

SYMPOSIUM

The predictive abilities of brand equity measures

Abstract

In this study, we investigate the ability of brand equity measures to predict future financial performance. Previous literature suggests that brand equity measures may be more relevant than historic accounting measures in explaining future business unit performance. Capitalizing on a unique data set, we examine whether specific brand equity measures are associated with future financial performance. Our results indicate that brand equity measures are leading indicators of future financial performance; however, historic accounting performance is a better proxy for future financial performance. Brand equity measures do provide incremental information to the information provided by historic accounting measures in explaining contemporaneous as well as future financial performance. The results from this study provide important insights for both marketing decision makers as well as for designers of performance measurement and incentive systems.

1 Introduction

There are claims in the literature that intangible assets are important determinants of firm value (Nagar & Rajan 2005; Gupta et al, 2004; Aaker 2001; Lev, 2001; Barth et al. 1998; Lehmann 2004; Amir and Lev 1996; Brooking, 1996). Examples of intangible assets include patents, trademarks, brands, licences, technology, employee training, a skilled workforce, and customer loyalty, amongst others (Wyatt, 2008, 2005; Lev 2001; Brooking, 1996); in this paper, we focus on brands. Accounting has been criticized for not consistently recognizing these intangible assets (Smith and Wright 2004; Kaplan and Norton 2000; Ittner and Larcker 1998; BrandEconomics 2002). To qualify as an asset for financial reporting, for example, it has to be shown, first, that the corporation exercises a considerable degree of control over the assets; that the risk concerning commercial success has been considerably reduced; and third, that market mechanisms are available to trade the asset or value its consequent cash flows (Lev 2001). As investments in (internally created) brands generally do not meet these qualifications, they are generally treated as expenses rather than as investments. As a result, accounting performance measures are argued to be of limited use in explaining firm value since they fail to capture the (long-term) benefits of investments in intangible assets.

The measurement difficulties described previously have prompted a search for alternative and reliable indicators of intangible assets; one alternative relates to the measurement, management and disclosure of non-financial performance measures (Maines et al, 2002). Non-financial performance measures may provide information that can explain future financial performance; in other words, non-financial indicators of investments in intangible assets may be better predictors of future financial performance than historical accounting measures. Studies on the predictive ability of a specific non-financial performance measures across companies are rather scarce (see Ittner, 2008; ; Chenhall & Langfield-Smith, 2007; Dikolli & Sedatole, 2007; and Shields & Shields, 2005, for reviews in this area). The challenge, therefore, is to substantiate which non-financial performance measures provide information (potentially in addition to financial data) for explaining future financial performance (Aaker & Jacobson, 2001).

In this paper, we capitalize on a unique data set to investigate whether specific non-financial performance measures (i.e., brand equity measures) are leading indicators of financial performance. Brand equity refers to the incremental utility or value added to a product by its brand name (Yoo et al, 2000); as such, it refers to customer perceptions, preferences and (predicted) behaviour (Keller, 1993). Brand equity measures intend to capture these perceptions and preferences of customers. Our research project extends previous research in this area in several ways. First, we investigate claims that specific non-financial performance measures (in our case: brand equity measures) are determinants of future financial performance. We distinguish between relative and incremental predictive ability as well as contemporaneous and leading effects, and we focus on several brand equity components and several accounting performance measures (specifically: return on investment, cash flow return on investment, return on sales, and sales over total assets). These issues are imperative in the design of the performance measurement and evaluation systems (cf. Chen et al, 2009; Dikolli Sedatole, 2007; Shields & Shields, 2005); they relate to questions such as: (a) what is the best performance measure for explaining future performance? (b) can specific brand equity measures provide incremental information beyond that of accounting performance

measures? and (c) can brand equity measures induce managers to develop a long-term perspective? Second, we focus on the accounting performance of several business entities rather than accounting performance of one firm. While previous research has indicated that specific non-financial performance measures are relevant within a firm (eg Chen et al, 2009; Wiersma, 2008; Banker & Mashruwala, 2007; Dikolli et al, 2007), there is little evidence about the predictive abilities of specific non-financial performance measures across firms and business units. As a result, the generalizability of the findings of previous studies may be low. Therefore, previous literature (eg Ittner, 2008; Nagar & Rajan, 2005; Shevlin, 1996) suggests that, to increase the generalizability of previous studies, it is better to rely on non-financial performance measures across entities rather than (solely) on individual firm's data. Third, while some studies (eg. Mizik & Jacobson, 2009, 2008; Barth et al, 1998) have provided evidence about the value-relevance of specific brand equity measures, stock markets may misprice information. We provide evidence that specific brand equity measures provide information about the future financial performance of the firm (rather than shareholders' impressions). Fourth, as literature suggests that non-financial indicators should shift managerial focus to a more long-term perspective (cf. Dikolli & Sedatole, 2007), we investigate the timing and duration of the non-financial performance measure (cf. Shields & Shields, 2005; Rust et al, 2004). That is, we investigate how long the association between brand equity measures and accounting performance lasts, and whether it is constant over the years. This is an important issue as previous literature has suggested that investments in intangible assets are expensed rather than amortized, which reduces the informativeness of financial statements. If brand equity information is important for managing the business, firms should consider reporting such forward-looking customer metrics in the supplementary sections of the annual report (cf. Wang et al, 2009; Wiesel et al, 2008). Finally, we provide some insight on the appropriateness of the brand equity model in explaining future performance (Aaker, 1996, 1991; Keller, 1993), a hot topic in current marketing literature (cf. Gupta & Zeithaml, 2006; Rust et al, 2004).

Our results indicate that brand equity measures are leading indicators of financial performance; an increase in brand equity is in all cases associated with an increase in future financial performance (including return on investment, cash flow return on investment and return on sales). However, historic accounting measures are better predictors of future financial performance than brand equity measures. This result defies previous claims in literature that brand equity measures are better measures for explaining future financial performance than historical accounting measures, yet is consistent with other research in this area (Wiersma, 2008; Nagar & Rajan, 2005; Maines et al, 2002, 2003; Banker et al, 2000). Our results also indicate that brand equity measures capture additional information not provided by historic accounting measures in explaining contemporaneous as well as future financial performance. This suggests that brand equity measures capture information (and, potentially, managerial effort) that is not included in historic accounting performance. Summarizing, we find some evidence that specific brand equity measures are leading indicators of financial performance. The results from this study provide important insights for both marketing decision makers as well as for designers of performance measurement systems.

The remainder of this paper is organized in 5 sections. The next section provides an overview of literature on brand equity and its' relation with financial performance. Section 3 discusses the data collection method and methodology, including sample characteristics and variables. The fourth section provides the results of the study, while the last section offers the discussion, conclusions and limitations.

2 Literature review and Hypothesis development

2.1 *Brand equity*

The concept of brand equity has emerged in the past 20 years as a core concept of marketing (Rust et al. 2004) and has received much attention from both managers and academics. The importance of brand equity is illustrated by the annual ranking of the world's top brands by several consulting firms (cf. Chu & Keh, 2006). In addition, the Marketing Science Institute has also designed the relation between brand metrics and financial performance as one of the research priorities (Marketing Science Institute, 2008).

One of the most common definitions of brand equity is that it is a set of brand assets and liabilities, linked to the brand's name and symbol, which can subtract from as well as add to the value provided by a product or service, and which provides value to customers as well as to a firm (Yoo et al, 2000; Aaker 1991, 1996). For example, the brand equity model by Aaker (1996, 1991) proposes that (1) brand equity creates value for both the consumer and the firm, (2) value for the customer enhances value for the firm, and (3) brand equity consists of multiple dimensions (cf. Yoo et al, 2000). Brand equity is important at (at least) two levels (Chu & Keh, 2006). At the macro or firm level, it affects the perception of investors and financial analysts, and subsequently plays a role in determining the stock prices of firms. At the micro or consumer level, it positively affects behavioural outcomes, including (future) purchase intent and other points of differentiation that lead to competitive advantages based on nonprice competition. As such, brand equity measures may provide an indication of current and future profitability of the firm, business unit or customer.

According to marketing literature (eg. Rust et al, 2004; Ambler et al, 2002; Keller, 1998; Aaker, 1991, 1996), brand equity is a multidimensional concept. There are five key dimensions that have emerged from prior literature (Keller & Lehmann, 2003; Ambler et al, 2002; Keller, 1998; Aaker, 1996, 1991):

- brand awareness: the extent and ease to which customers recall and recognize the brand and can identify the products and services with which it is associated;
- brand associations: the strength, favorability, and uniqueness of perceived attributes and benefits for the brand;
- brand attitudes: overall evaluations of the brand in terms of its quality and the satisfaction it generates;
- brand attachment: how loyal the customer feels towards the brand (including customer satisfaction and repeat buying patterns);
- brand activity or experience: the extent to which customers use the brand; talk to others about the brand; seek out brand information, promotions, and events; and so on.

In summary, high brand equity implies that customers have a lot of positive and strong associations related to the brand, perceive that the brand is of high quality, and are loyal to the brand (Yoo et al. 2000).

A key requirement for managing brand equity is the availability of good measures (Srinivasan et al, 2005), and several researchers and practitioners have suggested approaches to measure brand equity (see Srinivasan et al, 2005, p. 1434 for a review).

However, these brand equity measurement models provide little guidance with respect to the level of analysis (customer, product, business unit, entity), the timing (contemporaneous or lead), the duration (temporal length of the effect) nor the aspects of performance (such as return on investment, cash flow return on investment, return on sales, etc.; see Dikolli & Sedatole, 2007; Shields and Shields 2005). In this paper, we deal to some extent with three of these aspects: we provide information on the adequacy of the brand equity measures with regard to the congruity (i.e., the relation with financial performance), the level of analysis (firm and/or business unit), the timing (contemporaneous, 1 or 2 year lead) and the aspects of accounting performance that are associated with specific brand equity measures.

2.2 Brand equity and financial performance

Previous studies (eg. Mizik & Jacobson, 2008; Baldauf et al, 2003; Pahud de Mortanges & Van Riel, 2003; Kim et al, 2003; see also Keller & Lehman, 2006; Rust et al, 2004; and Ambler et al, 2002, for reviews) have investigated the relation between (aspects of) brand equity and financial performance. Two lines of research can be identified: the relation between brand equity measures and stock performance (value relevance studies), and the relation between specific brand equity measures (such as perceived quality) and financial performance (accounting performance; predictive ability studies).

A first line of research has investigated the value-relevance of financial estimates for brand equity. For example, Barth et al (1998) assess the information content of a brand equity measure generated by Financial World (FW) and a sample of 183 firms with data for some or all of the 1992-1996 period (404 pooled time-series cross-sectional observations). Financial World draws heavily on a brand value methodology developed by Interbrand Ltd. To form the Financial World brand equity measure, Financial World assumes earnings in excess of a 5% pre-tax return on capital to be brand-induced earnings; they multiply this figure by a 'brand strength factor' to obtain brand value¹ earnings. Barth et al (1998) indicate that brand value estimates are significantly positively related to prices and returns, incremental to accounting variables.

Madden et al (2005) extend this research and use the Interbrand method to empirically demonstrate that branding creates shareholder value. Based on the Interbrand valuation, they create a WMVB (World's Most Valued Brands) portfolio that contains the 111 companies that owned these brands. Their results indicate that strong brands deliver greater returns to stockholders than a relevant benchmark; in addition, strong brands appear to have lower risk than the relevant benchmark. Madden et al (2005) indicate that these findings hold even when market share and firm size are considered.

The previous studies use external sources to identify the value-relevance of information on brands; Kallapur & Kwan (2004) investigate the value relevance and reliability of brand assets recognized by 33 UK firms (i.e., internal valuation), and the stock price reaction to the announcement of brand capitalization. They find that brand assets are value relevant, i.e., associated with market values; however, their results indicate that there could be substantial differences in the extent of bias or error in brand valuations of firms with different levels of contracting incentives. Similarly, Muller (1999) investigates

¹ For additional details on Financial World's Brand Valuation Methodology, see: (Barth et al. 1998) and (Madden et al. 2005), p. 23-24

managerial decisions regarding whether to recognize acquired brands as an asset. The evidence by Muller (1999) suggests that UK firms are more likely to capitalize acquired brands when leverage is high, as well as to reduce the costs of seeking LSE mandated shareholder approval for future acquisitions and disposals. In other words, the research by Kallapur & Kwan (2004) and Muller (1999) suggests that the reliability of brand valuation is affected by the contracting incentives of the firm.

Other studies have investigated the value-relevance of specific elements of brand equity. For example, Aaker & Jacobson (1994) use the Equitrend database of Total Research corporation to investigate the information content of the dimensions of perceived quality and salience. The analysis is based on data for 34 consumer product firms for the three-year period 1990-1992 (i.e., 102 observations). 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 the information content of a brand attitude measure (a key component of brand equity) supplied by Techtel Corporation. They use quarterly data for 11 high-technology firms that have data available for all or some of the period 1988-1996 (resulting in 206 observations). Aaker & Jacobson (2001) find that changes in brand attitude lead accounting financial performance with one or two quarters, and are contemporaneously associated with stock returns. Aaker & Jacobson (2001) interpret this finding as stemming from the stock market participant's realization that brand equity leads return on equity; that is, the stock market incorporates the intertemporal effects of brand attitude on accounting performance into current stock prices.

Mizik and Jacobson (2008) link stock returns to changes in specific brand equity measures (including differentiation, relevance, quality, familiarity, and vitality) and unexpected changes in accounting performance. Using stock response modelling, they examine the effect of changes in each brand asset component and unexpected changes in accounting performance (i.e., earnings: operating income before depreciation divided by assets, and sales growth) for stock market valuation. Their analysis is based on data on 275 publicly traded firms in which a single brand represents the bulk of the firm's business (examples include Coca Cola, AT&T and Disney) and includes more than 1700 observations for BAVTM data from Young & Rubicam over 1993, 1997 and 1999-2004, CRSP data tapes for stock return information and COMPUSTAT data tapes for accounting performance measures. Mizik & Jacobson (2008) find that brand equity measures influence stock return 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 current as well as in future changes in accounting performance.

Finally, several studies have investigated the relation between (specific) brand equity measures and future accounting performance. For example, Kim et al (2003) examine the underlying dimensions of brand equity and how they affect financial performance of hotel firms. The results of this empirical study, using data collected via intercept surveys on 12 luxury hotels in Korea, indicate that brand loyalty, perceived quality, and brand image are important components of consumer-based brand equity. Their results indicate that specific brand equity measures are positively related to current financial performance (measured as revenue per available room in the hotel). Similarly, Smith & Wright (2004) investigate the relations between brand image, product quality, 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 indicate that brand image is not related to customer loyalty, yet that it is positively related to average price, which in turn is associated with contemporaneous sales growth. Morgan & Rego (2006) find different relations between repurchase likelihood (i.e., a customer's stated probability of purchasing from the same provider in the future) and the number of recommendations (the number of people to whom consumers of a firm's product or service would recommend the brand or company) and several financial performance measures (including cash flows, sales growth and margins after one to three quarters). Finally, Eng & Keh (2007) find that brand value estimates (obtained from Financial World magazine) are positively and significantly related to financial performance (ROA) for 3 years, yet that the positive effect declines over time.

2.3 Hypothesis development

Summarizing, the previous studies suggest that (financial) estimates for brand equity are value-relevant, yet that these estimates of brand equity may be biased (i.e., less reliable) due to contracting incentives. Second, there appear to be (mostly positive) relations between (unexpected changes in) specific brand equity measures and (unexpected changes in) current and future accounting performance (specifically, sales and return on assets, ROA). However, previous research provides little guidance for designing effective performance measurement and incentive systems; that is, should brand equity measures be included in performance measurement and incentive systems? Performance measurement systems should provide information that help managers to improve decision making; incentive systems should reward those performance measures that help to increase firm value (i.e., current as well as future financial performance). Therefore, to make informed decisions on the design of such systems, we need to focus on the ability of brand equity measures to explain future financial performance (Shevlin 1996; Nagar and Rajan 2005).

Historically, firms have relied almost exclusively on accounting performance measures (such as profits or accounting returns) for performance measurement. Accounting performance measures have many characteristics that help explain their prominent role in performance evaluation: they are subject to a variety of internal controls and external audits (i.e., reliable and objective), they are required for external reporting (i.e., comparable across firms and/or business units 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 (cf. Merchant, 2006; Otley, 1999). In addition, previous research suggests that accounting measures are relevant for the value of the firm (cf. Maines et al, 2003). However, some literature suggests that accounting measures are historical and 'backward-looking', are transactions-oriented and conservatively biased, and may reward excessive short-term and incorrect behaviour (gamesmanship and data manipulation; see Chenhall & Langfield-Smith, 2007; Atkinson et al, 1997; Merchant, 2006, 1990); this suggests that it is unlikely that accounting measures will be positively associated with future accounting performance.

On the other hand, it is often argued that non-financial performance measures are better predictors (or value-drivers) for future accounting performance. Non-financial performance measures are argued to improve contracting; that is, they may shift the attention of short-horizon managers to the long-horizon interests of the firm (cf. Dikolli &

Sedatole, 2007). In addition, they may help managers to evaluate the cause-and-effect relationships between marketing and (future) financial performance measures (cf. Kaplan & Norton, 2000). Thus, non-financial performance measures may be better predictors for future financial performance than financial performance measures. Yet non-financial performance measures also have some characteristics that make them more difficult to use in performance evaluation relative to accounting measures: they provide information on a limited set of activities (for example, branding); in other words, they are no 'summary measures'. Such 'partial measures' may not be congruent with the goals of the firm, and may result in dysfunctional behaviour such as gamesmanship and manipulation (cf. Merchant, 2006). In addition, non-financial performance measures are generally not comparable and/or relevant across firms or business units, they are generally unaudited and/or based on perceptions, and their linkage to future value is relatively uncertain (cf. Maines et al, 2002). Despite these potential disadvantages, several authors (Lev, 2004a; Lev & Daum, 2004; Baldauf et al, 2003) suggest that brand equity measures may be better predictors of future accounting performance than historic accounting measures, especially in industries where brands are of key importance to firms (cf. Wiesel et al, 2008).

Few papers² empirically test claims that non-financial performance measures) are *better* predictors for future financial performance than historic accounting numbers. Some papers suggest that non-financial indicators are better proxies for stock prices and/or future financial performance. For example, Amir & Lev (1996) suggest that growth and operating performance measures may be more relevant for the valuation of a wireless communications firm than earnings. Similarly, Nagar & Rajan (2001) suggest that non-financial quality performance measures may be more relevant for future changes in sales relative to financial quality performance measures. Finally, Morgan & Rego (2006) provide evidence on the predictive abilities of several specific marketing performance measures for future financial performance (including cash flows, total shareholder returns and sales growth). These studies suggest that specific non-financial performance measures may be better indicators of future accounting performance relative to historic accounting performance measures. However, to the authors' knowledge, there are no studies that explicitly investigate whether brand equity measures are drivers of future accounting performance. If brands are key intangible assets that drive future financial performance (as argued in the literature) and brand equity measures adequately capture the underlying value drivers of the firm, we may assume that they are more positively associated with future financial performance relative to historic accounting profits, especially in industries where brands are the primary assets of the firm. This results in our first hypothesis:

H1:

Brand equity measures are more informative predictors of future accounting performance relative to historic accounting measures.

The first hypothesis provides information on the relative information content of alternative performance measures (cf. Biddle et al, 1995). Relative information content assesses whether one measure contains more information than another (cf. Biddle et al, 1995). Relative information content is an important question when it is costly to collect information on specific dimensions of performance; in that case, choices have to be

² Examples of such (sometimes implicit) tests are provided in Wiersma (2008), Nagar & Rajan (2001), Lev & Demers (2001) and Amir & Lev (1996).

made about which measures to supply and/or reward (cf. Wiersma, 2008). Because relative information content assesses which measure better predicts future financial performance, it can be considered as a comparison of the congruity of different measures with the objectives that have to be achieved (cf. Wiersma, 2008).

Our second hypothesis relates to the incremental information content of specific performance measures. Incremental information content assesses whether additional information is helpful to make better predictions beyond an existing piece of information (cf. Biddle et al, 1995). In the context of performance measures, this implies that measures should have a non-zero weight in the reward system if they provide information about the dimensions of managerial actions that are not represented in other performance measures (cf. Wiersma, 2008; Datar et al, 2001). Several studies have explored the incremental information content of non-financial performance measures (see Ittner, 2008; Dikolli & Sedatole, 2007; and Shields & Shields, 2005, for reviews). In general, these studies suggest that non-financial performance measures have incremental information content in explaining future accounting performance.

We follow previous literature and assume that brand equity measures have incremental information content relative to historic financial performance measures. First of all, marketing literature suggests that these measures are important for explaining stock prices as well as future financial performance (cf. Mizik & Jacobson, 2008; Morgan & Rego, 2006; Yoo et al, 2000); thus, brand equity measures appear congruent with the objective to create value. In addition, brand equity measures are argued to capture the drivers of future accounting performance; that is, increases in brand equity are associated with an increase in the perceived value of products, thereby attracting customers and influencing customers' preference and choice which should result in higher price premium, volume premium, and revenue premium for the branded products. In addition, brand equity measures should provide an indication of customer loyalty and attachment; these affect future consumption patterns and firm risk, which can have an impact on a firm's future financial performance (cf. Keller, 1993). Finally, brand equity measures may reduce managerial incentives to increase short-term profits at the expense of long-term value. Current accounting regulation requires that marketing expenditures are expensed rather than amortized³. As a result, managers can increase short-term profit by reducing investments in R&D and marketing at the expense of the long term value of the firm (cf. Mizik & Jacobson, 2007). By adding (more) weight to

³ Financial accounting regulation requires that investments in brands (as well as R&D) are generally recognized as marketing (or R&D) expenses rather than as marketing investments (exceptions are brands obtained in the acquisition of another firm). As a result, investments in brands and R&D are 'lost' in subsequent periods; i.e., in financial terms, management cannot relate investments in brands or other intangible assets to the subsequent profits (or losses) that are the result of these investments. As financial accounting systems do not trace on a regular basis such investments in intangibles and subsequent value resulting from it, it is often difficult (and therefore expensive) to obtain information on it. Several marketing consulting firms, including Young & Rubicam as well as others, have developed brand equity measures to trace the customer perceptions and the perceived value of a brand. Other consulting firms have developed all sorts of employee and process measures to measure performance in specific areas. These measures trace brand equity (or other performance measures, in financial or non-financial terms) yet do not link current brand equity value to the required investments to build brand equity. Firms could voluntarily provide information on brand equity and other intangible assets in the management discussion and analysis or the management commentary sections of the financial report to help investors monitor firms performance (cf. Wiesel et al, 2008).

brand equity measures in incentive contracts, top management may reduce such dysfunctional behaviour. Summarizing, as brand equity measures are congruent with firm value and are likely to capture elements in managerial performance that are not reflected in historic accounting performance (as brand equity measures are oriented towards the future), it is likely that they have (at least some) incremental information content. This results in our second hypothesis:

H2:

Brand equity measures are incrementally informative predictors of future accounting performance, in addition to historic accounting measures.

Our research model is presented in figure 1.

[Insert figure 1 here]

3. Data and Research Methods

We use two sources to compile our data set. Data on brand equity measures are obtained from a proprietary data set from Young & Rubicam's BrandAsset™ Valuator database. Data on accounting performance measures are hand-collected from the REACH database. Each data set will be discussed shortly. Finally, we discuss the control variables included in our study as well as some statistical considerations.

3.1 Brand equity measures

Our measures for elements of brand equity are based upon proprietary data from Young & Rubicam (Y&R). Y&R's brand equity measure called the BrandAsset™ Valuator (BAV™)⁴ is a world-wide study of over 500.000 consumers' attitudes to approximately 35.000 brands across the same set of 55 parameters in 44 countries, conducted at regular intervals over 12 years (Keller 2003a; ConsultBrandStrategy 2005; Aaker 1996). BAV™ is one of the most comprehensive research programs on branding undertaken globally; it is widely recognized as one of the major brand equity measures (see Keller & Lehmann, 2006, 2003). BAV™ measures brands on four fundamental measures of brand equity value and in terms of a broad array of perceptual dimensions⁵. BAV™ provides comparative measures of the equity value of thousands of brands across hundreds of different categories, as well as a set of strategic brand management tools for planning brand extensions, joint branding ventures, and other strategies designed to maintain and grow brand value. Unlike most conventional brand image surveys, respondents evaluate brands from many different categories rather than just those within a narrowly defined category. The BAV™ measures are relative measures; i.e., all brands are ranked relative to each other, across all industries. BAV™ is thus argued to be able to follow truly global brand trends (as well as local brand trends) and to draw the broadest possible conclusions about how consumer-level brand equity is created and

⁴ BrandAsset™ Valuator is a registered trademark.

⁵ This section draws heavily on ConsultBrandStrategy 2005; Keller 2003a, appendix chapter 10; and Aaker 1996a.

built – or lost. Table 1 summarizes the BAV™ pillars, their meanings, and measurements.

[Insert table 1 here]

There are four key measures of brand health in BAV™ – the four ‘pillars’. Each pillar is derived from various measures that relate to different aspects of consumers’ brand perceptions and that together trace the progression of a brand’s development:

- *Differentiation* (labelled DIFF) measures the degree to which a brand is seen as different from others, which is a necessary condition for profitable brand building.
- *Relevance* (labelled REL) measures the breadth of a brand’s appeal (the overall size of a brand’s franchise) towards the (potential) customer base.
- *Esteem* (labelled EST) measures how well the brand is regarded and respected – in short, how well it’s liked.
- *Knowledge* (labelled KNOW) measures how familiar and intimate consumers are with the brand.

The first measure relates to customer awareness, the other measures towards associations and attitudes towards the brand (cf. Rust et al, 2004; Ambler, 2000). We investigate the relation of these four measures with contemporaneous as well as future financial performance. Since previous research (Mizik & Jacobson, 2008) suggests that these four pillars are highly correlated, we use an additional Brand Index measure that captures all four pillars. The Brand Index measure is computed based on factor analysis of the four pillars (similar to Mizik & Jacobson, 2008)⁶.

In the Netherlands, ConsultBrandStrategy has collected and stored these data on over 1,000 brands⁷ in the Netherlands. The data are measured in the beginning of a year (January/February), and (partially) published in the Spring (June) of the same year. The frequency of data collection has not been constant and has increased over time. We use survey data from 1997, 2000 and 2003 since we are able to match these to financial data for these companies. We restrict our analysis to ‘mono-brand’ firms and business units, i.e., firms and business units for which a single brand represents the bulk of the firm’s or business unit’s operations. We are able to identify 116 of these ‘mono-brands’ in the Young & Rubicam database; for 89 firms or business units, we are able to identify financial data for at least one year. We exclude monopolistic firms (for example, the Dutch railroad operator NS and the Dutch national airport Schiphol) since previous research (Anderson et al. 2004) suggests that monopolistic firms may have higher accounting performance⁸. We limit our analysis to the Dutch operations of foreign firms, or to firms that have at least 50% of their sales in the Netherlands. For example, we investigate the relation between the brand equity of Citroen and Renault (French car manufacturers) in the Netherlands and the financial performance of the Dutch branches

⁶ Factor analysis reveals that all four measures load on one component. Factor loadings are .513 (differentiation), .857 (relevance), .896 (esteem) and .780 (knowledge).

⁷ The criteria that Young & Rubicam utilizes in selecting what brands to include in the database are: (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.

⁸ On the other hand, these monopolistic firms are to a large extent controlled by the Dutch government which may actually decrease performance due to the fact that the government will not allow ‘excess profit’.

of Citroen and Renault (not the consolidated financial results of Citroen and/or Renault). For the same reason, we exclude Heineken (brewery) and DAF (car manufacturer) from our analysis since more than 50% of their sales is in other countries than the Netherlands. Our final sample consists of mainly non-listed firms (22.5% of our sample) as well as Dutch business units of larger international firms (77.5% of our sample). Organizations in our sample include, for example, Hero (food), Bavaria (brewery), Coca Cola Netherlands (bottler), Levi's Netherlands (apparel) and Efteling (amusement park). BrandAsset™ Valuator measures for these brands are available for all or some years for the three surveys.

To assess the validity of our measures, we compare the brand equity measures to the ranking and value of international brands developed by MillwardBrown and the Financial Times⁹. We are able to obtain BrandZ rankings and values for 18 individual brands; the Spearman correlation between the BrandZ value and the brand equity measures in our sample is positive, yet not significant ($p > 0.29$)¹⁰. The positive correlation between these measures provides some additional assurance regarding the validity of the measures that we use.

3.2 Financial performance measures

We collect financial performance measures by hand from the REACH database. The REACH database lists the annual reports for all companies that have to file their annual reports at the Chamber of Commerce in the Netherlands. REACH generally provides data for 5 consecutive years, starting from the last filed annual report. Financial data may be incomplete due to the fact that companies may merge or provide consolidated accounts (for example, for their European operations rather than solely for the Dutch operations). For the purposes of this research project, we use three specific measures¹¹:

- Return on Investment (ROI), specified as EBIT/total assets;
- Cash Flow Return on Investment (CFROI), specified as cash flow/total assets;
- Return on Sales (ROS), specified as EBIT/total sales;

Although these financial measures are not independent, the use of several measures can provide additional information on the relation between elements of brand equity and specific financial performance (Ittner, 2008; Morgan & Rego, 2006; Banker et al. 2000). We obtain annual financial measures for the period 1997-2004, where possible; tests are based on at least 198 observations.

3.3 Control variables

⁹ 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/globalbrands2006>.

¹⁰ We would expect a positive correlation, yet the significance is questionable; that is, the total value of international brands is probably different from the local value of brands due to country-specific preferences, differences in market size, etc.

¹¹ Originally, we also investigated the impact of brand equity measures on sales over total assets; however, our analyses indicated that this relation is insignificant. Sales over total assets is mainly determined by industry characteristics.

We include 4 control variables in our analysis. We include company size as a proxy for market power¹²; size is measured as total sales (LGSLSt-1, for equations for ROI and CFROI) respectively total assets (LGTAt-1, for equations for ROS)¹³. We include industry since financial ratios differ to a large extent among industries; we distinguish among durable manufacturing industry (DMFTG, industry codes 26-37); non-durable manufacturing (NDMFTG, industry codes 15-25); wholesale and retail trade and repair of motor vehicles and motor cycles (WRTMV, industry code 50); wholesale trade and commission trade (WST, industry code 51); retail trade, repair of personal and household goods (RT, industry code 52); accommodation and food service activities (ACCF, industry code 55) transportation and communication (TRCOM, industry code 60-64); and other service industries (SERVOTH, industry codes 71, 74 and 92). We also use a dummy variable to distinguish between 'single business firms' and business units of larger (international) firms (BU=1 when the company is part of a larger international firm, BU=0 when the company is a single business firm). Finally, we include year dummies (YR00 for BAVTM-observations over 2000, YR03 for BAVTM-observations over 2003; our control year is 1997).

3.4 Other statistical considerations

One of the issues in the specification of the model is the choice for level or change models (Wiersma, 2002; Banker et al. 2000). The change model has the advantage that it reduces bias in estimates resulting from spurious correlations and omitted variables. However, a disadvantage is that change models assume a constant relation between the change and the dependent variable. Additional problems with change variables are high unreliability and correlation with its components (Wiersma 2002). Finally, considering the relatively long time periods between the measurement of brand equity elements in our data set, the impact of a change in brand equity and the subsequent change in financial performance is hard to model (i.e., it is difficult to determine whether the results will show up in the first, second or third year of our sample period). Based on these considerations, we rely on estimates for the level models. Another related issue is the adequate time lag. Our time lag of up to 2 years is exploratory, in a sense that there is no formal theory that can indicate that length of this so-called 'lag'. It is possible to execute a specification search to explore this lag from the data (Morgan & Rego, 2006; Banker et al. 2000; Wiersma 2002); we cannot exclude the possibility that the impact of the brand equity measures will manifest itself beyond these 2 years. Finally, additional tests¹⁴ indicate that it is unlikely that an omitted variable bias or misspecification disturbs our results

In our tests, we compare the ability of brand equity measures to explain future financial performance with the ability of historic accounting measures to explain future financial performance. In addition, we investigate whether brand equity measures provide

¹² Another option is to proxy for market share as a proxy of size. However, we cannot obtain industry sales for all the years included in our sample. As such, the use of market share would mean that we lose a number of observations.

¹³ We use total sales when the denominator in the accounting performance measure does not include total sales, and total assets otherwise. In addition, for the STA-measure we reestimate the model using total assets as a control variable; the results remain mostly the same.

¹⁴ We use the RESET-test (Verbeek 2004), p. 63, p. 66) to test for omitted variable bias or misspecification.

additional information relative to historic financial performance in explaining future financial performance. Our tests are comparable to the tests for relative and incremental information content in capital market research (Biddle et al, 1995; Biddle et al, 1997). The previous tests jointly provide an indication as to whether brand equity measures are leading indicators of financial performance. We use the adjusted R^2 and the AIC to determine the predictive ability of brand equity measures. We winsorize the variables to reduce the effects of outliers¹⁵. To control for heteroskedasticity, we use Newey-West HAC standard errors and covariance.

4. Results

4.1 Descriptive statistics

Table 2 provides the characteristics of the firms and business units included in the sample. Table 3 provides the descriptive statistics for the variables used in our analysis.

[Insert table 2 and 3 here]

Table 2 and 3 indicates that our sample represents a wide cross-section of firms that vary significantly in terms of industry, size, brand characteristics, and financial performance. These firms are not representative of the Dutch population of firms as a whole; they are on average fairly large, have strong brands¹⁶ and mostly from the wholesale and retail industry (BIK-codes 50, 51 and 52). The characteristics of the sample may reduce the ability to generalize our findings to other industries and to 'multibrand firms' (i.e., firms with several brands in their portfolio).

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

[Insert table 4 here]

Table 4 reveals that the different brand equity measures are closely related ($p > 0.20$, $p < 0.01$); in addition, the Brand Index (BIT) is closely associated with the four individual brand equity measures ($p > 0.51$, $p < 0.01$). The correlations also suggest some associations between elements of brand equity and industry (for example, relevance (REL) is negatively associated with wholesale and retail trade in motor vehicles (WRTMV) and accommodation and food industry (ACCF), yet positively associated with wholesale trade (WST) and durable manufacturing (DMFTG); this suggests that there are industry characteristics (for example, product features or distribution channels) that affect brand equity. In addition, size (total assets, total sales) is also positively associated with brand equity: large firms have higher scores on the brand index,

¹⁵ Another option is to use the casewise diagnostics method in order to identify data points that do not fit the imposed model. In general, this increases the significance of the (brand equity) variables. However, this method also results in the fact that the data are 'molded' to fit the model, rather than test whether the model fits the data.

¹⁶ The brand equity measures are relatively scaled, i.e., the within the Dutch sample the lowest ranking brand receives a score of 0 and the highest ranking brand receives a score of 100. The average for the brand values is above 50, which means that the sample is biased towards the stronger brand.

relevance and knowledge ($p < 0.01$). In other words, large firms are more known amongst consumers, and are also more relevant to them (i.e., more consumers are likely to purchase products or services at these firms). There also appears to be a negative relation between brand equity and being a business unit (rather than a single business firm); this may be due to the fact that the 'single business firms' have more recognized brands in our sample (esteem and knowledge are higher for the firms), that they are larger or that there are industry effects. The relation between brand equity elements and financial performance is almost always positive and in about half of the cases significant. For example, DIFFT is positively and significantly associated with all measures of financial performance; similarly, RELT is positively associated with CFROI and ROS. The correlations suggest that brand equity measures in period T are associated with current as well as future financial performance. In addition, most financial performance measures appear to be related. Finally, there are industry effects with regard to financial performance. This suggests that industry effects may be associated with both brand equity measures as well as financial performance.

4.2 The Predictive ability of brand equity measures

To test the predictive ability of brand equity measure, we estimate the following regression equations:

$$PERF_{i,t+n} = \alpha_j + \beta_{1j} * IND_i + \beta_{2j} * SIZE_{i,t} + \beta_{3j} * PASTPERF_{i,t} + \beta_{5j} * BU_i + \beta_{nj} * YR + \varepsilon_i \quad (1)$$

$$PERF_{i,t+n} = \alpha_j + \beta_{1j} * IND_i + \beta_{2j} * SIZE_{i,t} + \beta_{4j} * BE_{i,t} + \beta_{5j} * BU_i + \beta_{nj} * YR + \varepsilon_i \quad (2)$$

respectively

$$PERF_{i,t+n} = \alpha_j + \beta_{1j} * IND_i + \beta_{2j} * SIZE_{i,t-1} + \beta_{3j} * PASTPERF_{i,t-1} + \beta_{4j} * BE_{i,t} + \beta_{5j} * BU_i + \beta_{nj} * YR + \varepsilon_i \quad (3)$$

Where:

$PERF_{i,t+n}$ = performance in period $t+n$ ($n=0,1,2$), i.e., either return on investment, cash flow return on investment, return on sales or sales over total assets, for firm i ;

IND_i = industry dummy for respectively durable manufacturing, non-durable manufacturing, wholesale and retail trade and repair of motor vehicles and motor cycles, wholesale trade, retail trade, accommodation and food service activities, transportation and communication, and other services, for firm i ;

$SIZE_{i,t-1}$ = Size (measured by logarithm of sales or total assets) of firm i in year $t-1$;

$BE_{i,t}$ = Brand equity (respectively BIM, Brand index measure; DIFF, differentiation; REL, relevance; EST, esteem; KNOW, knowledge; and BIT, brand index) in period t for firm i ;

$PASTPERF_{i,t-1}$ = performance in previous period $t-1$, i.e., either return on investment, cash flow return on investment, return on sales or sales over total assets, for firm i ;

BU_i = Business Unit dummy for firm i (i.e., $BU=1$ if the firm is a business unit of a larger firm, $BU=0$ if the firm is a single business firm);

YR = Year dummies for measurement year of brand equity (respectively 1997, 2000 or 2003);
 ε_i = Error term of firm i.

The previous regression equations jointly provide insight in the predictive ability of brand equity measures. By comparing the results from regression (1) to the results from regression (2), we obtain an indication of whether the brand equity measures are better predictors for future financial performance than historic accounting measures. If brand equity measures are better predictors for future financial performance than historic accounting measures, we may expect that (a) the explanatory power of the brand equity model exceeds the explanatory power of the historic accounting measure model, and (b) the t-statistic of the brand equity measure exceeds the t-statistic of the historic accounting measure model. We test condition (a) by focusing on the Adjusted R2, the Akaike Information Criterion (AIC) and the results of the Vuong-test. By comparing the results of different time-lags for regression (3), we get an indication of whether the brand equity measures are contemporaneous or leading indicators of financial performance, in addition to historic accounting measures. If brand equity measures are better predictors for future financial performance than for current financial performance, we expect that (a) the explanatory power (i.e., adjusted R2 and AIC) of the 'future model' exceeds the explanatory power of the 'contemporaneous model', and (b) that the significance of the t-test for the leading effects of the brand equity measures are larger than the significance of the t-test for the contemporaneous effects of the brand equity measures. Table 5 provides the results for the first two regression equations.

[Insert table 5 here]

Table 5 indicates that specific brand equity measures are more informative of future financial performance than the general brand index (BIM). That is, the significance (t-statistic) of differentiation exceeds that of the brand index; in addition, the adjusted R2 for the 'differentiation model' exceeds the adjusted R2 for the brand index models. Apparently, specific brand equity measures are more informative than a combined measure. In addition, table 5 reveals that brand equity measures are positively associated with future financial performance; for example, an increase in Brand Differentiation (DIFF) of 10 points is associated with an increase of future ROI of +0.8%, an increase of future CFROI of 0.9% and an increase in future ROS of 0.5% (all one year ahead). Other brand equity measures (REL, EST) also have positive and significant relations with future financial performance (one year ahead, with the exception of ROI). However, historic accounting measures appear to be better indicators for future accounting performance than brand equity measures: historic accounting performance is significant at the 1%-level in all cases as a predictor for future financial performance. In addition to the t-statistic, the Adjusted R2, the AIC and the Vuong test also indicate that the historic accounting measures outperform the brand equity measures as predictors of future financial performance. The results for the other variables are mostly consistent with expectations: size (sales, i.e. market power) appears to be associated with ROI; this may take away some of the effects of Relevance and/or Knowledge measures. Industry effects become significant in most models. The business unit of global firms is not significant in any of the models; this is inconsistent with evidence in the marketing literature that (global) brand standardization increases performance (Rao 2004; Solberg 2002). One reason may be that the firms in the sample are well known brands in the Netherlands, and that global brands do not have local benefits for international firms. Finally, the year 2000 dummy appears to be significant in some of the models; this

suggests that economic performance in 2000 was below that of 1997. Summarizing, brand equity measures are indicators of future financial performance; however, their predictive ability does not exceed the predictive ability of historic accounting measures. Based on these results, the first hypothesis is rejected.

Our second hypothesis deals with the question whether brand equity measures are leading indicators, incremental to historic accounting measures. We therefore compare the results of a model that estimates the contemporaneous effects of brand equity measures to the results of models that provide estimates for the leading effects of brand equity measures. Table 6 provides our results.

[Insert table 6 here]

Table 6 indicates that brand equity measures appear to have some incremental predictive power in explaining future accounting performance, in addition to historic accounting measures. More specifically, we find that Differentiation (DIFF) is positively associated with current¹⁷ (i.e., contemporaneous) as well as future financial performance (i.e., one or two years ahead). This provides some preliminary evidence that brand equity measures are leading indicators of financial performance, and is consistent with literature that suggests that brand value is positively associated with future financial performance for a number of years (cf. Eng & Keh, 2007). The positive effects of brand equity measures on future performance are decreasing; however, the relation between historic financial performance and future financial performance appears to decrease faster. One interesting observation relates to the ROI and ROS two years ahead: for those models, differentiation (and to a lesser extent relevance) are positively associated with future financial performance, while esteem (and knowledge) are negatively associated with future financial performance. One reason may be that brands have different life cycles: over time, customers may have (specific) associations with a brand yet that may not necessarily mean that they are willing to pay for these associations. All models suggest that brand equity measures provide information beyond the information captured by historic accounting measures. The previous results confirm hypothesis 2, i.e. specific brand equity measures appear to some extent leading indicators of future financial performance, incremental to historic accounting performance.

5. Discussion and Concluding Comments

This study contributes to a growing body of research investigating the relation between specific non-financial performance metrics and financial performance. In this paper, we investigate the relation between specific Brand Equity measures (Differentiation, Relevance, Esteem and Knowledge, as well as a combined brand equity measure labelled Brand Index Measure) and contemporaneous as well as future financial performance (return on investment, ROI; cash flow return on investment, CFROI; and return on sales, ROS). As such, our paper answers to recent calls in management accounting literature to substantiate which non-financial performance measures provide information (potentially in addition to financial data) that help to explain the (future) financial performance of a firm (Wiersma, 2008; Banker & Mashruwala, 2007; Lev and

¹⁷ Note that the brand equity measures are collected in the beginning of the year while the financial performance measures deposited at the end of the year. This suggests that there is, on average, a 'half year lag' between brand equity measures and financial performance measures for the same year.

Daum 2004; Kaplan and Norton 2004; Kaplan and Norton 2000; Smith and Wright 2004; Lev 2001; Aaker 2001; Aaker and Jacobson 2001; Maines et al, 2002). In addition, our results provide some evidence on the relevance of brand equity measures in explaining future financial performance (Aaker, 1991, 1991; Keller, 1993), an area which has received considerable attention in the marketing literature (MSI, 2008; Keller & Lehman, 2006; Rust et al, 2004; Ambler et al, 2002).

Our results indicate that brand equity measures are leading indicators of financial performance (including future return on investment, ROI; cash flow return on investment, CFROI; and return on sales, ROS). However, historic accounting measures are *better* predictors of future financial performance than brand equity measures. This result defies claims in literature that brand equity measures are better measures for explaining future financial performance than historical accounting measures yet is consistent with the results from previous research (Maines et al, 2002; Wiersma, 2008; Banker et al, 2000). One reason may be that other studies that have found significant results for the importance of non-financial performance measures (eg. Lev & Demers, 2001; Amir & Lev, 1996) have focused on high-tech industries, with mostly loss-making firms. Our sample focuses on well-established and (on average) profitable firms from several industries, for which brands are highly recognized and –apparently- important. In that situation, financial performance measures may be more relevant than non-financial performance measures. This may also explain why firms rely on incentives that reward (sustainable) increases in financial performance (cf. Leone & Rock, 2001). Overall, this result implies that the historic financial performance measures are more congruent with future financial performance than the brand equity measures.

Our results also indicate that specific brand equity measures provide *additional* information to the information provided by historic accounting measures. Differentiation appears to provide additional information, in addition to historic accounting performance, in explaining contemporaneous as well as future financial performance. The previous results do not imply that other elements of brand equity are not related to financial performance; rather, these other elements (such as Relevance and Knowledge) may be leading indicators for Differentiation and/or Esteem, may take longer to show up in financial performance than the 2 years that we employ in our sample, or may be captured by other variables (such as market power and/or size). In addition, brand life cycle developments may be important. For example, Y&R suggests that brands that are high in knowledge and esteem may see differentiation decline, particularly as competitors challenge the firm's market dominance. The firm may seek to maintain market share through promotional tactics such as discounting, yet this may accelerate the erosion of a brand's premium position. It may be that our sample holds a number of brands which are high in esteem and knowledge (as our data suggest), yet currently experience a decline in differentiation. According to Y&R, such a decline should (eventually) result in a decline in financial performance¹⁸. Additional research along these lines may provide interesting results.

Summarizing, brand equity measures appear to provide information that is not (fully) captured by accounting performance measures and help to explain future financial performance. Our results are important for both marketing decision makers as well as for designers of performance measurement and evaluation systems. First, our results provide marketing decision makers with the opportunity to substantiate their marketing

¹⁸ Special thanks to Andre Soff for pointing this out to us.

investments. For example, marketing decision makers can define the amount to be invested in brand building efforts and estimate the subsequent effects on brand equity. Our results help to translate these forecasted effects in brand equity to financial terms. 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) are also expected to pay-off in financial terms. This increases the accountability of marketers, which may improve marketers' credibility and boost the standing of the marketing function within the firm (Rust et al. 2004). Thus, our research project is a first step in identifying and understanding how marketing assets contribute to (short- and long-term) financial performance.

Second, our research also provides important insights for performance measurement and incentive system design. Analytical accounting literature (Lambert 2001; Datar et al. 2001; Banker and Datar 1989; Feltham and Xie 1994) suggests that performance measurement systems should include any measure that provides additional information on the effort of managers. Considering the fact that brand equity measures provide additional information in explaining both current as well as future financial performance it is probably useful to include such measures in performance measurement and incentive systems of marketing as well as general managers. Performance measures should be controllable (i.e., should reflect a manager's effort), undistorted (i.e., congruent with the firm's goals), and not be subject to manipulation of managers (cf. Gibbs et al, 2009). Brand equity measures may be used for marketing manager's compensation as they are (probably) highly controllable for them. In addition, brand equity measures may be useful for general manager's compensation as they may decrease distortion (i.e., they take away the pressure to focus on short term accounting performance; cf. Gibbs et al, 2009).

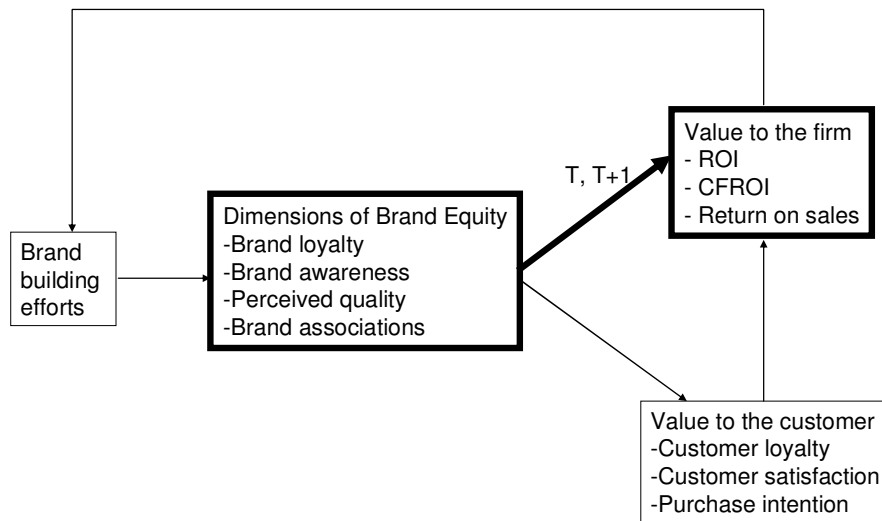
Finally, our results suggests that brand equity measures are reliable, in a sense that they (eventually) 'translate' in higher accounting performance. As such, providing this information may be relevant for investors, especially in firms where brands are important and/or firms that follow a customer oriented strategy (cf. Wiesel et al, 2008). Additional research may indicate whether these brand equity measures are actually disclosed and/or included in performance measurement systems and compensation systems in firms¹⁹. Subsequent research may also investigate whether the predictive abilities of brand equity measures differ amongst profit- and loss-making firms, respectively start-up and established firms or different industries. The relation between brand equity measures and future financial performance may be different across these categories due to, for example, switching costs, differences in time-lags between investments and manifestation of the benefits, and differences in aspects of brand equity relevant to consumers.

There are a number of limitations to our analyses. First, there is the issue of causality: although we assume that brand equity subsequently affects financial performance (which is consistent with models from (Keller 1993; Aaker 1992; Aaker 1991, 1996)), this relation may also be the other way around. That is, firms that perform well in financial terms may be regarded by customers as trustworthy, providing high quality products, etc. Considering the fact that marketing theory suggests that strong brands affect financial performance, it is unlikely that this relation runs from financial performance to

¹⁹ Considering the media attention and the strong following of brand equity measures, it is likely that these measures are also used for compensation purposes (eg. Bonus payments, career decisions, etc; cf. Chu & Keh, 2006).

strong brands. In addition, there is the issue of endogeneity. In our model, we assume that brand equity is an independent variable; however, in practice it is a choice variable (firms decide how much they want to invest in brand equity). If all firms optimally select brand equity investment programs based on exogenous factors, there should be no statistical relation between brand equity and performance, after controlling for the exogenous determinants (Ittner, 2008; Ittner and Larcker 2001; Ittner and Larcker 1998; Luft and Shields 2003). If that would be the case, our results could be explained by 'statistical accidents', misspecification, or omission of relevant variables; however, the results of the RESET tests indicate that inadequate specification or omitted variables are unlikely to be problematic. Another limitation is that our financial performance data are partially based on data from units of a larger firm. We cannot exclude the possibility that the data are affected by tax considerations (transfer pricing policies) or other external requirements (financial reporting policies) that affect the financial results. A fourth limitation is that 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. However, this is unlikely to be the case since most measures of brand value increase in our sample. Finally, our sample size is relatively limited compared to other research projects that have tried to investigate the relation between non-financial measures and financial performance (Wiersma, 2008; Banker & Mashruwala, 2007; Morgan & Rego, 2006; Banker et al, 2000); this may result in lower significance scores for our variables. In other words, the insignificance of some of our results may be due to the relatively small sample size.

Despite these limitations, this is one of the first studies that we are aware of that investigates the relations between a highly relevant intangible asset (represented by specific brand equity measures) and future accounting performance. In addition to the research avenues presented previously, future research may investigate the interrelations between specific brand equity measures, weighted by preference, brand usage or category usage, and current and future financial performance. In addition, our results indicate that brand equity affects performance; as such, additional research can investigate whether strong brands reduce the risk of the firm by increasing liquidity, solvability and other risk management metrics. Finally, future research can investigate the effectiveness of marketing dollars or euros. In this study, we focus on the relation between brand equity measures and financial performance; additional research may investigate the costs necessary to increase brand equity.



Brand equity model based upon Aaker (1991, 1996), Yoo et al (2000) and Baldauf et al (2003).
 Thick lines represent the variables of interest for this study.

Figure 1: Relations between Brand Vitality and financial performance

BAV™ Pillar	Underlying perceptual metrics	Meaning and role of pillar a)
Differentiation	Unique Distinctive Different	Perceived distinctiveness of the brand defines the brand and reflects its ability to stand out from competition
Relevance	Relevant to me	Personal relevance and appropriateness and perceived importance of the brand
Esteem	Personal regard	Level of regard consumers hold for the brand and valence of consumer attitude
Knowledge	Familiarity with the brand	Awareness and understanding of the brand identity

Based on Y&R documents and Mizik & Jacobson (2008). More information on BAV™ can be found at www.yrbav.com

Table 1: Summary of BAV™ Framework: pillars of the brand asset

Industry ^{a)}	Frequency	%
DMFTG	36	13.5
NDMFTG	21	7.9
WRMTV	36	13.5
WST	84	31.5
RT	42	15.7
ACCF	12	4.5
TRCOMM	21	7.9
OTHSERV	15	5.6
TOTAL	267	100.0

DMFTG = durable manufacturing, NDMFTG = non-durable manufacturing, WRMTV = wholesale and retail trade and repair of motor vehicles and motor cycles, WST = wholesale trade, RT = retail trade, ACCF = accommodation and food service activities, TRCOMM= transportation and communication, OTHSERV = other services

^{a)} Based on BIK industry codes, which are similar to the SIC industry codes in the US

Table 2: Distribution of firms/business units in sample

	N	Minimum	Maximum	Mean	Std. Deviation
BIM	267	-2.68	1.83	0.00	1.00
DIFF	267	1.28	99.90	58.56	28.44
REL	267	3.25	99.23	60.57	25.33
EST	267	5.71	99.61	63.97	25.65
KNOWL	267	10.84	99.71	65.99	22.45
BU	267	0.00	1.00	0.78	0.42
DMFTG	267	0.00	1.00	0.13	0.34
NDMFTG	267	0.00	1.00	0.08	0.27
WRMTV	267	0.00	1.00	0.13	0.34
WST	267	0.00	1.00	0.31	0.47
RT	267	0.00	1.00	0.16	0.36
ACCF	267	0.00	1.00	0.04	0.21
TRCOMM	267	0.00	1.00	0.08	0.27
OTHSERV	267	0.00	1.00	0.06	0.23
ROI _{t-1}	235	-22.18	32.13	7.25	10.12
ROI _t	234	-21.15	28.88	7.02	9.86
ROI _{t1}	236	-20.23	29.57	6.40	9.76
ROI _{t2}	234	-9.63	32.13	7.72	9.44
CFROI _{t-1}	236	-6.56	32.20	8.21	8.62
CFROI _t	237	-24.11	30.25	7.60	10.36
CFROI _{t1}	238	-10.72	27.10	7.76	8.45
CFROI _{t2}	235	-8.33	36.40	8.84	9.35
ROSt-1	218	-9.71	16.67	4.39	5.65
ROSt	217	-12.05	19.39	4.72	6.48
ROSt1	222	-11.20	15.89	3.98	5.52
ROSt2	222	-9.28	19.06	4.50	6.02
LGSLSt-1	218	3.34	7.57	5.24	0.76
LGTA _{t-1}	236	3.04	7.44	4.92	0.87

BIM = Brand Index measure (factor score of four pillars), DIFF= differentiation, REL = relevance, EST = esteem, KNOW= knowledge, BU= Business unit dummy (BU=1, single business organization =0), DMFTG = durable manufacturing, NDMFTG = non-durable manufacturing, WRMTV = wholesale and retail trade and repair of motor vehicles and motor cycles, WST = wholesale trade, RT = retail trade, ACCF = accommodation and food service activities, TRCOMM= transportation and communication, OTHSERV = other services

ROI t-1(t, t1, t2) = Return on investment in year t-1 (respectively t, t+1 and t+2),

CFROI t-1 (t, t1, t2) = Cash flow return on investment in year t-1 (respectively t, t+1 and t+2),

ROS t-1(t, t1, t2) = Return on sales in year t-1 (respectively t, t+1 and t+2),

LGSLSt-1 = Log of Sales in year t-1, LGTA t-1 = Log of Total Assets in year t-1,

Table 3: Descriptive statistics

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1 BIM	1.00	0.51	0.86	0.90	0.78	(0.17)	0.14	0.03	(0.13)	0.17	(0.04)	(0.17)	(0.06)	(0.09)	0.20	0.24	0.10	0.00	(0.10)	0.08	0.09	0.11	0.01	0.20	0.17	0.19	0.13	0.19	0.17	0.20	
2 DIFF	0.51	1.00	0.19	0.38	0.27	(0.06)	0.02	0.05	0.01	0.06	(0.02)	0.00	(0.13)	(0.04)	0.05	0.09	0.08	0.08	(0.15)	0.22	0.24	0.22	0.18	0.19	0.24	0.26	0.18	0.24	0.23	0.29	
3 REL	0.86	0.19	1.00	0.75	0.56	(0.24)	0.19	0.04	(0.41)	0.20	0.10	(0.16)	(0.01)	(0.12)	0.18	0.19	0.11	(0.02)	(0.09)	0.01	0.07	0.08	(0.01)	0.17	0.14	0.18	0.15	0.18	0.19	0.18	
4 EST	0.90	0.38	0.75	1.00	0.54	0.02	0.04	0.07	(0.06)	0.26	(0.13)	(0.25)	(0.06)	(0.07)	0.08	0.09	0.08	(0.02)	(0.06)	0.02	0.03	0.07	(0.04)	0.11	0.07	0.10	0.03	0.15	0.10	0.15	
5 KNOWL	0.78	0.27	0.56	0.54	1.00	(0.25)	0.18	(0.06)	0.09	(0.05)	(0.07)	(0.06)	(0.03)	(0.03)	0.31	0.37	0.05	0.00	(0.05)	0.06	0.02	0.02	(0.03)	0.17	0.11	0.10	0.08	0.06	0.06	0.05	
6 BU	(0.17)	(0.06)	(0.24)	0.02	(0.25)	1.00	(0.34)	0.06	0.21	0.31	(0.14)	(0.01)	(0.14)	(0.10)	(0.03)	(0.11)	0.00	0.00	0.00	(0.02)	(0.01)	0.00	(0.02)	(0.17)	(0.12)	(0.15)	(0.16)	(0.03)	(0.12)	(0.06)	
7 DMFTG	0.14	0.02	0.19	0.04	0.18	(0.34)	1.00	(0.12)	(0.16)	(0.27)	(0.17)	(0.09)	(0.12)	(0.10)	0.06	0.10	(0.00)	0.00	0.00	(0.01)	(0.01)	(0.01)	(0.05)	0.08	0.07	0.08	0.06	0.14	0.15	0.11	
8 NDMFTG	0.03	0.05	0.04	0.07	(0.06)	0.06	(0.12)	1.00	(0.12)	(0.20)	(0.13)	(0.06)	(0.09)	(0.07)	0.12	0.18	(0.00)	0.00	(0.00)	(0.09)	(0.00)	(0.07)	(0.11)	(0.12)	0.03	(0.06)	(0.12)	0.01	0.05	0.03	
9 WRMTV	(0.13)	0.01	(0.41)	(0.06)	0.09	0.21	(0.16)	(0.12)	1.00	(0.27)	(0.17)	(0.09)	(0.12)	(0.10)	(0.07)	(0.09)	0.00	0.00	(0.00)	0.02	(0.04)	(0.02)	(0.01)	(0.16)	(0.13)	(0.16)	(0.18)	(0.10)	(0.17)	(0.11)	
10 WST	0.17	0.06	0.20	0.26	(0.05)	0.31	(0.27)	(0.20)	(0.27)	1.00	(0.29)	(0.15)	(0.20)	(0.17)	(0.22)	(0.30)	(0.00)	0.00	0.00	(0.15)	(0.17)	(0.18)	(0.08)	(0.14)	(0.28)	(0.25)	(0.15)	(0.11)	(0.18)	(0.13)	
11 RT	(0.04)	(0.02)	0.10	(0.13)	(0.07)	(0.14)	(0.17)	(0.13)	(0.17)	(0.29)	1.00	(0.09)	(0.13)	(0.11)	0.02	(0.01)	0.00	0.00	0.00	0.25	0.30	0.37	0.29	0.25	0.30	0.35	0.33	0.10	0.09	0.17	
12 ACCF	(0.17)	0.00	(0.16)	(0.25)	(0.06)	(0.01)	(0.09)	(0.06)	(0.09)	(0.15)	(0.09)	1.00	(0.06)	(0.05)	(0.15)	(0.04)	0.00	0.00	0.00	(0.08)	(0.07)	(0.11)	(0.09)	(0.04)	(0.04)	(0.03)	(0.04)	(0.03)	0.01	(0.10)	
13 TRCOMM	(0.06)	(0.13)	(0.01)	(0.06)	(0.03)	(0.14)	(0.12)	(0.09)	(0.12)	(0.20)	(0.13)	(0.06)	1.00	(0.07)	0.37	0.40	(0.00)	0.00	(0.09)	(0.06)	(0.07)	(0.10)	0.01	0.05	0.04	(0.01)	(0.04)	0.06	(0.00)		
14 OTHSERV	(0.09)	(0.04)	(0.12)	(0.07)	(0.03)	(0.10)	(0.10)	(0.07)	(0.10)	(0.17)	(0.11)	(0.05)	(0.07)	1.00	(0.06)	(0.06)	(0.00)	0.00	(0.00)	0.16	0.07	0.08	0.11	0.17	0.11	0.12	0.11	0.07	0.11	0.03	
15 LGSLS-1	0.20	0.05	0.18	0.08	0.31	(0.03)	0.06	0.12	(0.07)	(0.22)	0.02	(0.15)	0.37	(0.06)	1.00	0.92	(0.04)	0.05	(0.02)	0.07	0.11	0.10	0.07	0.10	0.22	0.17	0.08	0.10	0.15	0.13	
16 LGTA-1	0.24	0.09	0.19	0.09	0.37	(0.11)	0.10	0.18	(0.09)	(0.30)	(0.01)	(0.04)	0.40	(0.06)	0.92	1.00	(0.07)	0.02	0.04	(0.01)	0.06	0.04	(0.02)	0.09	0.25	0.18	0.10	0.18	0.23	0.19	
17 yr97	0.10	0.08	0.11	0.08	0.05	0.00	(0.00)	(0.00)	0.00	(0.00)	0.00	0.00	(0.00)	(0.00)	(0.04)	(0.07)	1.00	(0.50)	(0.50)	(0.50)	(0.03)	(0.06)	0.12	0.12	(0.05)	(0.07)	0.09	(0.02)	0.05	0.01	0.15
18 yr00	0.00	0.08	(0.02)	(0.02)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.02	(0.50)	1.00	(0.50)	0.13	0.11	(0.05)	(0.11)	0.03	0.09	(0.09)	(0.03)	0.11	0.10	(0.07)	
19 yr03	(0.10)	(0.15)	(0.09)	(0.06)	(0.05)	0.00	0.00	(0.00)	(0.00)	0.00	0.00	0.00	0.00	(0.00)	(0.02)	0.04	(0.50)	(0.50)	1.00	(0.10)	(0.05)	(0.07)	(0.01)	0.01	(0.02)	0.00	0.04	(0.15)	(0.11)	(0.08)	
20 ROI-1	0.08	0.22	0.01	0.02	0.06	(0.02)	(0.01)	(0.09)	0.02	(0.15)	0.25	(0.08)	(0.09)	0.16	0.07	(0.01)	(0.03)	0.13	(0.10)	1.00	0.66	0.50	0.47	0.72	0.52	0.45	0.36	0.71	0.42	0.34	
21 ROI	0.09	0.24	0.07	0.03	0.02	(0.01)	(0.01)	(0.00)	(0.04)	(0.17)	0.30	(0.07)	(0.06)	0.07	0.11	0.06	(0.06)	0.11	(0.05)	0.66	1.00	0.72	0.48	0.47	0.84	0.62	0.42	0.54	0.72	0.55	
22 ROI1	0.11	0.22	0.08	0.07	0.02	0.00	(0.01)	(0.07)	(0.02)	(0.18)	0.37	(0.11)	(0.07)	0.08	0.10	0.04	0.12	(0.05)	(0.07)	0.50	0.72	1.00	0.65	0.48	0.59	0.81	0.52	0.37	0.42	0.73	
23 ROI2	0.01	0.18	(0.01)	(0.04)	(0.03)	(0.02)	(0.05)	(0.11)	(0.01)	(0.08)	0.29	(0.09)	(0.10)	0.11	0.07	(0.02)	0.12	(0.11)	(0.01)	0.47	0.48	0.65	1.00	0.38	0.34	0.54	0.73	0.23	0.17	0.43	
24 CFROI-1	0.20	0.19	0.17	0.11	0.17	(0.17)	0.08	(0.12)	(0.16)	(0.14)	0.25	(0.04)	0.01	0.17	0.10	0.09	(0.05)	0.03	0.01	0.72	0.47	0.48	0.38	1.00	0.52	0.63	0.45	0.58	0.41	0.42	
25 CFROI	0.17	0.24	0.14	0.07	0.11	(0.12)	0.07	0.03	(0.13)	(0.28)	0.30	(0.04)	0.05	0.11	0.22	0.25	(0.07)	0.09	(0.02)	0.52	0.84	0.59	0.34	0.52	1.00	0.69	0.50	0.51	0.72	0.55	
26 CFROI1	0.19	0.26	0.18	0.10	0.10	(0.15)	0.08	(0.06)	(0.16)	(0.25)	0.35	(0.03)	0.04	0.12	0.17	0.18	0.09	(0.09)	0.00	0.45	0.62	0.81	0.54	0.63	0.69	1.00	0.63	0.39	0.46	0.68	
27 CFROI2	0.13	0.18	0.15	0.03	0.08	(0.16)	0.06	(0.12)	(0.18)	(0.15)	0.33	(0.04)	(0.01)	0.11	0.08	0.10	(0.02)	(0.03)	0.04	0.36	0.42	0.52	0.73	0.45	0.50	0.63	1.00	0.27	0.27	0.44	
28 ROS-1	0.19	0.24	0.18	0.15	0.06	(0.03)	0.14	0.01	(0.10)	(0.11)	0.10	(0.03)	(0.04)	0.07	0.10	0.18	0.05	0.11	(0.15)	0.71	0.54	0.37	0.23	0.58	0.51	0.39	0.27	1.00	0.67	0.57	
29 ROS	0.17	0.23	0.19	0.10	0.06	(0.12)	0.15	0.05	(0.17)	(0.18)	0.09	0.01	0.06	0.11	0.15	0.23	0.01	0.10	(0.11)	0.42	0.72	0.42	0.17	0.41	0.72	0.46	0.27	0.67	1.00	0.67	
30 ROS1	0.20	0.29	0.18	0.15	0.05	(0.06)	0.11	0.03	(0.11)	(0.13)	0.17	(0.10)	(0.00)	0.03	0.13	0.19	0.15	(0.07)	(0.08)	0.34	0.55	0.73	0.43	0.42	0.55	0.68	0.44	0.57	0.67	1.00	
31 ROS2	0.07	0.21	0.11	0.02	(0.05)	(0.05)	0.09	(0.04)	(0.11)	(0.06)	0.13	(0.03)	(0.04)	0.05	0.08	0.15	0.09	(0.15)	0.06	0.18	0.33	0.44	0.66	0.25	0.35	0.45	0.58	0.34	0.43	0.70	

Correlations above 0.10 and 0.17 are significant at the 5% respectively 1% level.

BIM = Brand Index measure (factor score of four pillars), DIFF= differentiation, REL = relevance, EST = esteem, KNOW= knowledge, BU= Business unit dummy (BU=1, single business organization =0), DMFTG = durable manufacturing, NDMFTG = non-durable manufacturing, WRMTV = wholesale and retail trade and repair of motor vehicles and motor cycles, WST = wholesale trade, RT = retail trade, ACCF = accommodation and food service activities, TRCOMM= transportation and communication, OTHSERV = other services,

ROI t-1(t, t1, t2) = Return on investment in year t-1 (respectively t, t+1 and t+2),

CFROI t-1 (t, t1, t2) = Cash flow return on investment in year t-1 (respectively t, t+1 and t+2),

ROS t-1(t, t1, t2) = Return on sales in year t-1 (respectively t, t+1 and t+2),

LGSLs t-1 = Log of Sales in year t-1, LGTA t-1 = Log of Total Assets in year t-1.

Table 4 Correlations

Dependent variable	ROI _t						ROI _{t+1}						ROI _{t+2}					
C	-1.55	0.26	-5.35	-2.50	-2.82	-1.31	-1.79	0.51	-4.62	-2.15	-3.01	-1.16	-0.90	-2.96	-3.59	-1.04	-0.80	-1.19
BU	0.53	2.25	2.39	1.95	1.76	1.41	1.97	3.23	3.29	2.89	2.78	2.43	-0.19	0.35	1.09	0.34	0.53	-0.28
NDMFTG	1.72	(0.33)	-0.49	-0.41	-0.63	-0.70	-2.23	-3.52	-3.71	-3.63	-3.85	-3.89	-1.66	-3.74	-3.41	-3.75	-3.52	-4.26
WRMTV	-0.99	(0.96)	-1.46	-0.61	-1.19	-1.18	-1.15	-1.15	-1.62	-0.88	-1.36	-1.39	0.70	0.03	0.09	-0.54	0.14	0.75
WST	-1.72	(3.50)	-3.33	-3.17	-3.45	-2.84	-2.92	-4.21	-4.03	-3.84	-4.33	-3.54	0.62	0.25	-0.29	0.21	0.49	0.31
RT	2.65	6.89	6.93	6.65	6.86	6.55	4.34	7.45	7.46	7.20	7.50	7.11	5.33	7.48	7.81	7.58	7.40	7.27
ACCF	-0.25	(1.71)	-3.35	-1.78	-1.68	-2.33	-2.42	-3.28	-4.83	-3.42	-3.06	-3.90	0.53	-0.77	-0.61	-0.91	-1.10	-0.63
TRCOMM	-0.07	(1.91)	-1.37	-2.45	-2.50	-3.11	-2.42	-3.31	-2.93	-3.91	-3.80	-4.51	-1.71	-4.20	-2.79	-4.14	-4.04	-4.91
OTHSESV	1.62	4.18	3.59	4.34	4.01	4.05	1.05	3.91	3.31	3.98	3.72	3.64	3.95	6.50	6.23	6.25	6.61	6.61
LGSLSTP	0.59	0.84	0.88	1.15	1.16	1.52	1.04	0.97	1.04	1.30	1.23	1.63	1.06	2.02	1.44	1.97	1.94	2.58
YR00	-0.11	1.71	1.29	1.55	1.59	1.26	-3.26	-1.71	-2.13	-1.91	-1.77	-2.18	-3.23	-2.64	-2.50	-2.65	-2.66	-2.83
YR03	0.89	0.41	0.78	0.20	0.19	-0.09	-1.61	-1.72	-1.46	-1.96	-1.89	-2.23	-0.48	-1.31	-0.68	-1.31	-1.27	-1.51
ROI _{t-1}	0.65						0.46						0.39					
BIM		1.16						1.16						-0.60				
DIFF			0.09						0.08						0.05			
REL				0.03						0.02						-0.03		
EST					0.03						0.04						-0.03	
KNOW						-0.01						-0.01						-0.06
R ²	0.50	0.15	0.20	0.14	0.14	0.14	0.37	0.20	0.24	0.19	0.20	0.19	0.32	0.17	0.19	0.17	0.18	0.18
Adj R ²	0.47	0.09	0.15	0.09	0.09	0.08	0.33	0.15	0.20	0.14	0.15	0.14	0.27	0.12	0.13	0.12	0.12	0.13
AIC	6.80	7.33	7.26	7.34	7.34	7.34	6.99	7.23	7.17	7.24	7.23	7.24	7.04	7.23	7.21	7.23	7.22	7.21
F _{st}	16.28	2.79	4.12	2.62	2.70	2.57	9.31	4.01	5.16	3.79	4.01	3.74	7.13	3.25	3.56	3.25	3.31	3.49
Prob (F _{st})	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Bold, italic, bold italic = significant at respectively 10%, 5% and 1%

a) comparison of predictive ability of brand equity measures to historic accounting measure

BIM = Brand Index measure (factor score of four pillars), DIFF= differentiation, REL = relevance, EST = esteem, KNOW= knowledge,

BU= Business unit dummy (BU=1, single business organization =0), NDMFTG = non-durable manufacturing, WRMTV = wholesale and retail trade and repair of motor vehicles and motor cycles, WST = wholesale trade, RT = retail trade, ACCF = accommodation and food service activities, TRCOMM= transportation and communication, OTHSERV = other services, ROI t-1(t, t1, t2) = Return on investment in year t-1 (respectively t, t+1 and t+2), CFROI t-1 (t, t1, t2) = Cash flow return on investment in year t-1 (respectively t, t+1 and t+2),

ROS t-1(t, t1, t2) = Return on sales in year t-1 (respectively t, t+1 and t+2), LGSLT-1 = Log of Sales in year t-1, LGTA t-1 = Log of Total Assets in year t-1.

Table 5a: Predictive ability of brand equity measures compared to historic accounting measures

Dependent variable	CFROI _t						CFROI _{t+1}						CFROI _{t+2}					
C	-5.37	-0.67	-7.35	-5.25	-5.84	-3.62	-1.15	4.10	-2.06	-0.44	-0.86	1.19	3.74	6.26	2.68	3.49	3.47	4.45
BU	1.85	2.07	1.75	1.67	1.34	1.35	0.89	1.31	1.10	1.01	0.62	0.65	-0.13	0.33	0.26	0.18	-0.07	-0.05
NDMFTG	0.48	-1.55	-1.82	-1.65	-2.05	-1.76	-0.88	-3.16	-3.46	-3.21	-3.63	-3.38	-3.33	-5.46	-5.45	-5.51	-5.77	-5.57
WRMTV	-3.29	-5.25	-5.88	-4.56	-5.61	-5.93	-2.48	-4.74	-5.37	-3.92	-5.07	-5.39	-3.15	-4.92	-5.30	-4.33	-5.14	-5.29
WST	<i>-5.18</i>	<i>-7.06</i>	<i>-6.45</i>	<i>-6.60</i>	<i>-7.13</i>	<i>-6.24</i>	<i>-3.40</i>	<i>-6.01</i>	<i>-5.55</i>	<i>-5.62</i>	<i>-6.07</i>	<i>-5.20</i>	<i>-2.62</i>	<i>-4.51</i>	<i>-4.17</i>	<i>-4.30</i>	<i>-4.51</i>	<i>-4.01</i>
RT	2.33	4.80	4.72	4.42	4.81	4.49	1.53	3.96	3.84	3.61	3.98	3.65	3.49	4.96	4.93	4.77	4.93	4.77
ACCF	-1.63	-1.76	-3.73	-1.75	-1.57	-2.66	0.59	0.20	-1.69	0.31	0.40	-0.66	-0.64	-0.84	-1.74	-0.86	-0.79	-1.44
TRCOMM	-0.60	-0.69	-0.65	-1.46	-1.54	-1.76	-1.69	-1.89	-1.91	-2.52	-2.69	-2.94	-2.59	-3.19	-2.97	-3.50	-3.69	-3.82
OTHSERV	3.62	4.98	4.33	5.31	4.71	4.79	1.56	3.80	3.06	4.12	3.51	3.46	2.38	3.91	3.52	4.19	3.79	3.85
LGSLSTP	1.60	1.51	1.83	1.95	1.96	2.03	1.18	1.04	1.35	1.41	1.47	1.57	0.61	0.78	0.90	0.97	1.05	1.10
YR00	0.99	2.01	1.37	1.80	1.87	1.56	-2.82	-1.69	-2.30	-1.85	-1.82	-2.15	-0.35	0.03	-0.20	-0.02	-0.05	-0.15
YR03	0.15	1.25	1.44	0.97	0.96	0.72	-1.35	-0.58	-0.49	-0.80	-0.87	-1.11	0.24	0.59	0.71	0.48	0.39	0.29
ROI _{t-1}	0.54						0.56						0.38					
BIM		<i>1.82</i>						1.73						1.00				
DIFF			0.09						0.09						<i>0.05</i>			
REL				0.05						<i>0.05</i>						0.03		
EST					<i>0.06</i>						<i>0.06</i>						0.03	
KNOW						0.02						0.02						0.01
R2	0.38	0.23	0.27	0.21	0.22	0.20	0.46	0.24	0.28	0.22	0.23	0.21	0.27	0.18	0.20	0.18	0.18	0.17
Adj R2	0.34	0.18	0.22	0.16	0.17	0.16	0.43	0.19	0.24	0.17	0.18	0.16	0.23	0.13	0.14	0.12	0.13	0.12
AIC	7.10	7.31	7.26	7.34	7.32	7.34	6.57	6.91	6.85	6.94	6.92	6.95	7.10	7.22	7.20	7.23	7.23	7.23
F-st	9.95	4.81	5.96	4.39	4.67	4.21	13.61	4.96	6.31	4.46	4.79	4.14	5.79	3.43	3.76	3.34	3.37	3.25
Prob (F-st)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Bold, italic, bold italic = significant at respectively 10%, 5% and 1%
a) comparison of predictive ability of brand equity measures to historic accounting measure

BIM = Brand Index measure (factor score of four pillars), DIFF= differentiation, REL = relevance, EST = esteem, KNOW= knowledge,
BU= Business unit dummy (BU=1, single business organization =0), NDMFTG = non-durable manufacturing, WRMTV = wholesale and retail trade and repair of motor vehicles and motor cycles, WST = wholesale trade, RT = retail trade, ACCF = accommodation and food service activities, TRCOMM= transportation and communication, OTHSERV = other services, ROI t-1(t, t1, t2) = Return on investment in year t-1 (respectively t, t+1 and t+2), CFROI t-1 (t, t1, t2) = Cash flow return on investment in year t-1 (respectively t, t+1 and t+2),
ROS t-1(t, t1, t2) = Return on sales in year t-1 (respectively t, t+1 and t+2), LGSLT-1 = Log of Sales in year t-1, LGTA t-1 = Log of Total Assets in year t-1.

Table 5b: Predictive ability of brand equity measures compared to historic accounting measures

Dependent variable	ROS							ROS+1							ROS+2						
C	-2.80	0.55	-4.17	-2.80	-2.70	-1.21	-1.62	1.30	-2.98	-1.74	-1.92	-0.62	-2.13	-1.33	-3.30	-2.12	-1.87	-1.11			
BU	-0.99	0.79	0.59	0.70	0.30	0.03	0.13	1.33	1.08	1.21	0.86	0.76	-0.02	0.49	0.76	0.55	0.40	-0.26			
NDMFTG	1.20	-0.65	-0.74	-0.64	-0.96	-0.91	0.14	-1.09	-1.20	-1.11	-1.39	-1.28	-1.29	-2.16	-2.14	-2.12	-2.21	-2.54			
WRMTV	-0.05	-3.08	<i>-3.31</i>	-2.27	-3.23	-3.17	-0.09	-2.40	-2.61	-1.67	-2.54	-2.57	-0.85	-2.05	-2.29	-1.74	-2.08	-1.54			
WST	0.16	-3.38	-2.82	-3.21	-3.37	-2.57	-0.29	-3.07	-2.55	-2.86	-3.09	-2.35	-0.34	-1.18	-1.31	-1.22	-1.15	-0.68			
RT	0.53	-0.23	-0.11	-0.43	-0.13	-0.32	1.42	0.96	1.05	0.76	1.07	0.87	1.44	1.23	1.30	1.19	1.24	1.15			
ACCF	1.68	0.00	-1.17	0.22	0.10	-0.65	-0.03	-1.25	-2.28	-1.20	-0.98	-1.87	1.40	0.77	0.47	0.88	0.77	0.47			
TRCOMM	1.24	-0.90	-0.86	-1.19	-1.41	-1.92	0.01	-1.38	-1.47	-1.72	-1.84	-2.21	-1.51	-2.54	-1.94	-2.49	-2.65	-3.46			
OTHSERV	2.58	1.95	1.84	2.22	1.74	1.78	0.59	0.21	0.04	0.39	0.00	-0.06	1.93	1.21	1.11	1.33	1.18	1.22			
LGTA _{t-1}	0.87	0.99	1.27	1.15	1.25	1.57	0.73	0.73	1.05	0.91	0.97	1.19	1.14	1.34	1.20	1.31	1.40	1.96			
YR00	0.19	0.78	0.43	0.72	0.69	0.34	<i>-1.57</i>	-1.06	-1.40	-1.11	-1.16	-1.40	<i>-1.78</i>	<i>-1.51</i>	<i>-1.54</i>	<i>-1.47</i>	<i>-1.54</i>	<i>-1.79</i>			
YR03	0.24	-0.55	-0.45	-0.65	-0.75	-1.04	-0.85	-1.45	-1.39	-1.55	<i>-1.65</i>	-1.84	0.09	-0.30	0.02	-0.26	-0.35	-0.65			
ROI _{t-1}	0.72						0.54						0.31								
BIM		1.19						1.13						0.21							
DIFF			0.06						0.05						<i>0.04</i>						
REL				0.04						0.04						0.01					
EST					<i>0.04</i>						<i>0.04</i>						0.01				
KNOW						0.00						0.00						-0.04			
R2	0.48	0.14	0.18	0.13	0.13	0.11	0.36	0.13	0.16	0.12	0.13	0.10	0.18	0.08	0.12	0.09	0.08	0.10			
Adj R2	0.45	0.09	0.13	0.08	0.08	0.06	0.32	0.08	0.11	0.07	0.08	0.05	0.12	0.03	0.06	0.03	0.03	0.04			
AIC	5.99	6.48	6.44	6.49	6.49	6.51	5.89	6.20	6.17	6.22	6.20	6.24	6.33	6.43	6.40	6.43	6.43	6.42			
F-st	14.88	2.62	3.52	2.45	2.53	2.07	9.09	2.52	3.18	2.23	2.51	1.88	3.33	1.46	2.09	1.48	1.45	1.70			
Prob (F-st)	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.04	0.00	0.14	0.02	0.13	0.14	0.07			

Bold, italic, bold italic = significant at respectively 10%, 5% and 1%

a) comparison of predictive ability of brand equity measures to historic accounting measure

BIM = Brand Index measure (factor score of four pillars), DIFF= differentiation, REL = relevance, EST = esteem, KNOW= knowledge,

BU= Business unit dummy (BU=1, single business organization =0), NDMFTG = non-durable manufacturing, WRMTV = wholesale and retail trade and repair of motor vehicles and motor cycles, WST = wholesale trade, RT = retail trade, ACCF = accommodation and food service activities, TRCOMM= transportation and communication, OTHSERV = other services, ROI t-1(t, t1, t2) = Return on investment in year t-1 (respectively t, t+1 and t+2), CFROI t-1 (t, t1, t2) = Cash flow return on investment in year t-1 (respectively t, t+1 and t+2),

ROS t-1(t, t1, t2) = Return on sales in year t-1 (respectively t, t+1 and t+2), LGSLs t-1 = Log of Sales in year t-1, LGTA t-1 = Log of Total Assets in year t-1.

Table 5c: Predictive ability of brand equity measures compared to historic accounting measures

Dependent variable	ROI _t		ROI _{t+1}		ROI _{t+2}		CFROI _t		CFROI _{t+1}		CFROI _{t+2}		ROS _t		ROS _{t+1}		ROS _{t+2}	
C	0.70	-3.01	1.58	-2.16	0.24	0.95	-4.84	-9.34	1.59	-1.78	3.34	1.79	-2.19	-4.71	-0.94	-2.92	-2.45	-3.43
BU	0.70	0.87	2.36	2.40	-0.64	0.23	1.88	1.50	1.08	1.18	-0.54	-0.26	-0.74	-0.67	0.37	0.13	-0.14	0.12
NDMFTG	2.05	1.64	-1.82	-2.31	-1.79	-1.51	0.95	0.15	-0.45	-0.92	-2.65	-2.81	1.25	1.15	0.18	-0.11	-1.31	-1.39
WRMTV	0.03	0.93	-0.88	-0.55	0.70	2.96	-1.28	-1.45	-1.91	-1.34	-2.21	-1.90	-0.05	0.69	-0.10	-0.05	-0.85	1.92
WST	-0.99	-1.17	-2.91	-3.18	1.40	1.49	-4.34	-4.58	-2.95	-3.26	-1.44	-1.57	-0.13	-0.03	-0.61	-0.63	-0.20	-0.10
RT	3.51	3.39	5.21	5.12	5.49	5.03	3.54	3.51	2.25	2.06	4.40	4.22	0.56	0.44	1.44	1.51	1.42	0.98
ACCF	0.00	-0.82	-2.02	-2.85	-0.63	-1.68	-0.83	-1.98	0.43	-0.42	0.00	-0.81	1.85	1.46	0.15	-0.23	1.27	1.28
TRCOMM	0.71	0.56	-1.22	-1.43	-1.98	-1.27	0.29	-0.08	-0.58	-0.69	-1.92	-1.67	1.51	1.48	0.28	0.04	-1.65	-1.50
OTHSERV	0.68	1.09	1.29	1.43	2.90	4.03	2.79	2.61	0.97	1.27	1.65	1.86	2.60	2.77	0.66	0.53	1.93	2.87
LGTA _{t-1}	0.14	0.41	0.29	0.48	1.01	0.91	1.46	1.87	0.57	0.79	0.63	0.66	0.71	0.93	0.55	0.82	1.23	1.51
YR00	0.05	-0.08	-2.88	-3.04	-3.70	-3.63	1.29	0.89	-2.65	-2.85	-0.44	-0.53	0.32	0.18	-1.43	-1.58	-1.83	-1.93
YR03	0.81	1.07	-1.23	-1.09	-0.78	-0.22	0.21	0.47	-1.06	-0.80	0.35	0.64	0.38	0.50	-0.72	-0.75	0.03	0.26
ACCPERR-1	0.59	0.56	0.41	0.39	0.39	0.37	0.50	0.47	0.54	0.51	0.37	0.35	0.70	0.67	0.53	0.50	0.32	0.26
BIM	0.70		0.94		-0.70		1.03		0.71		0.29		0.39		0.40		-0.20	
DIFF		0.06		0.05		0.05		0.07		0.05		0.04		0.04		0.03		0.04
REL		0.04		0.02		0.08		0.01		0.03		0.02		0.03		0.00		0.09
EST		-0.01		0.00		-0.09		0.02		-0.01		-0.02		-0.02		0.01		-0.05
KNOW		-0.04		-0.02		-0.04		-0.04		-0.03		-0.02		-0.02		-0.02		-0.07
F2	0.47	0.49	0.34	0.35	0.31	0.33	0.37	0.40	0.46	0.48	0.26	0.28	0.48	0.50	0.37	0.38	0.18	0.23
Adj F2	0.43	0.45	0.30	0.30	0.27	0.28	0.33	0.36	0.43	0.44	0.22	0.22	0.45	0.46	0.32	0.33	0.12	0.16
AIC	6.85	6.84	7.07	7.08	7.04	7.03	7.13	7.10	6.56	6.54	7.11	7.12	5.99	5.98	5.90	5.90	6.34	6.30
F-st	14.12	12.19	8.23	7.00	6.91	6.18	9.58	8.78	13.68	12.00	5.54	4.70	13.81	11.92	8.49	7.31	3.08	3.39
Prob (F-st)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Bold, italic, bold italic = significant at respectively 10%, 5% and 1%

a) comparison of predictive ability of brand equity measures to historic accounting measure

BIM = Brand Index measure (factor score of four pillars), DIFF= differentiation, REL = relevance, EST = esteem, KNOW= knowledge,
 BU= Business unit dummy (BU=1, single business organization =0), NDMFTG = non-durable manufacturing, WRMTV = wholesale and retail trade and repair of motor vehicles and motor cycles, WST =
 wholesale trade, RT = retail trade, ACCF = accommodation and food service activities, TRCOMM= transportation and communication, OTHSERV = other services, ACCPERF_{t-1}= historic accounting
 performance (respectively ROI_{t-1}, CFROI_{t-1}, ROS_{t-1}), ROI_{t-1}(t, t1, t2) = Return on investment in year t-1 (respectively t, t+1 and t+2), CFROI_{t-1}(t, t1, t2) = Cash flow return on investment in year t-1
 (respectively t, t+1 and t+2), ROS_{t-1}(t, t1, t2) = Return on sales in year t-1 (respectively t, t+1 and t+2),
 LGTA_{t-1} = Log of Total Assets in year t-1.

Table 6: Predictive ability of brand equity measures incremental to historic accounting measures

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