

The Impact of Brand Equity on Customer Acquisition, Retention, and Profit Margin

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March 10, 2011

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We thank Peter Leeflang, Jacob Goldenberg, Gilles Laurent, Natalie Mizik, Marc Fischer and the participants in the Tuck Marketing Seminar Series for their valuable comments and helpful suggestions.

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ABSTRACT

This paper presents an empirical examination of the relationship between brand equity and customer acquisition, retention, and profit margin, the key components of customer lifetime value (CLV), as well as the role of marketing in this relationship. We examine a unique database from the U.S. automobile market, comprised of 10 years of survey-based brand equity measures as well as acquisition rates, retention rates, and customer profitability. We hypothesize and find that brand equity is significantly associated with the components of CLV in [expected](#) and meaningful ways. For example, [customer knowledge or familiarity](#) with the brand is positively related to all [three](#) components of CLV. [More surprisingly](#), however [differentiation](#) is a double-edged sword; [while](#) it is associated with higher customer profitability, [it is](#) also [associated](#) with lower acquisition and retention rates, suggesting that highly differentiated brands address targeted segments whose members exhibit changing preferences. We also find that marketing, especially advertising and market presence, exert both direct and indirect impacts on CLV through brand equity. Simulations show that changes in marketing, or exogenous changes in brand equity, can exert important impacts on CLV. Overall, the findings suggest the “soft” and “hard” sides of marketing need to be managed in a coordinated fashion. We discuss these and other implications for [researchers and practitioners](#).

INTRODUCTION

The development and application of marketing metrics has been both a major focus of academic work (e.g., Srivastava et al. 1998; Lehmann and Reibstein 2006; Srinivasan and Hanssens 2009) and a key issue for practitioners, having been a top priority of the Marketing Science Institute for the last decade. Previous research has demonstrated the importance of two key marketing assets: brand equity and customer lifetime value (CLV). This paper attempts to demonstrate how these two constructs are related; more precisely, how brand equity drives the key components of CLV: acquisition, retention, and profit margin.

Leone et al. (2006) emphasize that while many different methods have been proposed for measuring brand equity, they share the premise that “The power of a brand lies in the minds of consumers.” (p. 126). Numerous commercial measures exist including Milward-Brown’s BrandZ, Research International’s Equity Engine, IPSOS’s Equity*Builder and Young and Rubicam’s Brand Asset Valuator (BAV), the measure we use in this paper.

While brand equity is rooted in the hearts and minds of consumers, CLV is manifested in the dollar value of customer purchases. CLV is concerned with retention rates, acquisition rates, profit margins, and ultimately, the net present value of the long-term profit contribution of the customer (Farris et al. 2006). CLV is a financial measure that has immediate application as a metric for assessing customer prospecting, as an objective to be managed, and as a method for valuing the firm (Blattberg, Kim, and Neslin 2008; Gupta, Lehmann, and Stuart 2004).

As pointed out by Leone et al. (2006), Peppers and Rogers (2004, p. 301), and Rust, Zeithaml, and Lemon (2000, p. 55), brand equity is logically a precursor of CLV. If brand managers win the hearts and minds of the customer, customer managers have an easier time retaining and acquiring customers. This perspective is supported by the classic theory of

reasoned action (Engel, Blackwell, and Miniard 1995, pp. 387-389), which posits that consumer attitudes are a precursor to consumer actions. Quantifying this link between brand equity and CLV provides several benefits, including: (1) providing a broader base for valuing the “qualitative“ brand manager’s plans for advertising and positioning the brand, and (2) adding diagnostic value to the dollar values that comprise CLV. Keller and Lehmann (2006) identify the link between brand equity and CLV as a key area for future research.

While the brand equity to CLV link is crucial, it does not operate in a vacuum. Marketing actions – advertising, pricing, promotions, product innovations, market presence – drive both constructs. Researchers including Ailawadi, Lehmann, and Neslin (2003) and Srinivasan, Park and Chang (2005) show how marketing actions are associated with brand equity. Others such as Venkatesan and Kumar (2004) show how marketing actions are associated with CLV (see also the review by Blattberg, Malthouse, and Neslin 2009).

In summary, previous work has suggested and in some cases measured pair-wise relationships between marketing, brand equity, and CLV. However, work is needed that unifies these constructs. One important step in this direction is the work of Rust, Lemon, and Zeithaml (2004). They measure “return on marketing” by showing specific examples of the relationship between marketing and customer product ratings, and how these ratings determine CLV. We build on their work by (1) allowing marketing to influence CLV not only through brand equity but directly as well, (2) examining the impact of brand equity on profit margins in addition to the acquisition and retention components of CLV, and (3) using a widely used measure of brand equity (the Brand Asset Evaluator) and examining a particular industry over an extended period of time – one decade. Accordingly, the purposes of our paper are to:

- Determine the impact of brand equity on the components of CLV – customer acquisition, customer retention and profit margin;
- Measure the impact of marketing on brand equity and the components of CLV;
- Determine whether brand equity impacts the components of CLV, even after accounting for the impact of marketing activity;
- Demonstrate an easy-to-implement method for quantifying these relationships with the type of data that is available in real-world applications.

In summary, our goal is to quantify the strategic relationship between brand management (brand equity) and customer management (the components of CLV), and to demonstrate the role that marketing activities play in this relationship.

LITERATURE REVIEW

Brand Equity

Brand equity can be assessed at the customer mind-set (e.g. Aaker 1996, Keller 2008), product-market (e.g., Park and Srinivisan 1994), or financial market level (e.g., Mahajan, Rao, and Srivastava 1994). These approaches have different strengths and weaknesses (Ailawadi, Lehmann, and Neslin 2003). While financial market measures quantify current and future brand potential, they often rely on subjective judgements or volatile measures to estimate future value (Simon and Sullivan 1993). Product-market measures are more closely related to marketing activity but don't capture future potential (e.g., Kamakura and Russel 1993; Swait et al. 1993). More importantly, both approaches suffer from their limited diagnostic value for improving brand value. Customer mind-set metrics, on the other hand, identify brand strengths and weaknesses (Keller 1993). While this provides insights for strengthening brand equity, it

provides little information about brand performance in terms of market share or profitability. By linking brand equity to the components of CLV we bridge this gap.

We focus on customer-based brand equity defined as "the differential effect of brand knowledge or customer response to the marketing of the brand". It "occurs when the customer is familiar with the brand and holds some favourable strong, and unique associations in memory". (Keller, 1993, P.2). Not surprisingly, there are several mind-set measures of brand equity. Commercial measures such as Young & Rubicam's (Y&R) Brand Asset Valuator (BAV), Milward Brown's BrandZ or Research International's Equity Engine measure four to five major facets of brand perceptions. Similarly, academic researchers have proposed five to six key aspects that capture brand image beyond an overall attitude/halo component (Keller and Lehmann 2003; Lehmann, Keller and Farley 2008). Of the commercial measures, BAV is probably the best known and is "the world's largest database of consumer-derived information on brands (Keller, 2008, P. 393) as well as the first brand equity model discussed by Kotler and Keller (2009, P. 243). It also served as a basis for Aaker's (1996) 10 measures of brand equity. Y&R has measured brand associations for two decades and currently covers over 20,000 brands in over 40 countries. Four "pillars" – Knowledge, Relevance, Differentiation, and Esteem – have emerged from these observations as most diagnostic for metrics such as customer attraction, price elasticity and loyalty. Knowledge appears in Keller's definition and emerged as a key component in Lehmann, Keller and Farley (2008), while Relevance, Esteem, and Differentiation are the "favorable, strong, and unique" associations in Keller's definition. This paper examines how these four "pillars" relate to customer acquisition, retention, and profit margin.

Numerous studies have shown the link of marketing activities such as advertising to brand equity (e.g., Ailawadi, Lehmann, and Neslin 2003). In addition, Aaker and Jacobson

(1994, 2001) found a positive link between perceived brand quality and attitude and stock prices. The link between brands and stock price is also demonstrated in Kerin and Sethuraman (1998), Mizik and Jacobson (2008) and Madden, Fehle, and Fournier (2006). Scholars have also focused on the impact of brand equity on customer loyalty and tolerance of corporate misconduct (e.g., Chaudhuri and Holbrook 2001; Aaker, Fournier and Brasel 2004) as well as willingness to pay (Swait et al. 1993). Furthermore, even simple mind-set metrics, such as brand recall, have been shown to explain demand over and above marketing activity (Srinivsan, Vanhuele and Pauwels 2010). These findings, as well as work by Leone et al. (2006), Rust, Zeithaml, and Lemon (2000), and Peppers and Rogers (2004), provide empirical support for the notion that brand equity should link to hard measures of customer behavior such as the components of CLV.

Customer Lifetime Value

Farris et al. (2006, p. 143) define CLV as “The present value of the future cash flows attributed to the customer relationship.” As Farris et al. (2006) note, CLV is essentially the Net Present Value calculation used for capital budgeting in corporate finance. However, the unit of analysis for CLV is the customer, not the “project“.

CLV is used as a metric for deciding whether a group of customers is worth acquiring (Blattberg, Kim, and Neslin 2008), as a means to value the firm (Gupta, Lehmann, and Stuart 2004), and as an objective to be managed dynamically (e.g., Kahn, Lewis, and Singh 2009; Blattberg, Kim, and Neslin 2008, Chapter 28). A substantial portion of this research has focused on assessing the financial value of customers (Hogan et al. 2002; Hogan, Lemon, and Libai 2003) and on its determinants such as marketing actions (Rust, Lemon, and Zeithaml 2004; Venkatesan and Kumar 2004).

There are two main methods of calculating CLV (Dwyer 1989; Berger and Nasr 1998; Blattberg, Kim, and Neslin 2008): (1) the simple retention model, and (2) the Markov migration model. The simple retention model assumes that the customer is acquired, retained with a certain probability each year, and at some point ceases to be a customer. Once the customer “churns”, the possibility of the customer returning to the company is not considered except as a “new” acquisition. The migration model explicitly addresses this possibility. A customer may *temporarily* defect, that is, skip purchasing for a period or two and then resume purchasing. For example, a McDonalds customer may visit the establishment in week 1, skip weeks 2 and 3, and return in week 4. The same can occur for a durable product, e.g., a Ford owner may switch to a Toyota, but then, after a few years, come back and buy a Ford. Whereas the retention model is driven by retention rates and profit margin, the migration model is governed by retention rates, profit margin, and (re)acquisition rates. The data we have from the automobile industry include acquisition as well as retention measures. This allows us to exploit the strengths of the Markov migration model so we compute CLV using this approach.

CONCEPTUAL FRAMEWORK AND HYPOTHESES

Conceptual Framework

The literature review suggests the simple framework depicted in Figure 1. The framework [is essentially a value chain similar to those discussed by Keller and Lehmann \(2003\), Gupta and Lehmann \(2005\), and Reibstein and Lehmann \(2006\).](#) It proposes that marketing actions influence both brand equity and the components of CLV, and that brand equity has a direct impact on [the components of CLV](#) even after controlling for marketing actions. We next discuss the hypotheses related to this framework.

--- Figure 1 ---

Hypotheses

As mentioned earlier, the behavioral concept at work here is the theory of reasoned action, which posits a trail from customer cognitions (captured by brand equity) to affect, to intentions, to behavior (captured by CLV components). This process exists *over and above* marketing activities that might be aimed directly at increasing CLV. Therefore, our first hypothesis is:

H1: Brand equity impacts CLV, even after controlling for the direct effect of marketing activities.

H1 is fundamental but nontrivial to demonstrate. It is quite possible that the attitude to behavior link is lost amid the “noise” created by marketing efforts aimed directly at customer acquisition, customer retention, and customer profit margin. Alternatively, the effect of marketing on CLV may simply be direct, rather than mediated by brand equity.

A second premise of Figure 1 is that marketing activities can be used to increase both brand equity and CLV. Here these “activities” are operationalized as the elements of the marketing mix (i.e. advertising, product innovation, price, price promotion, and distribution). Previous work has not examined the impact of the elements of the marketing mix on the components of brand equity and CLV in the same setting. While one may consider these only as control variables, one role of this paper is to assess their effects in an integrated context. We therefore state the following (obvious) hypotheses:

H2A: Marketing activities impact brand equity.

H2B: Marketing activities directly impact customer acquisition, customer retention, and customer profit margin.

In addition, we have a number of specific hypotheses about which aspects of brand equity impact the three components of CLV. Here we focus on the four components of brand equity in the current BAV model:

- Knowledge: The extent to which customers are familiar with the brand.
- Relevance: The extent to which customers find the brand to be relevant to their needs.
- Esteem: The regard customers have for the brand's quality, leadership, and reliability.
- Differentiation: The extent to which the brand is seen as different, unique, or distinct.

How each of these is hypothesized to relate to the components of CLV – acquisition, retention, and profit – is summarized in Table 1.

Knowledge: Knowledge/familiarity with a brand is the first element in hierarchy of effects models such as Howard and Sheth (1969). Knowledge plays an important role in mitigating perceived risk (Alba and Hutchinson 1987). Customers should be more apt to switch to a brand if they are familiar with it because there is less risk that the product will not meet their needs. Similarly, well known brands do not have to pay customers a “risk premium” in the form of lower prices. Therefore, knowledge (familiarity) with a brand should have a positive effect on both acquisition and profit margin. In terms of retention, current customers have adapted to a product and hence learned to value its attributes (Carpenter and Nakomoto 1989). They also will be more confident in their judgment of the product, leading to it being more appealing when considering the mean and variance of alternatives in future choice decisions.

--- Table 1 ---

Relevance: Consistent with most mind-set models of brand equity, BAV includes a measure of need fulfillment, captured by relevance. Products can provide utility through functional, experiential or symbolic benefits (see Park, Jaworski, and MacInnis 1986). While the

importance of these benefits differs across individual consumers and change over time (Keller 1993), brands that fulfill the core needs of customers are likely to be considered for purchase (Punj and Brookes 2002) and consequently produce higher acquisition and retention rates as well as increased willingness to pay and hence higher margins. One might argue that relevance is a low bar, as companies in a given industry tend to converge and address similar needs (D'Aveni 1995). This suggests the effect of relevance may be weak. However, addressing customer needs is basic to the marketing concept (Kotler and Keller 2009, p. 19). We therefore advance the following hypothesis:

Esteem: Going a step beyond relevance, higher esteem means that the quality and reliability of the brand are judged favorably. Evaluative judgments such as esteem are seldom formed with regard to benefits of little subjective importance (Ajzen and Fishbein 1980). Put differently, brand respect and deference will be related to favorable appraisals of important attributes (see MacKenzie 1986). Hence, brands, which satisfy important consumption goals, should be able to achieve higher acquisition and retention rates and command price premiums. Taken together, this discussion suggests the following (fairly obvious) hypothesis:

H3: Brands with higher [knowledge, relevance and](#) esteem have higher customer acquisition [and](#) retention rates, and command larger profit margins.

Differentiation: [Differentiation](#) has long been the mantra of marketing, and hence [one might expect it to also](#) be positively associated with all the components of CLV (e.g., Day and Wensley 1988). Economic theory dictates that less differentiated products face more competition, which ultimately drives down prices. Thus, more differentiated products should have higher margins. However, distinctiveness, a key component of differentiation, has no

positive customer benefit *per se*. Psychologists find that individuals tend to rate distinct stimuli lower because they are harder to process and evaluate (Winkielman et al. 2006). The limited sales of failures such as the Pontiac Aztec and the Ford Edsel (and of successes such as Porsche 911) suggest highly distinctive cars appeal to relatively small segments. Recent field studies of the German automobile market confirm this by showing that aesthetically distinct vehicles turn over slower than less distinct automobiles (Landwehr, Labroo and Herrmann 2009). In addition, in mature markets differentiated brands tend to be highly targeted, which limits their customer base and leads to lower acquisition rates.

Differentiated brands also may be less able to hold onto their customers because of variety seeking or changes in customer preference due to changes in family status, social environment and cultural norms. Furthermore, distinct products have been linked to self image portrayal, need for uniqueness and variety seeking (Ratner and Kahn 2002, Levav and Ariely 2000). A Porsche, for example, is clearly a very differentiated and unique sports car. However, it addresses transient needs and its customers may make different choices on their next purchase after they have had their sports car “fix” or their circumstances change, e.g., they begin raising a family. We therefore hypothesize differentiation is a double-edged sword, positively associated with profit margins but negatively with customer acquisition and retention:

H4: Brands with higher differentiation will be associated with lower acquisition and retention rates, but higher profit margins.

In addition to these main effects, we also examine interactions among the BAV components

DATA

To link customer based brand equity to the components of CLV in a practical yet long-term, strategic way, we focus on a single, major industry – the U.S. automotive industry. Specifically, we focus on data for 39 major brands between 1999 and 2008 (comprising more than 97% of all automobile sales in the US market). The automotive industry is of great economic importance. Cars are high involvement products in terms of interest, symbolic value, hedonic value and risk (Lapersonne, Laurent, and Le Goff 1995). Thus, one would expect potential buyers to carefully collect and analyze product information, so the long-run dynamics of acquisition and retention become managerially more meaningful (Srinivasan and Ratchford 1991). Furthermore, switching behavior is easily observed since most customers trade in used cars when purchasing a new one. We compiled data on brand equity, customer acquisition, retention, and profit margin, and marketing variables from several sources, as detailed below.

Customer-Based Brand Equity

Of the several models that have been developed to measure brand equity [at the customer mind set level](#), Young & Rubicam's Brand Asset Valuator (BAV) is among the most visible (Mizik and Jacobson 2008). BAV is an extensive research program on global branding and has been called one of the most ambitious efforts to measure brand equity across products (Keller 2008; Aaker 1996). In the U.S. Young & Rubicam collects annual data from a sample of more than 6,000 designed to the U.S. population over 18 years of age (Agres and Dubitsky 1996). Table 2 contains the perceptual metrics used to derive the components that comprise BAV: "differentiation," "relevance," "esteem," and "knowledge". Items belonging to each component

were averaged to calculate a formative index. We rescaled items that were on different scales to a 1 to 100 scale to make them comparable.¹

--- Table 2 ---

One strength of BAV is its widespread use both in the business world and by academic researchers (Aaker 2004, Chapter 10), who related it to stock price movements and firm valuation (e.g., Mizik and Jacobson 2008). Furthermore, BAV is one of the very few measures available over a ten-year period for all the relevant brands of a major industry. [One](#) weakness of the data is that the number of “sub-scales” differs from one to seven across the pillars, and some sub-scales use simple yes-no responses when interval scales might have been more powerful. [More broadly, our specific results are limited to the dimensions of BAV as well as the product category studied, automobiles in the U.S. The results therefore should be taken strictly as “hypotheses” of what would happen in other situations.](#)

Customer Acquisition and Customer Retention

The customer purchase data used in our study to measure acquisition and retention were provided by the Power Information Network (PIN) and consist of trade-in and purchase data on 39 different automobile brands in the U.S. between 1999 and 2008. These data cover about 40% of transactions and are considered representative for the U.S. and have been successfully applied in previous research on automotive choice (Bucklin, Siddarth and Risso 2008; Jie, Lili and Schroeder 2009).

¹ For example, esteem consists of personal regard, leadership, high quality, and reliability. While regard is measured on a seven-point scale, the others are measured using yes-no responses. We rescale regard to a scale from 1 to 100 and derive the brand equity component esteem by averaging all four items. We refrain from using z-scores to calculate composite measures (see Mizik and Jacobson 2008) because we wanted to be able to quantify the impact of changes in brand equity on CLV using simulation (see below).

The migration CLV model requires switching probabilities *conditional* on which brand customers previously purchased, i.e., the percentage of customers who bought the focal brand in period t among customers who owned the brand in $t-1$ and made a purchase in t (retention) and the percentage of customers who bought the focal brand in period t among those who owned another brand in $t-1$ and made a purchase in period t (acquisition). This differs from the *unconditional* probabilities, i.e., the number of customers repurchasing the focal brand in t as a percentage of *all* customers purchasing in t (retention) and the number of customers switching to the focal brand in t as a percentage of *all* customers purchasing in t (acquisition). Table 3 illustrates the calculation of unconditional and conditional acquisition and retention probabilities. Unconditional probabilities sum to one and we incorporate this in our analysis to ensure logical consistency of our predictions. We convert predictions of the unconditional probabilities to conditional probabilities, which are used in the migration CLV model.

--- Table 3 ---

Customer (Gross) Profit Margin

The customer (*gross*) profit margin of a sold car is the difference between a brand's average wholesale price and its variable production costs, i.e. its costs of goods sold (COGS). Power Information Network (PIN) provided data on each brand's price per sold car, while COGS data are derived from annual reports. Our analysis excludes fixed costs such as advertising and R&D and represents the marginal contribution of a sale/customer. The merits of using only variable costs in CLV calculations are discussed by Blattberg, Kim and Neslin (2008, pp. 149-151). Similarly, Berger and Nasr (1998) do not consider fixed costs in their seminal paper on calculating CLV, a perspective shared by Mulhern (1999).

Marketing [Activities](#)

We use marketing mix variables that have been shown to influence customer acquisition and retention (Pauwels et al. 2004; Slotegraaf and Pauwels 2008; Ataman, Van Heerde, and Mela 2009; Ailawadi, Lehmann and Neslin 2003). We include each brand's yearly ad spending (*advertising*) in the U.S. (provided by TNS Media), the number of dealers in the U.S. (provided by Automotive News), product range measured as the number of distinct models offered, the number of new model launches introduced in a year (both provided by Wards Automobile), and the average customer incentives (*price promotions*) during the year (provided by Automotive News). Because of the high correlation between number of dealers (distribution) and product range/brand breath (0.59)², we combine these into a variable we called "*market presence*," i.e., the ubiquity of the brand in the market. Since these measures are on different scales, we rescale them to range between one and ten. Market presence is calculated as a formative index by averaging the rescaled components.

We adjust ad spending by the consumer price index (CPI), as reported by the U.S. Bureau of Economic Analysis. The average price of a brand's sold cars is adjusted by the CPI for gross domestic purchases of motor vehicles using the same source of information. The baseline price index for all prices and budgets is 1999.

² The correlation between dealers and range was the highest pairwise correlation among these five different measures of marketing actions.

ANALYSIS APPROACH

Statistical Analysis

Figure 1 suggests three equations: (1) Brand equity as a function of marketing activity, (2) Retention and acquisition as a function of brand equity and marketing activities, and (3) Profit as a function of brand equity and marketing activities.

Brand equity: To analyze the four brand equity measures – relevance, esteem, differentiation, and knowledge – as a function of marketing activities, we specify four regression equations and estimate them jointly using seemingly unrelated regression.

$$(BE_{kit} - \overline{BE}_{kt}) = \sum_{i=1}^I \alpha_{ik} F_i + \sum_{m=1}^M \delta_{mk} (X_{mit} - \overline{X}_{mt}) + \mu_{kit} \quad (1)$$

i	1, ..., 39 indexes the 39 brands, where $I = 39$
t	1, ..., 10 indexes the 10 years of data
k	1, ..., 4 indexes the four brand equity measures
m	1, ..., 5 indexes the five marketing activities defined earlier
BE_{kit}	Value of brand equity component k for brand i in period t
α_{ik}	Fixed effect for firm i on brand equity component k
F_i	Dummy coding for brand i
δ_{mk}	The impact of marketing activity m on brand equity measure k
X_{mit}	Value of marketing activity m for brand i in period t
μ_{kit}	Error term for brand equity component k , brand i and period t

The key coefficients are the four sets of δ 's representing the impact of marketing on each brand equity component. We include brand-specific fixed effects to control for cross-sectional variance so that [changes in brand equity](#) are likely to be due to changes in marketing [activity over time](#) rather than [stable and unique characteristics](#) of [the](#) brand. Second, we scale all variables relative to the mean across brands for the given time period. This provides a convenient way to account for (possibly nonlinear) trends from year to year. The model assumes that what matters is not, for example, the level of advertising, but rather the level of advertising relative to competition. [Measuring the variables in this way means that what we specifically examine is 1\)](#)

how deviations in marketing activities from the industry average impact the four pillars of BAV and 2) how deviations in each pillar of BAV from the industry average impact market place behavior as measured by acquisition and retention (which drive share) as well as margin.

Customer Acquisition and Customer Retention: As discussed in the data section, we model unconditional acquisition and retention probabilities because these have consistency properties (summing to one) we can exploit. Define S_{irt} as the unconditional acquisition probability ($r = 1$) or retention probability ($r = 2$) for brand i in period t . As shown in Table 3, summing S_{irt} produces:

$$\sum_{i=1}^I \sum_{r=1}^R S_{irt} = 1 \quad (2)$$

S_{irt} Unconditional probability of acquisition or retention (r) for brand i in period t
 r 1, acquisition; 2 for retention.

We employ a differential effects multinomial attraction model (Cooper and Nakanishi 1988) to maintain the logical consistency of equation (2). We predict logically consistent unconditional acquisition and retention probabilities, use them to derive absolute numbers (Table 3), and then derive the conditional acquisition and retention probabilities needed for calculating CLV. The differential effects multinomial attraction model is:

$$S_{irt} = \frac{A_{irt}}{\sum_{j=1}^J \sum_{r=1}^R A_{jrt}} \quad (3)$$

A_{irt} Attraction of brand i to acquire/retain (r) in period t

The A_{irt} 's are expressed as:

$$A_{irt} = \exp\left(\alpha_i F_i + \alpha_r A_r + \sum_{k=1}^4 \beta_{kr} (BE_{kit} - \overline{BE}_{kt}) + \sum_{m=1}^5 \delta_{mr} (X_{mit} - \overline{X}_{mt}) + \varepsilon_{irt}\right) \quad (4)$$

- α_i Fixed effect for brand i
- F_i Dummy coding for brand i
- α_r Fixed effect for acquisition and retention
- A_r Dummy coding for acquisition and retention
- β_{kr} Effect of brand equity component k on acquisition/retention (r)
- BE_{kit} Value of brand equity component k of brand i in period t
- δ_{mr} Effect of marketing activity m on acquisition/retention (r)
- X_{mit} Value of marketing activity m of brand i in period t
- ε_{irt} Error term for brand i , acquisition/retention (r) and period t

Equation (4) models attraction, and hence unconditional retention and acquisition, as functions of brand equity and marketing. The coefficients for these variables are retention or acquisition specific, so that brand equity measure k has a different impact on retention than on acquisition. We also include fixed effects for brand and for retention vs. acquisition.³

Taking the logarithm of equation (3), substituting in equation (4), summing over $I = 39$ brands and over $R = 2$ acquisition/retention, and multiplying both sides by $1/IR$ yields:

$$\frac{1}{IR} \sum_{i=1}^I \sum_{r=1}^R \ln S_{irt} = \frac{1}{IR} \sum_{i=1}^I \sum_{r=1}^R \left(\alpha_i + \alpha_r + \sum_{k=1}^K \beta_{kr} (BE_{kit} - \overline{BE}_{kt}) + \sum_{m=1}^M \delta_{mr} (X_{mit} - \overline{X}_{kt}) + \varepsilon_{irt} \right) - \ln \sum_{j=1}^J \sum_{r=1}^R A_{jrt} \quad (5)$$

Following Cooper and Nakanishi (1988) we subtract equation (5) from the log of equation (3) to form a single regression equation:

³ We also experimented with a model using a single composite fixed effect for acquisition/retention (r) and brand i . This model produced substantially similar effects. We decided to report the results for the specification of equation (5) which uses fewer degrees of freedom.

$$\ln \frac{S_{irt}}{\tilde{S}_t} = \alpha_i^* + \alpha_r^* + \left(\sum_{k=1}^K (\alpha_{r=1} \beta_{k1} + \alpha_{r=2} \beta_{k2}) (BE_{kit} - \overline{BE}_{kt}) \right) + \left(\sum_{m=1}^K (\alpha_{r=1} \delta_{m1} + \alpha_{r=2} \delta_{m2}) (X_{mit} - \overline{X}_{mt}) \right) + \varepsilon_{irt}^* \quad (6)$$

- \tilde{S}_t Geometric mean of S_{irt}
 α_i^* $\alpha_i - \overline{\alpha}_i$, $\alpha_r^* = \alpha_r - \overline{\alpha}_r$
 $\alpha_{r=1}$ 1 if acquisition, $\alpha_{r=1} = 0$ if retention
 $\alpha_{r=2}$ 0 if acquisition, $\alpha_{r=2} = 1$ if retention
 ε_{irt}^* $\varepsilon_{irt} - \overline{\varepsilon}_t$

Equation (6) is estimated using ordinary least squares on the stacked retention and acquisition numbers for each brand for each time period, resulting in 39 brands \times 10 time periods \times 2 (acquisition or retention) = 780 observations.

Customer Profit Margin: Figure 1 shows that profit margin per customer (π_{it}) is a function of marketing activities as well as brand equity. We model customer (*gross*) profit margin as:

$$(\pi_{it} - \overline{\pi}_t) = \sum_1^I \alpha_i F_i + \sum_{k=1}^K \beta_{pk} (BE_{kit} - \overline{BE}_{kt}) + \sum_{m=1}^M \delta_{pm} (X_{mit} - \overline{X}_{mt}) + \nu_{it} \quad (7)$$

- α_i Fixed effect for brand i
 β_{pk} Effect of brand equity component k on profit margin (p)
 BE_{kit} Value of brand equity component k of brand i in period t
 δ_{pm} Effect of marketing activity m on profit margin (p)
 X_{mit} Value of marketing activity m of brand i in period t
 ν_{it} Error term for brand i , profit margin (π) and period t

We include fixed effects and scale all variables relative to competition. The coefficient β_{pk} represents the unit change in a brand's profit, relative to competition, per unit change in its brand equity component k , relative to competition. The coefficient δ_{pm} represents the impact of marketing activity m on profit, again relative to competition. Note that we use data aggregated

across brands which is readily available to any firm. We consider this an adequate level of analysis since brand equity is an inherently aggregate level construct. However, this does not allow for inferences regarding differences across customers which may be of additional value, e.g. for developing communication strategies for different target segments. The average effects we estimate may also differ across brands, in particular luxury vs. non-luxury brands. We have investigated this possibility by testing for statistical differences of the brand equity effects and found no such indication.

Customer Lifetime Value

We calculate CLV using the Markov migration model advanced by Dwyer (1989) and Berger and Nasr (1998). We draw directly on Pfeifer and Carraway (2000), who show how to perform the calculation in a convenient matrix form. The migration model acknowledges that customers are acquired, lost, and then sometimes return to the “nest” over time (see Blattberg, Kim, and Neslin 2008, Chapter 5). In the context of the automobile market, the migration model captures the scenario that a customer purchases a Buick in Year 1, switches to another car in Year 4, and returns to Buick in Year 7.

The migration model starts with the “states” that characterize a customer at a particular point in time. We define three states:

1. Own focal car, purchased in period t
2. Own focal car, purchased earlier than period t .
3. Own competitive car, purchased in period t or earlier.

Given these states, the following parameters are needed to calculate CLV for focal car i :

- p Probability of purchasing a car in period t , i.e., the probability the customer is “in the market” in period t .

- S^*_{irt} Probability of purchasing the focal car i in period t , given the customer currently owns the focal car and purchases a car in period t (retention).
- S^*_{iat} Probability of purchasing the focal car i in period t , given the customer currently owns a competitive car and purchases a car in period t (acquisition).
- π_{it} Profit margin per customer for the focal car i in period t .

The above definitions imply a “transition matrix” (Table 4) of the probabilities that customers migrate from one state to another each period, as follows:

--- Table 4 ---

Own focal car, purchased in period t : The customer purchases a new car in period $t + 1$ with probability p and the probability that the purchased car will be the focal car is S^*_{irt} . Therefore, the probability of buying the focal car in period $t + 1$ is pS^*_{irt} , i.e. the customer purchased and was retained. The customer may purchase a different car with probability $p(1 - S^*_{irt})$. A customer who does not purchase any car is still an owner of the focal car, and so moves from state 1 to state 2.

Own focal car, purchased earlier than period t : The probabilities of transitioning to the various states are the same as if the customer started in state 1. The reason we distinguish between states 1 and 2 is the profit implications are different – unless the customer purchases the focal car, there is no profit margin.

Own competitive car, purchased in period t or earlier: The probability the customer purchases a car is p , but now the probability of it being the focal car is the acquisition probability, S^*_{iat} . So the probability of transitioning to state 1, owning the focal car purchased in the period $t + 1$, is pS^*_{iat} and the probability of remaining in state 3, owner of a competitive car purchased in period $t + 1$ or earlier, is $1 - pS^*_{iat}$. A customer in state 3 cannot transition to state 2 because the customer owned a *competitive* car purchased before period $t - 1$.

The final ingredient needed to compute CLV is the profit margin depending on the customer's state. This can be captured by a 3×1 vector reflecting the contribution for each state:

$$R = \begin{pmatrix} \pi_{it} \\ 0 \\ 0 \end{pmatrix} \quad (8)$$

If the customer purchases the focal car in the current period, the profit margin is π_{it} . Pfeifer and Carraway (2000) show that CLV can be calculated as follows:

$$CLV = (I - (1+d)^{-1}P)^{-1}R \quad (9)$$

- I Identity matrix (3×3 in our case since we have three states).
- P Transition matrix defined above and in Table 4 (3×3).
- d Discount parameter (we set this to 0.10 or 10% per year for our calculations).

The key drivers of CLV are the conditional acquisition and retention probabilities (contained in P) and the profit margin (contained in R). The estimates of Equation (6) provide predictions of the unconditional probabilities of acquisition and retention. As described earlier, we use these to work backwards and obtain the conditional probabilities, (the S^* 's). The estimates of Equation (7) provide the predictions of profit contribution needed for equation (8).

We consider the probability the customer purchases any car (p) to be exogenous, i.e., we assume

that brand equity does not affect the average interpurchase time nor vice-versa. According to
the average interpurchase times for the years we studied were _____ and
respectively, suggesting what is seen by improvements by some that cause them to speed up
purchase are offset by the decision by others to postpone purchase. We therefore use a value of p

= 0.20, meaning the customer replaces a car every five years on average, which is what we observe in the PIN data. This parameter affects the value of CLV (a higher p means higher CLV)

but for illustrating the impact of changes in brand equity, we believe the assumption of constant p is reasonable and will not dramatically alter the implications of our scenario calculations.

RESULTS

Correlations

Correlations among the variables appear in Table 5. For example, differentiation is highly correlated with margin (.63) and negatively with retention (-.43) and acquisition (-.48). This suggests, as hypothesized, that differentiation is a double-edged sword: high differentiation means the automobile is highly targeted and may appeal to customers in certain lifestages. Relevance and knowledge are highly correlated with customer retention (.79 and .76) and relevance is unsurprisingly highly correlated with customer acquisition (.69). We note high correlations among variables that portend multicollinearity problems. For example, relevance is highly correlated with several other variables; esteem is highly correlated with knowledge, etc. This may inflate standard errors and render fewer significant results. However, we felt it was important to be able to compare our results with other work that uses the BAV measures. Therefore we did not orthogonalize the brand equity measures. To the extent we find significant effects consistent with our hypotheses in the presence of multicollinearity, we believe that makes our results all the stronger.

--- Table 5 ---

Determinants of Brand Equity Components

Table 6 presents estimates of equation (1) – brand equity as a function of marketing. Advertising is positively linked to differentiation, relevance, and esteem while market presence

is positively related to relevance, esteem, and knowledge but negatively to differentiation - being widely present is inconsistent with being “unique”. Overall, marketing clearly exerts an important impact on the components of brand equity. In particular, the statistical significance of the advertising and presence variables provide support for Hypothesis H2A.

--- Table 6 ---

Impact of Brand Equity on Acquisition and Retention

Table 7 presents the estimates of Equation (6), linking brand equity and marketing actions to acquisition and retention. The brand equity components are related both to acquisition and retention. In support of H5, differentiation is negatively related to acquisition and retention. Knowledge is positively related to acquisition and retention, supporting H6. Esteem is positively related to customer retention but not to acquisition, partially supporting Hypothesis H4. In partial support of H3, relevance has a positive effect on acquisition ($p < .10$) but no significant impact on retention. Overall, six out of the eight coefficients relating brand equity to acquisition and retention are statistically significant at $p < .10$ (five coefficients at $p < .05$). Apparently, acquiring and retaining customers requires capturing their hearts and minds (Fournier 1998). Taken together, these findings lend support for Hypothesis H1 – “soft” customer mind-set measures of brand equity relate to “hard” measures of acquisition and retention, the prime ingredients of CLV, even after controlling for the impact of marketing activities.

--- Table 7 ---

As for the direct impact of marketing on acquisition and retention, there are significant effects, supporting H2B. Advertising seems to be a crucial driver of customer acquisition as well as customer retention. Price promotions are also significantly related to acquisition but not

retention. This is consistent with results on consumer packaged goods, where promotions tend to increase “penetration” but have a weaker impact on “share of requirements”/loyalty (Ailawadi, Lehmann, and Neslin 2003). Market presence increases acquisition as well as retention. Interestingly, the number of new model launches and the average price are not significantly related to acquisition or retention. The absence of a price effect may be due to the significant impact of incentives, which involve price. The absence of a new products effect could be due to the fact that most of the brands in our sample had active new product programs, and thus it was difficult even for brands with higher than average new product development to stand out from the crowd.

Impact on Customer Profit Margin

The estimates of Equation (7), relating brand equity and marketing to customer profit margin, are in Table 8. Differentiation and knowledge again are the strong brand equity measures. They both relate positively to profit, supporting Hypotheses H5 and H6. The impact of relevance is significant at the 10% level, supporting H4. The impact of esteem has an unexpected sign which could be due to multicollinearity but is not significant at the 10% level. Overall, the finding that three of the four equity measures relate significantly to profit provides support for H1.

--- Table 8 ---

Consistent with Hypothesis H2B, two marketing activities, advertising and market presence, relate to profit margin. The negative impact of advertising is only significant at the 10% level, but is consistent with the “advertising as information” theory, which suggests that advertising exposes consumers to more alternatives, underscores product differences, and hence

accentuates competition (Nelson 1974; Meurer and Stahl 1994). Such effects of advertising are particularly likely in oligopolistic industries and those in which customers negotiate individual prices (Scherer and Ross 1990; Gatignon 1984). Other studies have found similar effects of advertising on price elasticity as well as revenues (e.g., Kanetkar et. al. 1992; Lodish et al. 1995). Market presence, on the other hand, has a strong positive impact on profit margin.

Analysis of Indirect Effects

To further assess the role of brand equity, we conduct a series of Sobel tests to calculate the indirect effect of each marketing variable on the components of CLV, operating through their impact on the four brand equity components (Preacher and Hayes 2008). We obtain standard errors for these coefficients using bootstrapping and test for the statistical significance of indirect effects. These tests reveal that the effect of market presence on acquisition and retention operates partially through customer based brand equity (Table 9). Specifically, 28% of the total effect of market presence on acquisition and 29% of the effect on retention operates indirectly through the four brand equity components. We also find evidence of a positive indirect effect of advertising on profit margin. Thus, advertising increases margins by increasing brand equity, but decreases margins through its direct effect noted earlier. Taken together, the two effects cancel out and lead to a non significant total effect of advertising on margins.

--- Table 9 ---

Check for Endogeneity

The analysis of the relationships among customer acquisition, customer retention, profit margin, marketing effort, and brand equity potentially is subject to endogeneity, in particular

simultaneity given the annual nature of our data. Customers may notice a car is popular (because it is acquiring and retaining many customers) and adjust their brand equity perceptions. Similarly, managers may observe the performance of their brands in terms of acquisition and retention and adjust marketing accordingly. It is quite possible that these problems will not materialize. For example, customers may not notice acquisition and retention rates. However, this is an empirical question, one that we resolve by conducting endogeneity tests.

We conduct two tests for endogeneity, a Wu-Hausman F-test (Wu 1973, Hausman 1978) and a Durbin-Wu-Hausman χ^2 -test (Durbin, 1954, Wu 1973, Hausman 1978).⁴ The null hypothesis in both tests is that endogeneity is not a problem. As a result, OLS and instrumental variables (IV) estimates of equations such as Acquisition = f(brand equity, marketing) will both be consistent and converge to the same estimates as sample size increases.

The choice of instruments is particularly challenging because the data are both cross-section (brand) and time series (year). Ideally, instruments should vary by year and by brand. We use two instruments: (1) fixed effects for each brand in the model, and (2) lagged values of potentially endogenous variables (e.g., Differentiation_{t-1} for Differentiation_t, etc.; see Sudhir 2001; Vilcassim, Kadiyali and Chintagunta, 1999). For robustness, we also conducted the tests using two-period lags (Boulding, Lee, and Staelin 1994; Neslin, Henderson, and Quelch 1985). We test seven equations: acquisition, retention, profit margin, and the four pillar equations. In total, we conduct 28 tests; Wu-Hausman and Durbin-Wu-Hausman, using either one-period or two-period lags, for each of the seven equations.

⁴ We implemented these tests following Baum, Schaffer, and Stillman (2003, equations 53 and 54).

The results (Table 10) support the null hypothesis of no endogeneity. None of the 28 tests is significant at the 5% level; three are significant at the 10% level, consistent with what would be expected due to chance.

--- Table 10 ---

QUANTIFYING THE IMPACT OF MARKETING AND BRAND EQUITY ON CLV

We examine the impact of changes in marketing actions and brand equity on the CLV of an acquired customer. We consider two scenarios – (1) brand equity increases via a factor outside the control of management (e.g., a trend toward greater esteem for cars built in a particular country) and (2) marketing action taken by management (e.g., increases in advertising or market presence). Equations (1), (6), and (7) specify the impact of a change in brand equity or marketing on acquisition, retention, and profit margin. The scenarios are hypothetical but demonstrate the magnitude, and hence managerial relevance, of the link between “soft” measures (brand equity) and “hard measures” (acquisition, retention, profits, and CLV). We use equations (8) and (9) to calculate CLV.

We use the 2008 Cadillac as our focal car. Table 11 shows the results. The first column represents the current state of affairs – the base case. Cadillac is predicted to have a high retention rate, 50.15%, but a low acquisition rate, 1.31%. Note that since there are 39 brands, a “benchmark” acquisition rate would be approximately 1/39 or 2.5%. Cadillac’s low acquisition rate is likely due to its smaller target group. In terms of brand equity, Cadillac rates higher than average on all components with particular strength in esteem. Cadillac introduces fewer new products and uses fewer incentives compared to other brands. However, its advertising and market presence are slightly above average. Cadillac charges higher prices and is able to achieve

an above average profit margin of \$19,260. Using equation (9) and assuming a 5-year purchase cycle, the predicted CLV of its customers is \$28,737.

---Table 11---

In this illustration, the interpurchase time of 5 years coupled with the retention rate of 50% plays an important role in CLV. Cadillac gets \$19,260 when the customer is first acquired, so there is $\$28,737 - \$19,260 = \$9,477$ in NPV remaining. The value if a customer re-buys a Cadillac five years later, assuming a 10% discount rate, is $(1/(1.1))^5 \times \$19,260 = \$11,959$. In another five years, Cadillac has a 50% chance of retaining that customer again, which means a $.50 \times .50 = .25$ chance starting from the beginning. By ten years out, the discount factor is $(1/(1.1))^{10} = .39$ so the NPV of this is $.39 \times \$19,260 = \$7,426$. The sum $.50 \times \$11,959 + .25 \times \$7,426 = \$7,836$ is the majority of the \$9,477 remaining NPV after the initial purchase. The NPV of customers who buy a third time, etc., or defect and are then re-acquired comprise the remaining $\$9,477 - \$7,836 = \$1,641$ contribution to CLV. Clearly, retention and interpurchase time play a large role in determining CLV.

Scenario 1: Increased advertising

We now assume Cadillac increases its advertising by .5 standard deviations; the net effect (Table 6) on acquisition and retention would be positive although small (assuming that increases in the one pillar does not cause a second order change in the other pillars). The reason is that advertising-induced increases in differentiation tend to detract from retention and acquisition, while the advertising-induced increases in other pillars, plus the direct impact of advertising, tends to increase retention and acquisition (Table 7). These factors offset so the net impact is positive but small. This result is consistent with studies showing a low advertising elasticity for mature products (e.g., Hanssens, Parsons, and Schultz 2001). The same offsetting occurs

regarding profit contribution, yielding a slightly negative impact of -\$33 per car. The net impact on CLV is +\$226, due to the slightly higher acquisition and retention rates. This scenario clearly illustrates the offsetting direct and indirect effects of advertising, which result in only a small positive impact of advertising on CLV.

Scenario 2: Increased market presence

In this scenario, Cadillac increases its marketing presence by .5 standard deviations, e.g., by increasing the number of dealers and perhaps increasing its product range. This decreases differentiation, as the car becomes more “common” and less distinct. However, relevance, esteem and knowledge increase as customers become more familiar with Cadillac.

The changes in brand equity result in some increase in acquisition, and a substantial increase in retention, from 50% to 67%. Profitability also increases because knowledge has a strong impact on profit, as does market presence directly. This is partially offset by the negative direct impact of a decrease in differentiation, but the net result is that profit margin increases. As a result, CLV increases from \$28,736 to \$32,455, a gain of \$6,719, or 13%.

Market presence therefore is a key marketing “lever”. It sets in motion gains in relevance, esteem, and knowledge that increase its draw from competitors (acquisition) and, more substantially, its retention of current customers. In addition, net profitability per customer increases so all three components of CLV (acquisition, retention, and profit margin) move in the right direction. While the 13% gain in CLV is substantial, the increase has some face validity. A doubling or tripling in CLV would seem unrealistic, but a 13% increase due to investing in more dealers and extending the product line seems reasonable.

Scenario 3 – Exogenous change in brand equity

Brand equity sometimes changes for reasons outside the managerial actions quantified in our model, e.g. a competitive mis-step (e.g., Toyota's acceleration problem) or a product placement or "viral" activity (e.g. placing the Mini-Cooper in the movie *The Italian Job*).

As an example, assume Cadillac increases its differentiation from 2.25 to 3, the level of BMW. Table 7 suggests a decrease in retention rate and a smaller decrease in acquisition. Table 8 indicates an increase in profits, so that margin increases to \$19,458. The net result is that CLV increases to \$29,187, an increase of \$450, or 1.6% over the base case. The lower retention rate brought about by higher differentiation is offset by the higher profit margin that comes with higher differentiation.

The message of these illustrative scenarios is that changes in marketing actions have a meaningful impact on brand equity, which in turn begets meaningful changes in acquisition, retention, profit margin per customer, and ultimately, CLV and firm value. Exogenous changes in brand equity, not directly due to managerial actions, also can have meaningful impacts on customer acquisition, retention, profit margin, and CLV. The main point is that "soft" brand equity measures are managerially important, not only from a "positioning" standpoint, but from a financial standpoint as well, namely in determining the lifetime value of the brand's customers.

SUMMARY

This paper conducted an empirical examination of the relationship between brand equity and the components of CLV, capitalizing on a unique database comprised of 10 years of brand equity measures as well as the customer acquisition, retention, and profitability numbers that generate CLV. It also examined the role of marketing actions in this context, both as a generator

of brand equity, and as a control for ensuring the apparent relationship between brand equity and CLV is not spurious. The major findings are:

- Brand equity has a predictable and meaningful impact on all components of CLV, namely customer acquisition, retention, and profitability. Importantly, brand equity is strongly related with retention, consistent with the notion of building brand relationships (Fournier 1998).
- This relationship stands even after controlling for a broad array of marketing activities, which impact CLV both directly and indirectly through brand equity
- The individual components of brand equity exert different effects on acquisition, retention and profit margins. In particular, brand differentiation increases customer profitability but decreases acquisition and retention.

These findings demonstrate the link between the “soft” measures of the customer’s attachment to the brand and the “hard” measures that comprise CLV. This means that the battle for the hearts and minds of customers is a meaningful one which has quantifiable ramifications for customer profitability.

Not all of our specific hypotheses were supported, in that not all measures were statistically significant. However, several were in interesting and meaningful ways, and the key test – that brand equity adds explanatory power of CLV over and above marketing activities – was strongly supported. Our data were tinged with multicollinearity, and our statistical models used fixed effects. Because this much “control” can wipe out statistical relationships, the fact that we still obtained statistically and managerially significant results is encouraging. However, the non significant relationships should be interpreted with caution since multicollinearity could have played a role. We have employed several robustness checks, such as redoing our analysis

with random subsamples, and found our results to be generally reliable, in particular regarding the effect of brand equity. For marketing instruments we have identified links where multicollinearity could have led to non significant test statistics. In particular advertising has a significant impact on knowledge ($p < .05$) in some more parsimonious models. Despite a lack of theory, we have also tested for potential interaction effects between the pillars of brand equity and found that including interactions does not improve model fit in any our models ($p > .10$). This suggest that parsimonious models with main effects only can adequately capture the effect of brand equity on CLV. While the statistical relationships we measured were the impact of brand equity on the components of CLV, we were able to aggregate these components to calculate the impact on CLV itself. To this end, we used the Markov migration model of CLV, which allows customers to switch in and out of a brand over time. We demonstrated using reasonable scenarios that changes in marketing would change brand equity, which in turn would change acquisition, retention, and profitability. We also showed that exogenous changes in brand equity could affect CLV in meaningful ways.

While our work benefited from an exceptional database, it still begs for replication and extension. We examined one industry (automobiles) and one set of specific measures of brand equity (the Brand Asset Valuator); clearly the field needs to generalize beyond this. In addition, our work is aggregate – at the product/year level. Further work is needed to examine these relationships at the customer level to better understand the process behind the results. Note also we have not captured the financial benefit of acquiring cohorts of new customers, which depends on brand equity. In terms of firm decisions, this obviously should be taken into account. Finally, the CLV calculations here are somewhat myopic. They neither capture word of mouth effects (which are only indirectly represented by market presence and the four BAV pillars) nor the

profits from service (of major importance to dealers as well as a profit source to the manufacturer for parts sold to dealers). We hope this paper encourages work in these and related directions.

For managers, our work suggests that it should never be “brand management versus customer management.” The two should be managed in a coordinated fashion. The notion that brand managers are in one corner, working with ad agencies to win hearts and minds, while the customer/CRM managers are in another corner, designing direct marketing campaigns for acquisition and retention, is outdated. The two need to work together, because brand equity and CLV work together.

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TABLES

Table 1: Hypotheses of the Impact of Brand Equity on Components of CLV

	Acquisition Rate	Retention Rate	Profit Margin
Relevance	+	+	+
Esteem	+	+	+
Differentiation	-	-	+
Knowledge	+	+	+

Table 2: Four Brand Equity Components of Brand Asset Valuator Model

Components of Brand Equity	Perceptual Metrics	Aggregate Measure
Differentiation ¹	1. Uniqueness	% responding “yes”
	2. Distinctiveness	% responding “yes”
	3. Differentiation	% responding “yes”
	4. Innovativeness	% responding “yes”
	5. Dynamics	% responding “yes”
Relevance	1. Relevant to me	Average score on 1-7 scale
Esteem ¹	1. Regard	Average score on 1-7 scale
	2. Leadership	% responding “yes”
	3. High Quality	% responding “yes”
	4. Reliability	% responding “yes”
Knowledge	1. Familiarity with the brand	Average score on 1-7 scale

¹ Values for components of brand equity are calculated as a formative index of all items

Table 3: Calculation of Conditional Acquisition and Retention Probabilities*

		Period T				
Brand		A	B	C	D	Σ
Period T -1	A	68	14	12	6	100
	B	21	60	12	7	100
	C	15	18	62	5	100
	D	20	17	16	47	100
Σ		124	109	102	65	400
Unconditional Retention		68/400=.17	.15	.16	.12	.59
Unconditional Acquisition		56/400=.14	.12	.10	.05	.41
Conditional Retention		68/100=.68	.60	.62	.47	
Conditional Acquisition		56/300=.19	.16	.13	.06	

* E.g., of the 100 customers who owned Brand A in period T-1, 68 customers purchase the same Brand A in period T, 14 switch to Brand B, 12 switch to Brand C, and 6 switch to Brand D.

Table 4: Transition Matrix of Migration Probabilities per Period

Period t	Period $t+1$		
	State 1: Own focal car, purchased in period $t + 1$	State 2: Own focal car, purchased earlier than period $t + 1$	State 3: Own competitive car, purchased in period $t + 1$ or earlier
State 1: Own focal car, purchased in period t	pS^*_{irt}	$1 - p$	$p(1 - S^*_{irt})$
State 2: Own focal car, purchased earlier than period t	pS^*_{irt}	$1 - p$	$p(1 - S^*_{irt})$
State 3: Own competitive car, purchased in period t or earlier	pS^*_{iat}	0	$1 - pS^*_{iat}$

Table 5: Correlation Matrix of Marketing Actions, Components of Brand Equity and Customer Lifetime Value

	Components of Brand Equity				Marketing Activities				Components of CLV		
	Differen tiation	Relevance	Esteem	Knowledge	Advertising	New Model Launches	Price Promotions	Pricing	Market Presence	Customer Retention	Customer Acquisition
Components of BE											
Differentiation	1.00										
Relevance	-.40	1.00									
Esteem	.22	.65	1.00								
Knowledge	-.22	.77	.70	1.00							
Marketing Activities											
Advertising	-.34	.77	.41	.57	1.00						
New Model Launches	-.16	.37	.26	.31	.49	1.00					
Price Promotions	.26	-.13	.09	-.14	-.13	-.01	1.00				
Pricing	.67	-.20	.42	.05	-.32	-.13	.22	1.00			
Market Presence	-.54	.88	.41	.69	.56	.41	-.25	-.28	1.00		
Components of CLV											
Customer Retention	-.43	.79	.52	.76	.77	.42	-.16	-.25	.78	1.00	
Customer Acquisition	-.48	.69	.30	.54	.79	.44	-.12	-.44	.72	.88	1.00
Profit Margin	.63	-.20	.35	.06	-.28	-.10	-.10	.90	-.27	-.25	-.42

Table 6: Drivers of the Components of Brand Equity (Equation 1)*

Marketing Activities	Differentiation		Relevance		Esteem		Knowledge	
	St. Coef.	t value	St. Coef.	t value	St. Coef.	t value	St. Coef.	t value
Advertising	.26	4.83	.24	5.12	.25	5.19	.00	0.69
New Model Launches	.02	0.99	-.02	-1.15	.00	0.13	-.02	-1.54
Price Promotions	.01	0.16	.01	0.58	-.01	-.78	-.01	-0.20
Pricing	-.14	-1.68	.03	0.28	-.01	-.23	.06	0.50
Market Presence	-.41	-3.72	.53	5.77	.12	1.86	.62	7.72
R ²	.91		.95		.95		.95	

* Note: The values of the estimated fixed effects are not included in the table.

Table 7: Impact of Brand Equity on Acquisition, and Retention (Equation 6)*

	Customer Acquisition		Customer Retention	
	Stand. Coeff.	t value	Stand. Coeff.	t value
Components of BE				
Differentiation	-0.06	-2.08	-0.13	-4.66
Relevance	0.09	1.89	-0.02	-0.48
Esteem	-0.03	-0.68	0.10	2.13
Knowledge	0.16	4.51	0.35	9.70
Marketing Activities				
Advertising	0.10	3.40	0.06	2.12
New Model Launches	0.01	0.75	-0.01	-1.03
Price Promotions	0.04	3.45	0.01	1.00
Price	-0.04	-0.91	0.01	0.20
Market Presence	0.29	4.79	0.34	5.55
Intercept Acquisition/Retention	0.13	3.33	-0.26	-6.36
R ²		.95		

* Note: The values of the estimated fixed effects are not shown in the table.

Table 8: Drivers of Profit Margin (Equation 7)*

	Stand. Coeff.	t value
Components of BE		
Differentiation	0.36	5.97
Relevance	0.17	1.73
Esteem	-0.16	-1.52
Knowledge	0.18	2.13
Marketing Activities		
Advertising	-0.12	-1.74
New Model Launches	-0.01	-0.56
Price Promotions	0.01	0.34
Market Presence	0.32	2.69
R ²		.91

* Note: The values of the estimated fixed effects are not shown in the table.

Table 9: Direct and Indirect Effects of Marketing Activities on the Components of CLV*

CLV Component with Marketing Variables Beneath	Indirect Effects		Direct Effects (From Tables 7 and 8)	
	Stand. Coeff.	t value	Stand. Coeff.	t value
Acquisition				
Advertising	.02	2.02	.10	3.40
New Model Launches	-.01	-.21	.01	.75
Price Promotions	.00	.26	.04	3.45
Price	.04	1.97	-.04	-.91
Market Presence	.32	4.69	.29	4.79
Retention				
Advertising	.02	.98	.06	2.12
New Model Launches	-.00	-.36	-.01	-1.03
Price Promotions	.01	.52	.01	1.00
Price	.03	1.85	.01	.20
Market Presence	.33	4.73	.34	5.55
Profit Margin				
Advertising	.13	3.22	-.12	-1.74
New Model Launches	-.00	-.30	-.01	-.56
Price Promotions	.00	.05	.01	.34
Market Presence	.02	.26	.32	2.69

* Note: For ease of interpretation this table reports standardized coefficients only. In the text we report percentages of indirect to total effects, which were calculated, based on unstandardized coefficients.

Table 10: Endogeneity Tests

Equation	p-values (using 1-period lags)		p-values (using 2-period lags)	
	Wu-Hausman F-test	Durbin-Wu- Hausman χ^2 -test	Wu-Hausman F-test	Durbin-Wu- Hausman χ^2 -test
Customer Acquisition	.52	.38	.64	.48
Customer Retention	.13	.10	.31	.18
Profit Margin	.50	.36	.39	.24
Pillar Differentiation	.20	.16	.11	.07
Pillar Relevance	.57	.48	.49	.38
Pillar Esteem	.19	.12	.11	.08
Pillar Knowledge	.11	.08	.20	.13

Table 11: Illustrations of the Impact of Changes in Marketing and Brand Equity on CLV

Variable	<u>Base Case*</u>	<u>Scenario 1</u> Increased Ad Spending (+ .5 sd)	<u>Scenario 2</u> Increased Market Presence (+ .5 sd)	<u>Scenario 3</u> Increased Differentiation (BMW = 3)
Marketing Activities				
Advertising	41.24	151	41.24	41.24
New Model Launches	-0.22	-0.22	-0.22	-0.22
Price Promotions	-12,423	-12,423	-12,423	-12,423
Price	14,792	14,792	14,792	14,792
Market Presence	0.38	0.38	1.29	0.38
Brand Equity				
Differentiation	2.25	2.69	1.59	3.00
Relevance	0.17	0.22	0.32	0.17
Esteem	8.59	9.20	9.25	8.59
Knowledge	0.58	0.58	0.80	0.58
Components of CLV				
Acquisition	1.31%	1.37%	1.62%	1.29%
Retention	50.15%	51.06%	66.87%	48.71%
Net Profit	\$18,885	\$18,852	\$19,925	\$19,457
CLV	\$28,736	\$28,963	\$32,455	\$29,187

* For comparison purposes, the brand equity and CLV components in this column as well as the scenarios are as predicted by our estimates of equations (1), (6), and (7) (Tables 7, 8, and 9), given the levels for marketing activities specified above. The actual brand equity and CLV components for Cadillac in 2008 are: Differentiation = 1.79, Relevance = 0.34, Esteem = 5.66, Knowledge = 0.48, Acquisition Rate = 0.71%, Retention Rate = 39.9%, and Profit Margin = \$21,903. The actual CLV calculated from these numbers is \$31,223.

Figure 1: Conceptual Framework

