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Stock price reactions to brand value announcements: Magnitude and moderators

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ABSTRACT

While several studies find a positive impact of brand value on firm value, we still know very little on the variables moderating the brand value–firm value relation. In this study, we address this gap in the literature by developing and testing a new framework on the contingencies affecting the impact of brand value changes on stock returns. Drawing from branding theory, we hypothesize that stock price reactions to brand value changes are more positive for firms with high cash flow vulnerability, valuable growth opportunities, and high potential for further product or service price increases. We empirically examine the importance of these three moderators through an event study analysis of 503 brand value announcements derived from Interbrand's Best Global Brands lists from 2001 to 2012. We obtain evidence of significant abnormal stock returns on brand value announcement dates, with a brand to firm value conversion rate of approximately 4%. Cross-sectional regression analyses of announcement day abnormal stock returns suggest that shareholders mainly value the potential of brands to reduce cash flow vulnerability to adverse shocks. We obtain only mixed evidence on the importance of brands in generating growth, and no evidence for their role in allowing firms to set higher prices. Our results, which hold under a range of sensitivity tests, yield clear managerial guidelines regarding the types of firms for which strong brands matter most.

1. Introduction

A brand is a distinctive name for which the consumer has a higher willingness to pay than for otherwise similar products (Keller, 2012). A well-established literature documents that there is a positive association between brand value and stock returns (e.g., Barth, Clement, Foster, & Kasznik, 1998; Madden, Fehle, & Fournier, 2006; Mizik & Jacobson, 2008, 2009). However, research has yet to investigate the mechanisms driving the effect of brand value on firm value (Hsu, Fournier, & Srinivasan, 2012).

This study fills this gap in the literature by examining the firm-specific and macroeconomic moderators affecting the brand to firm value relation. We use theoretical perspectives on the cash flow implications of strong brands to derive the following three hypotheses. Several studies argue that strong brands can insulate firms' cash flows from the harmful effects of competitive actions (Keller, 2012; Zinkhan & Pereira, 1994) and adverse business conditions (Hsu et al., 2012; Johansson, Dimofte, & Mazvancheryl, 2012), thereby increasing firm value. Our *Vulnerability* hypothesis therefore predicts that brand value has a stronger impact on firm value for firms with high cash flow vulnerability, and during periods in which investors are more risk averse. Strong brands can also enable firms to exploit untapped growth opportunities through well-chosen brand extensions, and as such increase firm value (Gronlund, 2013; Hsu, Fournier, & Srinivasan, 2011). Our *Growth* hypothesis therefore predicts that brand value has a stronger impact on firm value for firms with larger potential for growth through brand extensions. A last important benefit of strong brands is that they can reduce the price elasticity of demand for the firm's products or services. As such, strong brands may allow firms to set higher prices without adversely affecting their sales volumes (Hsu et al., 2012; Png, 2012). This feature generates our *Price* hypothesis stating that brands have a stronger impact on firm value for firms with a higher potential for further product or service price increases.

We test the importance of these three hypotheses through an event study analysis of the stock price impact of 503 brand value announcements for 80 U.S. firms over the period of 2001 to 2012. U.S. firms are not allowed to recognize the value of internally-developed brands on their balance sheets. We therefore rely on brand value estimates provided by an organization external to the firm, i.e., the brand consultancy firm Interbrand. Each year, Interbrand releases a ranking of the world's 100 most-valued brands. It derives its brand value estimates from a combination of publicly available data and proprietary information and assessment methods.

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Our results indicate that the release of Interbrand's brand value estimates results in immediate, significant abnormal stock returns. As predicted, the announcement day stock price impact is increasing in the change in the brand value estimate with respect to the value from the previous-year's list.

To test the three contingency hypotheses, we construct a range of proxy variables suggested by the literature. We then run cross-sectional regressions of abnormal stock returns on brand value changes interacted with these proxy variables. Consistent with the Vulnerability hypothesis, stock price reactions are more positive for firms facing lower cash levels and fiercer industry competition. Also consistent with this hypothesis, shareholders react more positively to brand value increases during times of higher investor risk aversion. In line with the Growth hypothesis, brand value has a stronger impact on stock returns for firms with larger unrealized growth opportunities, as captured by a higher market to book ratio. However, we do not find a significant impact of brand portfolio strategy on stock price reactions, as predicted by this hypothesis. Inconsistent with the Price hypothesis, brand value increases do not generate more favorable stock price reactions for firms with lower industry-adjusted profit margins. All of our test results are robust to controlling for investor anticipation of brand value changes, and hold under a range of sensitivity tests.

Our study provides the following main contributions to the literature. First and foremost, while previous studies focus on the main effect of brand value on firm value, we develop and test a new conceptual framework of the moderators affecting the brand value–firm value relation.[1] Testing the role of moderators in the marketing–finance interface is useful, as it helps scholars to identify boundary conditions under which existing theory holds (Kimbrough & McAlister, 2009).

Second, our paper complements previous studies by using event study methodology rather than stock return response modeling (SRRM) to analyze the brand value–firm value relation. While SRRM involves assessing stock returns as part of a continuous process over time, event studies examine the stock price impact of well-defined, discrete, specific information releases over a short time frame, in our case the trading day on which brand value estimates are released to the market (Mizik & Jacobson, 2008). The quasi-experimental nature of the event study methodology allows us to make powerful, clean inferences on the magnitude of the impact of brand value changes on firm value. We thus obtain the new insight that, for each one-dollar brand value change, approximately four cents are capitalized into firm value. This translates into a market value change of about $29 million for the average company in the sample.

Table 1 summarizes the above key contributions by positioning our work relative to other studies on the relation between brand value and firm value.

On a broader level, our paper also complements several event studies on the stock price impact of marketing-related actions. Johnston (2007) reviews marketing studies using the event study approach. More recent work includes Tipton, Bharadwaj, and Robertson (2009), who examine deceptive marketing, Cao and Sorescu (2013), who study co-branding, and Homburg, Vollmayr, and Hahn (2014), who study distribution channel additions and intensity increases. While these papers examine decisions by brand owners, we focus on brand value announcements by a party external to the firm. Our paper also differs from these other marketing studies in that we focus on brand value in its totality, rather than on individual brand-building actions. As Simon and Sullivan (1993) note, brand value is the only variable that directly measures the economic benefit of a brand to its owner.

Finally, our study contributes to a small body of literature examining the value relevance of intangible asset information provided by parties outside the firm. The few previous studies in this area mainly focus on non-financial intangible asset measures, such as the American Customer Satisfaction Index (Fornell, Mithas, Morgeson, & Krishnan, 2006; Ittner & Larcker, 1998; O'Sullivan, Hutchinson, & O'Connell, 2009), Fortune Magazine's Best 100 Companies to Work for list (Edmans, 2011), and product quality reviews (Tellis & Johnson, 2007). Some of these studies find that the market underreacts to intangible asset information, due to uncertainty or limited attention from analysts. The Interbrand brand value estimates are calculated as net present values of brand-generated incremental profits. They are therefore likely to be more easily interpretable by investors than qualitative information. Consistent with this intuition, a calendar-time portfolio analysis of long-term stock returns following brand value announcements shows no evidence that shareholders underreact to brand value information.

Our findings may help corporate managers in their allocation of corporate resources. In particular, our results suggest that brand-building activities are likely to be most valuable for firms that are highly vulnerable to adverse cash flow shocks. But our results also suggest that the importance of branding fluctuates over time due to factors outside brand owners' control, i.e., changes in investors' attitude towards risk.

The remainder of this paper is structured as follows. Section 2 provides the conceptual framework and develops the research hypotheses. Section 3 describes the research methodology. Section 4 provides the empirical results. Section 5 summarizes the main findings, outlines the implications and limitations of our work, and provides directions for future research.

2. Conceptual framework and testable predictions

This section first outlines and motivates our testable prediction on the main impact of brand value announcements on firm value. We then develop a range of hypotheses on the variables moderating the impact of brand value on firm value.

2.1. Main effect of brand value on firm value

According to the semi-strong form of the efficient market hypothesis, stock prices instantaneously and fully incorporate any public information that changes shareholders' expectations of the net present value (NPV) of firms' future cash flows (Fama, 1970). Thus, to the extent that changes in Interbrand brand value estimates affect shareholders' expectations of discounted future cash flows, these changes will affect stock prices. More formally, the expected NPV of incremental future cash flows generated by brand value changes can be expressed as follows:

$$\mathrm{NPV} = \sum_{t=0}^{N} \frac{\Delta CF_t}{(1+r)^t} \tag{1}$$

with ΔCF_t the expected incremental cash flows at time t resulting from the brand value change, net of any costs incurred to create these cash flows (e.g., advertising and R&D expenses incurred by the firm to sustain its brand value); N the number of years over which shareholders expect corporate cash flows to be affected by the announced brand value change; and r the discount rate reflecting the expected systematic risk associated with these corporate cash flows.

The branding literature suggests three main channels through which brand value changes can affect the NPV value in Eq. (1), and as such

[1] One exception is Bharadwaj et al. (2011), who examine the moderating impact of earnings and industry concentration on the relation between brand quality and firm value using stock return response modeling.

Table 1
Summary of previous studies on the impact of brand value measures on stock returns.

Study	Brand value metric(s)	Methodology	Findings	
			Main effect	Moderator(s) examined
Aaker and Jacobson (1994)	Perceived brand quality (EquiTrend)	Stock return response model	Positive	None
Barth et al. (1998)	Brand value (FinancialWorld)	Market value model Stock return response model	Positive	None
Kerin and Sethuraman (1998)	Brand value (FinancialWorld)	Market value model	Positive	Contribution to firm sales
Aaker and Jacobson (2001)	Brand attitude (Techtel)	Stock return response model	Positive[a]	None
Madden et al. (2006)	Brand value (Interbrand)	Portfolio analysis	Positive[b]	None
Mizik and Jacobson (2008)	Brand Asset Valuator components (Young & Rubicam)	Stock return response model	Positive/no effect[c]	Sector
Mizik and Jacobson (2009)	Brand Asset Valuator components (Young & Rubicam)	Multiplier analysis	Positive/no effect[d]	None
Bharadwaj et al. (2011)	Perceived brand quality (EquiTrend)	Stock return response model	Positive[e]	Earnings Ind. concentration
Johansson et al. (2012)	Perceived brand quality (EquiTrend) Brand value (Interbrand)	Stock return response model	Positive/no effect[f]	None
This paper	Brand value (Interbrand)	Event study analysis	Positive (4% conversion value)	1. Proxies for perceived cash flow vulnerability (cash, industry concentration, risk aversion) 2. Proxies for growth opportunities (market to book, house of brands) 3. Proxy for firms' potential to increase product or service prices (profit margin)
→ Our contributions		First to use event study analysis to analyze impact of brand value on firm value	First to document magnitude of conversion rate of brand value to firm value	**First to conduct a systematic analysis of three sets of moderators that may affect the impact of brand on firm value. We find strong evidence for the importance of cash flow vulnerability, mixed evidence for the importance of growth opportunities, and no evidence for the importance of potential for further price increases.**

This table provides an overview of the relevant literature on the firm value impact of brand value estimates. We focus on studies examining the stock price impact of brand value, or of important brand value attributes such as brand attitude. We do not report studies examining the stock price impact of brand-building actions such as advertising spending or brand extensions. In the Methodology column, stock return response model refers to an approach in which (abnormal) stock returns, usually measured on a monthly frequency, are regressed on a brand value measure and control variables. Market value model refers to an approach in which equity market values, market to book values, or stock prices, typically measured on a yearly or quarterly frequency, are regressed on a brand value measure and control variables. Portfolio analysis refers to a method in which the stock price performance of a portfolio of firms with strong brand values is compared with the overall market performance. Multiplier analysis refers to an approach in which predicted firm value is defined as the product of a value driver (e.g., sales) and a corresponding multiplier. The multiplier is defined as an average or typical ratio of firm value to the value driver for a set of peer firms with similar characteristics. Event study analysis refers to an approach in which daily abnormal stock returns around brand value estimate announcements are regressed on a brand value measure and control variables. Moderators refer to variables affecting the slope of the relation between brand value and firm value, examined either by adding interaction terms or by splitting the sample into subsamples based on the value of the moderator. Our key contribution to the literature is printed in bold.

[a] Aaker and Jacobson (2001) focus on a sample of high-technology firms.

[b] In addition to their finding of a positive effect of brand value on firm value, Madden et al. (2006) find a negative impact of brand value on systematic firm risk.

[c] Mizik and Jacobson (2008) find that unanticipated changes in brand relevance and energy have a positive impact on stock returns, while three other brand pillars of the Young & Rubicam Brand Asset Valuator (differentiation, esteem, and knowledge) have no significant impact.

[d] Mizik and Jacobson (2009) find a positive effect of some of the brand value attributes composing the Young & Rubicam Brand Asset Valuator measure on firm value. They also find evidence that the strength of the impact differs across sectors.

[e] In addition to finding a positive effect of brand quality on firm value, Bharadwaj et al. (2011) also find that unanticipated changes in brand quality are negatively related to changes in unsystematic risk, and positively related to changes in systematic risk.

[f] Johansson et al. (2012) find a positive effect of EquiTrend perceived brand quality measures, but not of Interbrand brand value measures, on stock returns during the Fall of 2008. They also find a negative impact of EquiTrend perceived brand quality measures, but not of Interbrand brand value measures, on systematic and unsystematic risk.

impact stock returns. First, a number of authors argue that strong brands generate high customer loyalty, making firms' cash flows less vulnerable to the effects of competitors' actions (e.g., aggressive promotions) and adverse macroeconomic circumstances (e.g., the recent Global Financial Crisis) (Johansson et al., 2012; Keller, 2012). Strong brands may also mitigate firms' vulnerability to firm-specific marketing crises, such as the Tylenol crisis (Hsu et al., 2012). In theory, the effects of such firm-specific crises should be diversified away in shareholders' portfolios. In practice, several academic studies show that firm-specific risk does affect firm value due to factors such as imperfect portfolio diversification (Ang, Hodrick, Xing, & Zhang, 2006; Brown & Kapadia, 2007).

Second, strong brands may allow firms to generate growth by extending the brand name to new product or service lines (Hsu et al., 2011). Establishing a consumer brand name from scratch comes with estimated costs in the area of $100 to $200 million, and is associated with substantial risk (Gronlund, 2013). Shareholders may perceive the possibility of leveraging an existing strong brand name as more cost efficient and less risky, resulting in an increase in the NPV of expected future cash flows.

Finally, strong brands tend to reduce the price elasticity of consumer demand for firms' products or services (Hsu et al., 2012; Png, 2012), enabling firms to set higher prices without adversely affecting their sales. This feature of brands is also likely to improve expected cash flows, and therefore firm value.

However, even if shareholders consider brand value to be relevant for firm value, brand value announcements provided by an external organization such as Interbrand may not provoke significant stock price reactions. Patell (1976) provides three criteria for disclosed information to have a significant stock price impact: the information must not be known beforehand, the market must believe that the information is reliable, and the market must believe that the announcer is motivated to provide truthful information. Externally-provided brand value announcements may fail along any of these three dimensions. First, investors might be able to forecast Interbrand's brand value estimates prior to their release. Interbrand claims that its brand value estimates are based on publicly-available data as well as on proprietary information (obtained, e.g., through interviews with company managers). If the weight of the proprietary component of its brand value estimate is small, then the impact of its brand value estimates on stock prices will be negligible. Second, the market may deem the externally-provided brand value information unreliable. As argued by Lev (2004), brand values are even less visible and less linked to immediate tangible outcomes than other intangible assets such as R&D. As a consequence, shareholders may place a high uncertainty discount on brand value estimates, resulting in a negligible impact of brand values on stock prices. Third, shareholders may have doubts concerning Interbrand's incentives for providing truthful brand value estimates. Kallapur and Kwan (2004) obtain evidence suggesting that shareholders suspect corporate managers of providing inflated brand value estimates. Although brand consultancy firms such as Interbrand may be less inclined to provide biased information than corporate insiders, they may not be entirely neutral with respect to the brands of their actual or coveted clients.

To summarize, whether externally-provided brand value announcements have an impact on firm value is an empirical issue. We test the main effect of brand value changes on brand owner stock returns with the following hypothesis.

H1. Externally-provided brand value announcements have an impact on stock returns. The effect is increasing in the magnitude of the brand value change with respect to the previously announced brand value estimate.

Our discussion above on the main benefits of strong brands suggests three sets of moderators affecting the strength of the impact of brand value on firm value, i.e., cash flow vulnerability, growth opportunities, and potential for further price increases. We discuss each of these moderators and the associated testable predictions in more detail in the next subsections.

2.2. The moderating role of cash flow vulnerability

Given the ability of brands to shelter cash flows against the harmful effects of firm-, industry-, and market-related shocks, we predict that shareholders perceive strong brands to be more valuable for firms with higher cash flow vulnerability. We thus obtain the following Vulnerability hypothesis:

Vulnerability: Brand value changes have a stronger impact on stock returns for firms perceived to be more vulnerable to adverse cash flow shocks.

To test this hypothesis, we use three proxy variables suggested by the literature. Our first proxy variable is cash to total assets. Several articles in the corporate finance literature argue that large cash holdings can cushion the firm against adverse cash flow developments resulting from firm-specific, industry-specific, or macroeconomic sources. In particular, Fresard (2010) hypothesizes that firms may use their cash holdings to counter competitive actions, for example by targeting aggressive advertising against certain rivals. A large stock of cash can also signal the mere possibility of aggressive action, thereby pre-empting rivals' entry or capacity expansion decisions. Bates, Kahle, and Stulz (2009) find that firms with riskier cash flows hold more cash as a precaution against adverse cash flow shocks resulting from firm-specific or macroeconomic developments. In a similar vein, Hodrick (2013) argues that cash provides firms with unexercised option value, giving them financial flexibility in times of high uncertainty. Together, these arguments suggest that cash holdings and brands may perform partly overlapping roles in reducing firms' vulnerability to cash flow shocks, and as such act as substitutes in the eyes of investors. We therefore expect the impact of brand value changes on firm value to be mitigated by the magnitude of cash holdings. This yields the following testable prediction:

H2. Brand value changes have a weaker impact on stock returns for firms with a larger portion of cash in their asset structure.

Our second proxy variable to test the Vulnerability hypothesis is industry concentration. High industry concentration usually goes along with high barriers to entry, low consumer choice, and high product or service prices. As such, higher industry concentration is generally assumed to indicate a lower degree of competition among industry players (Tuli, Mukherjee, & Dekimpe, 2012). Several previous studies document the importance of industry concentration as a first-order determinant of firms' market shares and profits (Szymanski, Bharadwaj, & Varadarajan, 1993) and as a moderator in the marketing–finance relation (Bharadwaj, Tuli, & Bonfrer, 2011; Tuli et al., 2012). Given the potential of brands to reduce firms' vulnerability to competitive actions, we expect shareholders to react more strongly to brand value changes in industries with intense competition, or low industry concentration.

H3. Brand value changes have a stronger impact on stock returns for firms in less concentrated industries.

Our final proxy variable to test the Vulnerability hypothesis is a market-wide measure of investor risk aversion. Risk averse investors prefer a certain, lower payoff over an uncertain, higher expected payoff (Ross, Westerfield, & Jaffe, 2009). Risk aversion fluctuates over time and serves as a leading indicator of financial crises (Coudert & Gex, 2008). We expect shareholders to be more likely to perceive firms as vulnerable during times of high risk aversion. We also expect shareholders to attach a higher value to the ability of brands to mitigate cash flow vulnerability during such times. Thus:

H4. Brand value changes have a stronger impact on stock returns in times of higher investor risk aversion.

2.3. The moderating role of growth opportunities

Given a brand's potential to act as a platform for growth through well-chosen brand extensions, we expect strong brands to be more valuable for firms with larger untapped growth potential. We thus obtain the following Growth hypothesis:

Growth: Brand value changes have a stronger impact on stock prices for firms with a higher potential for growth.

Our first proxy variable to test this hypothesis is the market to book ratio. Market to book is the ratio of the market value of equity, which captures both assets in place and growth opportunities, to the firm's book value. As such, it acts as a standard measure of the value of a firm's growth potential (Adam & Goyal, 2008). We therefore obtain the following prediction:

H5. Brand value changes have a stronger impact on stock returns for firms with a higher market to book ratio.

Our second proxy variable captures a firm's brand portfolio strategy. Firms can adopt several strategies in managing their brands (Laforet & Saunders, 1994). A house of brands strategy implies that the company cultivates separate brands not linked to the corporation's name (e.g. Procter & Gamble). A corporate branding strategy implies that the company uses one unifying corporate brand (e.g. Microsoft). In a mixed branding strategy, the firm combines elements from the two other strategies (e.g. The Gap). The different branding strategies each have advantages and shortcomings (Hsu et al., 2011; Morgan & Rego, 2009; Rao, Agarwal, & Dahlhoff, 2004). Important for our study, a key advantage of the house of brands strategy is that it offers more flexibility for growth. In particular, since the individual brands constituting the house of brands are separate and contained, there is a lower risk of cannibalization and dilution resulting from overstretching the corporate umbrella brand through extensions (Bridges, Keller, & Sood, 2000). We thus obtain the following testable prediction:

H6. Brand value changes have a stronger impact on stock returns for firms following a house of brands strategy.

2.4. The moderating role of potential for price increases

Given that strong brands may reduce consumers' sensitivity to price increases, we expect shareholders to react more strongly to brand value changes for firms with more room for price increases on their products and services. We thus obtain the following Price hypothesis:

Price: Brand value changes have a stronger impact on stock returns for firms with a higher potential for further price increases of the branded product or service.

Our proxy variable to test this hypothesis is industry-adjusted profit margin. Margins capture the difference between sales and costs of goods sold. Firms already operating at higher margins than their industry peers are likely to have less room for using the brand name as a platform for subsequent price rises. This yields our final testable prediction:

H7. Brand value changes have a stronger impact on stock prices for firms with lower industry-adjusted profit margins.

Fig. 1 summarizes the conceptual framework with these moderators and their proxy variables.

3. Methodology

This section first discusses the construction of our data set. We then provide a brief description of our event study methodology. We conclude with an outline and description of the variables included in our moderator analysis.

3.1. Sample construction

In line with a number of recent studies (Chu & Tat Keh, 2006; Johansson et al., 2012; Madden et al., 2006), we use brand value estimates from Interbrand, the world's largest brand consultancy company. In addition to providing private services to its corporate clients, Interbrand releases brand value estimates for the world's 100 most-valued brands in BusinessWeek magazine every year. Appendix A provides a more detailed overview of Interbrand's brand calculation methodology.

We retrieve estimated brand values from Interbrand's Best Global Brands lists from 2001 (the year of BusinessWeek's first publication of the Best Global Brands list) to 2012. Our initial sample thus consists of 1200 brand value announcements. Each brand value announcement mentions the brand's ranking, the current-year brand value estimate, the previous-year brand value estimate (if available), and the country of domicile of the brand owner.

We then impose the following requirements on the data set:

- The brand must be owned by a firm domiciled and listed in the U.S.
- The brand owner must have firm-specific information available on Compustat for the fiscal year-end prior to the brand value announcement date.
- The brand owner must have stock price information available on CRSP for the 300 trading days preceding the brand value announcement date.
- The brand must be included in the previous year's Best Global Brands list, so that we can calculate the brand value change with respect to the previously-reported value.
- There must be no announcements of other important firm-specific news (e.g., mergers or departures of key executives) over the window ranging from trading day −1 to trading day 1 surrounding

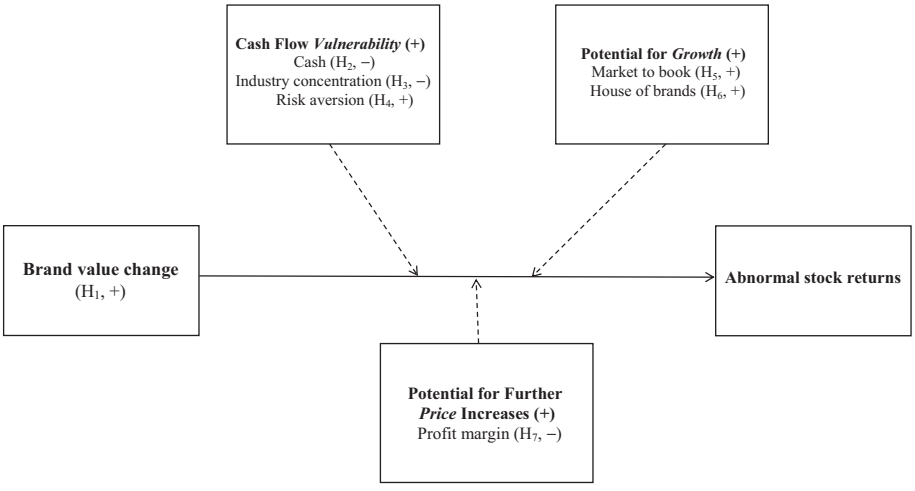

Fig. 1. Conceptual framework outlining the hypothesized moderators for the brand value–firm value relation. Notes: this figure provides an overview of the hypothesized moderators affecting the strength of the impact of brand value on firm value, as captured by abnormal stock returns on brand value announcement dates. It also lists the proxy variables used to test the importance of each of the channels, and their hypothesized impact on the strength of the relation between brand value and firm value. The words in italics represent the abbreviations for the moderators used throughout the paper. The full arrow represents the direct effect of brand value on firm value, while the dashed arrows represent moderating effects.

the brand value announcement date. We use the Factiva database to identify such confounding announcements.

Imposing these criteria yields a final sample of 503 brand value announcements for 80 different firms. The sample firms come from various industries. In total, 37.38% of the sample observations pertain to producers of durable goods (e.g. Ford), 36.78% to producers of nondurable goods (e.g. Coca-Cola), 20.48% to non-financial services (e.g. Google), and 5.37% to financial services (e.g. American Express).

3.2. Event study methodology

We start by calculating abnormal stock returns on brand value announcement dates following a standard event study methodology as outlined in Campbell, Lo, and MacKinlay (1997). A critical first step in an event study is the identification of the event dates of interest. In our case, we need to determine the exact dates on which Interbrand releases its brand value estimates to the public. Each annual publication of the Best Global Brands list in BusinessWeek is preceded by a press release, which tends to take place on the trading day before the publication date. If markets are semi-strong form efficient, the brand value information should be incorporated in the stock price as of the date of the press release. We therefore define this date as the announcement date. We obtain the exact dates and times of the Interbrand press releases of the 100 Best Global Brands estimates through the Factiva database.

The optimal event window length is an empirical question. The general guideline is that event windows should be set as narrowly as possible, in order to reduce the likelihood of confounding information affecting the abnormal return measures (McWilliams & Siegel, 1997). Since we know the exact timing of the twelve Interbrand ranking releases included in our study, we use abnormal stock returns measured on the trading day of the brand value announcements as focal dependent variables in our regression analysis. In Section 4, we discuss a robustness check in which we measure cumulative abnormal stock returns over a broader window.

To evaluate the stock price impact of brand value announcements, we require a measure of abnormal stock returns. The abnormal return is the actual ex-post return of the stock on the brand value announcement date minus the normal return of the firm on that date. The normal return is the return that would be expected had the brand value announcement not taken place. For each firm i on brand value announcement date t, this gives us

$$AR_{it} = R_{it} - E(R_{it}|X_t) \tag{2}$$

where AR_{it}, R_{it}, and $E(R_{it}|X_t)$ are abnormal, actual, and normal stock returns, respectively, for each brand value announcement date t between 2001 and 2012 in which company i is represented in the Interbrand Best Global Brands list and has previous-year brand value information available. X_t is the conditioning information for the normal return model. There are two common choices for modeling normal returns — the market model where X_t is the market return, and the constant mean return model where X_t is the average return of the security over a pre-event estimation window (Campbell et al., 1997). In line with most event studies on the marketing–finance interface, we opt for the market model to calculate normal returns, with as market return proxy the return on the CRSP equally-weighted market index. We use default Eventus® software settings for the estimation period length, i.e. a 255-day window ranging from trading days 300 to 46 prior to the brand value announcement date. We then estimate the normal return R_{it} as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{3}$$

where R_{mt} is the market return and ε_{it} an error term.

Table 2
Summary statistics of moderating and control variables.

Panel A: Averages, medians, and standard deviations

Variable	N	Average	Median	Standard deviation
CASH	503	0.110	0.081	0.097
INDUSTRY CONCENTRATION	503	0.199	0.127	0.199
RISK AVERSION	503	−0.013	0.135	0.454
MARKET TO BOOK	503	2.134	1.766	1.621
HOUSE OF BRANDS (0/1)	503	12.326%		
PROFIT MARGIN	503	0.117	0.087	0.207
SALES ($ million)	503	35,544	21,633	38,768
ADVERTISING	305	0.041	0.030	0.036
R&D	305	0.055	0.031	0.056

Panel B: Pairwise Pearson's correlations

Variables	1	2	3	4	5	6	7	8	9
1. CASH	1								
2. IND. CONCENTRATION	−0.10**	1							
3. RISK AVERSION	−0.02	−0.02	1						
4. MARKET TO BOOK	0.33***	−0.10	0.03	1					
5. HOUSE OF BRANDS	−0.24***	−0.02	−0.00	0.01	1				
6. PROFIT MARGIN	−0.01	−0.25***	−0.01	0.33***	0.04	1			
7. LOGSALES	−0.18***	−0.12***	0.04	−0.20***	−0.08*	−0.40***	1		
8. ADVERTISING	−0.21***	0.19***	0.01	0.29***	0.23***	0.17***	−0.31***	1	
9. R&D	0.12**	−0.40***	−0.01	0.64***	−0.18***	0.19***	0.01	−0.01	1

Notes.
This table reports descriptive statistics for the explanatory variables in the brand value announcement returns analysis. Appendix B defines the variables. Panel A reports averages, medians (when appropriate), and standard deviations. N denotes the number of observations for which the variables are available. Panel B reports pairwise Pearson's correlations.
* Denotes significance at the 10% level.
** Denotes significance at the 5% 1% level.
*** Denotes significance at the 1% level.

3.3. Moderating and control variables

Appendix B includes a detailed description of the measurement and data sources for each of the moderating variables. To test H2, we use the ratio of cash and marketable assets to total assets. Panel A of Table 2 shows that the average (median) CASH ratio of our sample firms is 0.11 (0.08). The large standard deviation of this ratio suggests that there is a large dispersion in cash holdings across the sample firms. Our INDUSTRY CONCENTRATION measure (H3) is the Herfindahl index based on the three-digit SIC code of the brand owner's primary activity. This index is well-grounded in industrial organization theory and has been used as an industry concentration measure by previous studies at the marketing–finance interface (Bharadwaj et al., 2011; Tuli et al., 2012).

To capture RISK AVERSION (H4), we use the Chicago Board Exchange Volatility Index (VIX). The VIX is based on real-time financial option prices. During periods of heightened risk aversion, investors are expected to place a higher value on financial options' hedging potential, resulting in higher option prices and VIX values (Coudert & Gex, 2008).

To test H5, we divide the market value by the book value of equity. To measure brand portfolio strategy (H6), we construct a HOUSE OF BRANDS dummy variable based on a thorough content analysis of firms' web pages and annual reports. As Panel A of Table 2 shows, approximately 12% of the sample comprises firms following a house of brands strategy. Corporate branding accounts for about half of the sample observations, and mixed branding for the remainder (not reported). We define PROFIT MARGIN (H7) as the ratio of sales net of costs of goods sold divided by sales, less the industry median value of this ratio. As Table 2 shows, the sample firms on average operate at substantially larger margins than their industry peers, which is consistent with their status as owners of leading brands.

In line with previous studies (e.g., Barth et al., 1998; Mizik & Jacobson, 2008), we include firm size, measured by the logarithm of company sales (LOGSALES), as a control variable in all of our regressions. Panel A of Table 2 shows that the sample firms tend to be very large companies (average sales of $35.5 billion). This finding is of course not surprising given that the Interbrand lists focus on the world's most-valued brands. We also verify whether our results hold after controlling for ADVERTISING and R&D expenses. These variables are available for 305 of the 503 sample observations.

Panel B of Table 2 reports Pearson's correlations between each pair of moderating and control variables. The pairwise correlations tend to be low, suggesting that multicollinearity is not an issue in most of our regression analyses. As a further check for multicollinearity, we report maximum and average Variance Inflation Factor (VIF) measures for each of the regression analyses.

4. Empirical results

We first present our results on the main effect of brand value on firm value, and on the moderators of this effect. We subsequently discuss a range of robustness tests. We then analyze the economic significance of the findings, and conclude with an analysis of long-term stock returns following brand value announcements.

4.1. Baseline regression results on main effect and moderators

To examine the main effect of brand value announcements on stock returns (H1), we regress announcement-date abnormal stock returns AR_{it} on yearly brand value changes, controlling for the logarithm of sales. In model form, this gives us:

$$AR_{it} = \beta_0 + \beta_1 \quad \text{BVCHANGE}_{it} + \beta_2 \quad \text{LOGSALES}_{it-1} + \varepsilon_{it} \qquad \text{(M1)}$$

BVCHANGE_{it} represents the change in the reported brand value estimate for firm i on brand value announcement day t. It is measured as the Interbrand brand value estimate announced at time t minus the previous-year brand value estimate, divided by the market value measured at the fiscal year-end prior to the brand value announcement date. The large majority of the sample firms have only one brand per year represented in the Best Global Brands list. The exceptions are Procter & Gamble and Yum!Brands, which each have two brands in the list over a number of years (Duracell and Gillette; and KFC and Pizza Hut, respectively). In the years in which two brands are represented for these companies, we calculate the numerator of the BVCHANGE variable by summing the estimated values of the two brands and subtracting their summed values for the previous year.

LOGSALES is measured at the fiscal year-end $t-1$ preceding the brand value announcement date. The same holds for the firm- and industry-specific explanatory variables in subsequent models. In contrast, as Appendix B indicates, macroeconomic variables such as risk aversion are calculated using information from the calendar month-end prior to the brand value announcement date. The reason for this difference is that macroeconomic data are usually released monthly, allowing us to use macroeconomic information measured closer to the announcement date. Nevertheless, we also use subscript $t-1$ for these macroeconomic variables in our models for expositional clearness. The main message conveyed by the model notation is that all explanatory variables in our regression analyses are calculated using information released prior to the brand value announcement dates, to avoid any concern that our results are affected by a simultaneity bias. This follows standard practice in the event study literature. The only exception is, of course, BVCHANGE, which is calculated based on brand value information released on the actual announcement date t.

Our sample observations are clustered by firm, since most brand owners are covered in more than one Best Global Brands list, and by announcement date, since all announcements in a given year occur on the same date. Following Petersen (2009), we correct the standard errors of the regression analysis for firm- and time-specific clustering by adopting the procedure developed by Thompson (2010). We apply this approach in all regressions reported throughout the paper, unless mentioned otherwise.

Table 3, Column (1) provides the results of our estimation of M_1. In line with H_1, BVCHANGE has a significant positive impact on announcement-date abnormal stock returns ($p < 0.05$). The coefficient on BVCHANGE indicates that stock prices incorporate approximately four cents per dollar of reported brand value change. LOGSALES does not have a significant impact. The regression has an R^2 of 1.62%. Low R^2s are a common feature of regressions using daily abnormal stock returns as dependent variables, and can be attributed to the high noise to signal ratio associated with these returns (Wurgler & Zhuravskaya, 2002).

To test our predictions on the contingencies affecting the brand value–firm value relation, we augment the benchmark model M_1 with interactions between BVCHANGE and the six moderator variables outlined earlier. We thus obtain the following model:

$$\begin{aligned} AR_{it} = \beta_0 + \beta_1 \quad \text{BVCHANGE}_{it} + \sum_{j=2}^{7} \beta_j \text{BVCHANGE}_{it} \\ * \text{MODERATOR}_{j,it-1} + \sum_{k=8}^{13} \beta_k \text{MODERATOR}_{k,it-1} \\ + \beta_{14} \quad \text{LOGSALES}_{it-1} + \varepsilon_{it}. \end{aligned} \qquad \text{(M2)}$$

Table 3, Column (2) presents the results of estimating M_2. Consistent with H2, we find a significant negative impact of the interaction term of BVCHANGE with CASH ($p < 0.05$). Coefficients on the interaction terms of BVCHANGE with INDUSTRY CONCENTRATION and RISK AVERSION are also significant ($p < 0.01$) with the signs predicted by H3 and H4.

Table 3
Impact of brand value changes on stock returns.

Variables (predicted impact)	Baseline models		Robustness tests				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Main effect							
BVCHANGE (H1, +)	0.039**	0.041**			0.046**	0.103***	0.147***
	(2.28)	(2.13)			(2.36)	(2.40)	(3.52)
$BVCHANGE_R$ (H_1, +)			0.036**	0.042**			
			(2.10)	(2.03)			
Moderating effects							
BVCHANGE * CASH (H2, −)		−0.407**		−0.396**		−0.512**	−0.393***
		(−2.35)		(−2.24)		(−2.28)	(−2.35)
BVCHANGE * IND. CONCENTR. (H3, −)		−0.072***		−0.074***		−0.128***	−0.075
		(−3.30)		(−3.25)		(−5.60)	(−1.20)
BVCHANGE * RISK AVERSION (H4, +)		0.212***		0.220***		0.163***	0.214***
		(4.02)		(4.16)		(4.53)	(3.02)
BVCHANGE * MARKET TO BOOK (H5, +)		0.060***		0.064***		0.081***	0.054***
		(3.55)		(3.74)		(2.86)	(3.37)
BVCHANGE * HOUSE OF BRANDS (H6, +)		0.084		0.083		0.046	0.071
		(0.83)		(0.79)		(0.29)	(0.81)
BVCHANGE * PROFIT MARGIN (H7, −)		0.012		0.012		0.010	0.011
		(1.60)		(1.58)		(1.26)	(1.44)
BVCHANGE * CONTRACTION (−/+)							0.116
							(0.06)
BVCHANGE * EXPANSION (+/−)							1.816
							(0.41)
Direct effects of moderators and control variables							
CASH		0.035***		0.036***		0.031**	0.033***
		(3.19)		(3.21)		(2.38)	(2.85)
INDUSTRY CONCENTRATION		0.006		0.006		0.004	0.006
		(0.81)		(0.77)		(0.32)	(0.81)
RISK AVERSION		0.004		0.003		0.004	0.006**
		(1.59)		(1.41)		(1.33)	(2.51)
MARKET TO BOOK		−0.001		−0.001		−0.000	−0.001
		(−0.57)		(−0.54)		(−0.22)	(−0.71)
HOUSE OF BRANDS		−0.001		−0.001		0.001	−0.001
		(−0.26)		(−0.30)		(0.43)	(−0.25)
PROFIT MARGIN		0.018***		0.018***		−0.005	0.017***
		(2.83)		(2.84)		(−0.45)	(2.67)
CONTRACTION							−0.095
							(−1.12)
EXPANSION							0.282
							(1.20)
LOGSALES	0.002	0.002*	0.002	0.002*	0.000	0.001	0.002*
	(1.25)	(1.75)	(1.16)	(1.66)	(0.05)	(1.56)	(1.79)
STOCK RUNUP						−0.026***	
						(−3.21)	
ADVERTISING						0.033	
						(0.47)	
R&D						0.054	
						(0.96)	
INTERCEPT	−0.016	−0.033**	−0.015	−0.033**	0.002	−0.019	−0.032**
	(−1.11)	(−2.19)	(−1.03)	(−2.16)	(0.11)	(−1.33)	(−2.43)
N	503	503	503	503	305	305	503
R^2	1.62%	8.76%	1.35%	8.86%	2.35%	15.53%	9.56%
Mean VIF	1.00	4.05	1.00	3.85	1.09	2.35	4.06
Max. VIF	1.00	1.73	1.00	1.67	1.04	7.47	18.58

Notes.
This table reports the results of regressions of abnormal stock returns on brand value announcement dates on BVCHANGE and potential moderating variables. t-Statistics (presented between parentheses under the coefficient estimates) are calculated using robust standard errors clustered by firm and announcement date. BVCHANGE is the change in the Interbrand brand value estimate relative to last year's brand value estimate, divided by the market value of equity measured at the fiscal year-end prior to the announcement date. $BVCHANGE^*$ is the residual of a regression of BVCHANGE on the explanatory variables outlined in Column (1) of Table 4. All other explanatory variables are defined in Appendix B. N denotes the number of observations. VIF stands for Variance Inflation Factor.
* Denotes significance at the 10% level for two-sided tests.
** Denotes significance at the 5% level for two-sided tests.
*** Denotes significance at the 1% level for two-sided tests.

Consistent with H5, we find a significant positive impact of the interaction term of BVCHANGE with MARKET TO BOOK ($p < 0.01$). Inconsistent with H6 and H7, the interaction terms of BVCHANGE with HOUSE OF BRANDS and PROFIT MARGIN are not significant.

We conclude that we obtain strong evidence for the Vulnerability hypothesis, mixed evidence for the Growth hypothesis, and no evidence for the Price hypothesis.

4.2. Robustness tests

The remaining columns of Table 3 provide the results of a range of robustness tests of our main effect and full models. Since Interbrand brand value estimates are partly based on public information, shareholders may be able to anticipate a fraction of these estimates by using information published over the course of the year between two

brand value releases. We therefore investigate the robustness of the baseline results to controlling for potential anticipation of brand value changes. In a first step, we conduct a regression of BVCHANGE on the following potential brand value change determinants:

- SALES GROWTH: the percentage increase in sales over the fiscal year prior to the announcement date. We expect BVCHANGE to be positively influenced by this variable;
- EPS FORECAST: the change in analysts' earnings per share (EPS) forecasts since the release of the last brand value estimate. Given that Interbrand's brand value metric is partly based on published information such as analyst opinions about future EPS, we expect a positive association between EPSFORECAST and BVCHANGE;
- STOCK RUNUP: the continuously-compounded stock return, measured over trading days −76 to −2 relative to the announcement date. We include this variable to allow for the fact that Interbrand may take brand owners' recent stock price performance into account in its brand value calculation;
- CONTRACTION and EXPANSION: as shown by Lamey, Deleersnyder, Dekimpe, and Steenkamp (2007), consumers tend to turn towards private labels during economic downturns, at the expense of national brands. This leads to a negative (positive) predicted impact of our proxy for economic downturns (expansions) on brand value changes. On the other hand, as Johansson et al. (2012) argue, strong brands may provide a safe harbor during harsh economic times, potentially leading to an increase in Interbrand's assessment of the added value of brands during economic downturns. Hence, the predicted effects of our business cycle measures on BVCHANGE are unclear.

Appendix B includes detailed descriptions of these potential brand value determinants. In model form, this gives us:

$$\begin{aligned} \text{BVCHANGE}_{it} = \beta_0 + \beta_1 \quad & \text{SALES GROWTH}_{it-1} \\ +\beta_2 \quad & \text{EPS FORECAST}_{it-1} + \beta_3 \quad \text{STOCK RUNUP}_{it-1} \\ +\beta_4 \quad & \text{CONTRACTION}_{t-1} + \beta_5 \quad \text{EXPANSION}_{t-1} + \epsilon_{it} \end{aligned} \qquad \text{(Ma)}$$

Table 4, Column (1) reports the results of our estimation of M_a. We find that the independent variables explain 8.77% of the variation in BVCHANGE. The positive coefficient on SALES GROWTH is in line with our prediction. The negative coefficient on CONTRACTION is in line with Lamey et al.'s (2007) conclusion that consumers substitute private labels for national brands during economic downturns. In Table 4, Column (2) we include ADVERTISING and R&D expenses as additional explanatory variables. Higher spending on advertising or R&D could translate into larger brand value increases. However, we do not find a significant impact for these variables. The other findings remain largely unaltered. In unreported regression specifications, we include a number of other potential brand value change determinants such as equity betas and market to book ratios. None of these determinants have a significant coefficient, and their inclusion does not result in material increases in the explanatory power of the regression.

We conclude that pre-announcement information predicts only a small fraction of the yearly changes in Interbrand's brand value estimates. This conclusion is consistent with Interbrand's claim that it uses proprietary information to calculate its brand value estimates. The low predictability of brand value changes may also be explained by the fact that, while Interbrand publicly discloses the main steps of its brand value calculation process, it keeps the details of its calculation algorithm private.

In a second step of the robustness tests, we replace BVCHANGE with the fitted residual BVCHANGE_R from model M_a in the main effect and full models. We assume that this residual represents the brand value change component that investors cannot infer from looking at publicly available brand value determinants prior to the brand value announcement. Columns (3) and (4) of Table 3 report the results of this test. Column (3) shows that the coefficient on the residual component of brand value change (0.036, $p < 0.05$) is similar in magnitude to that on the unadjusted BVCHANGE measure in Column (1). Column (4) shows that findings on the magnitude and significance of the moderating variables remain virtually unaffected by this alternative specification. In unreported tests, we use the residual brand value change from the regression reported in Column (2) of Table 4, and this also leaves our findings intact. The conclusion that results for unanticipated brand value changes are very similar to those obtained with the unadjusted BVCHANGE measure is not surprising, given that our results in Table 4 suggest that investors can only predict a small fraction of brand value changes. Put differently, most of BVCHANGE seems to be unanticipated by investors. We therefore continue to work with this unadjusted measure in the remainder of the regressions. As such, we avoid concerns that our results are affected by potential misspecifications in the brand value change models presented in Table 4.

In Columns (5) and (6), we verify the sensitivity of the results to controlling for the pre-announcement STOCK RUNUP, and for ADVERTISING and R&D expenses. We find that adding these control variables does not materially affect our findings on the main effect and moderators of the brand value–firm value relation.

In Column (7), we assess whether our full model results are robust to including measures for business contractions and expansions as additional moderators. We have no clear expectations on the direction of the effect of these moderators. Lamey et al. (2007) find that consumers are more prone to switch from national brands to private labels during economic downturns. As such, shareholders might deem brand value changes for the national brands in our sample as less sustainable during downturns. This viewpoint translates into the expectation of a weaker (stronger) impact of brand value changes on stock returns during economic downturns (expansions). On the other hand, investors might deem the potential of strong brands to shelter firms' cash flows against

Table 4
Determinants of brand value changes.

Variables (predicted impact)	BVCHANGE	
	(1)	(2)
SALES GROWTH (+)	0.092***	0.099**
	(2.79)	(2.40)
EPS FORECAST (+)	0.001	0.002*
	(0.62)	(0.96)
STOCK RUNUP (+)	0.017	0.023***
	(0.74)	(2.50)
CONTRACTION (−/+)	−0.677***	−0.731***
	(−3.76)	(−5.37)
EXPANSION (+/−)	0.552	0.404
	(0.75)	(0.56)
ADVERTISING (+)		0.033
		(0.30)
R&D (+)		0.013
		(0.28)
INTERCEPT	−0.013	−0.017
	(−1.12)	(−1.08)
N	503	305
R^2	8.77%	13.85%
Mean VIF	1.46	1.37
Max. VIF	1.82	1.86

This table reports the results of regressions of BVCHANGE on a number of potential determinants. t-Statistics (presented between parentheses under the coefficient estimates) are calculated using robust standard errors clustered by firm and announcement date. BVCHANGE is the change in the Interbrand brand value estimate relative to last year's brand value estimate, divided by the market value of equity measured at fiscal year-end preceding the announcement date. All other explanatory variables are defined in Appendix B. N denotes the number of observations. VIF stands for Variance Inflation Factor.

* Denotes significance at the 10% level for two-sided tests.
** Denotes significance at the 5% level for two-sided tests.
*** Denotes significance at the 1% level for two-sided tests.

adverse cash flow shocks more valuable during economic downturns (Johansson et al., 2012), which would yield the opposite prediction. As can be seen in Column (7), we do not find a significant impact of the business cycle moderators on stock price reactions. Our other findings remain similar, apart from the fact that the interaction of BVCHANGE with INDUSTRY CONCENTRATION is no longer statistically significant. However, one caveat on the results in Column (7) is that the maximum VIF of this model is 18.58. This VIF belongs to the interaction of BVCHANGE with CONTRACTION. Unsurprisingly, CONTRACTION is highly correlated with RISK AVERSION and EXPANSION (pairwise correlations of 0.38 and 0.66, respectively). Hence, the results in this model should be interpreted with caution as they are likely to be affected by multicollinearity.

We also conduct a number of other sensitivity tests not tabulated for parsimony. First, we restrict our sample to brand value announcements made after the start of the Global Financial Crisis (GFC). This robustness check is inspired by the often-heard argument that the financial sector's misspecification and overall poor understanding of financial models was one of the key drivers of the GFC. Unlike other brand value measures such as EquiTrend, Interbrand brand value estimates heavily rely on projections generated by financial models (Johansson et al., 2012). Thus, investors' perceptions of the reliability of Interbrand brand value estimates might have changed since the start of the GFC. In line with Beber and Pagano (2013), we take the Lehman Brothers collapse on September 15, 2008 as the start of the crisis, and we re-estimate the baseline model in Column (1) for all brand value announcements taking place after that date. Inconsistent with the conjecture that the GFC might have eroded investors' trust in Interbrand estimates, we find that the coefficient and significance level of BVCHANGE (0.044, $p < 0.01$) are even slightly higher, compared with the benchmark results in Column (1).

Second, we re-estimate all regressions in Table 3 with cumulative abnormal stock returns measured over windows (−1, 1) and (−3, 3) as dependent variables. Results are qualitatively similar, but the statistical significance of some of the findings drops when we use these longer windows. The reduction in statistical significance is consistent with the additional noise entering abnormal stock returns over extended windows.

In a final untabulated sensitivity check, we replicate the baseline models with abnormal stock returns obtained through the constant mean return model as described in Campbell et al. (1997). We define normal returns as average stock returns over the same estimation window as the one used for the market return model regressions. The correlation between announcement-date abnormal stock returns obtained through the market and constant mean return models is very high (0.76, $p < 0.01$). Hence, we obtain similar findings to those in the baseline models when we use this alternative method to calculate abnormal stock returns. This result is consistent with Kothari and Warner's (2007) general conclusion that the differences between alternative methods to estimate normal returns are typically minor for narrow event windows.

We conclude that our main effect and full model results are robust to a range of alternative regression specifications.

4.3. Economic significance of baseline regression results

Table 5 provides an insight into the economic importance of the baseline main and full effects model results in Columns (1) and (2) of Table 3. Row (1) shows that the dollar value of a 1% brand value increase for a brand owner with average market value translates into a dollar market value change of approximately $29 million. Thus, although the brand to firm value conversion ratio of 3.9% seems rather small, the dollar value magnitude of the main effect is substantial. Rows (2) to (5) show the dollar value of a 1% brand value increase for a brand owner with average market value under different assumptions for the values of each statistically significant moderating variable, everything else equal. Using the notation of M_2 displayed earlier, we calculate the dollar value by multiplying $(\beta_1 + \beta_j)$ by the relevant value of moderating variable j. We then multiply the outcome by 0.01 times the average market value of the brand owners. As relevant values for the moderating variables, we take their 25th, 50th, and 75th percentiles.

Table 5
Economic significance of main effect and moderating variables.

(a) Variable	(b) Coefficient size of BVCHANGE	(c) Dollar value impact of a 1% brand value increase
(1) MAIN EFFECT (M_1)	0.039	$28.47 million
(2) CASH (M_2)		
Value = 0.038 (25th percentile)	0.026	$18.64 million
Value = 0.081 (50th percentile)	0.008	$5.86 million
Value = 0.159 (75th percentile)	−0.024	−$17.31 million
		Δ = −$35.95 million
(3) IND. CONCENTRATION (M_2)		
Value = 0.075 (25th percentile)	0.036	$25.99 million
Value = 0.127 (50th percentile)	0.032	$23.26 million
Value = 0.228 (75th percentile)	0.025	$17.95 million
		Δ = −$8.04 million
(4) RISK AVERSION (M_2)		
Value = −0.311 (25th percentile)	−0.025	−$18.20 million
Value = 0.135 (50th percentile)	0.070	$50.83 million
Value = 0.356 (75th percentile)	0.116	$85.03 million
		Δ = $103.23 million
(5) MARKET TO BOOK (M_2)		
Value = 1.014 (25th percentile)	0.102	$74.35 million
Value = 1.766 (50th percentile)	0.147	$107.29 million
Value = 2.958 (75th percentile)	0.218	$159.50 million
		Δ = $85.15 million

Row (1) of this table reports the dollar value impact of a 1% brand value increase for an average-market value brand owner. Multiplying the BVCHANGE coefficient of 0.039 by 0.01 (value of BV) and $73,006 billion (the average market value of sample firms) yields the dollar value impact displayed in Column (c). Rows (2) to (5) consider the economic significance of the statistically significant moderating variables detected in Column (2) of Table 3. In Column (b), we calculate the corresponding coefficient of BVCHANGE as $(\beta_1 + \beta_j)$, multiplied by the relevant value of moderating variable j. As relevant values for the moderating variables, we take their 25th, 50th, and 75th percentiles. In Column (c), the dollar magnitude of the effect is calculated by multiplying the coefficient size by 0.01 and $73,006 billion. Δ captures the difference in dollar value impact between moderator values at the 75th and 25th percentile. Variables are defined in Appendix B.

We find that the moderating variables have an economically significant effect on the strength of the brand value–firm value relation. For example, for an average-market value brand owner, a 1% brand value change has an $85.15 million larger market value impact for a brand owner with a MARKET TO BOOK value at the top 75th percentile, compared with a MARKET TO BOOK value at the 25th percentile.

4.4. Calendar-time portfolio analysis of long-term stock returns

So far, our empirical analysis relies on the semi-strong market efficiency argument that stock prices should immediately reflect any relevant news (Fama, 1970). This argument implies that it is of little use to look for any stock price impact beyond event announcement dates. However, as Edmans (2011) argues, intangible value information is surrounded by a lot of uncertainty. Investors may therefore need time to fully grasp the tangible benefits associated with intangible assets. Accordingly, previous studies have shown evidence of an initial market underreaction to information on intangibles such as R&D and advertising (Chan, Lakonishok, & Sougiannis, 2001) and employee satisfaction (Edmans, 2011). If investors indeed

need time to fully grasp the implications of brand value changes for future expected cash flows, then we might observe an impact of brand value changes on stock returns measured over a longer period following the brand value announcement. To test whether this is the case, we adopt a calendar-time portfolio approach. This approach, which is increasingly used in studies on the marketing–finance interface (e.g., Mizik & Jacobson, 2009; Sorescu, Shankar, & Kushwaha, 2007), involves constructing a portfolio of stocks of firms included in Interbrands' Best Global Brands lists, and measuring the long-term abnormal stock returns to that portfolio. The main advantage of the calendar-time portfolio method is that it accounts for the cross-sectional correlation of stock returns, because the abnormal return estimate is computed from the intertemporal variance of portfolio returns (Fama, 1998). A disadvantage of the method is that it does not produce separate measures of abnormal stock returns for each firm (Sorescu et al., 2007). As a result, we cannot use this method to regress long-term stock returns on BVCHANGE, as we did for announcement-date stock returns. Instead, we construct three different portfolios: one with stocks with brand value increases, one with stocks with brand value decreases, and one with all stocks in the previous portfolios combined. We measure abnormal stock returns on each of these portfolios over the period starting at the end of the calendar month of the brand value announcement until six months after the brand value announcement. We focus on six-month returns since the gap between subsequent brand value announcements is only one year, and we do not want our findings to reflect the announcement effect of subsequent brand value announcements. Moreover, longer periods increase the risk of biases due to the occurrence of confounding factors. In line with Sorescu et al. (2007), we measure the returns on these portfolios using a three-factor Fama and French (1993) model. This implies regressing monthly stock returns on market, size, and book-to-market factors. In model form, this gives us:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p * \left(R_{mt} - R_{ft}\right) + \gamma_p * SMB_t + \delta_p * HML_t + \varepsilon_{pt} \qquad (4)$$

where R_{pt} is the rate of return of the calendar-time portfolio p during month t; R_{ft} is the rate of return on a U.S. Treasury Bond f during the same period; R_{mt} is the average rate of return of all stocks trading on the U.S. stock market; SMB_t is the difference between the rate of returns of small and large firm stocks, and HML_t is the difference in returns between high and low book to market stocks. The intercept α_p captures the average monthly abnormal return on the portfolio. As the number of firms in the calendar-time portfolio changes each month, we estimate Eq. (4) using weighted least squares, as in Sorescu et al. (2007).

Table 6 provides the results. If shareholders underreact to the positive (negative) news embedded in brand value increases (decreases), we expect to observe positive (negative) long-term returns for calendar-time portfolios consisting of stocks with brand value increases (decreases). However, we find that the intercepts of the corresponding portfolios are not significantly different from zero. Unsurprisingly, we also fail to detect significant long-term stock returns when we lump all stocks together in one portfolio. In untabulated robustness checks, we repeat the calendar-time analysis for stocks with brand value changes in the top and bottom 25th percentiles, thereby weeding out firms with small brand value changes. We do not find any significant abnormal returns for those more extreme cases either. We conclude that the announcement-date stock price reactions seem to capture the full impact of the brand value announcements.

5. Discussion, limitations, and further research

While previous literature has illustrated the general importance of branding for shareholder value, our study seeks to develop a richer understanding of the moderators affecting the strength of the impact of brand value on firm value. Our paper thus fits into a small, but growing stream of marketing studies examining the contextual factors influencing significant marketing–finance relations (Bharadwaj et al., 2011; Srinivasan, Lilien, & Sridhar, 2011; Tuli et al., 2012). We believe that more studies will follow suit, since obtaining more insight into moderating variables is a logical next step in the development of our knowledge of the underlying dynamics of the marketing–finance interface.

We find evidence of significant stock price reactions on brand value announcement dates, with the magnitude of the abnormal stock returns increasing in the brand value change. We also find that shareholders put more weight on brand value information for firms with lower cash levels, lower industry concentration, and higher market to book ratios. Moreover, the brand value–firm value impact is stronger in periods with higher investor risk aversion. A sensitivity analysis indicates that the statistically significant moderating variables also have an important dollar value impact.

We believe that our results are relevant for marketing managers, who are under increasing pressure to justify the value of their brand-building actions (Srinivasan & Hanssens, 2009). While previous studies provide the overall insight that branding matters, our results provide specific guidance regarding the firm types for which branding is likely to matter most. In particular, our contingency framework results send the following two main messages to corporate decision makers. First, our results suggest that brands are most valuable for firms in high need of a buffer

Table 6
Long-term stock returns following brand value announcements.

Portfolio	α_p	$R_m - R_f$	SMB	HML	R^2
1. BVCHANGE > 0	0.002	0.907***	−0.036	−0.040	88.89%
2. BVCHANGE < 0	(1.04)	(21.97)	(−0.41)	(−0.58)	86.19%
	0.003	1.330***	0.031	−0.221*	
	(0.94)	(19.98)	(0.27)	(−1.97)	
3. All stocks	0.002	1.057***	−0.013	−0.154**	92.19%
	(1.17)	(27.64)	(−0.17)	(−2.37)	

This table reports the results of calendar-time portfolio regressions using the three-factor model proposed by Fama and French (1993). t-Statistics (between parentheses) are corrected for heteroscedasticity. $R_m - R_f$ represents the market risk premium, SMB captures the difference in returns between small and big stocks, and HML captures the difference in returns between high and low book to market stocks. We obtain these three factors from the Kenneth French website.

* Denotes significance at the 10% level for two-sided tests.
** Denotes significance at the 5% level for two-sided tests.
*** Denotes significance at the 1% level for two-sided tests.

against the effects of marketing crises, competitive actions, and adverse business conditions. These firms might want to direct more resources to developing and sustaining strong brands, compared with other firms. Second, our results suggest that the strength of the brand value–firm value relation fluctuates over time due to changes in investors' attitude towards risk. Since these changes are out of individual firms' control, the main takeaway for managers is that they might want to devote more resources to brand-building activities in periods of heightened investor fear. Our results also suggest that, next to studying business cycle conditions, studies at the marketing–finance interface should take fluctuations in investor risk aversion into account.

In addition, our study has implications for the ongoing debate on the balance sheet recognition of intangible assets (e.g., Lev, 2008; Mizik & Nissim, 2011). As Mizik & Nissim point out, this debate is very relevant to marketing practitioners, since an appropriate accounting treatment of their marketing actions can lead to a better appreciation of the value of these actions. While we find that brand value changes result in significant market value changes, our evidence also suggests that shareholders place a substantial discount on brand value information. For each dollar of reported brand value change, only about four cents are reflected in market value. Since U.S. firms do not have to report the values of internally-developed brands, we cannot assess whether this low capitalization percentage is specific to externally-provided brand value estimates, or whether it also applies to brand value estimates provided by corporate insiders. While we leave it to accounting standard setters to decide on the threshold reliability for brand value estimates to warrant balance sheet recognition, our results suggest that there is room for brand value estimates that are deemed more reliable by shareholders.

Our work is not without its limitations, and these limitations themselves suggest interesting questions for future research. First, our results are based on a single brand value measure. Johansson et al. (2012) find evidence of a very low correlation between Interbrand brand value estimates and consumer-based brand value measures provided by EquiTrend. During the April 2012 conference on "Brands and branding in law, accounting, and marketing" at Chapel Hill, Nathalie Mizik also pointed out that annual brand rankings produced by the three main brand consultancies (Interbrand, Millward Brown, and Brand Finance) exhibit highly divergent brand value estimates and very little agreement on the direction of brand value changes. In comparison with other, especially consumer-based brand value measures, Interbrand brand value estimates have a more direct link with predicted cash flows, and are therefore likely to be more easily interpretable by investors. We thus conjecture that our event study results provide an upper bound on the potential impact of brand value announcements on firm value. It would be interesting to formally examine whether this is effectively the case.

Second, our mixed results on the impact of growth opportunities (significant impact of market to book, but insignificant impact of brand portfolio strategy) could be due to the fact that our brand portfolio strategy identification uses a rather rudimentary three-level taxonomy. We acknowledge that recent papers have developed more refined brand portfolio strategy classifications (Hsu et al., 2011; Morgan & Rego, 2009). We have abstained from such classifications since, as acknowledged by Hsu et al. (2011), the assignment of brand owners to more refined categories involves a fair amount of judgment and subjectivity. Nevertheless, it would be interesting to verify whether a more refined taxonomy could lead researchers to find a significant moderating impact of brand portfolio strategy on the brand value–firm value relation.

Another relatively straightforward extension of our study involves testing whether the same results hold for non-U.S. brands. Cross-country differences in accounting regulations with respect to the reporting of intangible assets (as documented, e.g., in Henry, Lin, & Yang, 2009), in institutional settings affecting stock market efficiency, in firms' spending on brand-building activities (as documented, e.g., in Deleersnyder, Dekimpe, Steenkamp, & Leeflang, 2009), and in shareholders' attitudes towards strong brands may all affect whether our findings can be generalized to a non-U.S. setting.

Finally, our study is limited in that it only focuses on large firms with strong brands, as covered in Interbrand's 100 Best Global Brands lists. This limitation is difficult to overcome in future work, since brand value estimates for firms outside of these rankings are not publicly available.

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Appendix A. Interbrand's brand value calculation methodology[2]

To qualify for the Interbrand Best Global Brands list, a brand needs to fulfill the following requirements: (i) at least one-third of the brand-related sales must be realized outside the home country, (ii) the brand should not be a purely business-to-business brand, and (iii) the company must publicly disclose its financial and marketing data.

Interbrand's methodology evaluates brand value in the same way any other corporate asset is valued, i.e., based on how much it is likely to earn for the company in the future in comparison with a similar non-branded product. It uses a combination of analysts' projections, company financial documents, and proprietary qualitative and quantitative information to arrive at a net present value of these earnings. In a first step, Interbrand calculates the net brand-related profit, defined as the estimated after-tax operating income of a brand minus what could be earned on a non-branded version of the same product. Interbrand measures the earnings of a non-branded version of the product by estimating the amount of capital required to generate the brand's sales, under the assumption that a generic version of the product would generate a 5% net pre-tax return on that capital. The net brand-related profit is then calculated as the excess of the brand's estimated after-tax profits over the generic product's estimated after-tax profits. Interbrand claims that it bases its estimate of this excess value on extensive discussions with the brand owner and with knowledgeable business analysts, as well as on its own analysis of the firm's financial statements. In a second step, Interbrand constructs an earnings multiplier that incorporates the estimated risk profile of the brand's earnings. The multiplier is based on seven common components of brand strength, i.e. Leadership, Stability, Trading Environment, Internationality, Trend, Effectiveness of Communications, and Protection. These components are combined to develop a single multiplier ranging from zero to 100. In a final step, Interbrand calculates the brand value estimate by multiplying the net brand-related profits (usually estimated over a horizon of six years) by the brand strength multiplier.

[2] Source: www.interbrand.com.

Appendix B

This table provides detailed definitions of the variables used in the empirical analysis. Variables are mentioned in alphabetical order.

Variable	Operational measure	Source
ADVERTISING	Advertising expenses divided by total sales, both measured at fiscal year-end prior to the brand value announcement date.	Compustat
BVCHANGE	Difference between the announced brand value estimate and the previous year's brand value estimate, divided by market value. Market value is measured at fiscal year-end prior to the brand value announcement date.	Brand value estimates from Interbrand, market values from Compustat
CASH	Cash and marketable securities divided by the book value of total assets, both measured at fiscal year-end prior to the brand value announcement date.	Compustat
CONTRACTION	Magnitude of the economic contraction over the calendar year preceding the brand value announcement. We first apply the Hodrick and Prescott (1997) filter on yearly U.S. Gross Domestic Product (GDP) time series data to isolate the cyclical component of these data. We label this component GDP_c^t. In line with Lamey et al. (2007), we use a smoothing parameter λ equal to ten. In line with Thoma (1994) and Lamey et al. (2007), we subsequently construct the following measure for the magnitude of the economic downturn in each year t of the sample period: $\begin{cases} \text{CONTRACTION}_t = 0, & \text{if } \Delta GDP_c^t > 0 \\ \text{CONTRACTION}_t = (\text{prior peak in } GDP_c^t) - GDP_c^t, & \text{if } \Delta GDP_c^t \le 0 \end{cases}$ With ΔGDP_c^t measured over the calendar year ending at the beginning of the calendar month in which the brand value announcement takes place.	Datastream
EXPANSION	Magnitude of the economic expansion over the calendar year preceding the brand value announcement. In line with Thoma (1994) and Lamey et al. (2007), it is calculated as $\begin{cases} \text{EXPANSION}_t = 0, & \text{if } \Delta \text{GDP}_c^t \le 0 \\ \text{EXPANSION}_t = \text{GDP}_c^t - (\text{prior minimum in GDP}_c^t), & \text{if } \Delta \text{GDP}_c^t > 0 \end{cases}$ With $(\Delta)GDP_c^t$ calculated as outlined earlier for variable CONTRACTION.	Datastream
HOUSE OF BRANDS (0/1)	Dummy variable equal to one for firms with a manifest house of brands branding strategy, which consists of using individual brand names, different from the corporate brand name, for the company's different products.	Brand owners' web sites and annual reports
INDUSTRY CONCENTRATION	Herfindahl concentration ratio based on the brand owner's three-digit primary SIC code. More particularly, the concentration ratio is calculated as the sum of the squared market shares of the individual firms in the industry, with market shares calculated based on sales data measured at fiscal year-end prior to the brand value announcement date.	Calculated using sales and SIC data obtained from Compustat
MARKET TO BOOK	Market value of equity divided by book value of equity, both measured at fiscal year-end prior to the brand value announcement date.	Compustat
PROFIT MARGIN	Calculated as sales minus costs of goods sold, divided by sales. We then industry-adjust this measure by subtracting the median value of this ratio for firms with the same three-digit SIC code.	Compustat
R&D	Research and development expenses divided by total sales, both measured at fiscal year-end prior to the brand value announcement date.	Compustat
RISK AVERSION	Percentage change in the volatility index (VIX) over the calendar year preceding the brand value announcement. We subtract the VIX value at the beginning of the calendar month of the previous brand value announcement date from that at the beginning of the calendar month of the brand value announcement date, and divide the outcome by the VIX value at the beginning of the calendar month of the previous brand value announcement date.	Chicago Board Exchange
SALES ($ million)	Total sales, measured at fiscal year-end prior to the brand value announcement date. In regression analyses we take the natural logarithm of total sales.	Compustat
STOCK RUNUP	Continuously-compounded stock return, measured over trading days −76 to −2 relative to the brand value announcement date.	Centre for Research in Security Prices (CRSP)
EPS FORECAST	Percentage increase in median one-year ahead earnings per share forecasts, measured over the calendar year prior to the brand value announcement date.	Institutional Brokers' Estimate System (I/B/E/S)
SALES GROWTH	Percentage increase in total sales over the fiscal year prior to the announcement date.	Compustat

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