

The Relationship between Profitability and Customer Retention Rates in Life Insurance Companies: Using Partial Least Squares Structural Equation Modeling

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Abstract

This study aimed to reveal the relationship between profitability and customer retention rates in life insurance companies. It examined whether the customers' repertoire that reflects the deviation of the customer retention rate derived from the negative binomial distribution Dirichlet model affects the profitability of life insurance companies. The results of the partial least squares structural equation modeling reveal the following. First, the profitability of life insurance companies is positively influenced by the customers' repertoire in accordance with prior research. Second, the profitability of life insurance companies is not influenced by promotions.

Keywords: profitability, Customer retention rate, life insurance company, PLS-SEM

1. Introduction

This study aimed to reveal the relationship between profitability and the customer retention rate among Japanese life insurance companies. Many prior studies point out that the marketers of subscription service companies such as life insurance and credit card companies should increase their customer retention rate to improve their profitability (Reichheld and Sasser, 1990). On the contrary, other prior research claims that there is not a simple causal relationship between profitability and the customer retention rate because it confirms "double jeopardy" even in the subscription services market (Sharp, Wright and Goodhardt, 2002; Sharp, 2010; Riebe, Wright, Stern and Sharp, 2014). Double jeopardy is the phenomenon of placing a higher value on larger firms' customer retention.

Sharp (2010) proposes the following possible relationship between profitability and the customer retention rate among subscription services companies. First, the customers have their repertoire through which they can compare competing companies. Their repertoire is reflected by the customer retention rates which are eliminated from the influence of double jeopardy. The customer retention rates are measured as the deviation from the negative binomial distribution (NBD) Dirichlet model.

Second, their repertoire affects the profitability of the firms positively. Wakuta (2018) examines the above relationship among Japanese life insurance companies and confirms it.

However, this prior research still has two limitations. First, it only uses data from a single year, so we still do not know whether we can confirm the relationship across different years. Second, it only focuses on the relationship between the repertoire and profitability; therefore, as Bhattacharya (1997) reveals, we still do not know how marketing efforts such as promotions that help the loyalty program, affect the profitability.

This study will answer the following two research questions;

RQ1: Can the relationship be confirmed across different years?

RQ2: How do promotions affect profitability?

The remainder of this paper proceeds as follows. Section 2 provides an overview of the literature and presents the research model and hypotheses. Section 3 comprises a description of the research methodology. Section 4 presents the two kinds of analysis and the results from the empirical data. Finally, Section 5 concludes and discusses limitations.

2. Literature review and research model

According to Reichheld and Sasser (1990), subscription service companies such as credit card and life insurance companies should increase their customer retention rate to improve profitability because cumulative transaction costs tend to decrease. They use MBNA, a credit card company in the United States, as an example. When a customer signs a contract with MBNA, the profit for the first year is minus 51 dollars, but the profit for the second year is 30 dollars and the profit for the third year is 42 dollars. Therefore, many life insurance companies have attempted to increase their customer retention rate. For example, many companies offer loyalty programs. Many prior studies reexamine the tendency of cumulative transaction costs to decrease in subscription service companies (Reichheld and Teal, 1996; Gupta, Lehmann and Stuart, 2004).

On the contrary, other prior research claims that there is not a simple causal relationship between profitability and the customer retention rate (Reinartz and Kumar, 2000; Sharp, 2010)¹⁾. This is partly because we can confirm “double jeopardy” even in the subscription services market (Sharp et al., 2002;

1) Recently, Reinartz, Thomas and Kumar (2005) explored the optimal level of the customer retention rate to overcome the conflict of these prior researches.

Riebe et al., 2014). Double jeopardy is the phenomenon of placing a higher value on larger firms' customer retention rate. Larger brands not only have more buyers, but these buyers also tend to buy more often. By contrast, smaller brands not only have fewer buyers, but those buyers also tend to buy those brands less often, resulting in smaller brands being punished twice. Many marketing scholars such as Ehrenberg, Goodhardt and Barwise (1990) and Sharp (2010) refer to this phenomenon as "double jeopardy." According to McPhee (1963), double jeopardy happens in the following two ways. Of the many people who choose well-known brand A, if asked, nearly all will say it is their favorite (because few are even aware of the more obscure brand B). Of the few people who are aware of B, at most half will say it is their favorite because most of them will also be aware of the well-known A; therefore, they split their vote.

Sharp (2010) and Riebe et al. (2014) propose the following possible relationship between profitability and the customer retention rates of subscription services companies. First, customers have their repertoire through which they can compare competing companies. Their repertoire is reflected by the customer retention rates that are eliminated from the influence of double jeopardy. The customer retention rates are measured as the deviation from the NBD Dirichlet model. Second, their repertoire affects the profitability of the firms positively. In fact, Riebe et al. (2014) empirically reveal the deviation from the NBD Dirichlet model of the customer retention rates affect the market share of the banks positively. Wakuta (2018) confirms this relationship in Japanese life insurance companies.

However, Wakuta (2018) still has two limitations. First, the study only used data from 2008; therefore, we still do not know whether we can confirm the relationship across different years. Second, the prior research focuses only on the relationship between repertoire and profitability; therefore, we still do not know how marketing efforts such as promotions, which help the loyalty program, affect profitability. Bhattacharya (1997) reveals that a deviation in the customer retention rate affects profitability positively; however, the share of discount users and the depth of price promotion simultaneously affect profitability negatively.

Therefore, this study examines the following hypotheses using the same research model that the prior research uses. Figure 1 illustrates research model 1 for testing hypothesis 1 (H1). Figure 2 illustrates research model 2 for testing hypothesis 2 (H2).

H1: Customer's repertoire affects profitability positively

H2: Promotion affects profitability negatively

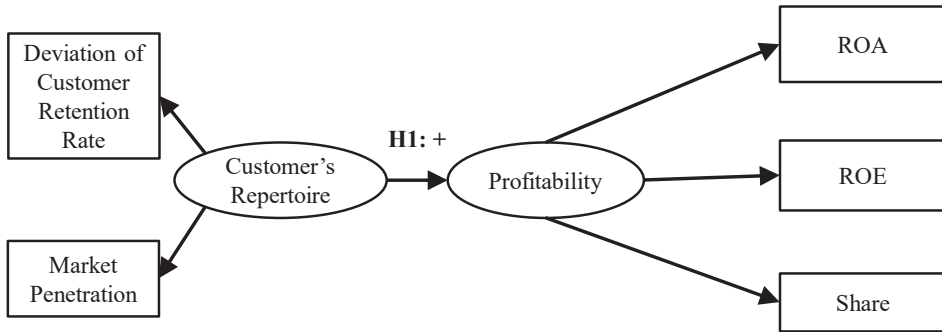


Figure 1. Research model 1

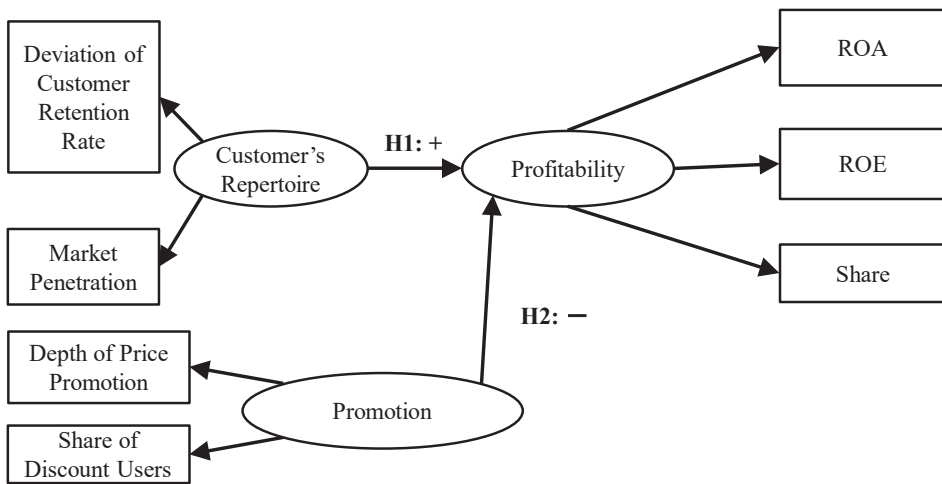


Figure 2. Research model 2

3. Research methodology

The current research consists of two kinds of studies. Study 1 uses research model 1 to test H1. Study 2 uses research model 2 to test H2.

Both studies use partial least squares structural equation modeling (PLS-SEM) because of small samples (Ringle, Wende and Becker, 2015). In 2015, there are 42 Japanese life insurance companies registered with the Japanese Financial Services Agency, which is considered a small sample. According to Reinartz, Haenlein and Henseler (2009), when we analyze small samples, the difference between the PLS-SEM results and those of CB-SEM (covariance based structural equation modeling) is small.

In both studies, the dependent variable (profitability) data was collected from published financial

statements. ROA (Return on Assets) is calculated by dividing the ordinary profit in 2015 by average total assets in 2014 and 2015. ROE (Return on Equity) is calculated by dividing the net income in 2015 by average equity in 2014 and 2015. Furthermore, share is calculated by dividing the ordinary income in 2015 by total market income in 2015.

The independent variable (customer’s repertoire and promotion) data was gathered by the research company, MyVoice Communications, Inc. The research company recruited people to answer our questionnaire, delivered it to them and gathered their responses through the Internet on 19th November 2015. Recruits were asked “Do you have a contract with a life insurance company?” All the respondents answered yes. Table 1 shows the profiles of all respondents (N = 400), comprising 231 males and 169 females.

Table 1. Respondents profile

		N	%
Gender	Male	231	58%
	Female	169	42%
Age	30 - 39	100	25%
	40 - 49	100	25%
	50 - 59	100	25%
	60 - 69	100	25%
Total		400	

Table 2. Variables and descriptive statistics value

Latent Variables	Observed Variables	Operational Definition	N	Mean	SD
Customer’s Repertoire	Market Penetration	1) “Which life insurance company do you have a contract with? Select all the companies you have contracts with.” 2) Share of each company	24	0.064	0.056
	Deviation of Customer Retention Rate	1) “How long have you had a contract with the selected life insurance company?” 2) = (Average contract length per a firm – Estimated value by the Dirichlet model) ÷ Estimated value by the Dirichlet model	24	0.146	0.454
Profitability	ROA	= Ordinary profit ÷ Average Total Assets	24	- 0.015	0.083
	ROE	= Net income ÷ Equity	24	0.021	0.181
	Share	= Ordinary Income ÷ Total Market Income	24	0.039	0.049
Promotion	Depth of Price Promotion	1) “What was your discount rate?” 2) Standardized average discount rate per a firm	24	0.000	1.000
	Share of Discount Users	1) “Did you use a discount service?” 2) Standardized share of each company	24	0.000	0.999

Table 2 shows the variables and descriptive statistics values. The respondents were asked the following four questions. First, they were asked “Which life insurance company do you have a contract with? Select all the companies you have a contract with.” The total number of respondents per company was totaled and divided the total number of respondents (= 400). This share of each company was used as the market penetration in this study. Second, they were asked “How long have you had a contract with the selected life insurance company?” This study averaged the length of contract per company. The theoretical length of the contracts was estimated by Kearns’ (2009) software using the NBD Dirichlet model. The average contract length per firm minus the estimated value divided by the estimated value equaled the deviation of customer retention rate in this study.

Third, the respondents were asked “What was your discount rate?” The discount rate per firm was averaged and standardized. This value was used as the depth of price promotion. Fourth, they were asked “Did you use a discount service?” The number of respondents that responded “yes” to this question was totaled and divided by the number of people contracted to each company and standardized. This share of each company was the share of discount users.

4. Results

4-1. Results of Study 1

According to Hair, Tomas, Hult, Ringle, and Sarstedt (2014), this study embraces a two-step approach to examining and interpreting the PLS-SEM results: (1) evaluation of the measurement model; and (2) evaluation of the structural model.

Table 3. Measurement model results in Study 1

Latent Variables	Observed Variables	Loading	IR	VIF	CR	AVE	Correlation and The Square Root of AVE	
							Repertoire	Profitability
Customer's Repertoire						.763	.620	.788
	Market Penetration	.877	.769	1.068				
	Deviation of Customer Retention Rate	.687	.472	1.068				
Profitability						.785	.550	.604
	ROA	.727	.529	1.966				.742
	ROE	.725	.526	1.940				
	Share	.771	.594	1.052				

Note: The square root of the AVE is on the diagonal and in bold italic font.

First, Study 1 evaluates the measurement model (Table 3). Wong (2013) suggests that it is necessary to evaluate (a) IR (Indicator Reliability), (b) internal consistency reliability and validity, (c) convergent validity and (d) discriminant validity. Table 3 shows the results of the evaluations above. All

IR values are over .400; therefore, they meet Hulland's (1999) criteria. All CR (Composite Reliability) values are over .700, confirming the internal consistency reliability and validity (Bagozzi and Yi, 1988; Hair, Sarstedt, Ringle and Mena, 2012). All AVE (Average Variance Extracted) values are over .500, confirming the convergent validity (Bagozzi and Yi, 1988). The correlation between Repertoire and Profitability is .604, which is lower than the square root of the AVE of Repertoire (= .788) and the square root of AVE of Profitability (= .742); therefore, they meet Fornell and Larcker's (1981) criteria, confirming the discriminant validity.

Second, Study 1 evaluates the structural model (Table 3, Table 4 and Figure 2). In Table 3, all VIF (Variance Inflation Factor) values are under 5.000, confirming no multicollinearity (Hair et al., 2012). According to Hair et al. (2012) and Tagashira and Morimura (2017), the PLS-SEM is different from the CB-SEM in that the PLS-SEM uses a bootstrapping procedure for significance tests. A bootstrapping procedure with 5,000 iterations was performed to examine the statistical significance of the path coefficients. As a result, Table 4 shows that the path from Repertoire to Profitability is significantly positive ($p < .001$) and the other paths also are significantly positive. Furthermore, the R^2 and Adjusted R^2 are significantly positive. Therefore, H1 is supported. Figure 2 illustrates the results of the structural model in Study 1.

Table 4. Results of Structural model in Study 1

Path	Standard β	Standard Error	t
Repertoire → Profitability	.604***	.096	6.316
Repertoire → Market Penetration	.877***	.077	11.434
Repertoire → Deviation of Customer Retention Rate	.687***	.185	3.722
Profitability → ROA	.727***	.100	7.309
Profitability → ROE	.725**	.261	2.782
Profitability → Share	.771***	.117	6.594
$R^2 = .365^{**}$, Adjusted $R^2 = .336^*$			

Note: *** $p < .001$, ** $p < .01$, * $p < .05$ (2-tailed)

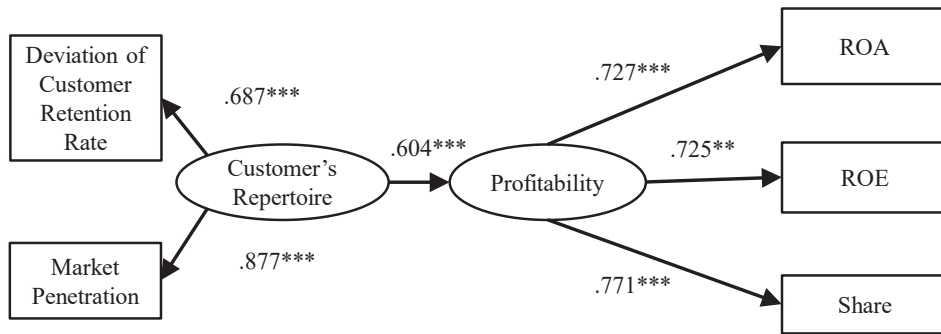


Figure 2. Structural model results in Study 1

4-2. Results of Study 2

First, Study 2 evaluates the measurement model (Table 5). Only the IR of Share of Discount Users is under .400. Therefore, the observed variable of Share of Discount Users is eliminated in Study 2. Table 5 shows the results. All IR values are over .400, therefore, they meet Hulland's (1999) criteria. All CR (Composite Reliability) values are over .700, confirming the internal consistency reliability and validity (Bagozzi and Yi, 1988; Hair et al., 2012). All the AVE (Average Variance Extracted) values are over .500, confirming the convergent validity (Bagozzi and Yi, 1988). The correlation between Repertoire and Profitability is .605, the correlation between Repertoire and Promotion is .593 and the correlation between Promotion and Profitability is .345. They are lower than the square root of the AVE of Repertoire (= .788), the square root of AVE of Profitability (= .742) and the square root of AVE of Promotion (= 1.000) ; therefore, they meet Fornell and Larcker's (1981) criteria, confirming the discriminant validity.

Table 5. Results of Measurement model in Study 2

Latent Variables	Observed Variables	Loading	IR	VIF	CR	AVE	Correlation and The Square Root of AVE		
							Repertoire	Profitability	Promotion
Customer's Repertoire					.763	.620	.788		
	Market Penetration	.877	.769	1.068					
	Deviation of Customer Retention Rate	.687	.472	1.068					
Profitability					.785	.549	.605	.742	
	ROA	.725	.526	1.966					
	ROE	.723	.523	1.940					
	Share	.774	.599	1.052					
Promotion					1.000	1.000	.593	.345	1.000
	Depth of Price Promotion	1.000	1.000	1.000					

Note: The square root of the AVE is on the diagonal and in bold italic font.

Second, Study 2 evaluates the structural model (Table 5, Table 6 and Figure 3). In Table 5, all VIF (Variance Inflation Factor) values are under 5.000, confirming no multicollinearity (Hair et al., 2012). A bootstrapping procedure with 5,000 iterations was performed to examine the statistical significance of the path coefficients. As a result, Table 6 shows that the path from Repertoire to Profitability is significantly positive ($p < .001$) but the path from Promotion to Profitability is not significantly negative. Therefore, H2 is not supported. Figure 3 illustrates the results of the structural model in Study 2.

Table 6. Structural model results in Study 2

Path	Standard β	Standard Error	t
Repertoire → Profitability	.618**	.196	3.159
Promotion → Profitability	-.021	.219	0.096
Repertoire → Market Penetration	.877***	.087	10.129
Repertoire → Deviation of Customer Retention Rate	.687***	.192	3.581
Profitability → ROA	.725***	.130	5.582
Profitability → ROE	.723**	.253	2.856
Profitability → Share	.774***	.127	6.081
Promotion → Depth of Price Promotion	1.000	—	—

$R^2 = .367^{**}$, Adjusted $R^2 = .306^*$

Note: *** $p < .001$, ** $p < .01$, * $p < .05$ (2-tailed)

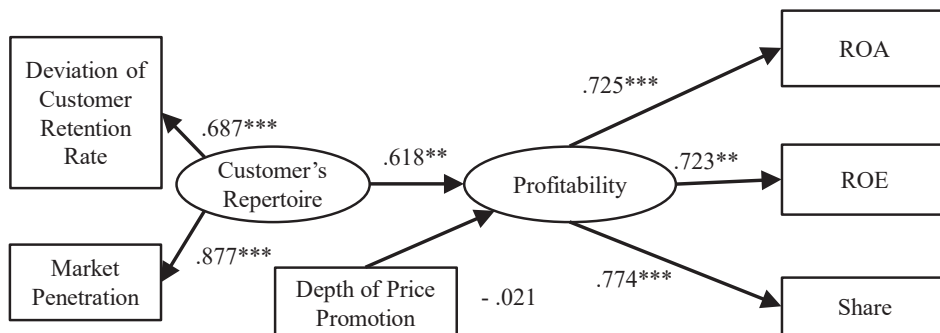


Figure 3. Results of Structural model in Study 2

5. Conclusion and Limitation

This study aimed to reveal the relationship between profitability and the customer retention rate in life insurance companies. It examined whether the customer's repertoire which reflected the deviation of the customer retention rate from NBD Dirichlet model, affected the profitability of life insurance companies. As a result, the PLS-SEM reveals the following. First, the profitability of life insurance

companies was positively influenced by the customer's repertoire in accordance with prior research. This finding was in accordance with Reibe et al. (2014) and Wakuta (2018). Second, the profitability of life insurance companies was not influenced by promotions. This was not in accordance with Bhattacharya (1997).

This study has at least two limitations. First, it could not answer why the profitability of life insurance companies was not influenced by promotions. Bhattacharya (1997) reveals that promotions such as the share of discount users and the depth of price promotion affect profitability negatively, but its power was very weak. We might have not recognized the small negative influence because of the small sample analysis.

Second, this study's results may not be generalizable. It focuses specifically on the Japanese life insurance market. I should re-examine the results in various contexts.

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生命保険業における収益性と顧客維持率の関係 —PLS-SEMを用いて—

涌田 龍治

要旨

本稿は、生命保険業の収益性と顧客維持率の関係を明らかにすることを目的としている。ここでは、顧客のレパトリーがNBDディリクレモデルからの顧客維持率の乖離値に反映されており、それが生命保険業の収益性に影響を与えるのかどうかを検証する。PLS-SEMの分析の結果、次の二点が明らかとなる。第一に、生命保険業の収益性は、先行研究と同じく、顧客のレパトリーから正の影響を受ける。一方、第二に、その収益性はプロモーションからは影響を受けない。