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In this article, the author addresses the question of how a firm's acquisition efforts influence the composition of the customer portfolio. The first part of the research is a conceptual model that illustrates how customer uncertainty provides an explanation for why promotionally acquired customers have lower repurchase rates and smaller lifetime values. The second part of the research involves empirical analyses of customer-level data from a newspaper and an online grocer. In both data sets, acquisition discount depth is negatively related to repeat-buying rates and customer asset value. For example, a 35% acquisition discount results in customers with about one-half the long-term value of non–promotionally acquired customers.

Customer Acquisition Promotions and Customer Asset Value

In recent years, several researchers (Blattberg and Deighton 1996; Gupta and Lehmann 2003; Rust, Zeithaml, and Lemon 2000) have noted that a firm's value and future prospects may be understood by analyzing its customer base. Furthermore, when customers are viewed as assets, a logical next step is to examine the relative value of different customer segments. The idea of the customer base as a portfolio of heterogeneously valued assets is a key conceptualization for customer management applications. This heterogeneity is often a motivation for developing differentiated or customized marketing programs (Peppers and Rogers 1993). Frequently, these customization efforts use transaction history measures (e.g., recency, frequency, and monetary value [RFM] measures) to project customer lifetime value (CLV), which is then used to allocate marketing resources to customers.

This conceptualization is considered here with another intention in mind: to study how acquisition discounts affect the composition of the customer portfolio. Although deep discounts can attract a large customer base, they may attract relatively low-value customers. The implication is that expected CLV may be endogenously determined by acquisition methods. This article examines the relationship between acquisition discount depth and the value of customer assets. It begins with an analytical framework that describes the role of uncertainty in customer acquisition. This conceptual model is augmented with empirical results that quantify the relationship between discount depth and customer value. Specifically, the long-term behavior of newspaper and online grocery customers is analyzed as a function of acquisition discount. In both categories, the results indicate a negative relationship between acquisition discounts and customer value.

This research contributes to the customer equity literature (Blattberg and Deighton 1996; Rust, Zeithaml, and Lemon 2000) that examines the relationship between marketing activities and customer value. In a review article, Berger and colleagues (2002) call for additional research that links CLV to marketing actions. Specifically, Berger and colleagues focus on how marketing actions affect the probability of retaining existing customers. The current article focuses on the acquisition side of the equation by examining how discounts can alter expected CLV. Anderson and Simester's (2004) recent article is particularly relevant to this work. In contrast to the findings presented herein, Anderson and Simester find that customers acquired through catalogs with more discounted items have higher long-term value. Understanding the relationship between acquisition discounts and the value of customer assets is particularly important when using customer equity concepts to value firms (Gupta and Lehmann 2003).

The current research also adds to the customer valuation literature by illustrating the applicability of survival models to the estimation of CLV. Standard approaches often involve strong, implicit assumptions that customer attrition rates are independent of the marketing mix and do not vary over time (Berger and Nasr 1998). In contrast, survival models can include marketing variables and estimate time-dependent hazard rates.

The article is structured as follows: I begin with an analytical description of how consumer uncertainty may influence customer trial and subsequent behavior. I augment this analytical model with empirical evidence from two distinct categories that reveals negative relationships between

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acquisition discounts and customer value. I then conclude with a discussion of future research opportunities, limitations of the study, and managerial implications.

CONSUMER UNCERTAINTY

The theory in this section is based on the premise that offering discounts to prospective customers lowers the risk associated with trial. By reducing perceived risk, trial offers and short-term promotional discounts may help expand a customer base by providing a low-cost environment for consumers to learn about a product. It is assumed that each individual customer x is willing to pay some maximum (reservation) price of $P_{max}(x)$ for a product with a regular price of P_{reg}.

In many categories, there may be customers who are uncertain about the product's value. It is assumed that customers learn their maximum willingness to pay through a single trial of the product. If a customer tries the product and learns that his or her maximum price is greater than the regular price ($P_{max}[x] > P_{reg}$), the customer will continue to purchase. If customers purchase a single unit in each discrete time period, the net benefit of being an active customer is

$$(1) \qquad \sum_{k=0}^{\infty} \alpha^k [P_{max}(x) - P_{reg}] = \frac{P_{max}(x) - P_{reg}}{1 - \alpha},$$

where α is an individual-level discount factor ($0 < \alpha < 1$). Conversely, if the customer learns that his or her maximum price is below the regular price, the net loss from a single trial is ($P_{reg} - P_{max}[x]$).

It is also assumed that consumers who have not tried the product possess a subjective probability density function of $f(P_{max}/x)$ for their valuations of the product. Consumers will try the product at the regular price if expected long-term utility is positive. This condition is given in Equation 2.

$$(2) \qquad \int_{P_{reg}}^{\infty} \frac{P_{max} - P_{reg}}{1 - \alpha} f(P_{max}/x) dP_{max}$$

$$- \int_{0}^{P_{reg}} (P_{reg} - P_{max}) f(P_{max}/x) dP_{max} \geq 0.$$

Equation 2 can be rewritten as follows:

$$(3) \qquad P_{reg} - E(P_{max}|x) \leq \alpha \int_{0}^{P_{reg}} (P_{reg} - P_{max}) f(P_{max}|x) dP_{max}.$$

Therefore, trial occurs if the current price is only slightly greater than the consumer's expected valuation of the product. The key implication is that consumers are expected to be willing to pay a small premium to learn about the product.[1]

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[1]Although the assumptions that all consumers are aware of and have expectations of the value of a product are unlikely in real contexts, the expression illustrates how expected long-term benefits can motivate trial.

Customer Acquisition and Customer Asset Value

Equation 3 has implications for customer acquisition because short-term discounts can reduce consumer risk, making trial more attractive. Customers acquired through such discounts either learn that their reservation prices (P_{max}) exceed the regular price and become active customers or learn that their reservation prices are below the regular price and do not buy when prices revert to regular levels. Short-term discounts can also attract customers who buy only during periods with low prices because they know that their reservation prices are less than the regular price. Therefore, deep acquisition discounts may attract increasing numbers of one-time buyers and customers who buy only during deal periods. Because of these factors, the expected lifetime value of promotionally acquired customers is likely to decrease as acquisition discount depth increases.

Furthermore, marketing policy can interact with customer reservation prices to affect repeat-buying behavior. If a single trial resolves uncertainty, the act of repeat buying at regular prices suggests that a customer's reservation price exceeds the regular price. When discounts are rare or precisely targeted, it is expected that the lifetime value of repeat buyers is independent of acquisition discount. In contrast, when discounts are periodically offered, acquisition discount may explain differences in lifetime value even among the repeat-buying population.

Therefore, the use of short-term promotions to acquire customers can affect customer-focused metrics, such as customer equity and CLV. In particular, cohorts of customers acquired with deep discounts may have considerably lower lifetime values than non–promotionally acquired customers. Valuing promotionally acquired customers with a lifetime value measure based on the behavior of non–promotionally acquired customers may result in an overestimation of customer equity. This point is salient given the growing use of customer asset–based valuations among academics (Gupta, Lehmann, and Stuart 2004) and practitioners (Alsop 1999; Sweeting 2004; Warner 1998).

Psychological Explanations

In addition to the preceding description of how customer uncertainty can influence trial and response to promotions, several psychological theories have been advanced to explain the possible negative consequences of promotional discounts (Blattberg and Neslin 1990; Neslin 2002). Attribution, dissonance, and adaptation-level theories all provide explanations of why promotionally acquired customers repurchase less frequently than regularly acquired customers.

Attribution theory addresses how people explain the causes of events. In the context of promotions, the concern is that customers attribute purchase to the promotional offer rather than to product quality (Scott 1976). Doob and colleagues (1969) use dissonance theory to explain the results of a field experiment in which they find that lower introductory prices lead to lower long-term sales. Doob and colleagues theorize that customers who pay the higher introductory prices relieve their internal dissonance by emphasizing the benefits of the brand. Adaptation-level theory (Helsen 1964) is applicable by way of reference price effects. The issue is that deeply discounted initial prices can lead to the formation of reference prices that are far below the regular price.

These theories are worth reviewing in two respects: First, it is likely that long-term response to discounts is a function of multiple factors, including uncertainty, attribution, and reference prices. Second, there may be differences in the persistence of uncertainty and the psychological mechanisms. Although the majority of uncertainty is resolved through product trial, the psychological factors may have longer-lasting effects.

APPLICATION: NEWSPAPER SUBSCRIPTIONS

The first empirical study uses subscriber data from a major metropolitan newspaper. The data consist of pricing, promotions, and purchasing activity for 1578 customers. The average price during the period was $2.40 per week and ranged from $1.75 to $3 per week. An important marketing tactic for the firm is reduced-rate introductory subscriptions. At the end of the introductory period, the strategy is to offer renewal at the full price. This is a common pricing strategy in the newspaper industry (Picard and Brody 1997). In the sample, 1204 customers are acquired with discounts of up to $1.25 off the regular weekly price, and 374 customers are acquired without any discount.

Newspaper Subscribers: Repeat Buying

For the first stage of the analysis, the connection between discount depth and repeat purchasing is examined. For this analysis, a binary variable is created for each customer, indicating whether the customer becomes a repeat buyer. This measure is the dependent value in a logistic regression that uses acquisition discount as an explanatory variable. The results appear in the column labeled "All Customers" in Table 1. The results indicate that discount level is negatively related to the propensity to renew. For example, the estimated parameters imply that the probability of renewal of a non–promotionally acquired customer is approximately 70%, whereas the probability of renewal by a customer acquired with a $1 weekly discount is only approximately 35%. These results show that as discount depth increases, the firm attracts an increasingly large fraction of one-time buyers.

There is an element of self-selection in the data because the customers acquired with the regular price initiated the transaction by contacting the newspaper, whereas the newspaper directly solicited the promotionally acquired customers. To verify that the negative relationship is not entirely due to self-selection, the column labeled "Discount Only" in Table 1 repeats the analysis of repeat buying but limits the analysis to promotionally acquired customers. Again, a negative relationship between discount depth and repeat purchasing rates is observed.

Table 1
LOGISTIC REGRESSION OF REPEAT BUYING VERSUS ACQUISITION DISCOUNT

	All Customers		Discount Only	
	Coefficient	SE	Coefficient	SE
Intercept	.8*	.12	2.0*	.33
Discount	−1.4*	.14	−2.6*	.35
Sample size	1578		1204	

*$p < .01$.

Newspaper Subscribers: Customer Asset Value

The relationship between acquisition discount depth and customer asset value is now considered. Because the newspaper is a continuously provided service, the value of a customer asset is directly tied to the time spent as a customer. Therefore, the key dependent variable is the time as a subscriber. The length of time as a subscriber for customer i is defined as T_i.

The subscriber data analysis is relatively straightforward, with only one complication: Unless the analysis involves purely historical data, customer lifetimes will be imperfectly observed. Observations may be censored if the event of interest has not occurred at the time of analysis. This is a common issue in categories such as newspaper subscriptions because customer lifetimes can last for decades. Therefore, customer tenures are modeled with techniques from survival analysis rather than a standard regression approach.
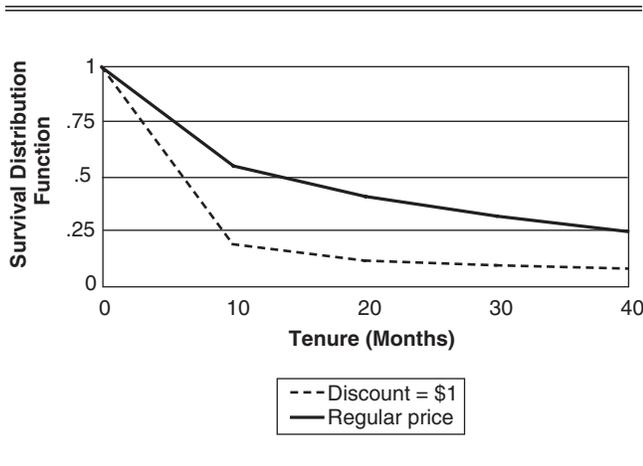
Survival analysis: nonparametric. From the analyst's perspective, the event time T for a given customer is a random variable that can be described with a probability distribution. The survival function S(t) gives the percentage of the population whose lifetimes exceed t, whereas the hazard function is the instantaneous risk that an event will occur at time t, given that the event has not occurred before time t. The interest here is in the distribution of customer lifetimes as a function of acquisition discount depth (e.g., S[t|Discount]). The distribution of survival times is important because the calculation of expected value needs to consider the impact of extreme elements of the population because frequently, a small percentage of customers supplies a large proportion of total revenues and profits (Peppers and Rogers 1993). Therefore, it is useful to be able to predict the relationship between acquisition discount depth and the percentage of customers who become long-term customers.

The first stage of the analysis of the relationship between acquisition discount depth and customer duration involves nonparametric estimates of the survivor function using the life table method. The initial research question addresses the equivalence of the survival functions for differentially acquired customers. This is a testable hypothesis of whether discount depth is associated with survival time. A rank test for association between tenure and the acquisition discount yields a chi-square value of 198.3 ($p < .001$).

The relationship between duration and discount is illustrated in Figure 1, which plots the survival functions for customers acquired without a discount and customers acquired with a $1 weekly discount. The two survival curves have similar shapes but differ in terms of degree. For the regularly acquired customers, more than 50% of the population survives at least 10 months. In contrast, only 20% of the initial population acquired by a discount survives this long. At 40 months, more than 25% of the regularly acquired customers are active, whereas less than 10% of the promotionally acquired group remains. In the overall sample, approximately 20% of customers have lifetimes that exceed a year, and only approximately 10% of the sample becomes long-term subscribers who remain for more than four years.

Survival analysis: parametric models. Parametric models that include acquisition discount as a covariate are now considered to quantify the relationship. This analysis employs accelerated failure time models (Kalbfleisch and Prentice

Figure 1
SURVIVAL FUNCTIONS FOR NEWSPAPER SUBSCRIBERS

cate that hazard rates increase as discount depth increases. The inclusion of the quadratic term in Model 2 is useful because it allows for more flexibility in the description of the relationship between long-term value and discount depth. Evaluation of the quadratic model's coefficients for the intercept and discount effects in Equation 4 indicates that very small discounts have a minor influence on hazard rates. The coefficients imply that hazard rates drop incrementally for 1% to 3% discounts and remain essentially flat until the discount level reaches approximately 6%. These results are consistent with the idea that consumers have a region of insensitivity around a reference price (Kalyanaram and Little 1994). The importance of including the quadratic term is confirmed by a nested model test between Model 1 and Model 2 ($\chi^2 = 6.24$, $p < .05$).[2]

Long-term customer value analysis. The preceding analysis provides evidence that acquisition discounts tend to attract customers with shorter lifetimes. The analysis is now extended by quantifying the relationship between the discount depth and customer asset value. The hazard model results can be used to estimate the expected lifetime duration and, with a few additional calculations, CLV. The expected lifetime length can be determined from Equation 5:

1980). The estimation of these models involves a formulation that is similar to an ordinary linear regression:

$$(4) \qquad \log(T_i) = \beta_0 + \beta_1 \text{Discount}_i + \beta_2 \text{Discount}_i^2 + \sigma\varepsilon_i,$$

where ε_i is a random disturbance term and the βs and σ are parameters to be estimated. The models that are estimated here use a limited set of covariates. The variable Discount is the weekly price concession for the initial subscription, and Discount[2] is the discount squared.

For the parametric models, assumptions made about the ε and σ terms impose varying degrees of restrictions on the form of the hazard function. Table 2 provides estimation results for three models. The exponential model assumes that the error term ε has a standard extreme-value distribution and that σ is equal to one. These restrictions imply a constant hazard function. Therefore, the exponential model is used as a baseline model. Table 2 also provides estimates for two versions of the generalized gamma model, which is a flexible form that does not overly restrict the shape of the hazard function (Kalbfleisch and Prentice 1980). The first gamma model includes only the acquisition discount as a covariate, and the second model includes both the acquisition discount and the square of the acquisition discount.

The exponential and the first gamma models include only the weekly dollar value of the acquisition discount. In these models, the negative coefficients for the discount term indi-

$$(5) \qquad E[T|\text{disc}] = \int_0^\infty t f(t|\text{disc})dt = \int_0^\infty S(t|\text{disc})dt.$$

When the distribution of expected lifetimes is known, the conversion of expected lifetime duration to an estimate of customer value is uncomplicated. Expected lifetimes are translated into long-term revenue by multiplying by the prices charged over time.

Figure 2 shows the relationship between acquisition discount and expected lifetime revenue for each of the three models in Table 2. Of the three curves, the exponential model leads to the most pessimistic forecasts. Forecasts based on the exponential model suggest that the average value of a non–promotionally acquired customer is approximately $290, whereas the average value of a customer acquired with a 35% discount (approximately $1 per week)

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[2]The statistical evidence indicates that it is important to include a nonlinear effect because a model that uses a squared discount yields only a negative estimate for the effect of the discount-squared term and a log-likelihood of –2064.

Table 2
HAZARD MODEL ESTIMATION RESULTS

Parameter	Model 0: Exponential		Model 1: Gamma with Discount		Model 2: Gamma with Discount and Discount[2]	
	Coefficient	*SE*	*Coefficient*	*SE*	*Coefficient*	*SE*
Intercept	3.2**	.07	1.4**	.08	1.3**	.09
Discount	–1.4**	.08	–.6**	.07	.1	.27
Discount[2]				–.6*	.25	
Scale (σ)	1.0 (fixed)		.9		.9	
Shape (δ)		–1.4		–1.4		
Log-likelihood	–2405		–2067		–2064	

*$p < .05$.
**$p < .01$.

Figure 2
LIFETIME REVENUE AND ACQUISITION DISCOUNTS: NEWSPAPER SUBSCRIBERS
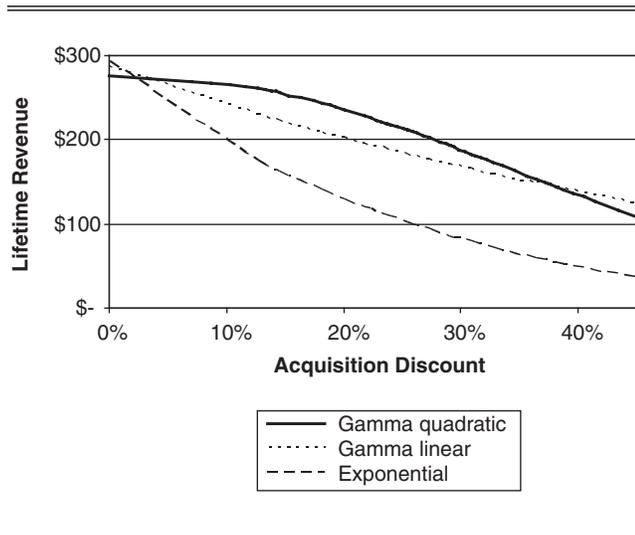
is only $60. These estimates are largely due to the exponential model's assumption of a constant hazard rate.

The gamma models are better able to account for the stabilization of hazard rates that occurs with long-term customers. For the gamma models, the expected value of regularly acquired customers is approximately $280, whereas the value of customers acquired with a 35% discount is approximately $150. A comparison of the two curves based on the gamma models is also instructive. The model with the quadratic term yields a curve that accelerates downward because of the negative coefficient on the quadratic term. This suggests that the negative influence of discounts accelerates as discount depth increases.

APPLICATION: ONLINE GROCER RETAILING

The second empirical study involves customers of an online grocer. The data include transactions from the online grocer's first 13 months of operation, comprising more than 70,000 orders received from 30,000-plus customers. Identifying information is kept for each transaction, including customer number, address, and payment method. The order file also includes prices, shipping fees, and promotional offers. Over the data collection period, the average order size is approximately $60, and the repeat-buying rate within 6 months of first purchase is slightly less than 50%.

Because the interest is in long-term behavior, the analysis is limited to customers who were acquired during the firm's second quarter of operation. During this quarter, the firm experimented with acquisition discounts. The selected sample includes 2862 customers, approximately 25% of whom were acquired through individual-specific promotional discounts of $5 to $25 on their first purchase.[3]

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[3]Discounts (receipt and value) were provided randomly to prospects who clicked through to the retailer using a banner advertisement. Information about consumers who did not redeem discounts was not available.

Online Retailing: Repeat Buying

To analyze repeat buying, a formulation similar to that used in the newspaper study is employed. A binary variable is defined to indicate whether the customer makes a subsequent purchase (within the next three quarters). This binary variable is the dependent measure in a logistic regression that uses acquisition discount as an explanatory variable. The estimation results imply that the probability of repeat purchasing for non–promotionally acquired customers is approximately 40%, but the probability drops below 25% for customers acquired with a $10 discount. As with the newspaper subscribers, the analysis suggests that higher acquisition discounts attract a large percentage of one-time buyers. The results for this regression appear in Table 3.

Online Grocery Retailing: Customer Asset Value

Because customer purchasing is not continuous, the lifetime value analysis for this category employs a different methodology. The approach taken here for estimating long-term value involves a combination of three quarters of individual-specific activity and a projection of future value. To estimate future value (beyond the three quarters of actual data), each customer's purchase history is divided into quarterly activity. Each quarter's activity is described using RFM measures (Hughes 2000). Table 4 reports the results of a Tobit model that predicts third-quarter activity as a function of second-quarter RFM scores.[4] The estimates are of the expected signs; only the term for average order size is nonsignificant.

The Tobit model is then used to forecast each customer's fourth-quarter activity. Customer asset value is calculated by summing the observed expenditures for the first through third quarters (and subtracting any acquisition discounts) with an estimate of the customer's long-term continuing value. The continuing value is constructed using the fourth-

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[4]First-quarter results are not used to predict future buying, because each customer has at least one purchase in the first quarter. This would reduce the ability to model the relationship between frequency and attrition.

Table 3
LOGISTIC REGRESSION OF REPEAT BUYING VERSUS ACQUISITION DISCOUNT

	Coefficient	SE
Intercept	−.59*	.16
Discount	−.06*	.02
Sample size	2862	

*$p < .01$.

Table 4
TOBIT MODEL FOR FORECASTING QUARTERLY REVENUE

	Coefficient	SE
Intercept	−119*	20.8
Recency	−7.5*	1.0
Frequency	53.6*	4.4
Average order	.12	.15
Scale	196.6*	6.8

*$p < .01$.

quarter forecasts and a multiplier. To construct the multiplier, a quarterly discount rate of 10% is assumed. The formula for customer value is then

$$CV = \sum_{i=1}^{3} NRQ_i + \frac{1}{10\%} \times PRQ_4,$$

where NRQ_i is net revenue for quarter i and PRQ_4 is projected revenue for the fourth quarter.

The relationship between acquisition discount depth and customer asset value is modeled by regressing the forecasted customer values against the value of each customer's acquisition offer. Two regression models are used to estimate this relationship; they appear in Table 5. The first assumes a linear relationship between customer asset value and acquisition discount, and the second specification includes Discount and $Discount^2$ as covariates.

The linear and quadratic relationships appear in Figure 3. Again, the projections indicate that promotionally acquired customers are substantially less valuable than non–promotionally acquired customers. Non–promotionally acquired customers have a long-term revenue value of approximately $360, whereas customers acquired with a $12 acquisition offer are worth about half that value. An interesting difference between the newspaper and the grocer forecasts is the shape of the quadratic projections. Whereas the forecasted values for the newspaper subscribers accelerate downward, there is a leveling off for the online retailer.

Table 5
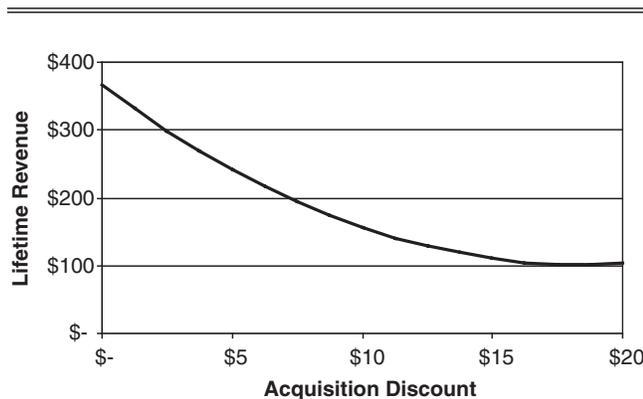#### CUSTOMER ASSET VALUE VERSUS ACQUISITION DISCOUNT

	Coefficient	SE
Intercept	366**	10.7
Acquisition discount ($)	–29**	7.1
Acquisition discount²	.8*	.35
R-square	.2	
Sample size	2862	

*p < .05.
**p < .01.

Figure 3
LIFETIME REVENUE AND ACQUISITION DISCOUNTS: ONLINE GROCER CUSTOMERS

LONG-TERM EFFECTS ON REPEAT-BUYING SEGMENTS

Thus far, this article has focused on the relationships of repeat-buying rates and customer value with acquisition discount depth. An associated issue is whether the negative relationships persist when the analysis is limited to the repeat-buying segment. Before these segments are analyzed, salient differences in the firms' marketing practices are reviewed. The newspaper uses low introductory prices and then shifts to full prices at the point of first renewal. Therefore, customers face the full price on all subsequent purchase occasions beyond the initial subscription. If it is assumed that all uncertainty about the newspaper's value is resolved during the initial subscription, a decision to renew at the regular price suggests that the customer's reservation price (P_{max}) exceeds the regular price (P_{reg}). If the differences between promotionally and non–promotionally acquired customers are entirely due to initial uncertainty, it would be expected that all customers who renew at the regular price exhibit similar long-term behavior, regardless of initial discounts.

In contrast, the online grocer varies the marketing mix from week to week. This distinction is important because it means that prices vary over time and that customers with reservation prices below the average regular prices may occasionally be offered a price environment that affords a positive utility transaction. Thus, repeat-buying activity may not provide as strong a signal about reservation prices, and acquisition discounts may explain differences in long-term behavior even when the analysis is limited to only repeat buyers.

Newspaper Repeat Buyers

The analysis of newspaper repeat buyers is conducted in a similar manner to the lifetime revenue analysis in the "Application: Newspaper Subscriptions" section. The first stage of the analysis nonparametrically examines the survival rates as a function of acquisition discount. A rank test for association between tenure and the acquisition discount indicates a negative relationship ($\chi^2 = 7.48$, $p < .01$). Figure 4 shows the survival functions for customers who are

Figure 4
SURVIVAL FUNCTION FOR NEWSPAPER SUBSCRIPTION REPEAT BUYERS
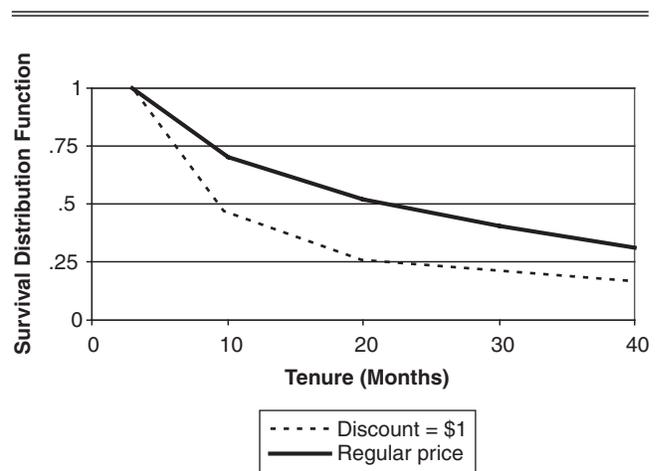
acquired with different discounts. Because these figures are limited to repeat purchasers, the survival functions do not decrease until three months of tenure. To forecast future revenue value, a generalized gamma model is again estimated using acquisition discount as an explanatory variable. For this analysis, the hazard functions are estimated using time as a subscriber beyond the first subscription.[5] The hazard model results appear in Table 6.

The results imply that long-term consumer behavior is not entirely explained by initial uncertainty. Figure 5 translates the hazard model results into lifetime revenue forecasts. In the repeat-buying segment, the expected lifetime value of regularly acquired customers is approximately $560, whereas the value for customers acquired with a 35% discount is only approximately 10% less. If all uncertainty is resolved within the introductory subscription period, the lower long-term value of repeat buyers acquired with discounts suggests that factors beyond initial uncertainty are also relevant but of minor importance.

Online Grocer Repeat Buyers

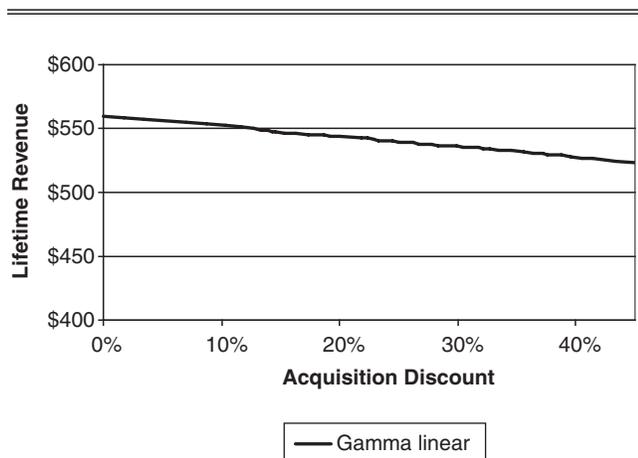The analysis of repeat buyers for the online grocer is conducted as it was in the "Application: Online Grocer" sec-

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[5]When the analysis is limited to repeat buyers, the inclusion of a quadratic discount term does not improve model fit.

tion. The first step is to remove one-time buyers from the data, reducing the sample to 1049 customers (142 acquired with a discount and 907 acquired without a discount). Table 7 presents the Tobit model results that were used to estimate expected customer value. Figure 6 plots expected long-term value against acquisition discount. Large differences in long-term value persist when the analysis is limited to repeat buyers. For the repeat-buying segment, expected lifetime revenue ranges from approximately $875 for regularly acquired customers to approximately $475 for customers acquired with a $10 discount.

*Repeat-Buying Population Conclusions*

The analyses indicate that the effects of acquisition discounts are not limited to differences in initial repurchase rates. However, the magnitude of the continuing effects varies dramatically across the two categories. In the newspaper subscriber data, there is a small negative relationship between acquisition discount and customer value in the repeat-buying population. In contrast, when the analysis of the online grocer customer data is limited to repeat buyers, a substantial negative relationship persists between acquisition discount and customer value. These disparate results are not surprising given the differences in the two firms' pricing policies.

Table 6
REPEAT-BUYING SEGMENT HAZARD MODEL RESULTS

Parameter	Model: Gamma with Discount	
	Coefficient	SE
Intercept	1.5**	.08
Discount	−.04*	.02
Scale (σ)	.2	
Shape (δ)	−5.9	
Sample size	697	

*p < .05.
**p < .01.

Table 7
TOBIT MODEL FOR FORECASTING QUARTERLY REVENUE

	Coefficient	SE
Intercept	−65.1***	20.58
Recency	−1.7*	.97
Frequency	38.9***	4.01
Average order	.4**	.19
Scale	173.9***	5.81
Sample size	1049	

*p < .1.
**p < .05.
***p < .01.

Figure 5
LIFETIME REVENUE OF NEWSPAPER SUBSCRIPTION REPEAT BUYERS

Figure 6
LIFETIME REVENUE OF ONLINE GROCER REPEAT BUYERS
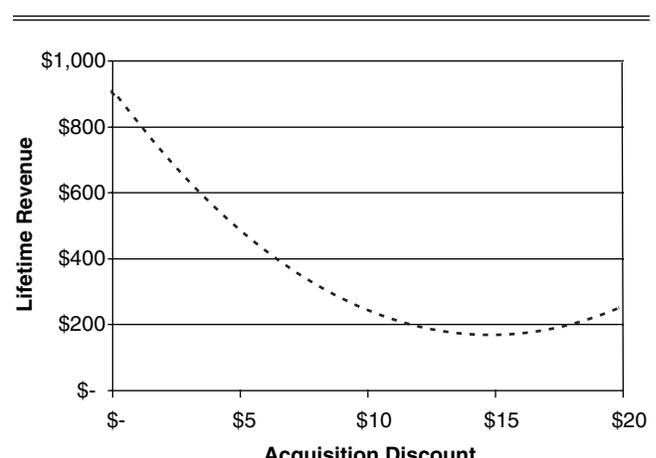
LIMITATIONS AND FURTHER RESEARCH

There are several limitations to this research. For example, the data do not allow for the study of the relationship between discount depth and the number of customers acquired. Despite this limitation, the empirical results are relevant to marketers who are interested in managing customer equity. For example, if the average value of a customer acquired with a 35% discount is about half the value of a non–promotionally acquired customer, the promotion must double the baseline acquisition rate to increase customer equity incrementally.

The relationship between acquisition discounts and lifetime value merits further study. Whereas the use of two distinct data sets supports the robustness of the phenomena, analysis of additional data would help quantify the magnitude and consistency of the effects. There are also opportunities to research the shape of the relationship between discount depth and CLV further. For the newspaper results, the quadratic CLV estimates accelerate downward, whereas the results for the online retailer suggest that lifetime value levels off with increasingly large discounts. The different shapes of the quadratic models for the newspaper and online retailer are managerially important because they are related to the marginal benefits of increasingly aggressive acquisition programs.

Anderson and Simester's (2004) contrasting results are also worthy of comment. Anderson and Simester find that increasing the depth of a price promotion has a positive effect on prospective customers and a negative effect on established customers. The disparate findings may be due to differences in the categories studied. The data used in the current study are from categories in which purchasing is continuous or occurs frequently, whereas Anderson and Simester analyze data from a durable category. In their study, it is likely that there is a sizable amount of time between initial and second purchase. The extended time between purchases represents an additional factor that may interact with psychological processes, such as attribution or dissonance.

Furthermore, in the data used in the current study, acquisition discounts are delivered in a direct manner, whereas in Anderson and Simester's (2004) data, consumers are presented with catalogs that vary in the number and depth of discounts offered. It is possible that a catalog with many discounted items influences a new customer's perceptions of the catalog's pricing while lowering the reference prices of experienced customers. By the next purchase occasion, newly acquired customers may have a positive but fuzzy price image of the catalog, whereas experienced customers with greater expertise regarding prices may have downwardly shifted their reference prices. Although the differences in context may largely explain the conflicting findings, the contrasting results suggest the need for additional research.

CONCLUSION

In addition to the customer equity and customer valuations literature, the results are relevant to the literature that examines the long-term effects of promotions (Neslin 2002), illustrating how acquisition promotions fit into customer relationship programs. As noted previously, acquisition discounts in the neighborhood of 35% attract customers with lifetime values of about half that of regularly acquired customers. This type of analysis is becoming increasingly feasible as customer relationship management systems enable firms to track individual customers over time. The collection of data over the entire customer life cycle enables firms to go beyond the typical practice of analyzing promotional effectiveness using cross-sectional data and use longitudinal customer data to evaluate the long-term value of marketing tactics.

The technique used to value the customer assets of the newspaper firm also provides benefits relative to standard CLV calculations (see Berger and Nasr 1998). First, using a hazard model to estimate the relationship between customer tenure and attrition accounts for possible duration dependence in retention rates. Second, the hazard approach solidifies the link between marketing actions and customer value by accounting for the influence of marketing variables, such as acquisition discounts and regular prices.

The valuation approach could be extended to include additional elements, such as costs and discount rates, that are often important in the calculation of customer asset value. For example, in the context of newspaper subscriptions, it may be beneficial to consider advertising revenues and delivery costs. However, the appropriate assumptions may not always be clear. For example, although advertising revenues are an important revenue source and are based on circulation levels, a marginal customer does not typically affect overall advertising revenue. Similar issues may be involved in determining how to allocate costs. These extensions are avoided to maintain clarity.

Finally, the customer valuation approaches are conservative and likely understate the differences between the promotionally and the regularly acquired populations. For the newspaper subscriber analysis, it is assumed that when customer attrition occurs, customers are never reacquired. This assumption is conservative because customers with longer purchasing histories are more likely to be reacquired. For the online retailer data, the 10% quarterly discount rate also yields a conservative estimate of the difference in lifetime revenue by heavily discounting the future component of revenues, which tend to be higher for the regularly acquired segment. In comparison, a 5% quarterly discount rate yields estimates of customer value that range from $620 for regularly acquired customers to approximately $100 for customers acquired with $20 discounts.

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