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Are Long-Tenure Customers Less Price Sensitive ? An Empirical Examination in a Services Context

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Abstract

Customer loyalty is a goal for many service organizations. Many marketing initiatives are implemented to favourably affect customer sentiment and build loyalty. Loyalty can be manifest as the length of the relationship, which is referred to as tenure, or the breadth of the relationship, also referred to as share of wallet or level of cross-purchasing. A long-tenure customer base is said to provide many benefits to the service provider. One of these claimed benefits is reduced price sensitivity (e.g. Reichheld & Teal 1996). One operationalisation of this benefit is that the impact of a price increase to a long-tenure customer will be lower than the impact of a price increase to a short-tenure customer. However, limited empirical evidence exists as to the accuracy of this belief. This study investigated whether long-tenure customers are indeed more sensitive or less sensitive to price increases. It used individual-level consumer records (n=69,672) from a large domestic insurance provider. The data was sourced from internal company records, and was based on the response to renewal notices sent to domestic insurance customers. The data included the price change the customer received, ranging from zero to a 20% price increase from the last policy renewal to the current one; their length of prior tenure with the provider (one to fifteen years), and whether they remained as a customer, or lapsed their policy after receiving the renewal notice. Several other control variables were also included. A series of logistic regression models were used to test the research proposition. The results give positive support to the proposition that longer customer tenure is associated with reduced sensitivity to price increases.

Customer Retention, and Pricing Decisions

Customers are increasingly being recognised and managed as assets to the firm (Hogan, Lemon and Rust 2002). A customer base represents a source of future revenue, both in terms of repeat-purchases of products currently bought, and potential for future purchases not yet bought. Indeed it is widely accepted that if there are set-up costs to the firm to attract or recruit new customers, then it is financially desirable to retain current customers rather than constantly lose customers and incur the expense of replenishing the customer base. This is not to underplay the importance of also winning new customers, as some loss in the customer base is inevitable and this must be replenished just to maintain market share (e.g. Sharp, Riebe et al. 2002).

Aside from initial attraction and set-up costs, there are other benefits said to accrue from retaining customers for longer periods of time. Many of these benefits were enunciated by Reicheld and co-authors (e.g. Reichheld and Sasser 1990; Reichheld 1996; Reichheld and Teal 1996). The benefits listed by Reicheld include amelioration of acquisition costs; enhanced overall revenue arising from a longer relationship time period; easier servicing due to customer learning, more referrals, greater tolerance of higher prices, and less likelihood of defection in future years. In recognition of the stated benefits of customer retention, many companies have embraced customer satisfaction and relationship marketing initiatives designed to keep customers for longer, or increase their share of wallet. Indeed, many of the possible antecedents of customer loyalty and retention have been examined in the academic literature, such as service quality (e.g. Zeithaml, Berry and Parasuraman 1996), customer satisfaction (e.g. Bloemer and Lemmink 1992; Biong 1993; Rust and Zahorik 1993;

Iacobucci, Grayson and Ostrom 1994; Danaher and Gallagher 1997; Patterson and Spreng 1997; Mittal and Lassar 1998; Ranaweera and Prabhu 2003) – for a recent meta-analysis see Szymanski (2001); loyalty programs (Sharp and Sharp 1997; Bolton, Kannan and Bramlett 2000), and cross-selling to raise customer switching costs and therefore customer longevity (e.g. Kamakura, Wedel et al. 2003).

Overall, such work has had a broad focus on initiatives that the firm can implement to favourably affect customer sentiment, or in some other way, make its customers more behaviourally loyal. However, it is also the case that the firm may sometimes choose to, or be forced to, do things that potentially have an unfavourable impact on customer sentiment and/or behaviour. A prime example of this is a price increase. If input costs to the firm increase, it must raise prices, otherwise margins will suffer. Naturally, one of the basic tasks of marketing in this situation is to manage this situation such that the potential impact on the customer base is minimised. However, it is still the case that price rises represent a potential threat to the establishment and maintenance of long-term customer relationships and loyalty. Furthermore, organizations have a powerful profit incentive to ensure their prices adequately reflect value, and achieve margin objectives. For example, Marn and Rosiello (1992) find that a one percent gain in price has more positive impact on bottom-line profit than a commensurate cost reduction. Likewise, in many cases price increases may be difficult to avoid for either marketers or their customers. Pricing decisions are often decided on the basis of costs (Zeithaml, Parasuraman and Berry 1985) and so flow-on effects in the form of price rises will occur if costs rise.

Research Question: are long-tenure customers less sensitive to price increases ?

The question arises, what happens when a service provider raises price ? In relation to the current customer base, elementary knowledge tells us that price is inversely related to aggregate demand, so the expectation is that a price rise will cause higher levels of switching, and/or reduced levels of cross-buying among the customer base. It would use useful to know which customers are more sensitive to the price increase. One common method of classifying customers is according to their current loyalty status, for example distinguishing between short-tenure and long-tenure customers. Do these two customers groups differ in terms of their sensitivity to price increases ? The answer would be useful from a practical viewpoint as well as an advance in academic research. For marketers, pre-identification may make retention programs easier to construct; or assist in designing 'winback' programs (Stauss and Friege 1999; Thomas, Blattberg and Fox 2004). Likewise, this knowledge would be potentially valuable in brand or corporate valuation. If longer-term customers are less price sensitive, then two companies with the same number of customers but with differing average customer tenure arguably differ in monetary value.

Despite its potential importance, there is little evidence on this issue. As stated earlier, Reichheld (1996) claimed that long-term customers are less price sensitive, but offered no empirical evidence as to this claim. One notable study of this claim was Reinartz and Kumar (2000) who investigated whether longer-term customers tended to *pay less* than newer customers – and found they did not. A study by Danaher (2002) examined the impact of different *forms* of price increases among customers of a telecommunications service, but tenure was outside the scope of that study. However, a literature search found no studies that have examined whether price increases as implemented by the service provider have differential impact on long-tenure versus short-tenure customers.

Would we expect long-tenure customers to be less price sensitive, or more price sensitive, than short-tenure customers ? There are opposing arguments for this question. To begin with, it is a reasonable proposition that long-tenure customers of a provider should be less sensitive to any price increases implemented by that provider. This may be is partially a form of 'selection effect' - very price sensitive buyers presumably are more likely to migrate between providers and will have lapsed previously. Secondly, if a customer stays with a service provider for a long period, this may reflect the fact that the utility provided by the service provider is high – it offers superiority in some aspect of the product offering which dampens sensitivity to price. Third, tenure provides more opportunity to cross-sell, which can build switching costs. Conversely, from the viewpoint of perceived fairness (e.g. Homburg, Hoyer and Koschate) a long-tenure customer who receives a price increase may feel their long-term loyalty to the provider has been unrewarded and so they may be motivated to redress this by seeking alternatives. In addition, Reinartz and Kumar (2000) report evidence that long-term customers may be more 'value conscious' hence less likely to accept higher prices. Given these opposing rationale, the research question is therefore framed as non-directional – is the effect of price increases on the odds of lapsing different for long-tenure compared to short-tenure customers ? I report on an empirical study to address this question.

Empirical Study

This study examined whether longer-term customers of a service provider exhibited different levels of price sensitivity compared to newer customers. Price sensitivity was assessed by examining the odds of not remaining as a customer (ie 'lapsing') arising from a price increase. Note that lapsing is an imperfect loyalty measure as not all lapsers have 'switched,' some merely fail to renew their annual contract. The effect of price on lapsing was compared across short-tenure customers and long-tenure customers. It utilised database information supplied by a large car insurance company. The data included information on the premium paid by the customer at their previous renewal, as well as the price indicated on an invitation to renew the premium sent one month before the policy was due to expire. From this information, the price change to the customer was calculated. Several other variables were included in the analysis as independent variables: the customer's age, whether the customer had multiple policies with the provider, the ratio of the original price paid to the coverage of the policy, and whether payment was by instalment or an annual payment. Age potentially confounds the effect of tenure because age and tenure are both time-related variables and are correlated. Its inclusion therefore clarifies the effect of tenure, while including the possible effect of age. Customers with multiple policies are likely to have a lower baseline lapsing rate, therefore this is posited to be related to the dependent variable. The ratio of the price paid by the customer to the coverage they receive is an indicator of how 'expensive' (prior to the price increase) the policy has been. Customers paying more for a given amount of coverage could be expected to have higher lapsing rates because they have a heightened economic incentive to seek alternatives. Finally, use of a 'payment plan' could lower the lapsing rate because this splits the overall price paid into smaller, more affordable payments, lowering the incentive for the customer to consider alternatives at renewal time.

The research proposition stated in statistical terms is that tenure moderates the *form* of the relationship between price and lapsing. Form in this context refers to the slope of the price-lapsing relationship, which is identified from a logistic regression coefficient. As the dependent variable is binary (remain / lapse), logistic regression is the appropriate analysis method. The analysis uses Moderated Regression Analysis (MRA) - (Sharma, Durand and Gur-Arie 1981), adapted for a logistic model, for identifying moderator variable relationships.

The approach commences with specifying three regression equations to identify if the coefficients are equal in each case.

(1) $$Log\left(\frac{P}{1-p}\right) = \beta_0 + \beta_1 X_1$$

(2) $$Log\left(\frac{P}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2$$

(3) $$Log\left(\frac{P}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta 3 X_1 * X_2$$

See Sharma, Durand and Gur-Arie (1981 p. 295)

Where P is the probability of lapsing. P/(1-P) is the *odds* of lapsing. In this model X_1 is the extent of upward price increase faced by the consumer ranging from 0 to +20 percent more than their last renewal price. X_2 is tenure in years, ranging from 1 to 15 years. The other independent variables are omitted from these illustratory equations for simplicity. If the coefficient for tenure is statistically significant in (2), but the interaction term in (3) is not, then tenure is merely a predictor variable. If the coefficient for the price x tenure interaction in (3) is statistically significant, this indicates that the effect of price on the odds of lapsing is contingent on the tenure of the customer. A negative coefficient would indicate that tenure dampens the effect of a price increase, whereas a positive coefficient would indicate longer tenure heightens the effect of a price increase. The interaction term was constructed using mean-centred price and tenure variables to reduce co-linearity. The price and tenure variables used as independent variables were not mean centred. Results are shown below.

Table 1 MRA: Model Comparisons. Dependent variable is odds of lapse v. renew.

Coefficients:	Model 1		Model 2		Model 3	
Independent variables:	Price, + *age, multiple policies & ratio*		Price, Tenure + *age, multiple policies & ratio*		Price, Tenure, Price x Tenure, + *age, multiple policies & ratio*	
	B	S.E.	B	S.E.	B	S.E.
Constant	-2.2	.05	-2.0	.05	-2.1	0.05
Price increase	+0.034	.003	+0.03	.003	+0.27	.003
Age	-.013	.001	-.009	.001	-.009	.001
Tenure	-		-0.08	.004	-0.08	.004
Price x Tenure	-		-		**-.002**	.001
Multiple policies	-0.66	.07	-.58	.07	-.57	.07
Price/Cover ratio	+0.09	.004	0.09	.004	0.09	.004
Payment	-4.0	.21	-4.0	.21	-4.1	.21
Nagelkerke R^2	0.09	-	0.10	-	0.10	-
-2LL ratio	42584	-	42123	-	42115	-

The interaction term is statistically significant, suggesting tenure moderates the effect of price

Results

The model parameters are all statistically significant at $p< 0.05$ or less, and the Nagelkerke fit statistic is reasonable at 0.10. It is difficult to produce a 'large' fit statistic from a logistic model when the variable of interest is far from a 50:50 split – here, the baseline split is 90% renew and 10% lapse. In this instance, the 'null' model can correctly classify 90% of cases by classifying every case as a non-lapser. Therefore a pseudo R^2 of 0.10 is quite acceptable. The coefficient for the interaction term price x tenure in the MRA is statistically significant (χ^2 8, df 1, $p<0.01$) even though the log likelihood ratio is reduced by a comparatively small amount. Given that the coefficient for tenure and the interaction term are both statistically

significant, the appropriate classification for tenure is a *quasi-moderator* (Sharma, Durand and Gur-Arie 1981). That is, it is related to the criterion variable and interacts with the predictor (independent) variable, namely price. The negative sign of the interaction coefficient suggests it dampens / weakens the effect of price on the odds of lapsing. That is, as tenure increases, the impact of higher prices on the odds of lapsing weakens. Based on the MRA results, I conducted a sub-group analysis to further clarify the role of tenure. The sample was split into two groups: a short-tenure group and a long-tenure group. Results are shown below. The mean tenure in years of the short-tenure group was 2.2 years, the long-tenure group averaged 9 years. Results are in Table 2 below.

Table 2: Sub-group analysis. Dependent variable is odds of lapse v renew.

Coefficients:	Group 1: short-tenure customers			Group 2: long-tenure customers	
	Coefficient (B)	S.E.		Coefficient (B)	S.E.
Constant	-6.37	0.25		-6.1	0.42
Price increase	**+0.36**	0.003		**+0.15**	0.006
Age	-.010	0.009		-.010	0.002
Multiple policies	-0.56	0.09		-0.62	0.13
Price/Cover ratio	+0.9	0.004		+.10	0.007
Payment plan	-4.2	0.24		-3.5	0.41
Nagelkerke R^2	0.10	-		0.06	-

The coefficient for price is lower among long-tenure customers

The sub-group analysis further clarifies the moderating role of tenure. The coefficient for price is markedly lower among long-tenure customers, by approximately half. Likewise the explanatory power of the logistic model is lower among long-tenure customers suggesting that price simply has less impact on the odds of lapsing among longer-tenure customers.

We can exponentiate the coefficients ($e^{\wedge B}$) to gain a sense of how much difference in the odds of lapsing there are among short-tenure customers compared long-tenure customers when faced with a price increase. The average odds of lapsing among short-tenure customers is 0.13 (11.5% lapse / 88.5% renew = 0.13). The exponentiated coefficient for price among short-tenure customers is $e^{\wedge 0.036} = 1.036$. A 1% price rise therefore raises the odds of lapsing by a factor of 1.036, which translates to a new lapsing rate of 11.9%. In other words, a 0.4 percentage point increase in lapsing for every 1% rise in price. Among long-tenure customer the average odds of lapsing is 0.076 (7.1% lapse, 92.9% renew = 0.076). The exponentiated coefficient for price among short-tenure customers is 1.015. A 1% price rise therefore raises the odds of lapsing by a factor of 1.015. This translates to a new lapsing rate of 7.2%. In other words, a 0.1 percentage point increase in lapsing for every 1% price rise. These figures give some sense of the managerial implications of the results presented here. Larger price increases would obviously result in quite marked differences in the change in lapsing rates among short-tenure versus long-tenure customers. These results, albeit based on only one set of data, suggest tenure does have a statistically and managerially significant relationship with reduced sensitivity to price increases. Does tenure 'cause' reduced price sensitivity ? This is unknown. It may be that a common factor underlies the relationship. For example, perhaps the long-tenure customers in this study are inherently less price sensitive. Such causal questions are difficult to answer. The next step for this research is replication, to test the generalisability of the tenure – reduced price sensitivity relationship.

References

Biong, H. (1993) Satisfaction and Loyalty to Suppliers within the Grocery Trade. European Journal of Marketing 27 (No. 7): 21-38.

Bloemer, J. M. M., and Lemmink, J. G. A. M. (1992) The Importance of Customer Satisfaction in Explaining Brand and Dealer Loyalty. Journal of Marketing Management 8: 351-364.

Bolton, R. N., Kannan, P. K., and Bramlett, M. D. (2000) Implications of loyalty program membership and service experiences for customer retention and value. Journal of the Academy of Marketing Science 28 (1): 95-108.

Danaher, P. J. (2002) Optimal pricing of new subscription services: analysis of a market experiment. Marketing Science 21 (2): 119 - 138.

Danaher, P. J., and Gallagher, R. W. (1997) Modelling Customer Satisfaction in Telecom New Zealand. European Journal of Marketing 31 (No. 2): 122-133.

Hogan, J. E., Lemon, K. N., and Rust, R. T. (2002) Customer equity management: charting new directions for the future of marketing. Journal of Service Research 5 (1): 4-12.

Homburg, C., Hoyer, W. D., and Koschate, N. (2005) Customers' reactions to price increases: Do customer satisfaction and perceived motive fairness matter? Journal of the Academy of Marketing Science 33 (1): 36-49.

Iacobucci, D., Grayson, K. A., and Ostrom, A. L. (1994) The Calculus of Service Quality and Customer Satisfaction. In Advances in Services Marketing and Management. Eds. T. A. Swartz, D. E. Bowen and S. W. Brown. Greenwich, Connecticut: JAI Press Inc., 1-67.

Kamakura, W. A., Wedel, M., de Rosa, F., et al. (2003) Cross-Selling Through Database Marketing: A Mixed Factor Analyzer for Data Augmentation and Predication. International Journal of Research in Marketing 20: 45-65.

Marn, M. V., and Rosiello, R. L. (1992) Managing Price, Gaining Profit. Harvard Business Review September//October: 84-94.

Mittal, B., and Lassar, W. M. (1998) Why do customers switch? The dynamics of satisfaction versus loyalty. The Journal of Services Marketing 12 (3): 177-194.

Patterson, P. G., and Spreng, R. A. (1997) Modelling the relationship between perceived value, satisfaction and repurchase intentions in business-to-business, services context: An empirical examination. International Journal of Service Industry Management 8 (5): 414-434.

Ranaweera, C., and Prabhu, J. (2003) On the relative importance of customer satisfaction and trust as determinants of customer retention and positive word of mouth. Journal of Targeting, Measurement and Analysis for Marketing 12 (1): 82-90.

Reichheld, F. F. (1996) Learning from Customer Defections. Harvard Business Review 74 (2): 56-69.

Reichheld, F. F., and Sasser, W. E. J. (1990) Zero Defections: Quality Comes to Services. Harvard Business Review 68 (5, September-October): 105-111.

Reichheld, F. F., and Teal, T. (1996) The Loyalty Effect: The Hidden Force Behind Growth, Profits, and Lasting Value. Boston, Massachusettes: Harvard Business School Press.

Reinartz, W., and Kumar, V. (2000) On the profitability of long-life customers in a noncontractual setting: an empirical investigation and implications for marketing. Journal of Marketing 64 (4): 17-35.

Rust, R. T., and Zahorik, A. J. (1993) Customer Satisfaction, Customer Retention, and Market Share. Journal of Retailing 69 (No. 2, Summer): 193-215.

Sharma, S., Durand, R. M., and Gur-Arie, O. (1981) Identification and Analysis of Moderator Variables. Journal of Marketing Research 18 (August): 291-300.

Sharp, B., Riebe, E., Dawes, J. G., et al. (2002) A Marketing Economy of Scale - Big Brands Lose Less of their Customer Base than Small Brands. Marketing Bulletin 13: 1-7.

Sharp, B., and Sharp, A. (1997) Loyalty Programs and Their Impact on Repeat-Purchase Loyalty Patterns. International Journal of Research in Marketing 14 (5): 473-486.

Stauss, B., and Friege, C. (1999) Regaining service customers: costs and benefits of regain management. Journal of Service Research 1 (4): 347-361.

Szymanski, D. M., and Henard, D. H. (2001) Customer satisfaction: a meta-analysis of the empirical evidence. Journal of the Academy of Marketing Science 29 (1): 16-35.

Thomas, J. S., Blattberg, R. C., and Fox, E. J. (2004) Recapturing lost customers. Journal of Marketing Research 41 (1): 31-45.

Zeithaml, V. A., Berry, L. L., and Parasuraman, A. (1996) The Behavioral Consequences of Service Quality. Journal of Marketing 60 (2, April): 31-46.

Zeithaml, V. A., Parasuraman, A., and Berry, L. L. (1985) Problems and Strategies in Services Marketing. Journal of Marketing 49 (Spring): 33-46.