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Assessing the Total Financial Performance Impact of Marketing Assets with Limited Time-series Data: A Method and an Application to Brand Equity Research

Natalie Mizik

Current–term product–market outcome measures do not offer a complete picture of marketing assets' impact on firm performance. Analysis of brand equity suggests that only 10% of a brand's impact on profitability is realized in the current year and 90% of the profitability impact is realized in the future.

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Report Summary

Although marketing assets are widely recognized as essential to the success of many firms, the issue of how to value these assets and assess their total impact on financial performance remains largely unresolved. One of the main challenges in empirically modeling the total impact (and the dynamics of this impact) is the limited availability of marketing metrics data over time. Here, Natalie Mizik presents an approach for estimating the total financial impact of marketing assets with limited time-series data. She demonstrates the approach with an application to brand equity research and derives important substantive insights.

Consistent with prior research, results indicate that brand equity, as measured by customer mindset metrics, positively impacts current financial performance. However, the results also document brand equity's significant and much greater impact on the future financial performance of a firm. Only about 10 percent of the total financial impact of brand equity is reflected in current-year profits; the remaining 90 percent of the profitability impact is realized in the future.

Because most existing brand equity models advocate the use of contemporaneous product-market performance outcomes—such as price, market share, or revenue and profit premium—to evaluate brand's financial impact, managers might not have the complete picture of their brand's financial contribution. Mizik's analyses indicate that a brand's performance impact is not immediately and fully captured in the current-term performance metrics. If managers do not appreciate the future long-term profitability impact of their branding efforts and if they gauge their strategies based on observed current-term product-market outcome metrics, they might significantly under-invest in value-generating brand assets. ■

Introduction

The need to quantify marketing's contribution to the financial bottom line is one of the great challenges facing marketing managers. Rust and colleagues (2004), for example, argue that the lack of accountability undermines marketers' credibility and threatens marketing's existence as a distinct function within a firm. Without a clear understanding of marketing contribution, adequate and reliable support for marketing function cannot be realized. Indeed, in the absence of adequate performance-impact measurement, managers may forego marketing initiatives geared toward enhancing long-term marketing assets with superior returns and replace them with initiatives of potentially lower value but with more immediate and quantifiable financial implications. Recent empirical studies in marketing document that this, indeed, is the case. Pauwels, Silva-Risso, Srinivasan, and Hanssens (2004), for example, show that promotions positively impact current sales but have detrimental effects on the long-term performance of a firm.

Several challenges hinder the ability of marketers to evaluate marketing's total contribution to the bottom line. First, most of the marketing assets are intangible and, as such, are inherently difficult to measure. As a result, we see little consistency in definitions and marketing metrics—even those collected within a single industry (Kimbrough and McAlister 2009). Second, we see little standardized marketing metrics data collection over time (Pauwels, Currim, et al. 2004). Poor data availability often prevents the use of traditional time-series approaches for assessing the full dynamic impact of marketing assets. With rising calls for accountability and cost controls, marketers need to overcome these challenges.

We discuss an approach for estimating the total impact of marketing assets and for assessing partial dynamics of this impact with short tim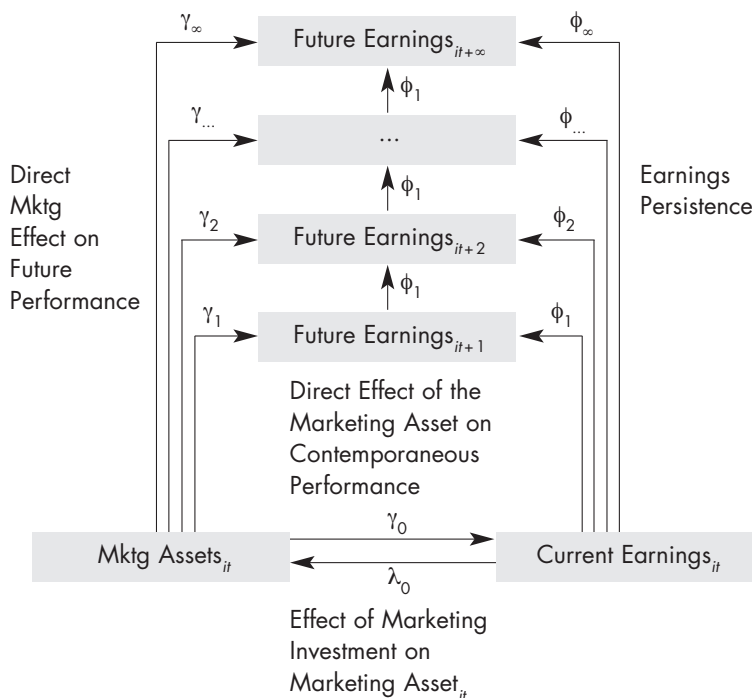e-series data availability. This approach relies and builds upon the stock return response modeling, which stems from accounting and finance research traditions and has recently been used in several marketing applications (Srinivasan and Hanssens 2009). It provides significant benefits relative to relying solely on current product-market outcome metrics in evaluating marketing assets' productivity, as it allows for the assessment of their total long-term contribution.

We illustrate this approach in the context of brand equity research and contrast our findings with recent brand equity models. Marketing researchers agree that brands have long-term effects. Most of the brand valuation models, however, rely on the current product-market performance measures (e.g., Ailawadi, Lehmann, and Neslin 2003; Keller and Lehmann 2006). As Srinivasan, Park, and Chang (2005) and Goldfarb, Lu, and Moorthy (2009) point out, these approaches do not address the brands' long-term future performance effects and, as such, do not capture the brands' total financial impact. The main substantive contribution of this study is in extending the previous brand equity research to address and quantify brands' future-term versus current-term performance impact.

Consistent with previous research, we find that customer-mindset brand equity has a significant positive effect on current financial performance. However, we also find that the impact of a brand on future financial performance is both significant and greater in magnitude than its immediate impact. Only a small portion of the total financial effect of a brand, about 10 percent, is reflected in current-year accounting performance, whereas the remaining 90 percent of the effect is realized in future years.

At a first glance, this differential between current-term and future-term performance impact might appear dramatic. However, because we measure performance in terms of

Figure 1
The Dynamic Performance Impact of Marketing Assets: Stylized Theoretical Framework

highlight the challenges in executing these approaches with limited time-series data. Then we demonstrate how we can derive an alternative modeling framework for cases where stock market data are available. This alternative approach allows for estimation of the total impact and for separating the total impact into current and future components with limited time-series data. We discuss the estimation issues and present an application of this approach in the context of brand equity. We discuss the contribution, benefits, and limitations of the proposed approach.

Assessing the Total Impact of Marketing Assets on Financial Performance

Firms invest into building marketing assets such as brands, customer equity, loyalty, and perceived quality in hopes of improving their financial performance. Some of these assets require significant initial investments, which might take several years to recoup, and almost all marketing assets call for continuous attention and resource commitment. Understanding the dynamics of financial returns to marketing assets is necessary for setting appropriate levels of marketing budgets and for more efficient resource allocation across different marketing initiatives.

Theoretical framework

Figure 1 depicts a stylized dynamic system of the impact of marketing assets on firm financial performance. Marketing assets impact current performance and future performance with the magnitude of the direct impact on performance at time period $t + k$ denoted by γ_k. When performance is measured in terms of profitability (e.g., earnings or cash flow), the contemporaneous effect γ_0 reflects the balance of the total costs associated with building Marketing Asset$_t$ and the revenues realized in time period t due to this Marketing Asset$_t$. As such, γ_0 can be either positive (if impact on revenue side dominates) or negative (when the

profitability, the contemporaneous brand effect reflects the balance of the brand-building costs and the brand-driven revenues realized in the current time period (i.e., brand asset profitability impact at time t is equal to revenue due to brand asset at time t minus the costs associated with building and maintaining brand at time t). The impact of the current brand asset on future profitability, however, only affects the revenue side of the profits since all costs and investments associated with building the brand at time t have been incurred at time t. As such, when we consider value-enhancing brand improvements, we would expect all future-term effects on financial performance to be non-negative.

The rest of the paper is organized as follows. We first present a stylized theoretical framework and discuss approaches for directly assessing the total financial impact and full impact dynamics of a marketing asset. We

costs dominate). The future direct impact of the Marketing Asset$_t$, γ_k (where $k > 0$), however, can only affect the revenue side, since all costs and investments associated with building Marketing Asset$_t$ occurred at time t. As such, when we consider value-enhancing marketing assets, we expect all future direct effects on performance (γ_k, $k > 0$) to be non-negative.[1]

The direct effects of Marketing Asset$_t$ on financial performance (γ_k), however, address only a part of the total performance impact. Additional effects arise from the dynamic properties of the specific performance metric used. Indeed, most profitability measures exhibit various degrees of persistence (i.e., higher profitability today is associated with higher profitability in subsequent periods). That is, companies can reinvest extra cash in the current period, which will lead to additional cash flows in the future. In Figure 1, these relationships are depicted by the right-hand-side arrows and are represented by the effects ϕ, where ϕ_k denotes the impact of current profitability in period t on profitability in period $t + k$. As such, we also need to account for this indirect impact of Marketing Asset$_t$ on future performance. For example, the total impact of Marketing Asset$_t$ on performance in period ($t + 1$) is equal to the sum of its direct effect γ_1 plus the indirect effect running through its impact on profitability in period t, $\gamma_0 \times \phi_1$. The impact of Marketing Asset$_t$ on profitability in later periods can be computed similarly, and integrating over all periods with appropriate discounting gives the net present value of the total long-term impact of Marketing Asset$_t$: The total long-term effect of Marketing Asset$_t$ is equal to $\dfrac{\hat{\Gamma}}{1 - \hat{\Phi}}$, where $\hat{\Gamma} = \sum_{t=0}^{\infty}(\frac{1}{\delta})^t \gamma_t$, $\hat{\Phi} = \sum_{t=0}^{\infty}(\frac{1}{\delta})^t \phi_t$, and δ is the discount factor.

As such, the total financial impact of Marketing Asset$_t$ consists of contemporaneous impact (γ_0) and future-term impact. The future-term impact can be decomposed into *direct* future impact ($\sum_{t=1}^{\infty}(\frac{1}{\delta})^t \gamma_t$) and *indirect* (i.e., through persistence in profitability) future impact ($\dfrac{\hat{\Gamma}\hat{\Phi}}{1 - \hat{\Phi}}$). An investment into a particular marketing asset is efficient when the total returns exceed the investment amount and are equal to or are greater than the firm's normal rate of return on its other assets.

As Figure 1 shows, current profitability might also systematically influence firms' marketing assets (i.e., a feedback from profitability to marketing assets might exist). This effect is depicted by λ_0. The sign of λ_0 is difficult to postulate a priori. For example, firms with decreased profitability may choose to boost their marketing assets through increased investment and focus (i.e., $\lambda_0 < 0$) with a hope for greater future profitability. Alternatively, firms with increased profitability might have greater slack and devote more attention to building up their marketing assets (i.e., $\lambda_0 > 0$). At the estimation stage, to allow for unbiased assessment of γ_0, it is necessary to properly model this possible simultaneity between Marketing Asset$_t$ and contemporaneous profitability (Current Earnings$_t$).

Direct estimation approaches

When sufficient time-series data are available, the assessment of the framework depicted in Figure 1 is rather straightforward. The researcher has a choice between two well-developed and frequently utilized approaches (or some combination of the two). The researcher can use either a vector autoregressive (VAR) or an instrumental variable distributed-lag regression method to assess the dynamics and the total financial impact of a marketing asset. The advantage of the VAR approach is that it allows modeling of the full system with all inter-relationships among variables in the system. A disadvantage of a traditional non-structural VAR approach is that it is, by definition, an auto-regressive system, which means contemporaneous effects are not

incorporated directly (i.e., the results depict future-term impact). In order to incorporate and estimate contemporaneous effects of current profitability and current assets, a structural VAR is required. With a structural VAR, however, restrictions the researcher imposes drive the estimation results.

The advantage of the instrumental variable approach is that it allows modeling of both the immediate and the future-term effects and provides the tools to address potential simultaneity between marketing asset and profitability and to disentangle γ_0 and λ_0 empirically rather than through modeling restrictions. A disadvantage of the instrumental variable approach is that good instruments are not always available, which makes the estimation infeasible. For further discussion, methodological issues, and comparison of these two methods, see, for example, Anderson and Hsiao (1982), Arellano (2003), Dekimpe and Hanssens (1999), Hamilton (1994), and Wooldridge (2001).

Neither of these approaches, however, is feasible when time-series data are short. An overwhelming problem for both approaches under limited time-series data is that the appropriate lag length cannot be modeled and, as a result, the total impact cannot be properly assessed. The challenge with the instrumental variable estimation is also that good instruments often cannot be constructed with short time series.

A feasible alternative: Market-based approach

When a researcher faces short marketing time-series data for a cross-section of firms and the stock market data for these firms are available, the total financial impact of a marketing asset can be assessed. Under the assumption of efficient markets, the market valuation of a firm reflects all available information and rational expectations related to its financial performance. External events and a firm's internal developments affect expectations of its future cash flows and thus result in changes in the stock market valuation of a firm. Under the

efficient markets hypothesis, the magnitude of the change in market value represents the market's unbiased expectations of the total long-term financial impact of these events and developments.[2] This phenomenon allows us to develop a model to assess the total financial implications of a marketing asset.

The proposed approach is related to and builds on the stock return response modeling (e.g., Mizik and Jacobson 2004). It differs, in that stock return response modeling focuses on assessing the "incremental information content" of a metric (i.e., incremental explanatory power to accounting profitability measures in predicting future-term cash flows), whereas the present approach makes the next step to model the immediate and future (long-term) effects and seeks to assess the *total* long-term financial impact of a marketing asset.

Theoretical Bases of the Market-based Approach. Under the efficient market hypothesis, the market value of a firm represents unbiased market expectations of its discounted future cash flows:

$$\text{MktValue}_{it} = \sum_{T=t}^{\infty} \left(\frac{1}{1 + r_{it}}\right)^{T-t} E(\text{Earnings}_{iT}), \ (1)$$

where MktValue_{it} is the market valuation of firm i at time period t, Earnings_{iT} is the net cash flow in period T, and r_{it} is the discount rate. That is, if the future earnings from time $(t + 1)$ to the infinity depicted in Figure 1 are appropriately discounted and summed up, the resulting sum is equal to the market value of firm i at time t, and we can use the stock market valuation of firm i as a proxy for the net present value of its total future financial performance. Thus, the system in Figure 1 can be transformed to the system in Figure 2: stock market value of a firm depends on the firm's financial performance and its assets.

Under the efficient market hypothesis, market valuation reflects all available information as well as rational expectations and reacts only to unanticipated events and developments. As

Figure 2
The Dynamic Performance Impact of Marketing Assets: Modeling Framework
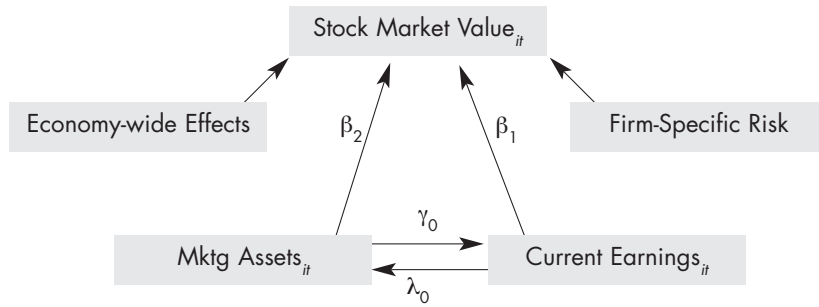
such, we can re-express Equation 1 in terms of the previous period capitalization, normal rate of return, and the change in the investor's expectations of future cash flows:

$$\text{Mkt Value}_{it} = (1 + \text{Eret}_{it})\text{Mkt Value}_{it-1} + \sum_{T=t}^{\infty}\left(\frac{1}{1+r_{it}}\right)^{T-t}\Delta E(\text{Earnings}_{iT}), \quad (2)$$

where Eret_{it} is the normal rate of return for security i at time period t (i.e., the risk premium for holding security i for the year t), and $\Delta E(\text{Earnings}_{iT})$ is the change in the expected cash flows at time period T. Firm-specific risk considerations and economic conditions determine the amount of normal return. Only unanticipated events and developments, occurring between the time periods $(t-1)$ and t, change expectations of the firm's future performance or the discount rate (r_{it}), and the term $\sum_{T=t}^{\infty}\left(\frac{1}{1+r_{it}}\right)^{T-t}\Delta E(\text{Earnings}_{iT})$ reflects the total long-run financial impact these events are expected to have on firm financial performance.

Estimation Model. By rearranging terms in Equation 2 and dividing by previous market valuation, we arrive at

$$\frac{\text{MktValue}_{it} - \text{MktValue}_{it-1}}{\text{MktValue}_{it-1}} =$$
$$\text{Eret}_{it} + \sum_{T=t}^{\infty}\left(\frac{1}{1+r_{it}}\right)^{T-t}\frac{\Delta E(\text{Earnings}_{iT})}{\text{MktValue}_{it-1}}, \quad (3)$$

which is

$$\text{StkRet}_{it} =$$
$$\text{Eret}_{it} + \sum_{T=t}^{\infty}\left(\frac{1}{1+r_{it}}\right)^{T-t}\frac{\Delta E(\text{Earnings}_{iT})}{\text{MktValue}_{it-1}}. \quad (4)$$

Thus, stock return (StkRet_{it}) is a linear combination of (1) *normal return* (Eret_{it}), which is equal to risk-free rate of return plus the firm-specific risk premium, and (2) *abnormal return* (i.e., "excess return,"

$$\sum_{T=t}^{\infty}\left(\frac{1}{1+r_{it}}\right)^{T-t}\frac{\Delta E(\text{Earnings}_{iT})}{\text{MktValue}_{it-1}}), \text{ which}$$

represents the change in the expected discounted future size-adjusted cash flows resulting from unexpected events and developments occurring between time periods $(t-1)$ and t. By relating the change in investors' expectations of the future size-adjusted cash flows to unanticipated changes in marketing assets and profitability, we can assess the total expected financial implications of marketing assets. That is, in our framework,

$$\sum_{T=t}^{\infty}\left(\frac{1}{1+r_{it}}\right)^{T-t}\frac{\Delta E(\text{Earnings}_{iT})}{\text{MktValue}_{it-1}} \text{ is a function}$$

of unexpected changes in earnings ($\Delta\text{Earnings}_{it}$) and marketing asset ($\Delta\text{MktgAsset}_{it}$). We can transform the modeling framework in Figure 2 to the estimation framework in Figure 3:

$$\text{StkRet}_{it} = \text{Eret}_{it} + \beta_1 * \Delta\text{Earnings}_{it} + \beta_2 * \Delta\text{MktgAsset}_{it} + \varepsilon_{it}, \quad (5)$$

with

$$\Delta\text{Earnings}_{it} = \gamma_0 * \Delta\text{MktgAsset}_{it} + \eta_{it}, \quad (6)$$

where StkRet_{it} is the stock return for firm i at time t, Eret_{it} is normal return, $\Delta\text{Earnings}_{it}$ is the unanticipated change in size-adjusted earnings (i.e., the portion of current earnings that could not have been predicted based on the information available at time $t-1$), $\Delta\text{MktgAsset}_{it}$ is the unanticipated change in the marketing asset of interest, and ε_{it} and η_{it} are i.i.d.-normal error terms. If no feedback

The Dynamic Performance Impact of Marketing Assets: Estimation Framework

an estimate of the total cumulative discounted cash flow expected to be generated per one dollar of unexpected earnings occurring in the current period. Thus, the indirect effect of Marketing Asset$_t$ is equal to $\beta_1 \times \gamma_0$. The total effect of Marketing Asset$_t$ on financial performance is a combination of both the direct and the indirect effects and can be computed as $\beta_{total} = \beta_2 + \beta_1 \times \gamma_0$.

The Issue of Potential Simultaneity. Under the condition of no simultaneity, an alternative and equivalent way to obtain the total long-term financial impact of a marketing asset is to estimate a single equation after substituting $\Delta Earnings_{it}$ in Equation 5 with Equation 6:

$$
\begin{aligned}
StkRet_{it} =\ & Eret_{it} + \beta_1(\gamma_0 \Delta MktgAsset_{it} + \eta_{it}) + \\
& \beta_2 \Delta MktgAsset_{it} + \varepsilon_{it} \\
=\ & Eret_{it} + (\beta_2 + \beta_1 \gamma_0)\Delta MktgAsset_{it} + \\
& \beta_1 \eta_{it} + \varepsilon_{it}. \quad\quad\quad (7)
\end{aligned}
$$

As such, the total long-term impact of $\Delta MktgAsset_{it}$ on financial performance, again, is $(\beta_2 + \beta_1 * \gamma_0)$ and we can simplify Equation 7 to Equation 8:

$$
\begin{aligned}
StkRet_{it} =\ & Eret_{it} + \tilde{\beta}_{total} \Delta MktgAsset_{it} + \vartheta_{it}, \quad\quad (8)
\end{aligned}
$$

where $\vartheta_{it} = \varepsilon_{it} + \beta_1 \eta_{it}$.

from Earnings$_{it}$ to MktgAsset$_{it}$ is present, γ_0 in Equation 6 can be consistently and efficiently estimated with least squares.

Interpretation. Estimating equations 5 and 6 allows us to assess the impact of a marketing asset on contemporaneous financial performance (γ_0) and its impact on future long-term performance (β_2). The total impact of a marketing asset can also be readily computed from the estimated coefficients as follows.

The coefficient β_2 depicts the direct effect of unanticipated changes in a Marketing Asset$_t$ on stock returns. Significant values of β_2 imply that the marketing asset impacts future financial performance of a firm above and beyond its impact on current earnings. However, β_2 does not capture the total effect of Marketing Asset$_t$ since Marketing Asset$_t$ can also have an additional, immediate impact on current-period earnings (γ_0) and, as such, also have an indirect effect on stock returns through its impact on current accounting performance (Earnings$_{it}$). The coefficient β_1 in Equation 5 is the earnings response coefficient. It depicts the effect of unanticipated changes in earnings (i.e., earning surprise) on stock return and is

This simplification, however, is only appropriate to the extent that no simultaneity between $\Delta MktgAsset_{it}$ and $\Delta Earnings_{it}$ is present (i.e., $\lambda_0 = 0$). In other words, Equation 8 does not address the issue of potential simultaneity between $\Delta MktgAsset_{it}$ and $\Delta Earnings_{it}$, and the estimate of $\tilde{\beta}_{total}$ in Equation 8 might not necessarily be equal to $(\beta_2 + \beta_1 * \gamma_0)$. Indeed, in the presence of simultaneity, $\tilde{\beta}_{total}$ will be equal to $(\beta_2 + \beta_1 * \overline{\gamma}_0)$, where $\overline{\gamma}_0$ is a meaningless weighted average of γ_0 and λ_0, which would be obtained from regressing Marketing Asset on Earnings without accounting for simultaneity. $\tilde{\beta}_{total}$ can be biased either upward

or downward depending on the relative magnitude of γ_0 and λ_0, and the errors variance-covariance.

Although the estimation of Equation 8 is more efficient and might lead to unbiased estimates in some situations, estimating equations 5 and 6 is more appropriate as doing so allows the researcher to address potential simultaneity between Marketing Asset$_{it}$ and Earnings$_{it}$ and to obtain an unbiased estimate of the total impact.

Estimation. Estimating the impact of a marketing asset on accounting performance (Equation 6) is straightforward once potential simultaneity is assessed and addressed. Estimation of Equation 5, on the other hand, requires the researcher to make several decisions before proceeding. These decisions relate to the modeling of the normal rate of return (Eret$_{it}$) and constructing the measures of unanticipated components of size-adjusted earnings series (ΔEarnings$_{it}$) and marketing series (ΔMktgAsset$_{it}$). Srinivasan and Hanssens (2009) and others discuss in detail the issues relating to these decisions.

Empirical Illustration: Application to Brand Equity Research

We present an application of the market-based approach to brand equity research. Marketing assets such as brands are widely acknowledged as valuable intangible assets with long-term benefits and are viewed as central to the success of many firms. Yet, the dynamics of brands' financial impact are not well understood.

Brand equity

Many definitions of brand equity exist in the literature, but most are consistent with Farquhar's (1989) definition: brand equity is the value a brand adds to the firm's offering. Keller and Lehmann (2006) provide a recent review of the brand equity literature and argue that the impact of brands and brand value are reflected on three levels: customer mindset,

product-market outcomes, and, ultimately, in the stock market value of a firm.

Customer mindset. Brands provide value to consumers. They help reduce consumer search costs and perceived risk, guarantee quality, and create/enhance consumption experiences (e.g., Aaker 2004; Erdem 1998; Keller 2003; Schmitt 1999). Brands are represented in consumer minds through a particular knowledge structure that encompasses familiarity, perceptions, attitudes, and relationships. The elements of this knowledge structure can be assessed to measure customer mindset–based brand equity. The content and the structure of brand knowledge and attitudes affect consumer behavior toward the brand, consumer response to marketing effort, and probability of brand choice over time (loyalty). Several theoretical models of consumer knowledge, attitude, and relationship structure have been proposed (Aaker 1996; Keller 2003). Most of these models focus on the consumer's familiarity with and understanding of the brand, attitudes, perceptions of quality, relevance, and the strength of the relationship or loyalty to the brand. Customer mindset brand measures are useful because they are diagnostic; that is, they reflect the sources of brand strength, and managers can use them to guide branding initiatives and brand development programs. However, these measures are also commonly criticized because (1) they do not provide a single, simple measure of brand performance as they are typically assessed through multiple-item surveys and (2) they do not reflect a brand's financial value. As such, they are not very useful in gauging financial returns to brand investment (i.e., marketing productivity) and determining appropriate spending levels.

Product-market Outcomes. Product-market outcome measures of brand equity, on the other hand, are often represented in dollar value. Several product-market measures have been proposed and used to assess brand equity. Most popular measures are based on the price premium or market share premium a

brand commands over a generic or over its competitors (e.g., Park and Srinivasan 1994; Sethuraman 1996). Ailawadi, Lehmann, and Neslin (2003), however, argue that revenue premium is superior to both price and share premiums because it captures the trade-off between the price and demand and summarizes the overall performance premium. Yet others (e.g., Goldfarb, Lu, and Moorthy 2009) argue that the profits, rather than the price, share, or revenue premium, provide a better metric of brand value because profit measures incorporate the costs of maintaining and managing the brand.

Srinivasan, Park, and Chang (2005) also advocate a profitability-based measure of brand equity. They define brand equity as the annual incremental dollar contribution (i.e., incremental revenue minus incremental variable costs), which is obtained by a brand relative to a base product. The authors, however, also note a limitation of this measure. Specifically, they note that since this measure (just as other product-market–based measures) reflects only the contemporaneous (one-year) financial impact and not future performance impact, it does not reflect the *total* financial contribution of a brand.[3] As such, they conclude that additional analyses are needed to determine the total value of brand equity.

Several industry brand equity models rely on earnings-decomposition and brand growth multipliers to ascertain the total value of a brand. That is, product-market brand outcomes such as brand-induced profits or sales are first computed and then weighted by a "multiplier" to arrive at the final valuation. Knowles (2003), for example, suggests multipliers that range from .9 to 2.5 of annual sales. The earnings decomposition approaches generally lack credibility and have been criticized (e.g., Fernandez 2001) because they rely heavily on subjective judgment rather than data analysis to decide (1) what portion of profits is due to brand[4] and (2) what brand multiplier is appropriate.

Financial Market Valuation. When a brand is viewed as an asset, its value is defined as the total sum of all cash flows (current and future) attributable to this brand. The full brand value is revealed at the time of a brand acquisition or it can be assessed by aggregating the brand's overall franchise and licensing income (Mahajan, Rao, and Srivastava 1994). Brand acquisitions, however, are relatively rare events, and many brands are not franchised or licensed. The total value of a brand asset, however, is important to know even if there is no impending acquisition: Understanding full financial returns due to a brand is necessary to help guide the level and direction of brand investments (Rust et al. 2004).

Simon and Sullivan (1993) propose using the "residual" market value after all other tangible sources of firm value have been accounted for, as a measure of brand equity. This approach, however, has been critiqued because the residual market value also reflects many other intangible assets unrelated to branding or marketing (e.g., management quality, growth prospects, proprietary scientific knowledge, innovation and technology strategy, etc.). An approach is needed to separate brand-related value from the other sources of value.

Several studies have linked consumer mindset (e.g., Aaker and Jacobson 1994, 2001; Mizik and Jacobson 2008) and product-market–based (Barth et al. 1998) brand metrics directly to stock returns to assess their future financial impact. These studies report that some brand-related assets have long-term financial implications above and beyond their immediate impact on same-year profits. These studies, however, have not taken the next step: They have not addressed the contemporaneous versus future performance impact and have not quantified the total performance impact of brands. As such, the dynamics and the relative magnitude of the immediate versus future returns to brand assets are still unknown.

Study objectives

Keller and Lehmann (2006, p. 747) highlight the following question as an important research problem in branding: "What are the links between customer-market, product-market, and financial-market level measures of brand equity?" We present an approach that links customer mindset, product-market, and financial-market brand outcomes in a single framework and demonstrate how the total financial impact of a brand and dynamics of brand impact can be assessed with limited time-series data.

Data and measures

We combined data from five different sources to compile the dataset for our analysis. The University of Chicago's Center for Research in Security Prices (CRSP) database provided stock returns information. We obtained the Fama and French and momentum risk factor returns from the Kenneth French web data library. We used the Standard and Poor's COMPUSTAT database to obtain quarterly accounting data for 1988–2005. We used IBES database to collect analysts' earnings forecasts data for 2000–2005. Y&R graciously provided their measure of Brand Asset Index from the Brand Asset Valuator (BAV) database.

Stock Return Measures. We accessed the CRSP data files to obtain monthly stock returns data for our sample firms for 2000–2005. The use of monthly returns data allows us to line up the measures of stock returns to correspond with the Y&R data collection dates (which occur in the fourth quarter of each calendar year). That is, we calculate the raw stock return for firm i and year t as

$\text{Ret}_{it} = \prod_{m=1}^{12}(1 + \text{ret}_{im}) - 1$, where Ret_{it} is firm i's raw stock return in year t, ret_{im} is the CRSP holding period return for firm i in month m of year t.

Economy-wide factors and firm-specific risk considerations influence stock returns. These effects need to be controlled for to reduce potential omitted variable bias and to increase power of the analysis. We use multiple measures of abnormal stock return to assess the stability of our findings. Specifically, we use the Fama and French (1993, 1996) three-factor model augmented with momentum (Carhart 1997) to compute monthly abnormal returns and aggregate them to form cumulative abnormal returns (CAR) and continuously compounded abnormal returns (CCAR). We also use firm characteristics-based approach (Daniel and Titman 1997) to compute abnormal returns adjusted for firm risk characteristics (CHAR). The legend following Table 1 provides details regarding computation of our abnormal return measures.

Accounting Earnings Measures. We use two alternative measures of unanticipated accounting performance. One is based on time-series forecasts and utilizes COMPUSTAT data. The other is based on the actual reported values and the financial analysts' forecasts of earnings per share (EPS) and utilizes the IBES data.

COMPUSTAT-based accounting performance measure. We use Operating Income before Depreciation over Assets (ROA) as one of our accounting performance measures. Because firms in our sample have fiscal year-ends in different calendar quarters, we use quarterly COMPUSTAT data to line up accounting measures with the Y&R data collection waves occurring in the fourth calendar quarter each year. We make use of accounting data prior to the 2000 BAV survey to allow for more data points for estimation of the time-series model we use to calculate unexpected earnings. We find that quarterly ROA is best approximated by a fixed effect, fourth-order autoregressive model adjusted for time period specific effects. That is, we use a model of the form

$$\begin{aligned} \text{ROA}_{iq} = \alpha_i + \phi_1 * \text{ROA}_{iq-1} + \\ \phi_2 * \text{ROA}_{iq-2} + \phi_3 * \text{ROA}_{iq-3} + \\ \phi_4 * \text{ROA}_{iq-4} + \sum_{q=1}^{Q} \delta_q * \text{Time}_q + \varepsilon_{iq}, \quad (9) \end{aligned}$$

Table 1
AR(4) Fixed Effects Instrumental Variable Forecast Model for Operating Income

	Estimate	StdError	T-stat
$\phi_1{}^{\pm}$	.12471	(.02680)	[4.65]
ϕ_2	.00019	(.01628)	[.01]
ϕ_3	−.0396	(.01176)	[−3.37]
ϕ_4	.59117	(.00727)	[81.29]
# of observations	11,569		
F-statistic	2,518.66		

$$ROA_{iq} = \alpha_i + \phi_1 * ROA_{iq-1} + \phi_2 * ROA_{iq-2} + \phi_3 * ROA_{iq-3} + \phi_4 * ROA_{iq-4} + \sum_{q=1}^{Q} \delta_q * Time_q + \varepsilon_{iq}.$$

The table presents results of estimating the forecast model for accounting performance. ROA_{iq} is the value of the quarterly Operating Income over Assets (COMPUSTAT data21/data44) series for firm i in quarter q, ROA_{iq-1}, ROA_{iq-2}, ROA_{iq-3}, and ROA_{iq-4}, are its lagged values. Time is a set of time-period indicators for each year-quarter. To obtain estimates of the parameters α_i and ϕ_1, ϕ_2, ϕ_3, and ϕ_4, we use the Anderson and Hsiao (1982) approach. Standard errors are in parentheses, t-statistics in brackets. ± denotes the use of instrumental variable estimation.

where ROA_{iq} is the value of the accounting performance series for firm i in quarter q, ROA_{iq-1}, ROA_{iq-2}, ROA_{iq-3}, and ROA_{iq-4}, are its lagged values. Time is a set of time-period indicators for each year-quarter. Equation 9 states that the series depend on a firm-specific amount, the value of the series in the previous four quarters, and the time-period specific effects. Coefficient α_i is the firm-specific constant and ϕ_k is the kth-order autoregressive coefficient depicting the persistence of the series.

To obtain the estimates of parameters α_i and ϕ_1, ϕ_2, ϕ_3, and ϕ_4, we use the Anderson and Hsiao (1982) approach. We re-compute all data as deviations from the time period-specific mean to remove time period-specific effects (δ_q), take first differences to remove the fixed effect (α_i), and use ROA_{iq-2} and ROA_{iq-3} to create instruments for ($ROA_{iq-1} - ROA_{iq-2}$). Table 1 reports our estimation results. The dominant predictors in the model are the first-order (.125) and fourth-order (.591) (i.e., same quarter the previous year) lags of ROA series. This pattern reflects strong seasonality common across firms. After obtaining the estimates of $\hat{\phi}_1$, $\hat{\phi}_2$, $\hat{\phi}_3$, and $\hat{\phi}_4$, we are able to calculate $\hat{\alpha}_i$ as the mean of $(ROA_{iq} - \sum_{k=1}^{4}(\hat{\phi}_k ROA_{iq-k}))$ for each

firm i and to compute forecasts for one, two, three, and four quarters ahead. For a given calendar year t, $\Delta ROA_{it} = \sum_{q=1}^{4}(ROA_{iq} - \widehat{ROA}_{iq|q=4, t-1})$, where ΔROA_{it} is the unanticipated change in ROA in year t for firm i. That is, we use information available in the fourth quarter of the year ($t-1$) to forecast expected earnings in quarters one through four of year t and compute the deviations of the forecasts from actual earnings, then sum them up to obtain the measure of unanticipated earnings in calendar year t.

IBES–based accounting performance measure. Our alternative measure of accounting performance comes from the IBES database. For the 2000–2005 period, we collect actual earnings per share (EPS_{iq}) and the mean analysts' forecasts of EPS_{iq} formed in the forth quarter of the prior year. Again, because the firms in our sample have different fiscal year ends, we use quarterly data to line up the EPS measures by calendar year end to correspond with the Y&R data collection periods. We sum up the four calendar quarters to annualize EPS and analysts' forecasts data. The unanticipated EPS_{it} (ΔEPS_{it}, i.e., the analysts' forecast error) is the difference between the actual EPS_{it} value and the analysts' mean forecast of $\widehat{EPS}_{it}$ scaled by the previous year stock price. That is, the measure reflects the unanticipated change in return on equity ($\Delta Net\ Income_{it}/Market\ Value_{it-1}$).

Brand Asset Index. Since year 2000, Y&R's Brand Asset Valuator (BAV) initiative has undertaken regular surveys of consumers' brand perceptions. We use BAV surveys of "mono-brand" publicly traded firms (i.e., firms whose products are marketed under a single brand name) conducted at the calendar year-end. We were able to identify 266 "mono-brands" in the Y&R database. The Y&R BAV model assesses five brand "pillars" (i.e., fundamental perceptual brand attributes), namely, perceived brand Differentiation, Relevance, Esteem, Knowledge, and Energy.[5] We aggregate the five BAV components to create a sin-

Figure 4
The Dynamics of Brand Asset Index for Select Brands and Sectors in the Study
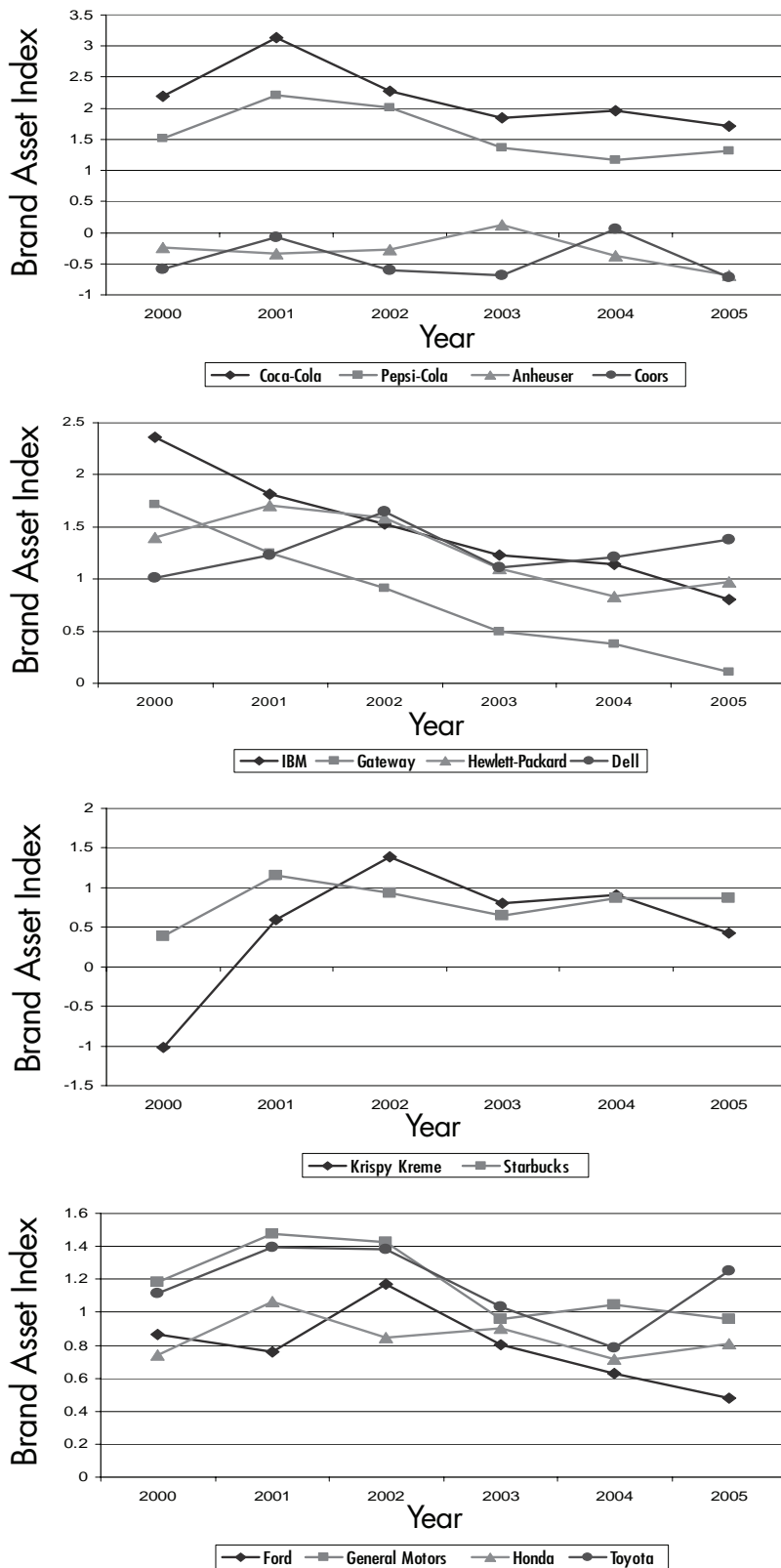
gle Brand Asset Index, which we denote as BAIndex. Specifically, we compute BAIndex as an equally weighted sum of five z-standardized brand pillar scores. To facilitate the interpretation of the substantive results, we z-standardize the resulting measure to have a zero mean and a unit variance. This procedure creates an index (Brand Asset Index) reflecting the overall strength of a brand.

Figure 4 depicts temporal dynamics of the BAIndex for several brands included in the study. For example, we see a consistent dominance of Coca-Cola over Pepsi over time with both brands showing a slow decline in more recent years. BAIndex captures the rapid rise (and catching up with Starbucks) in 2000–2002 and the subsequent slow erosion of the Krispy Kreme brand. BAIndex captures the shifting brand power within industries. In the PC manufacturing sector, we observe a decline in the brand strengths of Gateway, IBM, and Hewlett-Packard, which allows Dell to advance from the last brand position in 2000 to number one in 2005. Similarly, in automobile manufacturing, the decline of the U.S. brands (Ford and GM) allows Toyota to take the number one position and Honda to overtake Ford.

Computing Unanticipated Changes in Brand Asset Index. Since the stock market reacts only to unexpected information, explanatory factors in Equation 5 should reflect only unanticipated changes in the explanatory measures. Typically, because analysts' forecasts are unavailable, time-series forecasts are used as a proxy of market expectations for marketing constructs, and the residuals from time-series models serve as the estimates of the unanticipated components of the marketing series. This approach is similar to the one we use for estimating the unanticipated components of our *ROA* measure. Given our data, however, efficient estimation of a time-series model for BAIndex measure is not feasible because we have at most six observations per firm. An alternative approach to assess the dynamic properties of BAIndex is needed.

One alternative is to examine the stock market beliefs regarding the dynamics of BAIndex series. That is, rather than assessing the actual dynamics of the series, we can assess the stock market's beliefs about the dynamics and derive an appropriate measure of unanticipated BAIndex components using the estimates of market's beliefs and expectations. This approach is an equivalent substitute for a time-series–based approach. To the extent that the market's beliefs deviate from true properties of a series, this approach allows the creation of more precise and more informative (i.e., with a greater information content) measures of unanticipated components for BAIndex series (Kimbrough and McAlister 2009).

We can assess the stock market's beliefs regarding the dynamics of BAIndex by estimating the following model:

$$\text{AbnormalStkRet}_{it} = \beta_1 \Delta \text{Earnings}_{it} + \beta_2^*(\text{BAIndex}_{it} - \phi_0 \text{BAIndex}_{it-1}) + \varepsilon_{it}, \quad (10)$$

where ϕ_0 is the market's estimate of the BAIndex series persistence and $\phi_0 \text{BAIndex}_{it-1}$ is the market's expectation of the BAIndex_{it}. We can rewrite Equation 10 as:

$$\text{AbnormalStkRet}_{it} = \beta_1 \Delta \text{Earnings}_{it} + \beta_2^* \text{BAIndex}_{it} + \beta_2^0 \text{BAIndex}_{it-1} + \varepsilon_{it}. \quad (11)$$

We estimate Equation 11 and observe that across all of our abnormal returns and accounting earnings measures, $\beta_2^* = -\beta_2^0$. That is, the stock market's perceptions of the brand assets' dynamics are well represented by random walk (i.e., $\phi_0 = 1$). We formally test the validity of the $\beta_2^* = -\beta_2^0$ restriction in Equation 11 and find that we cannot reject this restriction across all alternative abnormal stock return and unanticipated accounting performance measures.[6] This result is consistent with the stock market using random walk to depict BAIndex dynamics. As such, we can use the first-difference in the BAIndex as the measure of its unanticipated components:

$$\Delta \text{BAIndex}_{it} = \text{BAIndex}_{it} - \text{BAIndex}_{it-1}. \quad (12)$$

Data Sample Characteristics. Merging all data sources yields an unbalanced pooled cross-sectional time-series panel data set representing 266 firms with a maximum of six observations per firm. Because we do not have complete data available for variables for all the years in our sample, our panel is unbalanced. In order to minimize any potential survivorship bias and to preserve the degrees of freedom, we did not impose any restrictions on firms or industries to enter our sample. As a result, the sample size varies across different models we estimate depending on the metrics utilized in the analysis.

Table 2 provides sample characteristics and descriptive statistics for the variables we use in our analyses. The legend following Table 1 provides detailed variable definitions with the data source and data item identifiers. As is evident from Table 1, our sample represents a wide cross-section of firms that vary significantly in terms of size, profitability, and BAIndex score.

Table 3 provides bivariate correlations for the variables we use in the analyses. We observe a large and highly significant bivariate correlation between the level of BAIndex score and our ROA measure, and slightly lower but still significant correlations between BAIndex and EPS and EPS forecasts. Consistent with the stock market reacting to unanticipated changes in (rather than levels of) valuable assets, little bivariate correlation is present between the level of BAIndex score and the abnormal stock return measures.

Empirical Analysis

The future-term impact of the brand

In order to assess the future-term impact of the brand asset, we regress stock returns on unanticipated earnings and unanticipated BAIndex. Table 4 Panel A presents results of estimating Equation 5 using alternative measures of abnormal stock returns and our

Table 2
Descriptive Statistics

Variable	N	Mean	Std	5%	Median	95%
Market Cap ($M)	1,490	30,479.98	53,872.17	537.14	10,333.59	137,807.65
Assets ($M)	1,486	48,804.79	140,365.55	438.85	9,931.42	268,954.00
Sales ($M)	1,468	19,940.51	35,615.16	635.19	7,608.19	74,698.00
Operating Income ($M)	1,253	3,644.67	7,165.90	38.33	1,014.24	18,143.00
ROA	1,252	.1495	.0917	.0178	.1457	.2995
EPS actual ($)	1,214	1.4383	1.9455	−.44	1.37	4.065
EPS forecast ($)	1,222	1.5737	1.4542	−.06	1.45	3.930
Raw Stock Return	1,561	.0908	.4635	−.5495	.0502	.8414
CAR	1,561	.0725	.3891	−.5034	.0490	.7545
CCAR	1,561	.0022	.3881	−.6230	.0115	.6145
CHAR	1,389	.0000	.4027	−.6661	.0245	.5660
Brand Asset Index	1,453	.0000	1.0000	−1.5151	−.0661	1.6782

The sample includes all available quarterly COMPUSTAT data for 1988–2005 for firms tracked in the Y&R Brand Asset Valuator database and listed in CRSP. Variable definitions with respective COMPUSTAT data numbers are presented below the table.

Variable Definitions:

Market Cap$_{it}$ is the market value of firm i at the end of calendar year t and is equal to Number of Shares Outstanding$_{it}$ * Stock Price$_{it}$ (COMPUSTAT data14$_{it}$ × data15$_{it}$)

Assets$_{it}$ is the value of total assets of firm i at the end of calendar year t (COMPUSTAT data44$_{it}$)

Sales$_{it}$ is the value of sales value of firm i in the four quarters of calendar year t ($\sum_{q=1}^{4}$ COMPUSTAT data44$_{iq}$)

Operating Income$_{it}$ = operating income of firm i in the four quarters of calendar year t = ($\sum_{q=1}^{4}$ COMPUSTAT data21$_{iq}$)

ROA$_{it}$ = Operating Income$_{it}$ / Assets$_{it}$

EPS actual$_{it}$ = actual earnings per share (Net Income) of firm i in calendar year t = ($\sum_{q=1}^{4}$ IBES actual EPS$_{iqt}$)

EPS forecast$_{it}$ = mean analysts' forecast value of earnings (Net Income) per share for firm i in calendar year t based on the information at the end of the calendar year $(t-1)$ = ($\sum_{q=1}^{4}$ IBES mean forecast EPS$_{iqt|it-1}$)

Raw Stock Return Ret$_{it}$ = $\prod_{m=1}^{12}(1 + ret_{im}) - 1$, where ret$_{im}$ is the holding period return for firm i in month m coming from the CRSP monthly returns file

Cumulative Abnormal Stock Return (CAR) for firm i in year t

CAR$_{it}$ = $\sum_{m=1}^{12}[ret_{im} - expRet_{im}]$, where

expRet$_{im}$ = $\hat{\beta}_i(Ret_{market,m} - Ret_{risk\ free,m}) + \hat{s}_i(SMB_m) + \hat{h}_i(HML_m) + \hat{m}_i(MOM_m)$, (Ret$_{market,m}$ − Ret$_{risk\ free,m}$) is risk-free market return, SMB$_m$ is the return on a value-weighted portfolio of small stocks minus the return on a value-weighted portfolio of big stocks, HML$_m$ is the return on a value-weighted portfolio of high book-to-market stocks less the return on a value-weighted portfolio of low book-to-market stocks, MOM$_m$ is the momentum factor (computed as the average return on the two (small and big size) high prior return portfolios minus the average return on the two (small and big size) low prior return portfolios in month m), which come from Kenneth French's data library posted on his website. $\hat{\beta}_i$, $\hat{s}_i$, $\hat{h}_i$, and $\hat{m}_i$ are estimated for each firm i using Fama and French (1993) three-factor model augmented with momentum (Carhart, 1997):
$(Ret_{im} - Ret_{risk\ free,m}) = \alpha_i - \hat{\beta}_i(Ret_{market,m} - Ret_{risk\ free,m}) + \hat{s}_i(SMB_m) + \hat{h}_i(HML_m) - \hat{m}_i(MOM_m) + \varepsilon_{i,m}$

Continuously Compounded Abnormal Stock Return (CCAR) for firm i in year t:

CCAR$_{it}$ = $\log(\prod_{m=1}^{12}(1 + [ret_{im} - expRet_{im}]))$, where ret$_{im}$ and expRet$_{im}$ are defined as above

Characteristics-Based Abnormal Stock Return (CHAR) for firm i in year t:

CHAR$_{it}$ = Ret$_{it}$ − expRet$_{it}$ where

expRet$_{it}$ = $\sum_{t=1}^{T}\alpha_{1t} * Year_t + \sum_{t=1}^{T}\alpha_{2t} * \log(MV_{it-1}) * Year_t + \sum_{t=1}^{T}\alpha_{3t} * \log(BMV_{it-1}) * Year_t$ and comes from estimating the following model:

Ret$_{it}$ = $\sum_{t=1}^{T}\alpha_{1t} * Year_t + \sum_{t=1}^{T}\alpha_{2t} * \log(MV_{it-1}) * Year_t + \sum_{t=1}^{T}\alpha_{3t} * \log(BMV_{it-1}) * Year_t + \varepsilon_{it}$, where

Ret$_{it}$ is defined as previously, Year$_t$ is a dummy variable equal to 1 if year is equal to t and 0 otherwise, log(MV$_{it-1}$) and log(BMV$_{it-1}$) are firm risk characteristics of size (as modeled by log of lagged Market Value) and book-to-market equity (as modeled by the log of lagged Book Value over Market Value). The effects of size and book-to-market characteristics vary by year t.

Table 3
Bivariate Correlations

	Brand Asset Index	Raw Return	CAR	CCAR	CHAR	EPS actual	EPS forecast	ROA
Brand Asset Index	1							
	1453							
Raw Return	−.02633	1						
	(.3278)							
	1383	1561						
CAR	.02189	.72724	1					
	(.4161)	(<.0001)						
	1383	1561	1561					
CCAR	.03438	.73481	.97027	1				
	(.2014)	(<.0001)	(<.0001)					
	1383	1561	1561	1561				
CHAR	.05085	.8472	.80766	.85692	1			
	(.0751)	(<.0001)	(<.0001)	(<.0001)				
	1226	1389	1389	1389	1389			
EPS actual	.07325	.07095	.01886	.09985	.18131	1		
	(.0164)	(.0136)	(.5125)	(.0005)	(<.0001)			
	1074	1208	1208	1208	1150	1214		
EPS forecast	.07425	−.07325	−.11249	−.033	.02298	.8333	1	
	(.0147)	(.0106)	(<.0001)	(.2502)	(.4350)	(<.0001)		
	1080	1216	1216	1216	1156	1214	1222	
ROA	.22147	.13016	.12753	.1673	.24094	.23322	.13343	1
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	
	1100	1225	1225	1225	1156	1044	1051	1252

Correlations are presented as Pearson correlation coefficients, (significance), number of observations.

COMPUSTAT-based measure of earnings (ROA). We obtain positive and significant coefficients for ΔROA ranging from 2.64 for CAR to 3.51 for CHAR. Our earnings response coefficient estimates for ΔROA are consistent with those in the previous literature (Kothari 2001). Kormendi and Lipe (1987), for example, report an estimate of 3.38. When an unanticipated shock to ROA occurs, investors view it as containing information not only about changes in current-term results but also about future-term prospects. Our estimates of the earnings response coefficient suggest that the market expects around $3 of total discounted future earnings to be generated following $1 of unanticipated shock to ROA.

The estimated coefficients for the ΔBAIndex are also positive and statistically significant across all abnormal return measures. These findings indicate that the BAIndex measure provides the stock market participants with useful, non-overlapping information to ΔROA about the future-term prospects of the firm. The significant effect of BAIndex arises from the relationships existing between the Brand Asset and future earnings or the BAIndex measure capturing relevant performance information not reflected in ΔROA.

Table 4
Direct Future-term Performance Impact of the Brand

Table 4, Panel A: Operating Income–based Measure of Earnings

	CAR	CCAR	CHAR
Brand Asset Index	.05230*	.05482*	.09465**
	/.06728/	/.07172/	/.10661/
	(.02773)	(.02750)	(.03028)
	[1.89]	[1.99]	[3.13]
Unanticipated	2.63694**	2.68708**	3.50730**
Change in ROA	/.29911/	/.30997/	/.33883/
	(.28659)	(.28420)	(.32237)
	[9.20]	[9.45]	[10.88]
F-stat	28.43	25.76	21.06
N	796	796	751

Table 4, Panel B: EPS-based Measure of Earnings

	CAR	CCAR	CHAR
Brand Asset Index	.06157*	.06733*	.10406**
	/.08058/	/.08801/	/.11687/
	(.02656)	(.02653)	(.02850)
	[2.32]	[2.54]	[3.65]
EPS Forecast Error	1.45473**	1.70896**	3.65982**
	/.23889/	/.28032/	/.34069/
	(.19821)	(.19801)	(.32626)
	[7.34]	[8.63]	[11.22]
F-stat	19.46	20.15	22.22
N	842	842	789

Abnormal StkRet$_{it}$ = $\beta_1\Delta$Earnings$_{it}$ + $\beta_2\Delta$BAIndex$_{it}$ + ε_{it}

The table presents results of estimating the effects of Brand Asset Index on stock returns. The models also include annual dummy variables so as to capture the effects of economy-wide factors. Results are reported as estimate, /standardized regression coefficient/, (standard error), [*t*-statistic]. ** Denotes significance at the 1% level; * denotes significance at the 10% level.

The magnitude of the BAIndex impact varies slightly across our abnormal stock return measures. Indeed, finding variation across alternative abnormal return measures is common (Fama 1998). A one-unit change in the BAIndex measure is associated with 9.5 percent CHAR, 5.2 percent CAR, and 5.5 percent CCAR. These results indicate that one unit increase in BAIndex (which is equal to one standard deviation, given our scaling of BAIndex) is associated with a 9.5 percent increase in the market value of a firm when risk is accounted for based on firm-specific

characteristics and with a 5.2 to 5.5 percent increase in the market value of a firm when risk premium is modeled using three-factor model plus momentum (Fama and French 1993; Carhart 1997).

Examining the values of standardized regression coefficients for BAIndex and earnings is also insightful. Across the alternative abnormal return measures, we find that the standardized coefficient for ΔBAIndex is 22 to 31 percent of the size of the standardized coefficient estimate for ΔROA. That is, the BAIndex is not a substitute for accounting performance measure and is not as reflective of future-term performance as earnings, but it does have significant incremental explanatory power for stock returns.

Panel B replicates the analysis using an EPS-based measure of accounting earnings. Again, we observe significant positive effects of earnings surprise on abnormal stock returns. The magnitude of the estimated earnings response coefficient for EPS in the BHAR model is similar to that obtained using ROA measure and suggests an equivalent informativeness of analysts-based and time-series–based measures of earnings surprises. Interestingly, the estimates of ΔEPS effect in CAR and CCAR models are notably lower than in corresponding models of ΔROA. The estimated effects of BAIndex are similar, albeit somewhat greater in magnitude and more significant than those in Table 4, Panel A. In terms of relative explanatory power, again, we observe that standardized regression coefficients for ΔBAIndex are considerably lower than those for ΔEPS: Brand Asset Index provides about 31 to 34 percent of the explanatory power of ΔEPS.

The current-term impact of the brand: Assessing simultaneity between BAIndex and current earnings
The total impact the brand asset has on stock return includes both a direct effect and an indirect effect that arises through brand asset's

impact on accounting performance. That is, the indirect effect arises if the BAIndex impacts current-term accounting performance, which in turn influences financial market value (as shown in Figure 3). In order to assess this indirect effect, we need to estimate the impact of BAIndex on accounting earnings in the presence of potential simultaneity. That is, we need to estimate a model of the following form:

$$Earnings_{it} = \alpha_{Earn,i} + \gamma_0 BAIndex_{it} +$$
$$\sum_{m=1}^{M} BAIndex_{it-m} + \sum_{k=1}^{K} \phi_{Earn,k} Earnings_{it-k} +$$
$$\sum_t \tau_t * Year_t + \eta_{it}. \qquad (13)$$

In order to obtain a consistent estimate of γ_0 in Equation 13, we first need to take first differences to remove firm-specific effect $\alpha_{Earn,i}$, and we need to create instruments for $\Delta BAIndex_{it}$, $\Delta BAIndex_{it-1}$, and for $\Delta Earnings_{it-1}$ to address their correlation with the differenced error term $(\eta_{it} - \eta_{it-1})$ using data from the period $(t-2)$ and earlier (Anderson and Hsiao 1982; Arellano 2003). Given our short time series for BAIndex, however, we are not able to create a reliable instrument for $\Delta BAIndex_{it}$, which makes this approach to dealing with simultaneity infeasible.

We do, however, as most researchers, have access to longer accounting data time series. Access to longer accounting time series allows the possibility of estimating the opposite direction of the simultaneous system. Namely, we can assess the impact of $Earnings_{it}$ on $BAIndex_{it}$ (i.e., λ_0) by estimating a model of the following form:

$$BAIndex_{it} = \alpha_{BA,i} + \lambda_0 Earnings_{it} +$$
$$\sum_{k=1}^{K} \lambda_k Earnings_{it-k} +$$
$$\sum_{m=1}^{M} \phi_{BAIndex,m} BAIndex_{it-m} +$$
$$\sum_t \tau_t * Year_t + \nu_{it}. \qquad (14)$$

Again, we need to remove fixed effects through first-differencing and create instruments for

$\Delta Earnings_{it}$, $\Delta Earnings_{it-1}$, and $\Delta BAIndex_{it-1}$ using data from the period $(t-2)$ and earlier to address their correlation with the first-differenced error term (Anderson and Hsiao 1982; Arellano 2003). This approach generates consistent estimates of λ_0, λ_1, and $\phi_{BAIndex,1}$.

Table 5 reports the results of this estimation for EPS and ROA. We present two alternative models, including and excluding own effects of BAIndex. For both earnings measures, we do not find evidence of simultaneity. We observe significant persistence in BAIndex, but the level of firm current profitability does not appear to influence its BAIndex.

The total impact of the brand

Because we do not find simultaneity between Earnings and BAIndex, we can estimate Equation 8 to assess the total financial impact of the brand. Table 6 presents the results of this estimation. The estimated effects are both greater and more significant than those in Table 4. We find that one unit change in the BAIndex is associated with a 12.1 percent change in characteristics-based abnormal stock return and with a 7.6 to 7.9 percent change in abnormal stock returns when risk is modeled using the Fama-French three-factor plus momentum model.

The dynamics of the BAIndex impact on financial performance

Given the estimates in tables 4 and 5, we can examine the temporal dynamics of the brand on firm financial performance as follows. For example, if we consider the CAR- and ROA-based estimates, we observe that the total impact of the BAIndex on stock return is .076 and the direct impact of BAIndex on stock return is .052. Then, .024 is the indirect effect that arises through BAIndex influencing current ROA. This indirect effect of BAIndex can be decomposed into the contemporaneous and the future-term effect as follows. We can compute the immediate impact of BAIndex on ROA as .024/2.64 = .009 and the future-term indirect impact (which arises due to earnings

Table 5

Assessing Simultaneity between Brand Asset Index and Earnings

	ROA-based Measure of Earnings		EPS-based Measure of Earnings	
$\text{Earnings}_{it}^{\pm}$	2.66967	3.24508	.04402	–.21782
	(7.00568)	(9.63238)	(1.06968)	(1.08870)
	[.38]	[.34]	[.04]	[–.20]
$\text{Earnings}_{it-1}^{\pm}$	–2.49713	–2.71923	.57161	.82852
	(5.61239)	(7.70439)	(1.29174)	(1.42195)
	[–.44]	[–.35]	[.44]	[.58]
Earnings_{it-2}	.64036	.76998	.13131	.07188
	(.50362)	(.63306)	(.32193)	(.31696)
	[1.27]	[1.22]	[.41]	[.23]
$\text{BAIndex}_{it-1}^{\pm}$		.33892*		.42078**
		(.19362)		(.17816)
		[1.75]		[2.36]
BAIndex_{it-2}		.15224**		.13536**
		(.07102)		(.06710)
		[2.14]		[2.02]
F-stat	16.86	3.94	16.14	3.44
N	737	423	696	420

$\text{BAIndex}_{it} = \alpha_{BA,i} + \lambda_0 \text{Earnings}_{it} + \lambda_1 \text{Earnings}_{it-1} + \lambda_2 \text{Earnings}_{it-2} + \kappa_{it}$
$\text{BAIndex}_{it} = \alpha_{BA,i} + \lambda_0 \text{Earnings}_{it} + \lambda_1 \text{Earnings}_{it-1} + \lambda_2 \text{Earnings}_{it-2} + \phi_1 \text{Earnings}_{it-1} + \phi_2 \text{Earnings}_{it-2} + \nu_{it}$
The models also include annual dummy variables so as to capture the effects of economy-wide factors. Standard errors are in parentheses; *t*-statistics in brackets. ** Denotes significance at the 5% level; * denotes significance at the 10% level. ± denotes the use of instrumental variable estimation.

Table 6

Total Financial Impact of the Brand

	CAR	CCAR	CHAR
Brand Asset Index	.07606**	.07858**	.12110**
	(.02333)	(.02328)	(.02691)
	[3.26]	[3.38]	[4.50]
F-stat	17.45	12.87	16.81
N	1,139	1,139	1,015

$\text{AbnormalStkRet}_{it} = \beta_{Total} * \Delta\text{BAIndex} + \varepsilon_{it}$
The model also includes annual dummy variables so as to capture the effects of economy-wide factors. Standard errors are in parentheses; *t*-statistics in brackets. ** Denotes significance at the 1% level; * denotes significance at the 10% level.

persistence) is then equal to .024 – .009 = .015.[7] As such, the future-term impact of BAIndex is .067 (i.e., .052 + .015). These estimates suggest that only about 12 percent (.009/.076) of the BAIndex performance impact is realized in the current-year operating income and the remaining 88 percent are realized in the future. Similar calculations using ROA and CCAR and CHAR imply that only about 11 percent (CCAR) and 6 percent (CHAR) of the brand impact is realized in the current term, and the remaining 89 to 94 percent of the impact is realized in the future.

The analysis using EPS-based estimates suggests similar results. We find that across the different abnormal stock return measures, on average, about 8 percent of the BAIndex impact is reflected in contemporaneous income. The remaining 92 percent of the impact is not reflected in contemporaneous EPS-based earnings measure.

Case in Point: Martha Stewart Living Omnimedia, Inc. (2002)

It takes much care and effort and often requires significant resource commitments to build a successful brand that elicits positive consumer perceptions, attitudes, and actions. Brand perceptions and attitudes, however, are influenced not only by the deliberate brand-building initiatives, but also by random events and occurrences that may be beyond management's control. External events can significantly affect the brand and the Martha Stewart ImClone affair allows us to examine the effects of value-destroying brand changes.

On December 27, 2001, on a tip from her broker, Martha Stewart sold all 3,928 shares of ImClone stock she owned. This sale allowed Stewart, according to the SEC, to avoid a loss of $45,673, as the day following this sale, the ImClone stock price fell 16%. Throughout 2002, Stewart drew heavy media attention and criticism as it became clear that she lied to the SEC, federal prosecutors, and the FBI about her ImClone stock sale. On June 4, 2003, Stewart was indicted by the government on nine counts and resigned as chairman and CEO of Martha Stewart Living, but she remained on the board and continued to serve as the company Chief Creative Officer.

Martha Stewart Case Exhibit 1
Brand Perceptions of Martha Stewart Brand 2000–2005
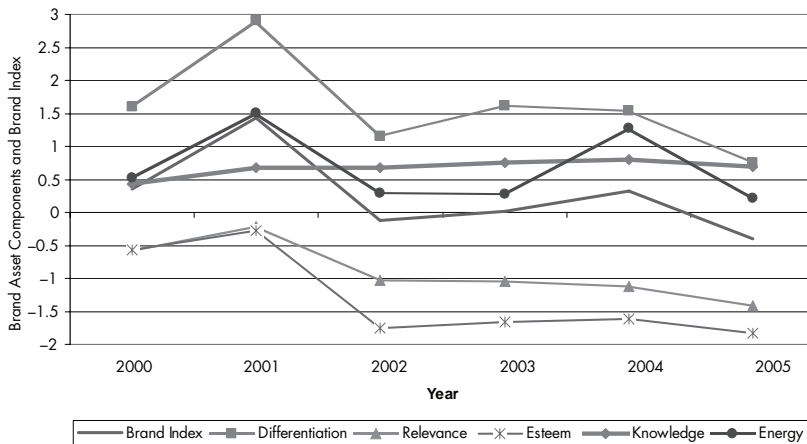
In January 2004, Martha Stewart went on trial and was found guilty in March 2004 of conspiracy, obstruction of an agency proceeding, and making false statements to federal investigators. Ten days after her conviction, Stewart stepped down as director and chief creative officer of the company she founded. In July 2004, Stewart was sentenced to five months in a federal correctional facility and two years of supervised release. She reported to prison October 2004, and was released March 4, 2005.

The scandal that broke out in early 2002 significantly affected perceptions of Martha Stewart brand. As evidenced in Exhibit 1, perceived brand Differentiation, Relevance, Esteem, and Energy for Martha Stewart brand dropped one to two points each. The only brand component that showed an increase in 2002 was Brand Knowledge, as it increased by .25 points. The aggregate Brand Index metric for Martha Stewart brand dropped a whopping 1.55 points (the second largest negative year-to-year change in the Brand Index in the data sample).

While the company revenue in 2002 remained the same as in 2001 and the operating income declined only by $7.5M to be in line with the 2000 level, the stock price of Martha Stewart Living dropped precipitously in 2002.

This dramatic drop in the stock price reflects the lower expectations of future operating performance of the company after the scandal.

Interestingly, during the crisis of 2002, it appears the company did not put additional effort into supporting the Martha Stewart brand: the $15.2M advertising spending in 2002 remained flat, just at the level of 2001 spending (Exhibit 2). The initial marketing inaction was followed by a 20 percent advertising increase to $18.2M in 2003 and a further increase to $25.9M in 2004. These investments into advertising appear to have paid off with reversals of brand perceptions: Brand Index climbed to .01 in 2003 and to .32 in 2004 (Exhibit 3). As Exhibits 2 and 3 show, post-2001, the changes in the stock price of Martha Stewart Living correlate closely with the changes in the Brand Index. We see depressed stock price during 2002 and 2003 and an increase in both Brand Index and stock price in 2004, followed by a decrease in both metrics in 2005.
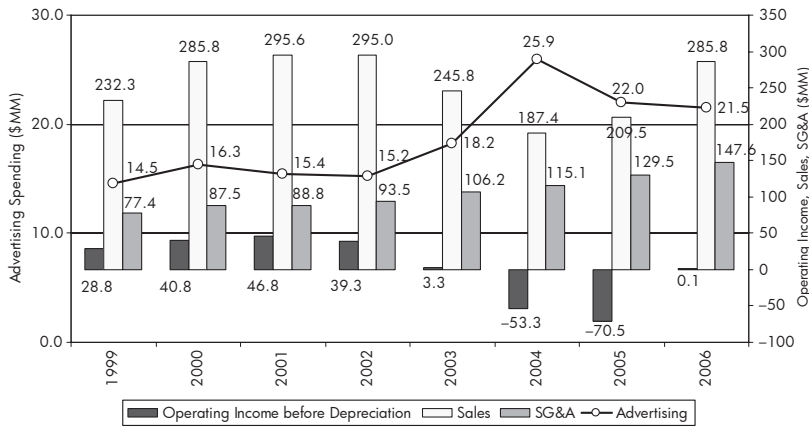
Importantly, however, Exhibits 2 and 3 show that the stock price leads the changes in the accounting performance measures of sales and operating income. Accounting performance for 2002 appears unaffected by changed brand perceptions. It is not until 2003 that we observe a significant drop in sales and operating profits. 2004 and 2005 follow with low sales and significant operating losses. Sales appear to rebound slightly in 2005, while the company still reports an operating loss of $70.5M. It is only in 2006, four years after the scandal, that Martha Stewart Living Omnimedia, Inc. inches back into profitability.

Discussion, Conclusion, and Directions for Future Research

We present an approach and demonstrate how the total financial impact of marketing assets can be estimated with limited time-series data when stock market data are available. This approach is applicable to many marketing
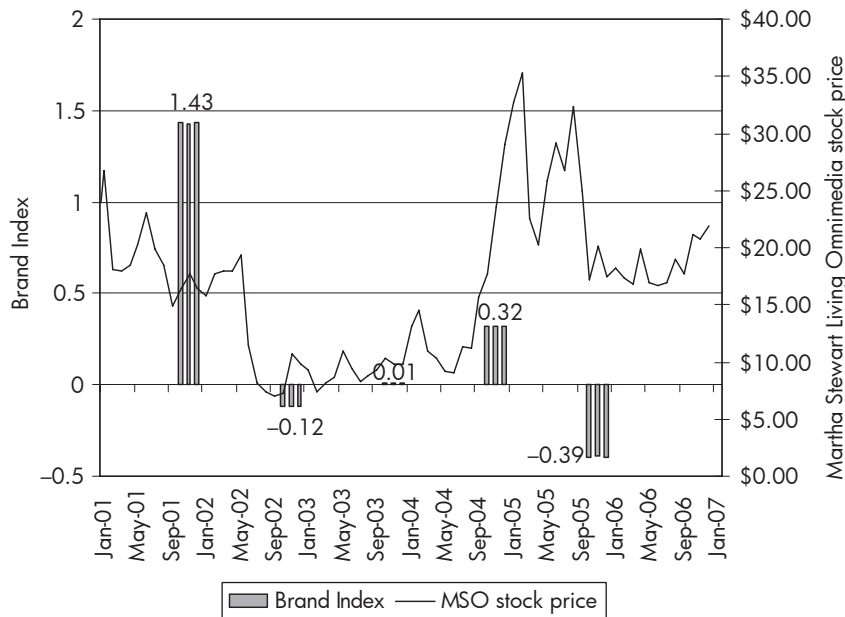

Martha Stewart Case Exhibit 2
Martha Stewart Living Omnimedia, Inc. 1999–2006 Operating Performance: Sales, SG&A, Operating Income Before Depreciation, and Advertising Spending

Martha Stewart Case Exhibit 3
Martha Stewart Living Omnimedia Brand Index (2000–20005) and the MSO Stock Price (1999–2006)

We illustrate the approach by linking customer mindset–, product-market–, and stock market–based brand equity in a single framework. Most recent brand equity models use contemporaneous product-market performance outcomes, such as price, market share, revenue, and profit premium, to evaluate a brand's financial impact. However, as Srinivasan, Park, and Chang (2005) point out, these approaches are not addressing the brands' long-term future performance effects and, as such, do not capture the brands' total financial impact. We assess the total effect of brand asset on financial performance and explain how to decompose the estimated total impact into current- and future-term components. Our analyses indicate that the effect of the BAIndex is not immediately and fully captured in the current-term earnings. Rather, the full effect of brand takes time to be realized. We find that only about 10 percent of the brand performance impact is realized in the current earnings and the remaining 90 percent is realized in the future. If managers do not appreciate the future long-term profitability impact of branding effort and if they gauge their strategies based on observed current-term product market returns, they might significantly under-invest in value-generating brand assets.

We undertook a number of sensitivity tests to assess the stability of our findings and found no evidence to challenge the results we report. For example, we find consistent results using alternative abnormal returns and accounting earnings measures. We tested alternative forecasting models for our ROA measure and alternative model specifications to assess simultaneity, and found results fully supportive of those we report. We assessed the temporal stability of our findings and did not find differences across different time periods. To rule out the "signaling" explanation for the observed market reaction, we assessed the impact of Brand Index on current and future operating profits directly. All additional tests confirm our main conclusion: brand impacts current and future financial performance and only a small portion of the brand impact is reflected in contemporaneous accounting profitability.

phenomena where time-series measures for marketing assets are available. While we demonstrate the approach empirically for a single marketing asset (brand), it is straightforward to extend the estimation framework to incorporate multiple asset groups simultaneously (provided the timing of asset measurement is consistent across asset groups).

Many interesting issues remain unanswered and suggest areas for future research. For example, why is the immediate brand impact so small relative to total impact? What drives this result? High brand-building costs, or a delay in consumer response to brand improvements (which would be reflected in revenues)? Disentangling the cost and the revenue side of the dynamic brand impact on profits can provide valuable managerial insights. Using performance impact estimates and incorporating relevant costs data, managers can assess, for example, the relative financial benefits of brand enhancement strategies. Doing so would help managers better evaluate their resource commitment to marketing budgets.

Further, we observe noticeable differences in the BAIndex impact across different abnormal stock return measures. This finding raises another interesting research question that pertains to the relationship between firm-specific risk and brand assets. Recent research (McAlister, Srinivasan, and Kim 2007) shows that firm Beta is systematically related to its advertising and R&D. Exploring similar relationships between brand equity metrics and Beta, as well as the other common risk factors (e.g., SMB, HML, momentum), would be worthwhile.

Finally, one of the limitations of our proposed approach is that it allows assessment of only partial dynamics of brand impact. That is, we do not know the full dynamic pattern of the impact (e.g., how many years it takes to realize the full benefit of a brand). Further, in some cases consistent estimation of immediate impact might be difficult if simultaneity is present. Once longer marketing time series become available, full dynamics of brand impact on performance can be estimated using traditional VAR and IV approaches. For now, however, the proposed approach offers important insights into marketing ROI and is feasible for cases where only limited time series for marketing metrics are available.

Acknowledgments

Notes

1. Value-destroying marketing assets (i.e., liabilities such as poor quality reputation) would have negative future-term effects on profits, and γ_k ($k > 0$) would be negative.

2. Without the efficient markets, these expectations of long-term impact are not strictly unbiased.

3. Ailawadi and colleagues (2003) also highlight other shortcomings of the various product-market–based measures (e.g., limited diagnostic ability, sensitivity to model specifications, subjectivity, etc.).

4. *Financial World*, for example, uses a rule of thumb that all profits above 5% pre-tax return on capital are due to brand.

5. A detailed description of the BAV model and its elements is provided in Gerzema et al. (2007), Gerzema and Lebar (2008), and Mizik and Jacobson (2008).

6. The *F*-statistic for testing the restriction averages 1.30 across our alternative measures, while the 95% critical value is 3.84. Complete estimation and test results are available upon request.

7. Because we find no simultaneity, we can also estimate Equation 6 with OLS. This estimation leads to similar results: the estimate of γ_0 is .008 (*T*-stat = 2.39).

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