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What is This?
Are Brand-Equity Measures Associated with Business-Unit Financial Performance? Empirical Evidence from the Netherlands

FRANK H. M. VERBEETEN*
PETER VIJN**

We investigate the association between brand-equity measures and business-unit financial performance. Brand-equity measures may complement historic accounting information in explaining business-unit financial performance. Capitalizing on a unique data set, we find an association between some (yet not all) brand-equity measures and contemporaneous as well as future business-unit financial performance. Our results provide important insights for both managers and designers of performance-measurement systems.

**Keywords:** Brand Equity, Nonfinancial Performance Measures, Financial Performance, Predictive Ability, Business Unit

1. Introduction

In this paper, we investigate whether specific nonfinancial performance measures (i.e., brand-equity measures) are associated with business-unit (BU) financial performance. The term "brand equity" refers to the incremental utility or value added to a product by its brand name (Yoo, Donthu, & Lee [2000]). Marketing literature

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(e.g. Keller & Lehmann [2006]) suggests that brand equity is a multidimensional concept; key dimensions include awareness (the extent to which customers recall and recognize the brand) and brand associations (the uniqueness of perceived attributes). Keller (1993) argues that brand-equity measures capture these customer perceptions, preferences, and (predicted) behavior; and therefore, they should be relevant for firms, divisions, or business units exploiting the brand because eventually they affect financial performance.

Yet are all brand-equity measures associated with BU financial performance? While several studies investigate the relation between brand-equity measures and stock prices or firm financial performance (e.g., Barth, Clement, Foster, & Kasznik [1998]; Chu & Keh [2006]; Mizik & Jacobson [2008]), most provide little evidence on the association between brand-equity measurement alternatives and BU financial performance. It is important to study this issue because adequate prediction of future financial performance is important for forecasting earnings and free cash flows, analyzing liquidity and financial flexibility, performance-measurement, valuation of business units, resource allocations, and other decisions in the firm (Krishnan & Largay [2000]). Previous studies provide little evidence in this area, largely due to a lack of data, because most companies measure only one brand-equity construct or do not provide insight into BU financial performance.

In this paper, we capitalize on a unique database on several brand-equity dimensions obtained from Young & Rubicam (Y&R). The Y&R brand-equity dimensions measure the results of a mixture of firm-level brand-building decisions (product decisions, such as research and development [R&D] allocations and new product development) as well as local BU decisions (marketing and services, such as price setting, choice of advertising media and distribution channels, and customer service). Y&R identifies four key brand dimensions (Consult Brand Strategy [2005]): differentiation (is the brand unique?), relevance (is the brand relevant to the needs of customers?), esteem (does the brand live up to its promises?), and knowledge (is the brand known among potential customers?). Each of these dimensions may have a different association with future BU financial performance; some may be relevant only at the firm level, others may affect contemporaneous or future BU financial performance. We also obtain financial performance data for the firms and business units in the Y&R database, which provides us with the opportunity to evaluate the associations between different brand-equity measures and BU financial performance. We focus our efforts on two issues identified by Dikolli and Sedatole (2007) as the major causes of inconsistent results in performance driver studies: measurement of the nonfinancial performance indicator and timing differences (lags in the association between a performance driver and measured outcome).

Our empirical results indicate that some, yet not all, brand-equity measures are associated with BU financial performance. Specifically, we find an association between differentiation and contemporaneous and future BU financial performance. This association suggests that firm and BU managers should ensure that their brand and products or services “stand out in the crowd” to sustain long-term financial performance. Other brand-equity measures (relevance, esteem, knowledge, and the
brand index measure) are not associated with contemporaneous or with future BU financial performance. One potential explanation is that these measures capture historic or current customer behavior (which is already captured by historic sales or industry buying patterns) rather than the forward-looking attitudes of the local consumers' mindset that differentiation appears to capture.

We extend previous findings that brand-equity measures affect shareholders’ impressions (e.g., Barth et al. [1998]; Mizik & Jacobson [2008]) and firm financial performance (Chu & Keh [2006]). Our results suggest that differentiation captures information (and, potentially, managerial effort) that is not included in historic BU financial performance. The results from our study provide important insights for (marketing) managers and for designers of performance-measurement systems. We also provide some insight on the appropriateness of the brand-equity model in explaining future financial performance, which is a hot topic in current marketing literature (Rust, Ambler, Carpenter, Kumar, & Srivastava [2004]; Gupta & Zeithaml [2006]; MSI [2008]).

Our study makes two contributions to the literature. First, prior research generally has treated brand equity as a unidimensional financial construct (e.g., Barth et al. [1998]; Kallapur & Kwan [2004]; Chu & Keh [2006]); we find that brand equity is multidimensional and that the individual nonfinancial dimensions have unique associations with BU financial performance measures. This finding signals the importance of selecting the “right” measure (i.e., which consumer judgments to include in a particular measure) to achieve long-term results. Second, we extend prior work at the firm level and find an association between differentiation and contemporaneous and future BU financial performance, in addition to historic financial performance. Measures of BU performance can be used for several purposes, including BU (manager’s) performance measurement, BU valuation, financial planning, and tax minimization (through transfer pricing and cost allocation policies). Also, brand-equity measures may reflect firm-level brand-building decisions and activities as well as BU managerial effort. For these reasons, an association may not exist between brand-equity measures and BU financial performance. Our results, however, indicate that BU financial performance measures do capture the contribution of (firm-level or locally developed) brand equity.

The paper is organized as follows. Section 2 provides an overview of the literature on brand equity and its relation with financial performance. In Section 3, we develop our hypotheses, and in Section 4, we discuss our data collection methods and procedures, including sample characteristics and variables. Section 5 provides the results of the study. In Section 6 we discuss our findings. Section 7 concludes.

2. Literature Review

Some researchers claim that intangible assets (such as patents, brands, and a skilled workforce) are important determinants of firm value (e.g., Brooking [1996]; Lev [2001]; Wyatt [2005, 2008]). Accounting has been criticized for not consistently recognizing these intangible assets (Kaplan & Norton [2000]); as a
result, researchers argue that accounting performance measures are of limited use in managing long-term value creation in intangible-intensive firms. These measurement difficulties have prompted a search for alternative and reliable nonfinancial performance measures as indicators of intangible assets (Maines et al. [2002]; Luft [2009]). Studies on the predictive ability of specific nonfinancial performance measures across companies are scarce (see Shields & Shields [2005]; Dikolli & Sedatole [2007]; Ittner [2008] for reviews in this area). Therefore, the challenge is to substantiate which specific nonfinancial performance measures are associated with contemporaneous and future financial performance.

2.1. Brand Equity

Brand equity is now accepted as a core concept of marketing (Rust et al. [2004]). It has received much attention from both managers and academics, and its importance is illustrated by the media attention on consulting firm’s annual rankings of the world’s top brands. Brand equity is defined as the set of brand assets and liabilities that are linked to the brand’s name and symbol. Brand equity can subtract from, as well as add to, the value provided by a product or service, and can provide value to both customers and the firm (Aaker [1991, 1996]).

According to the marketing literature (e.g., Keller [2003]; Rust et al. [2004]), brand equity is a multidimensional concept that assesses customers’ mind-set measures such as awareness and attitudes. These multiple dimensions of brand equity are affected by both firm-level decisions (on products, such as R&D allocations and new product development) as well as local BU decisions (marketing and service decisions, such as price setting, choice of advertising media and distribution channels, and customer service; e.g., Mittal, Kumar, & Tsiros [1999]; Verhoef, Langerak, & Donkers [2007]). Both firm-level and local BU brand-equity decisions should be managed jointly to optimize firm and BU financial performance.¹

A key decision in that respect is whether a brand should be global (i.e., a brand whose positioning, personality, look and feel are in most respects the same from one country to another) or local (i.e., brands that exist in one country or in a limited geographic area; Aaker & Joachimsthaler [1999]). Key advantages of global brands are strong economies of scale, development of a unique brand image across countries, and fast launch of new products in different markets. Strategic advantages of local brands are better responses to local needs, flexibility in pricing strategy, possibility of responding to local competition, and possibility of balancing a portfolio of brands (Schuiling & Kapferer [2004]). The global versus local brand decision may affect firm-level and BU (marketing) decisions as well as BU marketing and financial performance.

¹ The interdependency between firm-level and BU-level decisions is not restricted to brand-equity decisions (especially in intangible-intensive firms). For example, the performance of the local BU is determined partially by firm-level investments in R&D, Information Technology systems, corporate culture, supply chain relationships, human resource policies, and so on (Lev [2001]). Local BU managers generally are appointed to exploit these intangible assets.
2.2. Brand Equity and Financial Performance

Previous studies have investigated the relation between aspects of brand equity and financial performance. We identify two main lines of research, the value relevance studies that examine the relation between brand-equity measures and stock price performance, and the predictive ability studies that focus on the relation between brand-equity measures and accounting performance.

Barth et al. (1998) assess the value relevance of a financial brand-equity estimate generated by Interbrand and Financial World magazine. They find that, incremental to accounting variables, brand value estimates are significantly and positively related to stock prices and stock returns. Madden, Fehle, and Fournier (2006) extend this research and use the Interbrand estimates to create a portfolio of 111 companies that own the world’s most valuable brands. Their results indicate that strong brands deliver greater returns at lower risk to stockholders than does a relevant benchmark. Madden, Fehle, and Fournier (2006) indicate that these findings hold even when they control for market share and firm size, suggesting that brand-equity measures are relevant to investors.

Kallapur and Kwan (2004) investigate the value relevance and reliability of internally recognized brand assets of thirty-three U.K. firms, and the stock price reaction to the announcement of brand capitalization. They find that brand assets are value relevant; their results also suggest that there could be substantial differences in the extent of bias or error in brand valuations of firms because of a firm’s incentive structures. Muller (1999) investigates managerial decisions on whether to recognize acquired brands as an asset. Muller’s (1999) evidence suggests that U.K. firms are more likely to capitalize acquired brands when leverage is high, and to reduce the costs associated with the London Stock Exchange’s shareholder approval requirements for future acquisitions and disposals. Muller (1999) and Kallapur and Kwan’s research (2004) suggest that the reliability of brand-equity disclosures is affected by the contracting incentives of the firm.

Other studies investigate the value relevance of specific elements of brand equity. For example, Aaker and Jacobson (1994) use the Total Research Corporation’s Equitrend database to investigate the information content of the dimensions of perceived quality and salience. Their results indicate that perceived quality provides incremental information to earnings in explaining stock returns. On the other hand, salience does not have a significant effect on stock returns. In another study, Aaker and Jacobson (2001) investigate a key component of brand equity, the information content of a brand attitude measure supplied by Techtel Corporation. They find that changes in brand attitude lead accounting financial performance by one or two quarters and are contemporaneously associated with stock returns. Aaker and Jacobson (2001) interpret this finding as stemming from the stock market participant’s realization that brand equity leads to return on equity. Mizik and Jacobson (2008) link stock returns to changes in specific brand-equity measures and unexpected changes in accounting performance. They find that brand-equity measures influence stock returns both directly and indirectly.
An increase in specific brand-equity measures is positively associated with stock returns; in addition, changes in other brand-equity measures are reflected in both current and future changes in accounting performance.

Several studies investigate the association between specific brand-equity measures and future accounting performance. For example, Kim, Kim, and An (2003) examine the underlying dimensions of brand equity and how they affect the accounting performance of Korean hotel firms. Their results show that specific brand-equity measures are positively related to current financial performance as measured by revenue per available room in the hotel. Smith and Wright (2004) investigate the relations between brand image, product quality, and customer loyalty—all of which may be considered proxies for brand-equity elements—and average price, sales growth, and return on assets in the electronics industry. Their results suggest that brand image is not related to customer loyalty, but it is positively related to average price, which in turn is associated with contemporaneous sales growth. Eng and Keh (2007), using information obtained from Interbrand and Financial World magazine, find that brand value estimates are positively and significantly related to financial performance (return on assets [ROA]) for three years, but the positive effect declines over time.

3. Hypotheses Development

Historically, firms have relied almost exclusively on accounting performance measures, such as profits or accounting returns, for the measurement of BU performance. Accounting performance measures may serve several purposes within the firm, including evaluation of the performance of the BU or the BU manager, valuation of the BU, earnings forecasting and cash-flow planning, allocation of resources, and minimizing taxes. Accounting performance measures have many characteristics that help explain their prominent role in performance measurement: they are subject to a variety of internal controls and external audits, thus, they are reliable and objective; they are required for external reporting, that is, they are comparable across firms, divisions, and BUs and available at relatively low costs; they are easy to understand; and they integrate the results of all organizational activities into a single coherent financial measure (Otley [1999]; Merchant [2006]). In addition, previous research suggests that accounting measures are relevant for the value of the firm (Maines et al. [2003]).

However, some authors suggest that accounting measures are historical, backward-looking, transactions-oriented, and conservatively biased, and may reward excessive short-term and incorrect behavior (gamesmanship and data manipulation; see Merchant [1990, 2006]; Atkinson, Waterhouse, & Wells [1997]). For example, managers can artificially inflate short-term performance by cutting discretionary spending that is important for building brand equity (e.g., R&D and advertising expenses), thus reducing the long-term performance of the firm and its BUs (Mizik & Jacobson [2007]). Therefore, some authors argue that historic accounting measures provide little insight into a company’s or BU’s future financial performance (Maines et al. [2003]).
There are several ways to solve the allegedly short-term bias of accounting measures within firms. One solution is to require minimum investments in R&D or advertising at the firm and BU level, but this solution reduces managerial decision rights and may not provide insight on the effectiveness of R&D and advertising expenses or other managerial effort in building brand equity. Firms also may use nonfinancial (brand-equity) measures to monitor the developments in intangible assets and solve the horizon problem. Well-chosen brand-equity measures shift the attention of short-horizon managers to the long-horizon interests of the firm (Dikolli & Sedatole [2007]). In addition, they help managers to evaluate the cause-and-effect relations between marketing activities and (future) financial performance (Kaplan & Norton [2000]). Little evidence is available, however, on the association of brand-equity measures and BU financial performance.

For the purposes of this research project, we start with the assumption that well-chosen brand-equity measures may explain future BU financial performance. First of all, marketing studies suggest that these brand-equity measures are important for explaining both stock prices and firm financial performance (e.g., Barth et al. [1998]; Chu & Keh [2006]; Mizik & Jacobson [2008]); thus, brand-equity measures appear congruent with the objective to create value, especially in branded firms. In addition, marketing researchers (e.g., Rust et al. [2004]) argue that brand-equity measures capture the drivers of future financial performance, such as the perceived value of products and customers' preferences and brand attachment. Furthermore, brand-equity measures may reduce managerial incentives to increase short-term profits at the expense of long-term value.

It is inappropriate to assume, however, that all brand-building activities will have positive financial effects for BUs. First of all, firm-level investments in brand equity in multinational firms may satisfy the largest number of consumers across markets yet may be irrelevant to local BU consumers' particular needs. Different (firm-level) brand-building initiatives might affect different aspects of (local BUs) brand equity, which can generate different financial returns for different local BUs. Firm-wide branding strategies (such as global pricing corridors, global advertising campaigns, or other global marketing strategies) may limit the responsiveness of local BUs to competitor reactions. At the local level, BU managers may overinvest in specific marketing actions that build brand equity (e.g., excessive local advertising). In addition, if firms have other opportunities to monitor the brand-building activities of BU managers, they might emphasize other objectives (e.g., tax minimization) of BU financial performance measures relative to performance measurement and incentive objectives. In all these situations, it is unlikely that a relation exists between specific brand-equity measures and BU financial performance.

Therefore, it is an empirical question which, if any, of the brand-equity measures has an association with BU financial performance. Recent research at the firm level (Mizik & Jacobson [2008]) as well as the information provided by Y&R (Consult Brand Strategy [2005]) suggests that different brand-equity dimensions relate to either the growth potential or the current strength of the brand. Mizik and Jacobson (2008) suggest that the strength dimensions are captured by current
accounting performance measures (sales and return on assets) at the firm level. The
growth potential dimensions may represent aspects of performance that are unlikely
to be captured by historic, transaction-oriented financial measures. In addition, mar-
keting literature (e.g., Van der Lans, Pieters, & Wedel [2008]) indicates that differ-
entiation (one of the growth potential dimensions of brand equity) is for a large
part determined at the local level. This suggests that local BU managers can con-
tribute significantly to perceived brand equity and marketing performance, which
should affect BU financial performance. Therefore, we expect that the growth
dimensions of the brand-equity measures are most likely to be associated with BU
financial performance. We empirically test this assertion through the following
hypotheses:

\[ H_1: \text{Brand-equity measures that focus on future brand growth have a positive}
\text{association with BU financial performance.} \]

\[ H_2: \text{Brand-equity measures that focus on current brand strength have no}
\text{association with BU financial performance.} \]

### 4. Data and Research Methods

We use two sources to compile our data set. We obtain our data on brand-
equity measures from a proprietary data set in Y&R’s BrandAsset™ Valuator
(BAV™) database. We collect data on BU financial performance measures from
the REACH database.

#### 4.1 Brand-Equity Measures

Our brand-equity measures are based on proprietary data from Y&R. Y&R’s
brand-equity measure, BAV™, is a global study of more than 500,000 consumers’
attitudes on approximately 35,000 brands across the same set of fifty-five parame-
ters in forty-four countries, conducted at regular time intervals (Aaker [1996]; Con-
sult Brand Strategy [2005]). BAV™ is widely recognized as one of the major
brand-equity measures (see Keller [2003]; Keller & Lehmann [2006]). The BAV™
measures are relative measures; that is, all brands are ranked relative to each other,
across all industries. Table 1 summarizes the BAV™ measures, their meaning, and
measurement.

There are four key measures, called “pillars,” of brand equity in BAV™. Each
pillar is derived from various measures that relate to different aspects of consumers’
brand perceptions and that trace the progression of a brand’s development. Differenti-
tation measures the degree to which a brand is seen as different from others, which
is argued to be a necessary condition for profitable brand building. Relevance meas-
ures the breadth of a brand’s appeal, that is, the overall size of a brand’s franchise,
toward the (potential) customer base. Differentiation and relevance reflect the
growth potential of a brand (brand vitality). Esteem measures how well the brand is
TABLE 1

Summary of BAV™ Framework: Brand-Equity Pillars

<table>
<thead>
<tr>
<th>BAV™ Measure</th>
<th>Underlying Perceptual Metrics</th>
<th>Meaning and Role of Pillar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differentiation</td>
<td>Unique</td>
<td>Perceived distinctiveness of the brand defines the brand and reflects its ability to stand out from competition</td>
</tr>
<tr>
<td>Relevance</td>
<td>Relevant to me</td>
<td>Personal relevance and appropriateness and perceived importance of the brand</td>
</tr>
<tr>
<td>Esteem</td>
<td>Personal regard</td>
<td>Level of regard consumers hold for the brand and relevance of consumer attitude</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Familiarity with the brand</td>
<td>Awareness and understanding of the brand identity</td>
</tr>
</tbody>
</table>

Source: The information is based on Young & Rubicam (Y&R) documents and Mizik and Jacobson (2008). More information on the BrandAsset™ Valuator (BAV™) can be found at www.yrbav.com.

Note: This table presents the four brand-equity measures, their underlying perceptual metrics and their meaning and role as developed by Y&R.

regarded and respected—in short, how well it is liked. Knowledge measures how familiar and intimate consumers are with the brand. Esteem and knowledge reflect the current strength of the brand (brand stature).

We investigate the association of these four measures with contemporaneous and future BU financial performance. Since previous research (e.g., Mizik & Jacobson [2008]) suggests that these four pillars are highly correlated, we also use an additional brand index measure that captures all four pillars. Similar to Mizik and Jacobson (2008), we compute the brand index measure based on factor analysis of the four pillars. Factor analysis reveals that all four measures load on one component. Factor loadings are 0.51 (differentiation), 0.86 (relevance), 0.90 (esteem), and 0.78 (knowledge).

Consult Brand Strategy, which is a business unit of Y&R, has collected and stored the data on more than 1,000 brands in the Netherlands. The data are gathered in January and February, and are published partially in June of the same year. Our brand-equity measures reflect the customer perceptions in the Netherlands; these perceptions relate to a mixture of firm-level decisions (product decisions, R&D allocation) as well as local BU decisions (marketing and service decisions, such as advertising and channel distribution decisions) implemented by the firms and business units in the sample. We use survey data from 1997, 2000, and 2003. We restrict our analysis to single-brand firms and BUS in the Netherlands, that is, firms and business units for which a single brand represents the bulk of the firm’s or BU’s

2. The criteria that Y&R utilizes in selecting which brands to include in the database are as follows: (1) leading brands, (2) current customers and their potential competitors, (3) international clients (to facilitate cross-national comparisons), (4) prospects, and (5) new categories that may be relevant for the future.

3. Unfortunately, we have no information at which managerial level (firm level, BU level) specific brand-building decisions are made.
operations. We are able to identify eighty-nine such firms or business units for which financial data for at least one year are available. We exclude monopolies such as the Dutch railroad operator NS and the Dutch national airport Schiphol, because previous research (Anderson, Fornell, & Mazvancheryl [2004]) suggests that these firms may have a higher accounting performance.

We limit our analysis to the Dutch operations of foreign firms (global brand strategy BUs) or to local companies that have at least 50 percent of their sales in the Netherlands (local brand strategy business unit). For example, we investigate the relation between the brand equity of Citroën and Renault (French car manufacturers) in the Netherlands and the financial performance of the Dutch branches of Citroën and Renault (not the consolidated financial results of Citroën or Renault). For the same reason, we exclude Heineken (brewery) and DAF (car manufacturer) from our analysis, because more than 50 percent of their sales are made in countries other than the Netherlands. Our final sample consists of mainly nonlisted local brand strategy BUs (22.5%) and Dutch BUs of larger multinational firms (global brand strategy BUs, 77.5%). Organizations in our sample include Hero (food), Bavaria (brewery), Coca-Cola Netherlands (bottler), Levi's Netherlands (apparel), and Efteling (amusement park).

To assess the validity of our measures, we compare the brand-equity measures of our sample to the ranking and value of international brands developed by MillwardBrown and the Financial Times. We are able to obtain BrandZ rankings and values for eighteen individual brands; the Spearman correlation between the BrandZ value and the brand-equity measures in our sample is positive, but not significant (p>0.29). The positive correlation between these measures provides some additional assurance regarding the validity of the measures that we use.

4.2 BU Financial Performance Measures

We collect BU financial performance measures from the REACH database; REACH provides financial data for all companies that file their financial statements at the Chamber of Commerce in the Netherlands. For the purposes of this research project, we use two specific measures: return on investment (ROI), specified as earnings before interest and taxes (EBIT) divided by total assets; and cash flow

4. Most of these firms are in a holding structure; shares in the holding are held by either other (investment) companies (e.g., Hero), foundations (e.g., Efteling), or families (e.g., Bavaria).

5. The value of international brands, the BrandZ Top 100 most valuable brands, is published by MillwardBrown and the Financial Times, see http://news.ft.com/reports/globalbrands2. We expect a positive correlation between our brand-equity measures and the BrandZ most valuable brand measures, yet the significance of the correlation is questionable; that is, the total financial value of international brands is different from the brand-equity measures for local BU brand measures because of different measurement methodologies, country-specific preferences, differences in market size across countries, and so on.

6. Originally, we also investigated the impact of brand-equity measures on return on sales and sales over total assets. Return on sales generally is considered a key variable in marketing, as strong brands are argued to provide higher returns (Aaker [1991]; Keller [2003]). We have excluded it from our analysis as it is less relevant for firm value. In addition, our analyses indicate that the relation between brand-equity measures and sales over total assets is mainly determined by industry characteristics; therefore, we completely exclude return on sales from our analysis.
return on investment (CFROI), which we define as operational cash flow divided by total assets. Tests are based on at least 198 observations.

4.3 Control Variables

We include four control variables in our analysis. Size (LOGSALES$_{t-1}$), measured as total sales, is a proxy for market power. We include industry dummies because financial ratios differ greatly among industries. We also use a dummy variable to distinguish between local and global branding strategies of the firm (GLOBALBRSTR dummy equals one when the BUs activities are part of a global branding strategy approach by a multinational firm, and zero when the company is a stand-alone company, that is, when it is a local brand BU). We include year dummies for the years 2000 and 2003. Our control year is 1997.

4.4 Other Statistical Considerations

One of the issues in the specification of the model is the choice between level or change models (Banker, Potter, & Srinivasan [2000]). The change model has the advantage of reducing bias in estimates resulting from spurious correlations and omitted variables. A disadvantage is that change models assume a constant relation between the change and the dependent variable; other disadvantages are high unreliability and correlation with its components (Wiersma [2002]). When we consider the relatively long time periods between the measurement of brand-equity elements in our data set, we find that the impact of a change in brand equity and the subsequent change in financial performance is hard to model, because it is difficult to determine whether the change in brand-equity measures will show up in the financial results for the first, second, or third year of our sample period. Based on these considerations, we rely on estimates from the level models.

Another issue is the adequate time lag. Our time lag of up to two years is exploratory, in the sense that there is no formal theory that can indicate the length of this so-called lag. We cannot exclude the possibility that the impact of the brand-equity measures will manifest itself beyond these two years.

We winsorize the variables to reduce the effects of outliers. To control for heteroskedasticity, we use Newey-West (1987) standard errors and covariance. We use the RESET test (Verbeek [2008]) to test for omitted variable bias or misspecification. Neither of the test results indicates particular misspecification of our models.

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7. The use of several (although not independent) measures can provide insight on the relation between brand-equity measures and specific aspects of accounting performance (Ittner [2008]). Both operational cash flows (CFROI) and earnings (ROI) are main determinants of firm value (Dechow [1994]).

8. We distinguish among durable manufacturing industry (industry codes 26–37); nondurable manufacturing (industry codes 15–25); wholesale and retail trade and repair of motor vehicles and motor cycles (industry code 50); wholesale trade and commission trade (industry code 51); retail trade, repair of personal and household goods (industry code 52); accommodation and food service activities (industry code 55); transportation and communication (industry code 60–64); and other service industries (industry codes 71, 74, and 92).
5. Results

In this section, we provide the statistics and the results from the regression equations for our hypothesis test.

5.1 Statistics

Table 2 shows the distribution by industry of the business units that we use in the sample. Table 3 provides the statistics for the variables in our analysis.

Tables 2 and 3 indicate that our sample represents a wide cross-section of BUS that vary significantly in terms of industry, size, brand characteristics, and financial performance. These BUS are not representative of the Dutch population of companies as a whole. BUS in our sample have strong brands. On average, they are fairly large and come mostly from wholesale and retail industries. The characteristics of the sample may reduce the ability to generalize our findings to other industries, small companies, nonbranded companies, or multibrand companies.

<table>
<thead>
<tr>
<th>TABLE 2</th>
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<tbody>
<tr>
<td>Distribution of Firms/Business Units in Sample</td>
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</table>

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number</th>
<th>Percent of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durable Manufacturing Industry</td>
<td>36</td>
<td>13.5</td>
</tr>
<tr>
<td>Nondurable Manufacturing Industry</td>
<td>21</td>
<td>7.9</td>
</tr>
<tr>
<td>Wholesale and Retail Trade and Repair of</td>
<td>36</td>
<td>13.5</td>
</tr>
<tr>
<td>Motor Vehicles and Motorcycles Industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wholesale Trade Industry</td>
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<td>31.5</td>
</tr>
<tr>
<td>Retail Trade Industry</td>
<td>42</td>
<td>15.7</td>
</tr>
<tr>
<td>Accommodation and Food Service Industry</td>
<td>12</td>
<td>4.5</td>
</tr>
<tr>
<td>Transportation and Communication Industry</td>
<td>21</td>
<td>7.9</td>
</tr>
<tr>
<td>Other Services Industry</td>
<td>15</td>
<td>5.6</td>
</tr>
<tr>
<td>Total</td>
<td>267</td>
<td>100</td>
</tr>
</tbody>
</table>

*Note: This table presents the distribution of the firms and business units in the sample over industries. Industry classification is based on the Dutch BIK industry codes, which are similar to the Standard Industrial Classification industry codes in the United States. The first column presents the industry, the second column presents the number of observations, and the third column presents the percentage of firms from a specific industry in the sample.*

The brand-equity measures are relatively scaled, that is, within the Dutch sample, the lowest ranking brand receives a score of zero and the highest ranking brand receives a score of 100. The average for the brand values is above fifty, which means that the sample is biased toward the stronger brands.
### TABLE 3

Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIFFERENTIATION</td>
<td>267</td>
<td>1.28</td>
<td>99.90</td>
<td>58.56</td>
<td>28.44</td>
</tr>
<tr>
<td>RELEVANCE</td>
<td>267</td>
<td>3.25</td>
<td>99.23</td>
<td>60.57</td>
<td>25.33</td>
</tr>
<tr>
<td>ESTEEM</td>
<td>267</td>
<td>5.71</td>
<td>99.61</td>
<td>63.97</td>
<td>25.65</td>
</tr>
<tr>
<td>KNOWLEDGE</td>
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<td>10.84</td>
<td>99.71</td>
<td>65.99</td>
<td>22.45</td>
</tr>
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<td>1.00</td>
</tr>
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<td>0.00</td>
<td>1.00</td>
<td>0.78</td>
<td>0.42</td>
</tr>
<tr>
<td>ROlt-1</td>
<td>235</td>
<td>-22.18</td>
<td>32.13</td>
<td>7.25</td>
<td>10.12</td>
</tr>
<tr>
<td>ROlt</td>
<td>234</td>
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<td>28.88</td>
<td>7.02</td>
<td>9.86</td>
</tr>
<tr>
<td>ROlt1</td>
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<td>-20.23</td>
<td>29.57</td>
<td>6.40</td>
<td>9.76</td>
</tr>
<tr>
<td>ROlt2</td>
<td>234</td>
<td>-9.63</td>
<td>32.13</td>
<td>7.72</td>
<td>9.44</td>
</tr>
<tr>
<td>CFROlt-1</td>
<td>236</td>
<td>-6.56</td>
<td>32.20</td>
<td>8.21</td>
<td>8.62</td>
</tr>
<tr>
<td>CFROlt</td>
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<td>7.60</td>
<td>10.36</td>
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<tr>
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<td>-10.72</td>
<td>27.10</td>
<td>7.76</td>
<td>8.45</td>
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<tr>
<td>CFROlt2</td>
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<td>36.40</td>
<td>8.84</td>
<td>9.35</td>
</tr>
<tr>
<td>LOGSALES_t-1</td>
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<td>3.34</td>
<td>7.57</td>
<td>5.24</td>
<td>0.76</td>
</tr>
</tbody>
</table>

**Note:** This table presents the variables that are used in the regression analyses.

**Variable Definitions:**

- **DIFFERENTIATION, RELEVANCE, ESTEEM, and KNOWLEDGE** refer respectively to differentiation (the perceived distinctiveness of the brand), relevance (the personal relevance and appropriateness and perceived importance of the brand), esteem (level of regard consumers hold for the brand), and knowledge (awareness and understanding of the brand identity), that is, the four nonfinancial brand-equity measures developed by Y&R. **BRANDINDEX** refers to the brand index measure, that is, the factor score of the four previous brand-equity measures.

- **GLOBALBRSTR** is a dummy variable that indicates whether the observation relates to a business unit in a global brand strategy (coded as one) or a local brand strategy BU (coded as zero).

- **ROlt-1(t, r1, r2)** refers to the return on investment (EBIT/Total Assets) in year $t-1$ (respectively $t$, $t+1$, and $t+2$);

- **CFROlt-1 (t, r1, and r2)** refers to operational cash flow return on investment (Operational Cash Flows/Total Assets) in year $t-1$ (respectively $t$, $t+1$, and $t+2$); and

- **LOGSALES_t-1** refers to the Log of Sales in year $t-1$.

Table 4 provides the bivariate correlations of the brand-equity measures, some of the control variables, and financial performance.

Table 4 shows that the different brand-equity measures are closely related ($p>0.19$, $p<0.01$). The correlations also suggest some associations between elements of brand equity, financial performance, and industry (nontabulated). In addition, large BUs have stronger brands as well as higher financial performance. For example, size ($LOGSALES_{t-1}$) is positively associated with brand index, relevance, and knowledge ($p<0.01$). There also appears to be a negative relation between brand-equity measures and pursuing a global brand strategy. This finding is consistent with previous research (Schuiling & Kapferer [2004]) and may be due to the fact that local brand BUs have
TABLE 4
Correlations

<table>
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<tr>
<th>Variable</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
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<td>1  BRANDINDEX</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>2  DIFFERENTIATION</td>
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<td>1.00</td>
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<td>16</td>
<td>17</td>
<td>18</td>
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<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
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</tr>
<tr>
<td>3  RELEVANCE</td>
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<td>0.19</td>
<td>1.00</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
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<tr>
<td>4  ESTEEM</td>
<td>0.90</td>
<td>0.38</td>
<td>0.75</td>
<td>1.00</td>
<td>38</td>
<td>39</td>
<td>40</td>
<td>41</td>
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<td>43</td>
<td>44</td>
<td>45</td>
<td>46</td>
<td>47</td>
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<td>5  KNOWLEDGE</td>
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<td>0.54</td>
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<td>48</td>
<td>49</td>
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<td>51</td>
<td>52</td>
<td>53</td>
<td>54</td>
<td>55</td>
<td>56</td>
</tr>
<tr>
<td>6  GLOBALBRSTR</td>
<td>(0.17)</td>
<td>(0.06)</td>
<td>(0.24)</td>
<td>0.02</td>
<td>(0.25)</td>
<td>1.00</td>
<td>57</td>
<td>58</td>
<td>59</td>
<td>60</td>
<td>61</td>
<td>62</td>
<td>63</td>
<td>64</td>
</tr>
<tr>
<td>7  LOGSALESt-1</td>
<td>0.20</td>
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<td>0.08</td>
<td>0.31</td>
<td>(0.03)</td>
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<td>66</td>
<td>67</td>
<td>68</td>
<td>69</td>
<td>70</td>
<td>71</td>
</tr>
<tr>
<td>8  ROIt-1</td>
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<td>0.02</td>
<td>0.06</td>
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<td>74</td>
<td>75</td>
<td>76</td>
<td>77</td>
</tr>
<tr>
<td>9  ROIt</td>
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<td>0.07</td>
<td>0.03</td>
<td>0.02</td>
<td>(0.01)</td>
<td>0.11</td>
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<td>82</td>
</tr>
<tr>
<td>10  ROIt1</td>
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<td>0.22</td>
<td>0.08</td>
<td>0.07</td>
<td>0.02</td>
<td>0.00</td>
<td>0.10</td>
<td>0.50</td>
<td>0.72</td>
<td>1.00</td>
<td>83</td>
<td>84</td>
<td>85</td>
<td>86</td>
</tr>
<tr>
<td>11  ROIt2</td>
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<td>0.18</td>
<td>(0.01)</td>
<td>(0.04)</td>
<td>(0.03)</td>
<td>(0.02)</td>
<td>0.07</td>
<td>0.47</td>
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<td>0.65</td>
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<td>89</td>
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<td>12  CFROIt-1</td>
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<td>0.17</td>
<td>0.11</td>
<td>0.17</td>
<td>(0.17)</td>
<td>0.10</td>
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<td>0.48</td>
<td>0.38</td>
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<td>91</td>
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<tr>
<td>13  CFROIt</td>
<td>0.17</td>
<td>0.24</td>
<td>0.14</td>
<td>0.07</td>
<td>0.11</td>
<td>(0.12)</td>
<td>0.22</td>
<td>0.52</td>
<td>0.84</td>
<td>0.59</td>
<td>0.34</td>
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<td>92</td>
</tr>
<tr>
<td>14  CFROIt1</td>
<td>0.19</td>
<td>0.26</td>
<td>0.18</td>
<td>0.10</td>
<td>0.10</td>
<td>(0.15)</td>
<td>0.17</td>
<td>0.45</td>
<td>0.62</td>
<td>0.81</td>
<td>0.54</td>
<td>0.63</td>
<td>0.69</td>
<td>1.00</td>
</tr>
<tr>
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<td>0.18</td>
<td>0.15</td>
<td>0.03</td>
<td>0.08</td>
<td>(0.16)</td>
<td>0.08</td>
<td>0.36</td>
<td>0.42</td>
<td>0.52</td>
<td>0.73</td>
<td>0.45</td>
<td>0.50</td>
<td>0.63</td>
</tr>
</tbody>
</table>

Note: Table 4 presents the Pearson correlations for the variables of interest. Correlations above 0.10 and 0.17 are significant at the five and one percent levels, respectively.

Variable Definitions:

BRANDINDEX refers to the brand index measure, that is, the factor score of the four nonfinancial brand-equity measures differentiation, relevance, esteem, and knowledge.

DIFFERENTIATION, RELEVANCE, ESTEEM, and KNOWLEDGE refer respectively to differentiation (the perceived distinctiveness of the brand), relevance (the personal relevance and appropriateness and perceived importance of the brand), esteem (level of regard consumers hold for the brand), and knowledge (awareness and understanding of the brand identity), that is, the four nonfinancial brand-equity measures developed by Y&R.

GLOBALBRSTR is a dummy variable that indicates whether the observation relates to a business unit in a global brand strategy (coded as one) or a local brand strategy BU (coded as zero).

LOGSALESt-1 refers to the Log of Sales in year t-1.

ROIt-1(t, t, t-2) refers to the return on investment in year t-1 (respectively t, t+1, and t+2), calculated as (EBIT/Total Assets) of the firm.

CFROIt-1(t, t, t-2) refers to operational cash flow return on investment in year t-1 (t, t+1, and t+2), calculated as (Operational Cash Flows/Total Assets) of the firm.
more recognized brands in our sample. The relation between brand-equity elements and financial performance generally is positive and significant. In addition, all financial performance measures are highly correlated.

5.2 Brand-Equity Measures and BU Financial Performance

To test the predictive ability of brand-equity measures, we estimate the following regression equations, excluding control variables:

\[ \text{PERF}_{i,t+n} = \alpha_j + \beta_{1j} \times \text{PASTPERF}_{i,t-1} + \epsilon_i \]  

(1)

and

\[ \text{PERF}_{i,t+n} = \alpha_j + \beta_{2j} \times \text{PASTPERF}_{i,t-1} + \beta_{3j} \times \text{BE}_{i,t} + \epsilon_i \]  

(2)

where \( \text{PERF}_{i,t+n} \) = performance in period \( t+n \) \( (n=0,1,2) \), that is, either ROI or CFROI for company \( i \); \( \text{PASTPERF}_{i,t-1} \) equals historic accounting performance in previous period \( t-1 \), that is, either ROI or CFROI, for company \( i \); \( \text{BE}_{i,t} \) equals brand equity (respectively brand index measure, that is, a factor analysis of the four brand-equity measures, or differentiation, relevance, esteem, and knowledge in period \( t \) for company \( i \)); and \( \epsilon_i \) equals the error term for company \( i \).

The previous regression equations provide insight into the association between brand-equity measures and BU financial performance. By comparing the results from eq. (1) with the results from eq. (2), we test whether brand-equity variables add to the explanatory power of our model. We use the adjusted \( R^2 \), the Akaike's (1973) information criterion (AIC), and the residual dispersion test to compare whether the addition of brand-equity measures gives incremental information relative to the baseline model.\(^{10}\) The adjusted \( R^2 \) incorporates a trade-off between goodness-of-fit and the number of regressors used in the model (Verbeek [2008]). The AIC also suggests this trade-off; models with a lower AIC generally are preferred because they are more parsimonious. The residual dispersion test, based on abnormal estimation errors (Gu [2007]; see also Appendix A), indicates whether the increase in the association between brand-equity measures and financial performance is statistically significant. Comparing eq. (1) with eq. (2) can be regarded as a test of the incremental predictive ability of brand-equity measures (Biddle, Seow, & Siegel [1995]).\(^{11}\) Other studies in this area (e.g., Banker, Potter, & Srinivasan [2000]; Wiersma [2008]) use similar methods. We do not compare the adjusted \( R^2 \)'s or the regression coefficients across

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\(^{10}\) In addition, we use the Vuong (1989) test, which we adjust for the number of estimated coefficients (Clarke [2007]; Markwat, Kole, & van Dijk [2009]). These results are available from the corresponding author on request.

\(^{11}\) We also test for the relative predictive ability of brand-equity elements compared with historic accounting performance measures. Our results (available from the corresponding author upon request) indicate that historic accounting performance measures are better predictors of future accounting performance relative to brand-equity measures. This result refutes the claims in the marketing and management accounting literature that brand-equity measures are drivers of performance and therefore should have a larger predictive ability than historic accounting measures, but is consistent with the results from previous research (e.g., Banker, Potter, & Srinivasan [2000]; Wiersma [2008]).
models that are contemporaneous, or one or two years ahead. These models relate to different dependent variables, and therefore, cannot be compared (Gu [2005, 2007]). Table 5 presents the results for the regressions.

Table 5 indicates that there is a positive association between differentiation and both contemporaneous \( \text{ROI}_t \) and \( \text{CFROI}_t \), and one-year-ahead \( \text{ROI}_{t+1} \) and \( \text{CFROI}_{t+1} \). The brand-equity measures are collected at the beginning of the year, but the financial performance measures are realized during the year. On average, there is a six-month lag between brand-equity measures and financial performance measures for the same year. The \( \beta \) for differentiation is positive and significant \((p<0.1)\); the other brand asset measures (relevance, esteem, knowledge, and the brand index measure) have statistically nonsignificant effects. Their lack of significance may indicate that these measures are relevant for stock price valuation and firm performance (Mizik & Jacobson [2008]) yet not necessarily for local BU performance.

The adjusted \( R^2 \) increases, and the AIC for the model that solely includes differentiation (Models 4 and 8) is lower relative to the baseline model (Models 1 and 5). When the effects of the other brand measures are restricted to zero (Models 4 and 8), the effects of the other variables in the model remain the same compared to the models that include all variables (Models 3 and 7). In addition, a model that incorporates historic financial performance and differentiation (Models 4 and 8) is more informative than a model that includes historic financial performance and a brand index measure (Models 2 and 6). This finding suggests that differentiation is the brand-equity measure that has the highest association with BU financial performance and signifies the importance of selecting "adequate" brand-equity measures for performance-measurement purposes.

Table 5 also indicates that there is a reduction in the regression coefficient for historic accounting performance in models that include historic accounting performance and differentiation (Models 4 and 8), relative to the regression models that solely include historic accounting performance (Models 1 and 5). This result suggests that differentiation may partially substitute for historic accounting BU performance. The residual dispersion tests based on abnormal estimation errors confirms this: although the increase in predictive ability is significant for \( \text{CFROI}_t \) and \( \text{CFROI}_{t+1} \) \((p<0.1)\), it is only marginally significant for \( \text{ROI}_t \) and \( \text{ROI}_{t+1} \) \((p<0.20)\).\(^{12}\) One additional reason for this result may be that the sample is relatively small \((n≈200)\).

The results for a two-year time lag are all nonsignificant, suggesting that the duration of brand-equity measures is between one and two years. A final interesting observation relates to the ROI two-years-ahead. For this model, differentiation and relevance (both \( p<0.17 \)) have a positive association with future financial performance, but esteem \((p<0.07)\) and knowledge \((p<0.16)\) have a negative association

\(^{12}\) Our results for the unadjusted residual dispersion test are qualitatively similar to the results presented in the tables, albeit that significance levels are slightly higher for the unadjusted residual dispersion test (results available from the corresponding author upon request).
### TABLE 5
Predictive Ability of Brand-Equity Measures

**Panel A: Predictive ability of brand-equity measures for ROI<sub>t+n</sub>**

<table>
<thead>
<tr>
<th>Model</th>
<th>ROIt</th>
<th>ROIt+1</th>
<th>ROIt+2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td><strong>CONSTANT</strong></td>
<td>92.2</td>
<td>92.3</td>
<td>92.4</td>
</tr>
<tr>
<td><strong>GLOBALSTR</strong></td>
<td>-1.55</td>
<td>-0.72</td>
<td>-3.91</td>
</tr>
<tr>
<td><strong>LOGSALST-1</strong></td>
<td>0.53</td>
<td>0.85</td>
<td>0.99</td>
</tr>
<tr>
<td><strong>BRANDINDEX</strong></td>
<td>0.59</td>
<td>0.35</td>
<td>0.57</td>
</tr>
<tr>
<td><strong>DIFFERENTIATION</strong></td>
<td>92.29</td>
<td>92.14</td>
<td>92.15</td>
</tr>
<tr>
<td><strong>RELEVANCE</strong></td>
<td>92.25</td>
<td>-0.04</td>
<td>92.26</td>
</tr>
<tr>
<td><strong>ESTEEM</strong></td>
<td>92.19</td>
<td>0.00***</td>
<td>92.20</td>
</tr>
<tr>
<td><strong>KNOWLEDGE</strong></td>
<td>92.22</td>
<td>2.61</td>
<td>2.65</td>
</tr>
</tbody>
</table>

| Adj. R² | 0.47 | 0.47 | 0.47 | 0.48 | 0.33 | 0.33 | 0.34 | 0.34 | 0.27 | 0.27 | 0.29 | 0.27 | 0.07 |
| Model   | (1) vs (2) | (1) vs (3) | (1) vs (4) | (5) vs (6) | (5) vs (7) | (5) vs (8) | (9) vs (10) | (9) vs (11) | (9) vs (12) |
| F-test Adj. Res. Dispersion | -0.15 | 0.15 | 1.70 | 0.34 | 0.30 | 1.64 | 0.67 | -0.35 | 0.08 |
| Sign. F-test | NS | NS | 0.19 | NS | NS | 0.20 | NS | NS | NS | NS | (continued)
**TABLE 5 (Continued)**

Panel B: Predictive ability of brand-equity measures for $CFROI_{t+n}$

<table>
<thead>
<tr>
<th>Variable</th>
<th>$CFROI_t$</th>
<th>$CFROI_{t+1}$</th>
<th>$CFROI_{t+2}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
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<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
</tr>
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<td>(7)</td>
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<td>(9)</td>
</tr>
<tr>
<td></td>
<td>(10)</td>
<td>(11)</td>
<td>(12)</td>
</tr>
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<td>-4.99</td>
<td>-8.34</td>
</tr>
<tr>
<td></td>
<td>(-0.93)</td>
<td>(-1.40)</td>
<td>(-1.39)</td>
</tr>
<tr>
<td><strong>GLOBALBRSTR</strong></td>
<td>1.85</td>
<td>2.28</td>
<td>1.95</td>
</tr>
<tr>
<td></td>
<td>(0.94)</td>
<td>(1.14)</td>
<td>(0.88)</td>
</tr>
<tr>
<td><strong>LOGSALES−I</strong></td>
<td>1.60</td>
<td>1.27</td>
<td>1.68</td>
</tr>
<tr>
<td></td>
<td>(1.55)</td>
<td>(1.22)</td>
<td>(1.37)</td>
</tr>
<tr>
<td><strong>CFROI−I</strong></td>
<td>0.54***</td>
<td>0.52***</td>
<td>0.49***</td>
</tr>
<tr>
<td></td>
<td>(5.17)</td>
<td>(4.82)</td>
<td>(4.47)</td>
</tr>
<tr>
<td><strong>BRANDINDEX</strong></td>
<td>0.81</td>
<td>92.67</td>
<td>92.68</td>
</tr>
<tr>
<td></td>
<td>(1.25)</td>
<td>92.72</td>
<td>92.73</td>
</tr>
<tr>
<td><strong>DIFFERENTIATION</strong></td>
<td>92.77</td>
<td>0.06**</td>
<td>0.06**</td>
</tr>
<tr>
<td><strong>RELEVANCE</strong></td>
<td>92.80</td>
<td>(2.22)</td>
<td>(2.35)</td>
</tr>
<tr>
<td></td>
<td>92.83</td>
<td>0.02</td>
<td>92.84</td>
</tr>
<tr>
<td><strong>ESTEEM</strong></td>
<td>92.88</td>
<td>(0.32)</td>
<td>92.89</td>
</tr>
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<td></td>
<td>92.93</td>
<td>0.00</td>
<td>92.94</td>
</tr>
<tr>
<td><strong>KNOWLEDGE</strong></td>
<td>92.98</td>
<td>(0.09)</td>
<td>92.99</td>
</tr>
<tr>
<td></td>
<td>92.103</td>
<td>-0.03</td>
<td>92.104</td>
</tr>
<tr>
<td><strong>Adjoint R^2</strong></td>
<td>0.34</td>
<td>0.34</td>
<td>0.35</td>
</tr>
<tr>
<td><strong>AIC</strong></td>
<td>7.10</td>
<td>7.10</td>
<td>7.90</td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>(1) vs. (2)</td>
<td>(1) vs. (3)</td>
<td>(1) vs. (4)</td>
</tr>
<tr>
<td><strong>F-test Adj. Res. Dispersion</strong></td>
<td>-1.07</td>
<td>0.60</td>
<td>3.24</td>
</tr>
<tr>
<td><strong>Sign. F-test</strong></td>
<td>NS</td>
<td>NS</td>
<td>0.07</td>
</tr>
</tbody>
</table>

(continued)
Table 5 presents the Ordinary Least Squares results for the following equations:

\[ \text{PERF}_{i,t+n} = \alpha_j + \beta_{1j} \times \text{PASTPERF}_{i,t-1} + \varepsilon_i \quad (1) \]

and

\[ \text{PERF}_{i,t+n} = \alpha_j + \beta_{2j} \times \text{PASTPERF}_{i,t-1} + \beta_{3j} \times \text{BE}_{i,t} + \varepsilon_i \quad (2) \]

where \( \text{PERF}_{i,t+n} \) equals performance in the period \( t+n \) (\( n=0,1,2 \)), that is, either ROI or CFROI for firm \( i \); \( \text{PASTPERF}_{i,t-1} \) equals historic accounting performance in the previous period \( t-1 \), that is, either return on investment or cash flow return on investment, for firm \( i \); \( \text{BE}_{i,t} \) equals brand equity (respectively \( \text{BRANDINDEX} \), brand index measure, that is, a factor analysis of the four brand-equity measures; and the four brand-equity measures of differentiation, relevance, esteem, and knowledge) in period \( t \) for firm \( i \); and \( \varepsilon_i \) equals error term for firm \( i \).

*, **, *** denote significance and 10, 5, and 1 percent levels, respectively.

Variable Definitions:

AIC is Akaike’s (1973) information criterion.

\( \text{ROI}_{t-1}(t,t+1) \) refers to the return on investment in year \( t-1 \) \((t,t+1, \text{and } t+2)\), calculated as \((\text{EBIT}/\text{Total Assets})\) of the firm.

\( \text{CFROI}_{t-1}(t,t+1) \) refers to operational cash flow return on investment in year \( t-1 \) \((t,t+1, \text{and } t+2)\), calculated as \((\text{Operational Cash Flows}/\text{Total Assets})\) of the firm.

\( \text{GLOBALBSTR} \) is a dummy variable that indicates whether the observation relates to a business unit in a global brand strategy (coded as one) or a local brand strategy BU (coded as zero).

\( \text{LOGSALES}_{t-1} \) refers to the Log of Sales in year \( t-1 \).

\( \text{BRANDINDEX} \) refers to the brand index measure, that is, the factor score of the four nonfinancial brand-equity measures of differentiation, relevance, esteem, and knowledge.

\( \text{DIFFERENTIATION}, \text{RELEVANCE}, \text{ESTEEM}, \text{AND KNOWLEDGE} \) refer to differentiation (the perceived distinctiveness of the brand), relevance (the personal relevance and appropriateness and perceived importance of the brand), esteem (level of regard consumers hold for the brand), and knowledge (awareness and understanding of the brand identity), respectively, that is, the four nonfinancial brand-equity measures developed by Y&R.

AIC is Akaike’s (1973) information criterion. Year and industry indicators are included in all regressions but not reported. The table provides the parameter coefficient and \( t \)-statistics (in parentheses below each coefficient). The \( t \)-statistics are based on Newey and West (1987) standard errors.
with future financial performance. Considering that the inclusion of additional variables does not add to the explanatory power of the model, this finding should be interpreted with caution.

Overall, the results presented previously partially confirm our first hypothesis: contemporaneous and future BU financial performance measures capture the contribution of the growth potential of brand equity (differentiation). Our results are also consistent with our second hypothesis, that is, brand equity's current strength has no association with contemporaneous and future BU financial performance.

The control variables for years (nontabulated) are significant in most models. Size and the global branding strategy dummy are not significant in any of the models. This last result indicates that global brand standardization may increase overall firm performance (Rao, Agarwal, & Dahlhoff [2004]), but that strong local brands can deliver strong marketing and financial performance at the local BU level (Schuiling & Kapferer [2004]).

We perform additional robustness checks to verify our results. We note that our sample consists of local brand companies operating mostly in the Netherlands, as well as Dutch business units that are part of the global branding strategy of larger multinational firms. Measuring the financial performance of this last group of business units is not easy. First, because the financial statements of local branches may not be audited, the quality of the financial measures that are extracted from these statements is not guaranteed. We verify empirically whether the financial statements of local business units in multinational firms are audited by an external auditor and find that this is the case for 33 percent of the firms in our sample. Second, multinational firms have transfer pricing policies that may optimize tax payments globally, rather than giving an adequate picture of the financial performance of the local unit. These policies may add systematic noise to the financial measures of their local units. Finally, Dutch business units of multinational firms are likely to be more restricted by the global brand strategy of the parent company. That is, local brand firms may have more opportunities to act to local developments (including better responses to local needs, flexibility in pricing strategies, response to local competition, and so on) relative to their global brand BU counterparts. As a result, financial performance in these local brand firms may be more closely associated with brand-equity measures. Therefore, to see whether our results may be affected by the abovementioned transfer pricing policies and branding strategies, we perform subsample analyses for the Dutch national firms as well as the BUs in multinational firms.

In general, our results are similar in terms of sign of the coefficients, even though the statistical significance is lower due to the small sample size. This result suggests that the impact of transfer pricing policies and branding strategies on our results is limited. The important differences for the local companies are that esteem has a negative association with contemporaneous and future ROI

13. Thanks to one of the reviewers for pointing out this opportunity for a robustness check to us.
(p<0.1 for $ROI_t$ and $ROI_{t+2}$; p<0.15 for $ROI_{t+1}$); and that future $CFROI_{t+2}$ appears to be more strongly associated with the brand index measure (p<0.15) and with knowledge (p<0.05) rather than with historic financial performance. The main differences for the global brand BU sample are that there is no association between differentiation and current financial performance, yet there is one with BU financial performance (both ROI and CFROI) one and two years ahead. However, these results should be interpreted with caution, because the number of observations is small and the number of industries we use as control variables is reduced.

6. Discussion

Our study adds to the growing body of research that investigates the relation between the nonfinancial performance metrics, such as brand-equity measures, and accounting performance. Thus, our paper answers recent calls in the marketing and management accounting literature to substantiate which nonfinancial (brand-equity) measures explain contemporaneous and future (BU) financial performance (see Ittner [2008]; MSI [2008]).

Our results indicate that differentiation, which is a specific brand-equity measure, has a positive association with both current and future BU financial performance. One potential explanation for our results is that differentiation indicates the potential for future (profitable) growth at the BU level. In markets where products and services become more commoditized and offerings are similarly priced, differentiation may be a key factor in attracting (new) consumers. Differentiation may represent forward-looking attitudes of the local consumer mind-set that are not captured by historic BU financial performance measures or by any of the other brand-equity measures. Thus, differentiation appears to capture local consumer's perceptions on whether firm-level and local BU (marketing) decisions and activities jointly have set the local BUs brand and products or services apart from competitors. This finding suggests that the integration of firm-level and BU-level brand-building decisions to differentiate the brand should be a key concern for managers.

The lack of significance for the other brand-equity measures does not mean that they are irrelevant to companies. The effects of these other brand-equity measures (relevance, esteem, and knowledge) may be captured by other variables in the regression model, such as differentiation, historic sales, or industry dummies. For example, we find positive correlations between differentiation and the other brand-equity measures. We also find positive correlations between some of the other brand-equity measures (relevance, esteem, knowledge, and the brand index measure), historic sales, and specific industry dummies. In particular, relevance appears to be closely related to historic sales as well as to the brand strength dimension (esteem and knowledge). This suggests that relevance may reflect current and past customer behavior (purchase patterns) rather than future-oriented customer perceptions and preferences. Considering these correlations,
our brand index measure also appears to capture the brand-equity strength dimension rather than the growth dimension. Other brand-equity dimensions may thus be useful for marketing managers yet appear to have little value in explaining future BU financial performance.

7. Conclusion

Our results are important for both (marketing and financial) managers and designers of performance measurement and evaluation systems. First, our results provide marketing decision makers with the opportunity to substantiate their marketing investments. As a result, marketing decision makers can evaluate whether the amount to be invested in marketing campaigns and the specific results to be obtained in terms of brand equity (specifically differentiation) also can be expected to pay off in financial terms. The findings from this study thus may increase the accountability of marketers. Similarly, our results are relevant for financial managers as differentiation can help to forecast earnings and cash flows more accurately, or provide better value estimates for BUs that will be put up for sale. Thus, this research project is a first step in identifying and understanding how marketing assets contribute to both short- and long-term BU financial performance.

Our research also provides insights for performance measurement and incentive system design. The analytical accounting literature (e.g., Banker & Datar [1989]; Feltham & Xie [1994]; Datar, Cohen Kulp, & Lambert [2001]; Lambert [2001]) suggests that performance measurement systems should include any measure that provides additional information on the efforts of managers. Our results indicate that specific brand-equity measures are congruent with the goals that most firms pursue and provide additional information on future BU financial performance. Including brand-equity measures in compensation schemes might provide several advantages to firms: it motivates managers to focus on long-term firm value rather than only on short-term accounting profits; and it provides insight in managerial efforts and effectiveness in brand building.

The previously described interdependencies between firm-level and local BU (marketing) activities and decisions in building brand equity create a performance measurement problem. When the local BUs performance is influenced by the brand-building activities and decisions at the firm level, differentiation is a “noisy” measure for local BU management and thus less informative to firm top management. Differentiation not only captures managerial effort of the local BU manager, but also captures the brand-building actions and decisions at the firm level. This results in a free-rider problem: brand-equity measures at the local level may increase, yet this increase is not due to local BU manager’s effort but to firm-level brand-building decisions and actions. Similarly, when local BUs brand-building decisions and actions affect brand-equity measures at the firm level, brand-equity measures at the firm-level are noisy as they capture not only firm-level decisions yet also the (lack of) effort of all local BU managers. Firms
Thus face a trade-off between the congruity and sensitivity or precision of the brand-equity measures in designing performance measurement and incentive system design (Datar, Cohen Kulp, & Lambert [2001]).

Discussions with Y&R suggest that firms that consider their brands as important assets do use brand-equity measures in their incentive structures. The perception is that firms in the fast-moving consumer goods industry, in which the relation with the client is important yet indirect, apply brand-equity measures at both the firm level as well as at the local BU level. Examples include BUs in Procter & Gamble (see also Raggio & Leone [2006]) and Heineken. This suggests that brand-intensive firms consider brand-equity measures informative on local BU as well as firm-level (marketing) managers effort. Subsequent research may investigate the exact measurement (firm level or local level) and weights put on these brand-equity measures.

Our analyses have several limitations: first, there is the issue of causality. Although we assume that brand equity affects subsequent financial performance, which is consistent with models from Keller (1993) and Aaker (1991, 1996), this relation also may be the other way around. Considering the fact that marketing theory suggests that strong brands affect financial performance, it is unlikely that this relation runs from financial performance to strong brands.

Second, the brand-equity measures that we use in our study are designed by a specific firm, Young & Rubicam, and Y&R's measures might deviate from the concepts developed in the marketing literature, the measures used within companies, or both. We consider the risk that the operational definition of brand equity deviates from the marketing literature is limited, considering that the Y&R brand-equity model is well established (Keller [2003]; Aaker [1996]).

Third, there is the issue of endogeneity. In our model, we assume that brand equity is an independent variable, but in practice, it is one of choice in that firms decide how much they want to invest in brand equity. If all firms were to optimally select brand-equity investment programs based on exogenous factors, then after controlling for the exogenous determinants, there would be no statistical relation between brand equity and performance (Luft & Shields [2003]; Ittner [2008]). If that were the case, then our results could be explained by misspecification or the omission of relevant variables, but instead, the results of the RESET tests indicate that inadequate specification or omitted variables are unlikely to be problematic.

Fourth, our financial performance data are mostly based on data from units of larger firms. Even though subsample analyses provide similar results, we cannot exclude the possibility that the data are affected by tax or other external requirements of financial reporting policies.

Fifth, we may measure a "mechanical relation": firms that increase marketing expenses in year $t$ and reduce those marketing expenses in period $t+1$ will show an increase in performance. This is unlikely to be the case, however, because most measures of brand value increase in our sample, suggesting increased rather than decreased marketing expenses.

Sixth, branding is a long-term process, so the time lag of at most two years in our sample might not be long enough to capture the effects of branding activities.
The rather short time lag might explain the nonsignificant results for some of the brand-equity measures, such as esteem and knowledge. We do not control for corporate, BU, or product strategy, or for any other environmental variables, such as competition or economic circumstances.

Finally, our sample size is relatively small compared with other research projects, such as those by Wiersma (2008); Banker and Mashruwala (2007); and Banker, Potter, and Srinivasan (2000), that investigate the relation between nonfinancial measures and financial performance. As a result of this relatively small sample size, the significance of our estimates may be lower.

Despite these limitations, to our knowledge, ours is one of the first studies that investigates the relation between a highly relevant intangible asset (brand equity) and BU financial performance. Many issues, in addition to the limitations mentioned before, require further attention. For example, industry-specific analysis may shed light on different effects of brand-equity measures across industries. Further analysis of the interrelations among the brand-equity measures also may provide insight in how brand-equity measures affect BU financial performance.

### Appendix A

Gu (2007) notes that the regression residual dispersion with proper control for scale can be used as an alternative measure for comparing the explanatory power of different nonfinancial measures with financial performance. We analyze the relation between the four scale quartiles of the dependent variable and the explanatory power of the independent variables in the baseline and extended models. Results are reported in Table 5, Panels A and B.

### TABLE 6

<table>
<thead>
<tr>
<th>Scale Quartile</th>
<th>ROI&lt;sub&gt;t&lt;/sub&gt;</th>
<th>ROI&lt;sub&gt;t+1&lt;/sub&gt;</th>
<th>CFROI&lt;sub&gt;t&lt;/sub&gt;</th>
<th>CFROI&lt;sub&gt;t+1&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (ROI&lt;sub&gt;t&lt;/sub&gt;)</td>
<td>Error</td>
<td>Mean (ROI&lt;sub&gt;t+1&lt;/sub&gt;)</td>
<td>Error</td>
</tr>
<tr>
<td>1</td>
<td>-0.37</td>
<td>5.79</td>
<td>-0.09</td>
<td>6.17</td>
</tr>
<tr>
<td>2</td>
<td>4.65</td>
<td>4.29</td>
<td>4.10</td>
<td>4.39</td>
</tr>
<tr>
<td>3</td>
<td>8.27</td>
<td>3.96</td>
<td>7.04</td>
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</tr>
<tr>
<td>4</td>
<td>15.90</td>
<td>3.64</td>
<td>14.02</td>
<td>6.84</td>
</tr>
</tbody>
</table>

*Note: Estimation errors are obtained from regression residuals as follows:

- Regressions are run for the levels in models (1) \( PERF_{t+1} = \alpha + \beta \cdot \text{PASTPERF}_{t} + \varepsilon \) (where \( PERF_{t+1} \) is ROI or ROI<sub>t+1</sub>, CFROI<sub>t</sub>, or CFROI<sub>t+1</sub>; and \( \text{PASTPERF}_{t} \) is ROI<sub>t</sub> or CFROI<sub>t</sub>). Please see Table 4 for variable definitions of ROI and CFROI.

- Four scale quartiles are formed based on the absolute fitted values of the dependent variable; for each quartile, pricing errors are calculated as the absolute average residual for each quartile; for each individual observation, the individual abnormal residual is calculated by subtracting from the individual residuals the average absolute residuals of the scale quartiles to which the observation belongs; and the average abnormal squared residuals of the baseline and extended models are compared. Results are reported in Table 5, Panels A and B.*
models. Gu (2007) argues that residual dispersion is subject to scaling; thus, correct inferences based on residual dispersion call for proper control of the scale effect. To obtain adequate residuals, we run the baseline model (which includes solely the historic accounting measures) and the extended model (which includes the historic accounting and the nonfinancial brand-equity measures). Next, we find a "benchmark error" by calculating the average absolute residual of the scale quartile to which the observation belongs. We obtain scale quartiles by ranking the observations based on fitted values of the dependent variable.

Table 6 indicates that the relation between estimation errors and scale is nonlinear; as a result, the estimation errors may be contaminated by scale changes. Therefore, we calculate individual abnormal residuals by subtracting from the individual residuals the average absolute residuals of the scale quartile to which the observation belongs. Next, we recalculate the residual dispersion for each model using the abnormal errors. The average abnormal squared residuals of the baseline and extended models are compared; results for this test are reported in the bottom of Table 5, Panels A and B.

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Raggio, R. D., and R. P. Leone. 2006. Producing a Measure of Brand Equity by Decomposing Brand Beliefs into Brand and Attribute Sources. ZIBS Research Report, Emory University.


