this often manifests as a Willingness To Accept (WTA) that is higher than the Willingness To Pay (WTP). This asymmetrical behavior frequently results in a lack of trading activity in the market[2][3][4].

From a traditional economic perspective, the Endowment Effect is considered a behavioral anomaly[1]. Some researchers have attempted to provide microeconomic explanations for such

DOI: 10.54254/2754-1169/44/20232195

behavioral anomalies from the perspectives of loss aversion, status quo bias, and reference dependence in behavioral economics[1][2][3][5][6]. Recent experimental research has sparked intense debates regarding whether the Endowment Effect is a result of "subject misunderstanding" or an objective fact, and further investigations have revealed the robustness of the Endowment Effect[7][8].

The source of the M&A premium has always been a matter of academic and industry interest. Early research suggested that the acceptance of M&A premiums was a rational choice made by the principal merging company after a critical judgment of market conditions and the target company. In recent years, with the development of behavioural economics and psychology, more and more researchers have begun to explore the irrational factors in M&A behaviour, devoting more attention to the previously neglected psychological factors in M&A behaviour.

This means that studying the causes of the M&A premium also requires attention to the irrational characteristics of the target company and its decision makers. However, in the area of corporate finance, to which corporate M&A belongs, there are only a few studies on the endowment effect, with only one relevant literature on the application of the endowment effect in the area of corporate law[9], and little discussion of the mechanisms of the endowment effect on the generation of M&A premiums.

To fill this gap, this paper takes M&A events in which both parties to the M&A are US listed companies as the research sample from 2010-2018, and tests the existence of the endowment effect by examining the M&A premium characteristics of a sub-sample of M&A companies that have acquired other listed companies before they themselves were acquired, and on this basis, portrays the unobservable endowment effect through proxy variables to investigate the effect of the endowment effect on whether the M&A premium of the general sample of firms has explanatory power and the effect of target firms belonging to different industries on this effect

2. Definition and Methodology

2.1. The Definition of the Endowment Effect

The endowment effect is the tendency for people to esteem what they possess more highly than the same thing when they do not. Researchers who evaluated consumers' valuations of public goods using the contingent valuation method (CVM) gave rise to the study of the endowment effect. According to these survey investigations, respondents were more willing to accept a lower minimum price (willingness to accept, WTA) than a higher maximum price (willingness to pay, WTP) for a public product. This difference has been attempted to be explained by researchers. The endowment effect was initially proposed by Thaler (1980)[5], who characterized it as follows: people often demand more money to give up an item they own compared to the money they are ready to pay to acquire it. This is known as the WTA-WTP disparity. Scholars have revealed the reasons for the differences in the strength of the endowment effect from different perspectives, as shown in Table 1. The reasons for these differences include, for example, enquiry theory and other psychological mechanisms in addition to the classical loss aversion explanation[3][10].

DOI: 10.54254/2754-1169/44/20232195

Table 1. Sources of variation in the strength of the endowment effect and the direction of its impact

Source	Direction of influence	Psychological mechanism	Research object	Literature sources
Uncertainty of value	+	Both gains and losses are uncertain, and due to loss aversion, people place more weight on the downside	General merchandise and experimental tokens	van Dijk & van Knippenberg, 1996[11]
Replaceability	–	Loss of an irreplaceable commodity can lead to greater losses	Sweets and personal health	Shogren et al., 1994[12]
The difficulty of the acquisition process	+	The valuation of an item depends on the memory obtained from the query	Performance awards and lotteries	Loewenstein & Issacharoff, 1994[13]
Access to the emotions of the process	+	Emotion at the time of acquisition can affect valuation	Souvenirs and general merchandise	Martinez et al., 2011[14]
Length of time held	+	Subjective sense of ownership increases with length of ownership	Mugs held for different lengths of time	Strahilevitz & Loewenstein, 1998[15]
Emotions at the time of the transaction	+	Negative sentiment will place more value on the potential loss of a trade		Lin et al., 2006[16]
Age of trader	–	Older people tend to make more deliberate and rational decisions		Lichtenstein & Slovic, 2006[17]

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

2.2. Methodology

Although most research on the endowment effect has been conducted on individual consumers, Kahneman et al hypothesise that the endowment effect also exists when the subject of the transaction is the firm[1], which provides insight into the endowment effect in the context of corporate mergers and acquisitions. Combined with the many factors influencing the endowment effect, this paper conjectures that the endowment effect will be significant in the corporate M&A context. This is because: 1) as a heterogeneous transaction target, the control of the company is often irreplaceable in the eyes of the decision makers of the target company. Shogren et al[12] show that people usually show stronger endowment effects for such irreplaceable goods; 2) CEOs or board members who are also among the founders of the target company develop a strong attachment to the company due to their experience of the difficult process of starting and growing the company, which in turn; 3) the founder CEO is also reluctant to relinquish control of the company due to his high personal gains and personal prestige in the company[18]. Accordingly, this paper proposes hypothesis 1 to be tested.

Hypothesis 1: There is an endowment effect at the decision-making level of the target company in a corporate M&A situation.

The M&A premium is the excess of the transaction price over the fair value as a percentage of the fair value. For target companies with normal operations that are not in financial crisis, the M&A premium is usually prevalent as the M&A offer will only be accepted if the host company offers a sufficiently satisfactory price. From the perspective of the endowment effect, when the target company's decision makers increase their psychological valuation due to the endowment effect, the higher valuation will also drive the formation of higher M&A transaction prices and M&A premiums according to the classical M&A game model. Therefore, this paper conjectures that the presence of the endowment effect has some explanatory power for the M&A premium, and accordingly, hypothesis 2 is proposed.

DOI: 10.54254/2754-1169/44/20232195

Hypothesis 2: The endowment effect explains the M&A premium and has a positive effect on the M&A premium.

3. Empirical Analysis

3.1. Variables and Indicators

Table 2. Representative Indicators and Calculation Methods for Each Variable

Variable type	Variable	Indicators	Code	Unit	Calculation method
Dependent variable	M&A premiums	M&A premium based on share price four weeks prior to M&A announcement date	P_{W4}	%	((Transaction price - share price four weeks prior to the M&A announcement date)/share price four weeks prior to the M&A announcement date) x 100%
		M&A premium based on share price one week prior to M&A announcement date	P_{W1}	%	((Transaction price - share price one week prior to M&A announcement date)/share price four weeks prior to M&A announcement date) x 100%
		M&A premium based on share price on the day before the M&A announcement date	P_{D1}	%	((Transaction price - share price on the day before the M&A announcement date)/share price on the day before the M&A announcement date) x 100%
Independent variable	Endowment effect	Whether the founder is at the decision-making level	FO		1 if the profile of a director or officer in the target company's annual report or shareholder proxy contains information such as "co-founder" or "joined the company from its inception", otherwise 0
		Length of time since the company was founded	STime	Year	Year of merger announcement minus year of creation of target company
		The length of time the CEO	ATime	Year	The length of time the CEO of the target company has been in office in the year of the M&A announcement, calculated as less than one year
		Age of CEO	Age	Year	Age of the CEO of the target company in the year of the M&A announcement
Control variables	Business Performance	Return on Earning	ROE		ROE of the target company's annual report for the year prior to the M&A announcement - median ROE of the target company's industry for the year prior to the M&A announcement; where the industry classification of the M&A company is based on the Fama French 12 classification in the WRDS database
		Price-to-Book Ratio	MB		Share price per share/net assets per share as disclosed in the annual report of the target company for the year prior to the M&A announcement
		Difference in debt/equity ratio	FS		Debt/equity ratio of the target company as disclosed in its annual report for the year prior to the M&A announcement minus the debt/equity ratio of the principal

DOI: 10.54254/2754-1169/44/20232195

Table 2. (continued).

				merging company for the year prior to the M&A announcement
Synergy	Industry relevance	SI		A score of 4 was given if the target company and the main merging company had exactly the same four-digit SIC code; a score of 3 was given if the two companies were clearly related in the value chain (e.g. belonging to the same industry or upstream or downstream) or if two of the SIC codes were the same; a score of 2 was given if there was a possible business connection between the two companies (e.g. the possibility of business cooperation); and a score of 1 was given if they were not related at all. Score each sample M&A pair based on the company's main business description, SIC code and information from the company's official website
Agency issues	The separation of powers	SR		1 if the CEO and Chairman of the target company are the same, 0 otherwise
	Current ratio	CF		Current ratio as disclosed in the annual report of the target company for the year prior to the M&A announcement
Negotiation skills	Revenue Variance	DR	US$ million	Operating revenue disclosed in the annual report of the principal merging company for the year preceding the M&A announcement less operating revenue disclosed in the annual report of the target company for the year preceding the M&A announcement
	Whether there are any other bidders	COM		1 if there are other bidders, 0 otherwise

Note: 1) The Fama-French 12 industry classification is a commonly used industry classification standard for US listed companies based on SIC codes; 2) The share price used to calculate the M&A premium is the previous trading day if it is not a trading day; all share prices are taken from the closing price; 3) The "M&A announcement date" refers to the date on which the M&A parties' intention to enter into the transaction is initially determined and disclosed to the public on the SEC's website.

3.2. Sample

Considering the availability and completeness of the data, 425 completed M&A events from 2010-2018 in which both parties to the M&A were US-listed companies were selected as the initial sample in this paper.

To ensure consistency in the regression analysis, the initial sample with the following characteristics was excluded: incomplete data, non-cash payments, at least one of the M&A parties was in the financial sector (SIC numbers 6000-6999), non-control transfer M&A in which the principal merging company owned less than 50% of the equity after the acquisition, extreme values of premiums exceeding 200% and special M&A in which the target company had a poison pill plan events. The number of active M&A events after processing was 389. The descriptive statistics for each indicator are shown in Table 3.

DOI: 10.54254/2754-1169/44/20232195

Table 3. Descriptive Statistics for Each Indicator Data

Variable	Indicators			Mean	Minimum	Maximum	Median
	Explanation	Code	Unit				
M&A premiums	M&A premium based on share price four weeks prior to M&A announcement date	P_{W4}	%	45.155	-27.71	196.88	36.82
	M&A premium based on share price one week prior to M&A announcement date	P_{W1}	%	39.701	-27.67	171.49	33.51
	M&A premium based on share price on the day before the M&A announcement date	P_{D1}	%	37.757	-30.31	187.5	32.18
Endowment effect	Whether the founder is at the decision-making level	FO		0.375	0	1	0
	Length of time since the company was founded	STime	Year	30.524	1	235	22
	Length of time in office as CEO	ATime	Year	11.447	1	50	9
	Age of CEO	Age	Year	56.319	35	85	56
Business Performance	Return on Earning	ROE		-0.115	-37.999	15.391	0.014
	Price-to-Book Ratio	MB		3.141	-65.985	69.6	2.189
Synergies	Difference in debt/equity ratio	FS		-0.064	-8.712	1.418	-0.05
	Industry relevance	SI		3.296	1	4	3
Agency issues	Separation of powers	SR		0.368	0	1	0
	Current ratio	CF		2.983	0.289	27.244	2.235
Negotiation skills	Revenue Variance	DR	US$ million	12 461.14	-37 727.56	143 514.8	2 705.068
	Whether there are Any other bidders	COM		0.033	0	1	0

Note: M&A premium data from SDC platinum database, financial data from Compustat database and Bloomberg database, other data such as founder information from Wikipedia and the SEC's website SEC Disclosure of Companies Annual Report (Form 10-k) and Shareholder Proxy Statement (DEF 14A).

3.3. Test of Hypothesis 1

To test hypothesis 1, a sample of companies that had also acquired other companies before their own acquisition between 2010-2018 and did not change CEOs between the 2 acquisitions (17 companies in total, involving 34 M&A events) were screened out from the total sample. For these companies, as the decision makers are the same, if hypothesis 1 does not hold, i.e. WTP = WTA, then there should be no significant difference in the transaction price between the 2 M&A events, controlling for other influencing factors. Whereas if hypothesis 1 holds, then there is a sale price > WTA > WTP > purchase price and therefore the transaction price at the time of the sale of the company should be significantly higher than the transaction price at the time of the purchase of the other company. If it is further assumed that the M&A price is proportional to the share price, then the M&A premium at the time of sale of the company should be significantly higher than the M&A premium at the time of

DOI: 10.54254/2754-1169/44/20232195

purchase of the other company, after controlling for other influencing factors. Using this principle, a statistical test can be used to determine whether an endowment effect exists.

To control for other influencing factors, a full-sample regression of all control variables was first run with the three M&A premiums as the dependent variables, respectively, the following benchmark model was used:

$$P = \beta 0 + \beta 1CV1 + \beta 2CV2 + \cdots + \beta nCVn. \quad (1)$$

P denotes the M&A premium and CV denotes the control variable. By substituting the data corresponding to each indicator in Table 2 into equation (1) and using the STATA tool, the regression results based on the least squares (OLS) method were obtained as shown in Table 4.

Table 4. Benchmark regression results

Variable	Coefficient		
	Models (1)	Models (2)	Models (3)
ROE	-0.952(-1.03)	-0.173(-0.18)	-0.273(-0.25)
MB	-0.288(-0.98)	-0.357(-1.26)	-0.389(-1.35)
FS	8.012*(1.75)	8.473*(1.86)	9.825**(2.10)
SI	-6.433**(-2.15)	-6.983***(-2.76)	-7.712***(-2.91)
SR	-8.211***(-2.60)	-5.193**(-1.86)	-5.547**(-2.05)
CF	1.144(1.38)	1.399*(1.80)	1.766**(2.15)
DR	1.524(0.81)	2.007(1.14)	1.884(1.10)
COM	17.512*(1.85)	9.742(1.14)	11.766(1.59)
IND	0.142(0.04)	0.583(0.18)	0.773(0.25)
CONS	66.586***(6.42)	61.356***(7.02)	60.821***(6.60)
F-Value	2.32	1.95	2.38

Notes: 1) Models (1), (2), and (3) use PW4, PW1, and PD1 as dependent variables, respectively.2) * * *, * *, and * denote significance at 1%, 5%, and 10% significance levels, respectively, with t-values in parentheses.3) Due to the large order-of-magnitude differences between the DRs and the dependent variables, the DRs are standardised before being added to the regression.

As seen in Table 4, the regression results of the three M&A premiums are basically the same. The data of 34 M&A cases involving 17 sub-sample companies are substituted into the model (1)-(3) respectively, and the M&A premium is predicted using the model estimation results, and then the actual M&A premium is subtracted from the prediction results respectively, to get the part of the 3 kinds of M&A premiums that cannot be explained by the control variables. The results of the three calculations are averaged as the M&A premium after the control variables. After calculation, we get: the mean value of M&A premium that cannot be explained in the 1st M&A of 17 sample companies is P1 is -16.869%, and the mean value of M&A premium that cannot be explained in the 2nd M&A is P2 is -5.928%, and the one-sided paired t-test with P1 67 P2 as the alternative hypothesis, the result shows that the original hypothesis can be rejected at the significance level of 10 per cent. Thus indicating that the endowment effect does exist, i.e. hypothesis 1 is valid.

3.4. Test of Hypothesis 2

To test hypothesis 2, the proxy variables for each endowment effect are added to the baseline model, and a multiple regression model is established expressed as follows:

$$P = \beta 0 + \beta 1\ Endowment\ + \beta 2CV1 + \beta 3CV2 + \cdots + \beta n + 1CVn. \quad (2)$$

DOI: 10.54254/2754-1169/44/20232195

P denotes M&A premium, Endowment denotes the proxy variable for endowment effect, and CV denotes the control variable. PW4, PW1 and PD1 are used as dependent variables respectively, and the data of each variable is substituted for multiple regression, and the results are shown in Table 5.

Table 5. Regression Results

Variable	Coefficient		
	Models (1)	Models (2)	Models (3)
FO	3.845(0.99)	0.695(0.20)	0.898(0.26)
STime	-0.020(-0.35)	-0.011(-0.23)	-0.017(-0.36)
ATime	-0.056(-0.30)	-0.117(-0.71)	-0.082(-0.49)
Age	-0.501**(-2.49)	-0.435**(-2.39)	-0.455**(-2.55)

Note: 1) * * * *, * * *, * indicate significant at 1%, 5%, and 10% level of significance, respectively, with t-values in parentheses; 2) Results for the remaining control variables have been omitted.

Table 5 shows that in the three models, the coefficient of founder (FO) is positive, while the coefficients of firm founding time (STime), CEO inauguration time (ATime), and CEO age (Age) are negative. The signs of the coefficients for all variables except STime and ATime are consistent with theoretical predictions. This suggests that a younger founder at the decision-making level or CEO age is associated with a higher M&A premium demanded by the firm, i.e., when the decision-making level has a greater endowment effect on the firm, the M&A premium is higher. However, in terms of significance, FO, ATime, and STime do not yield statistically significant results.

4. Conclusion

This paper examines the existence of endowment effects in M&A behaviour and the impact of endowment effects on M&A premiums using multiple regression methods. Data on 425 M&A events of US listed companies from 2010 to 2018 and multiple regression models are used to analyse the impact of the endowment effect of the target company's decision-making layer reflected by proxy variables such as whether the founder is in the decision-making layer, the length of the company's founding, the length of the CEO's inauguration, and the CEO's age, on the M&A premium of target companies in different industries. The results show that the endowment effect in M&A behaviour has a significant positive explanatory effect on M&A premiums, and this effect is more important in emerging industries.

Therefore, this paper suggests that when analysing the M&A value of potential target companies, the main merger party can start from the strength of the endowment effect of the target company's decision-making layer, 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 synergies, so as to consider the M&A cost in a more comprehensive way. In addition, the existence of the endowment effect brings about the difference between WTA and WTP, which makes it impossible to carry out transactions that could have reached Pareto improvements, thus bringing about a certain degree of efficiency loss. Therefore, for industrial M&A policy makers, weakening the impact of the endowment effect in various ways will lead to more efficient industrial integration.

References

[1] *Kahneman, D., Knetsch, J.L. and Thaler, R.H. (1990) 'Experimental tests of the endowment effect and the Coase Theorem', Journal of Political Economy, 98(6), pp. 1325–1348. doi:10.1086/261737.*

[2] *Morewedge, C.K. and Giblin, C.E. (2015) 'Explanations of the endowment effect: An integrative review', Trends in Cognitive Sciences, 19(6), pp. 339–348. doi:10.1016/j.tics.2015.04.004.*

[3] *Gilovich, T. and Medvec, V.H. (1995) 'The experience of regret: What, when, and why.', Psychological Review, 102(2), pp. 379–395. doi:10.1037/0033-295x.102.2.379.*

[4] DellaVigna, S. (2009) 'Psychology and economics: Evidence from the Field', Journal of Economic Literature, 47(2), pp. 315–372. doi:10.1257/jel.47.2.315.
[5] Thaler, R. (1980), "Toward a Positive Theory of Consumer Choice". Journal of Economic Behavior & Organization , 1 (1) , 39–60.
[6] Marzilli Ericson, K.M. and Fuster, A. (2011) 'Expectations as endowments: Evidence on reference-dependent preferences from exchange and valuation experiments *', The Quarterly Journal of Economics, 126(4), pp. 1879–1907. doi:10.1093/qje/qjr034.
[7] Plott, C.R. and Zeiler, K. (2005) 'The willingness to pay–willingness to accept gap, the "endowment effect," subject misconceptions, and experimental procedures for eliciting valuations', American Economic Review, 95(3), pp. 530–545. doi:10.1257/0002828054201387.
[8] Fehr, D., Hakimov, R. and Kübler, D. (2015) 'The willingness to pay–willingness to accept gap: A failed replication of Plott and Zeiler', European Economic Review, 78, pp. 120–128. doi:10.1016/j.euroecorev.2015.05.006.
[9] Arlen, J., Spitzer, M. and Talley, E. (2002) 'Endowment effects within Corporate Agency relationships', The Journal of Legal Studies, 31(1), pp. 1–37. doi:10.1086/324659.
[10] Johnson, E.J., Häubl, G. and Keinan, A. (2007) 'Aspects of endowment: A query theory of value construction.', Journal of Experimental Psychology: Learning, Memory, and Cognition, 33(3), pp. 461–474. doi:10.1037/0278-7393.33.3.461.
[11] van Dijk, E. and van Knippenberg, D. (1996) 'Buying and selling exchange goods: Loss aversion and the endowment effect', Journal of Economic Psychology, 17(4), pp. 517–524. doi:10.1016/0167-4870(96)00017-7.
[12] Shogren, J. et al. (1994) 'Resolving Differences in Willingness to Pay and Willingness to Accept', American Economic Review, 84(1).
[13] Loewenstein, G. and Issacharoff, S. (1994) 'Source dependence in the valuation of objects', Journal of Behavioral Decision Making, 7(3), pp. 157–168. doi:10.1002/bdm.3960070302.
[14] Martinez, L.F., Zeelenberg, M. and Rijsman, J.B. (2011) 'Regret, disappointment and the endowment effect', Journal of Economic Psychology, 32(6), pp. 962–968. doi:10.1016/j.joep.2011.08.006.
[15] Strahilevitz, M.A. and Loewenstein, G. (1998) 'The effect of ownership history on the valuation of objects', Journal of Consumer Research, 25(3), pp. 276–289. doi:10.1086/209539.
[16] Lin, C.-H. et al. (2006) 'The role of emotions in the endowment effect', Journal of Economic Psychology, 27(4), pp. 589–597. doi:10.1016/j.joep.2005.10.001.
[17] Lichtenstein, S. and Slovic, P. (2006) The construction of preference. Cambridge: Cambridge University Press.
[18] Adams, R., Almeida, H. and Ferreira, D. (2009) 'Understanding the relationship between founder–CEOS and firm performance', Journal of Empirical Finance, 16(1), pp. 136–150. doi:10.1016/j.jempfin.2008.05.002.