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ORIGINAL EMPIRICAL RESEARCH

Brand architecture strategy and firm value: how leveraging, separating, and distancing the corporate brand affects risk and returns

Liwu Hsu · Susan Fournier · Shuba Srinivasan

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Abstract Despite evidence suggesting a growing incidence of brand architecture strategies beyond the branded house (e.g., Boeing and IBM) and house-of-brands (e.g., P&G with Tide and Cheer), and recognition that in practice these strategies are very different, there is still a need for research on how financial markets value the full range of brand architecture strategies pursued by firms. We replicate and extend Rao et al.'s (*Journal of Marketing, 68*(4), 126-141, 2004) investigation of brand portfolio strategy and firm performance by (1) adding sub-branding and endorsed branding architectures, (2) clarifying the "mixed" architecture to constitute a BH-HOB hybrid and remove sub- and endorsed branding variants, and (3) quantifying the impact of a company's brand architecture strategy on stock risk in addition to returns. To explore the risk profiles of these five different strategies, we offer a brand-relevant conceptualization of the sources of idiosyncratic risk that may be exacerbated or controlled through brand architecture strategy: brand reputation risk, brand dilution risk, brand cannibalization risk, and brand stretch risk. We demonstrate superior results in terms of model performance using the expanded five-part architecture categorization and conclude with implications for practice. Our results show that risk/return tradeoffs for sub-branding, endorsed branding, and the BH-HOB hybrid differ significantly from what common wisdom suggests.

Keywords Branding · Brand architecture · Brand portfolio strategy · Firm performance · Shareholder value · Abnormal returns · Risk · Time-series econometrics

L. Hsu (✉)
College of Business Administration, University of Alabama in Huntsville, Huntsville, AL 35899, USA
e-mail: liwu.hsu@uah.edu

S. Fournier · S. Srinivasan
School of Management, Boston University, Boston, MA 02215, USA

S. Fournier
e-mail: fournism@bu.edu

S. Srinivasan
e-mail: ssrini@bu.edu

Introduction

Previous papers (Bahadir et al. 2008; Bharadwaj et al. 2011; Morgan and Rego 2009; Rego et al. 2009; Wiles et al. 2012) explore the impact that select characteristics of brand portfolios can have on firm value, including the number of brands owned, the number of segments in which brands are marketed, and the degree to which brands compete with one another. However, only one (Rao et al. 2004) has examined brand architecture strategy: the hierarchical specification describing (1) whether one or two levels of brands are used, (2) whether, how, and how strongly individual brands within the company's portfolio are grouped and relate to each other, and (3) the visibility and role of the corporate master brand (Kapferer 2012). Rao and colleagues consider a three-category scheme consisting of the branded house (BH), in which a unifying corporate brand extends across all entities in the portfolio (e.g., IBM and Boeing); house-of-brands (HOB), wherein distinct brands not linked to the corporate brand are cultivated for specific market segments (e.g., P&G with Tide and Cheer); and a "mixed" architecture that combines all other alternatives. They find that BH generates the highest values of Tobin's Q and conclude that markets might not value HOB appropriately as investors appear to underappreciate that a multitude of brands distributes risk over more brands.

Still, there is a lack of research on how financial markets value the full range of brand architecture strategies pursued by firms. Evidence (Rajagopal and Sanchez 2004) points to the growing incidence of more refined architecture strategies beyond the HOB and BH, especially in the face of mergers and acquisitions. Kapferer (2012) underlines that "behind these two basic alternatives … are architectures that in practice and consequence are very different" (p. 314). Branding experts including Aaker (2004), Franzen (2009), Kapferer (2012), and Keller (2012) note that since brand architecture has a strong influence on the performance of a company and governs the efficiency and effectiveness of marketing resources, an examination of more comprehensive brand architecture strategies is warranted.

This paper uses a Carhart four-factor model estimation to assess the risk/return profiles of BH, sub-branding, endorsed branding, HOB, and BH-HOB hybrid architecture strategies. We replicate and extend Rao et al. (2004) by adding sub-branding and endorsed branding as brand architecture alternatives and clarifying the mixed branding strategy as a BH-HOB hybrid. A further point of differentiation is that we include a larger sample of 302 firms, with a longer time span of over 10 years, and control for an expanded set of marketing, accounting, and firm variables. We demonstrate superior results in terms of model performance from our five-part categorization compared to the BH/HOB/Other scheme and confirm improved explanatory value for more comprehensive and theoretically grounded distinctions in brand architecture.

Our research also quantifies for the first time in the literature, to the best of our knowledge, the impact of a company's brand architecture strategy on stock risk. Given that managers and investors seek to maximize returns while minimizing risk exposure, it is crucial that brand strategy recommendations consider risk. To provide diagnostic insight into the risk profiles of the different strategies, we offer a brand-relevant conceptualization of drivers of idiosyncratic risk. Building from marketing research, we delineate four sources of idiosyncratic risk that may be exacerbated or controlled through brand architecture strategy: brand reputation risk, brand dilution risk, brand cannibalization risk, and brand stretch risk. More generally, our risk taxonomy contributes to the marketing discipline by framing brand decisions in risk management terms.

Finally, from a practice perspective, this research sheds light on the wisdom of popular branding architectures. Results show that risk/return profiles for the different architectures sometimes differ significantly from what common wisdom suggests: sub-branding does not control risk and in fact exacerbates it, for example, and the BH-HOB hybrid does not improve performance versus its component strategies. We contribute by offering guidance to practitioners to carefully consider risk/return tradeoffs when selecting branding architectures for their firms.

The rest of the article is organized as follows. In developing our conceptual framework, we first provide an overview of the additional strategies included in our expanded brand architecture scheme. We then establish our focal financial performance metrics: risk and returns. Consumer and marketing research is integrated to conceptualize four sources of idiosyncratic risk relevant to the brand architecture setting. With this as background, we then develop hypotheses concerning the effects of brand architecture strategy on financial performance. After describing our data, measurement, and methodological approach, we conclude with findings and implications from the research.

Beyond BH and HOB: a five-part categorization of brand architecture strategies

Popular architecture variants beyond the BH and HOB include sub-branding and endorsed branding, alternatives with two-brand structures that link and leverage both separate and corporate brands (Laforet and Saunders 1994). With sub-branding, the separate and corporate brands operate equally as meaning-laden, equity-creating entities (Franzen 2009; Keller 2012). Intel pursues a sub-branding strategy with the Intel Pentium and Intel Celeron, as does Apple with its iPod, Mac, and iPhone sub-brands (Aaker 2004). With endorsed branding (e.g., Post-It Notes by 3M), the linked second brand is superordinate to and more visible than the corporate brand which plays but an authenticating endorsement role (Aaker and Joachimsthaler 2000). Endorsed branding is cued visually using graphics that render the second brand more prominent vis-à-vis the parent brand, as for example through the ordering primacy of brand names, larger font sizes, bold lettering, or packaging placement (Keller 1999, 2012). Semantic conventions such as the use of the word "by" often specify the subordinate corporate brand connection in endorsed branding, as with Post-it Notes by 3M. The strategic differences concerning the prominence of the corporate brand connection in sub- versus endorsed branding have important consequences for consumer decisions and the efficiency and effectiveness of brand-building efforts, and may affect firm performance (see Web Appendix for visual illustrations).

Since sub-branding and endorsed branding leverage both separate and corporate brands, they are lauded for their ability to control risks while also granting demand- and supply-side advantages. Aaker (2004) praises sub- and endorsed branding "because they allow brands to be stretched beyond their existing zone of comfort," "protect brands from being diluted from overstretching" (p. 44), and "allow the master brand to compete in arenas in which it otherwise would not fit" (p. 58). Sood and Keller (2012) commend sub-branding for its ability to encourage broader participation in markets and extend brands farther than would otherwise be the case. Endorsed branding too receives encouragement for its assumed "best-of-all-worlds" accommodation that grants authentication from

the corporate brand while distancing the corporate brand from negative halos and maximizing the positioning and targeting abilities of a separate brand (Dolan 1998; Keller 1999; Keller 2012). A tradition of experimental research on brand leveraging supports benefits for these strategies at the consumer behavior level (Dacin and Smith 1994; Roedder-John et al. 1998; Sheinin and Biehal 1999; Sood and Keller 2012).

It is also increasingly common to find firms whose brand architectures do not fall cleanly into one of the above architecture categories (Kotler and Keller 2007; Rajagopal and Sanchez 2004). Hybrid structures combine at least two of the four strategies, most commonly the BH and HOB (Franzen 2009). Colgate-Palmolive, for example, uses not only Colgate and Palmolive as customer-facing brands but also goes to market with individual brands such as Softsoap and Speed Stick, none of which bear the corporate brand. Franzen (2009) notes that although some firms purposively pursue a hybrid strategy, the manifestation can also be an unintended consequence of mergers and acquisitions engaged to drive shareholder value. Although logic suggests benefits in a diversified BH-HOB hybrid portfolio, empirical evidence on its relative performance has yet to be obtained.

Because their objective is fundamentally different and focused on the impact of BH versus HOB, Rao et al. (2004) sometimes include sub-branding and endorsed branding within their mixed category, thereby grouping structures that are mixed because two brands are linked and utilized, as with sub-branding and endorsed branding, and structures that are mixed in that two or more architectures are used (as in the BH-HOB combination). We adhere to the recommendations of Kapferer (2012) and Aaker (2004) and consider sub-branding and endorsed branding as distinct strategies in their own right. Further, per Franzen (2009), we clarify the nature of the hybrid mix and focus on the prevalent BH-HOB combination. This attention to composition is important as different hybrid mixtures will differentially influence shareholder value. The five-part categorization thus disentangles the distinct effects of the hybrid, sub-branding and endorsed branding strategies on firm value components. Table 1 (column 2) provides representative examples from our data of firms that adopt each architecture strategy.

How brand architecture affects firm value

Firm value is determined by two fundamental finance metrics: levels of stock returns and the volatility or risk associated with those returns (see Srinivasan and Hanssens 2009 for full details on these metrics). Stock return is the percentage change in a firm's stock price. Risk, as reflected in higher stock-price volatility, suggests vulnerability of and uncertainty in future cash flows; high risk damages firm valuation by inducing higher financing costs. Returns and risk are jointly considered such that managers can assess whether expected returns offer adequate compensation for inherent levels of risk (Anderson 2006). In tackling the firm valuation question, we report brand architecture strategy effects on returns as well as systematic and idiosyncratic risk.

Stock returns

Stock returns reflect investors' expectations of future cash flows. Positive stock returns result from supply- and demand-side advantages. Supply-side advantages improve bottom-line performance through lower costs while demand-side advantages drive top-line performance through higher revenues, thereby enhancing cash flows. In contrast, supply-side disadvantages and demand-side disadvantages reduce cash flows and negatively affect stock returns. To inform hypotheses, we examine the demand- and supply-side effects of the different brand architectures (Rao et al. 2004; Srivastava et al. 1998). From the supply-side, we consider three factors related to cost reduction through branding: economies of scale in marketing, administrative, and operating cost efficiencies, and lower costs of new brand introductions. From the demand-side, three factors relate to revenue enhancement: opportunity for additional sales through improved ability to target new and distinct customer segments, increased likelihood for success of new introductions through awareness and trial advantages, and increased prospects for brand extensions and customized brand offerings. We expect the different brand architecture strategies to provide returns driven by their supply- and demand-side cash flow effects (see Table 1, Panel A).

In focusing on stock return as a key financial performance metric we follow the advice of Mizik and Jacobson (2009), who suggest that for applications establishing a causal link, "it is more expedient and advantageous to use stock return" (p. 322). Although Tobin's Q, investigated in Rao et al. (2004), provides an alternative metric, Mizik and Jacobson support abnormal returns as more appropriate for assessing long-term returns. They further demonstrate that "the estimates and their interpretation should be identical" (p. 323) with either metric.

Stock risks

Shareholder value is affected by two types of risk: systematic and idiosyncratic. Systematic risk stems from economy-wide factors (e.g., macro-economic risk, industry risk) that affect the overall stock market and all firms in it. Idiosyncratic risk is the uncertainty associated with firm-specific circumstances and characteristics (e.g., R&D spending, company leadership, advertising spend), after market variation is accounted for. Although evidence supports the importance of both risk sources for managers and investors (Ferreira and Laux 2007), idiosyncratic risk constitutes 80% of the average stock variance measure (Goyal and Santa-Clara 2003) and has significant relevance to firm value (Brown and Kapadia 2007).

Table 1 An evaluation of brand architecture strategies in terms of returns and risk factors

Panel A: Stock returns[a]

Brand architecture strategy	Representative examples	Supply-side factors			Demand-side factors		
		Economies of scale in marketing	Administrative and operating cost efficiencies	Lower costs of new brand introductions	Improved ability to target new customer segments	Increased success likelihood for new introductions	Increased prospects for brand extensions and distinctly customized brands
Branded house	Boeing, Dole, Southwest Airlines, Staples, Walgreens	++	++	++	−	++	−
Sub-branding	Apple, BD, Bausch & Lomb, Dell, Intel	+	+	+	+	++	+
Hybrid	Brunswick, Gap, PepsiCo, The New York Times Company, Toys "R" Us	−	−	+	+	+	++
Endorsed branding	3M, Abbott, American Electric Power, Intuit, Sealed Air	−	−	−	+		++
House-of-brands	Church & Dwight, Darden Restaurants, P&G, VF, Yum! Brands	−−	−−	−−	++		+++

Panel B: Idiosyncratic risk[b]

Brand architecture strategy	Representative examples	Brand reputation risk	Brand dilution risk	Brand cannibalization risk	Brand stretch risk
Branded house	Boeing, Dole, Southwest Airlines, Staples, Walgreens	++	++		++
Sub-branding	Apple, BD, Bausch & Lomb, Dell, Intel	+++	+++	+	+
Hybrid	Brunswick, Gap, PepsiCo, The New York Times Company, Toys "R" Us	+	+	+	−
Endorsed branding	3M, Abbott, American Electric Power, Intuit, Sealed Air	+	+	++	−
House-of-brands	Church & Dwight, Darden Restaurants, P&G, VF, Yum! Brands	−−	−−	+++	−−

[a] (+) and (−) denote relative advantages and disadvantages, respectively, of the different brand architecture strategies in terms of specific demand- and supply-side effects

[b] (+) and (−) denote the relative increase or decrease, respectively, of exposure to specific sources of idiosyncratic risk for the different brand architecture strategies. Brand reputation risk is defined as the deterioration of a brand's overall standing and esteem value. Brand dilution risk is defined as the loss of the meanings that differentiate a brand from its competition. Brand cannibalization risk is defined as the loss of sales that accrue when consumers purchase other products offered by the same firm. Brand stretch risk is defined as the lack of flexibility to introduce new, tailored offerings

Figure 1 provides our conceptual framework. We report the effects of brand architecture strategy on both systematic and idiosyncratic risk. Given that brand architecture, as a firm-specific decision, is most relevant to the notion of idiosyncratic risk, and that systematic risk is a more general, macro-economic concern, we focus hypotheses on the impact of brand architecture on idiosyncratic risk.

Brand-relevant drivers of idiosyncratic risk

The conceptual framework organizing this research leverages not just theories of market-based assets and risks to cash flows but also consumer and branding research that implicates relationships between brand architecture strategy and firm performance. To help formulate our hypotheses, we develop a brand-relevant conceptualization of drivers of idiosyncratic risk (see Table 1, Panel B). The typology helps assess how specific brand architectures can protect a firm from, or increase their exposures to, idiosyncratic risk. We build from research on threats to brand equity and identify four brand-relevant drivers of idiosyncratic risk: brand reputation risk, brand dilution risk, brand cannibalization risk, and brand stretch risk. In keeping with conventions (Abrahams 2008), we conceptualize all four risk sources expressly as downside risks.

Building from cross-disciplinary work (Scott and Walsham 2005), *brand reputation risk* is defined as the deterioration of a brand's overall standing and esteem value that derives from negative information signals regarding the brand, its business practices, or its management team. Reputation risk is linked fundamentally to firm value (Roberts and Dowling 2002): reputation risks threaten "the current and prospective impact on earnings and capital arising from negative publicity that may expose the institution to litigation, financial loss, or a decline in its customer base" (Eisenberg 1999, p. 38). The downside risk of lost esteem value stems from negative signals that erode confidence in a firm's products/services, precipitating financial losses (Argenti and Druckenmiller 2004). Through the selection of strategies that connect brands to potential negative sources of information, firms are more or less exposed to reputation risk. Architectures that allow vertical extensions of a master brand into downscale markets have been highlighted for their risks to the brand's standing (Aaker 1996), with research confirming damage to a brand's quality associations, perceived exclusivity, and image overall (Motley and Reddy 1993). Brand reputation risk also manifests as a spillover risk arising from exposure to "unintended risks from related brands in a portfolio when negative incidents occur" (Lei et al. 2008, p. 111). Strong linkages between offerings in the form of shared brand connections, shared attribute or benefit associations (Erdem and Sun 2002), the use of shared fonts, logos, trade dress, and designs, or even proximate shelf locations (Lei et al. 2008; Sullivan 1990) make firms vulnerable to this type of spillover risk.

Brand dilution risk concerns the loss not of esteem value or standing but of the meanings that differentiate a brand from its competition. Differentiation is the primary driver of market share and penetration, and losses in differentiation lead to brand equity erosion (Agres and Dubitsky 1996). The loss or dilution of unique brand meanings negatively affects cash flows through reductions in the customer base due to brand switching and lower price premiums. The frequency, depth, range, and quality of master brand extensions increase a firm's exposure to dilution risks. As a master brand is stretched

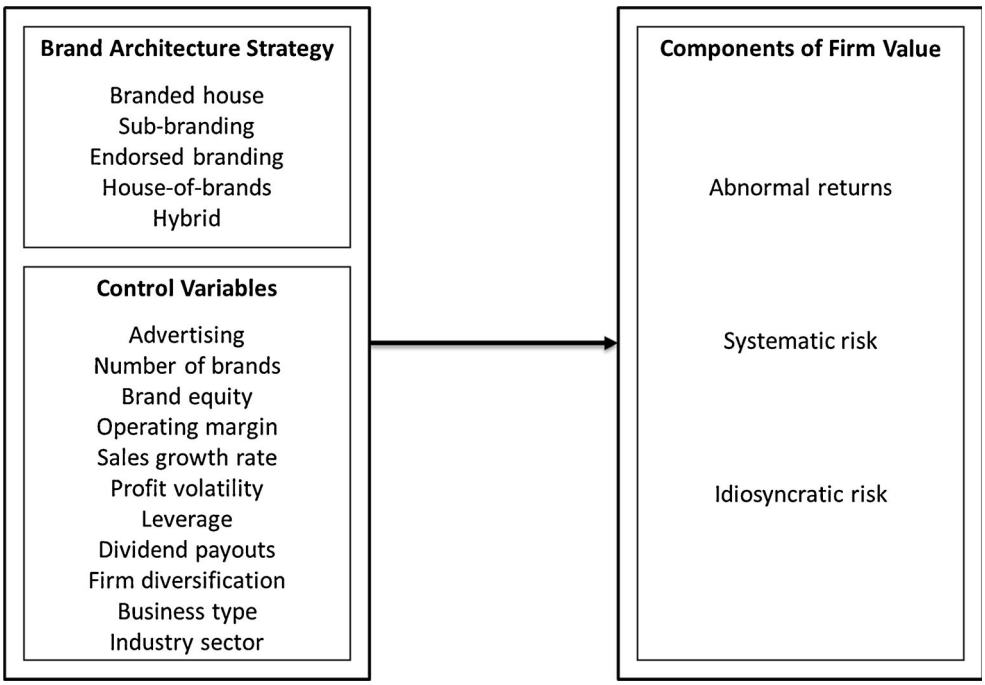

Fig. 1 Linking brand architecture strategy to components of firm value

through line (e.g., Tylenol PM) or category (e.g., Starbucks liquor) extensions, it becomes distanced from what is unique about it in consumers' minds (Loken and Roedder-John 1993). The focal meanings associated with a leveraged brand also become diluted as each new extension adds unique meanings that must be accommodated in the meaning mix (Roedder-John et al. 1998). As brand meanings lose clarity (Aaker 2004), this causes interference with memory and retrieval processes that drive purchase and repeat (Morrin 1999). Companies with multiple offerings in a category also risk brand dilution simply because such brands are likely to lack distinctiveness in consumers' minds (Park et al. 1986). Brand architectures centered to a greater or lesser degree on a corporate brand connection are forced to accommodate extensions under the corporate umbrella, resulting in greater dilution risks for the master brand (Aaker 2004).

Brand cannibalization risk manifests in the loss of sales, revenues, or margins that accrue when "one product's customers are at the expense of other products offered by the same firm"[1] (Mason and Milne 1994, p. 163). Sullivan (1990) frames cannibalization or "intra-brand substitution" as a type of spillover risk and stresses that companies should strive to minimize competition within product lines to control this downside risk. Through the selection of different brand architectures, firms are more or less at risk of exposure to cannibalization. Firms with multiple brands and line extensions are characterized by greater cannibalization (Mason and Milne 1994). Fighting brands that defend a firm against price-based competitors (e.g., Kodak FunTime film) and vertical line extensions into value-based markets (e.g., Coach's Poppy line) exacerbate cannibalization by suggesting substitutability among offerings (Keller 1999). Value-based offerings become counter-productive when customers who would otherwise purchase the costlier version trade down to the cheaper brand (Kirmani et al. 1999). An architecture whose purpose is to optimize brand offerings for each of many target segments poses greater risks of cannibalization to the brand.

Brand stretch risk manifests in the lack of flexibility to take advantage of new market opportunities, capitalize on new technologies, or adapt to changing consumer tastes through the introduction of new, tailored offerings. Brand leverage is a core motivation for building brand assets in the first place, and any restrictions on this activity detract from the ability to capture value from a brand (Aaker 2004). A master brand with concrete meanings tied to a specific offering has less room to grow and hence greater stretch risk (Aaker 1990). A master brand with dominant meanings tied to a specific category—such as with Levi's and jeans—has less ability to respond to opportunities and hence greater stretch risk (Herr et al. 1996). Any master brand faces growth restrictions through dominant meanings that strain the credibility of new offerings (Farquhar et al. 1992) as with Hooters' failed extension into air travel. Brand architecture strategy can thus affect brand stretch risk through a relative focus on corporate brand meanings that reduce or otherwise constrain the leverage opportunities open to a given brand.

To illustrate our idiosyncratic risk framework, we apply the four risk drivers in the context of Rao et al.'s (2004) finding on higher Tobin's Q for BH versus HOB and its implication for heightened risk. Reputation risk is exacerbated in the BH where, by virtue of linking the corporate brand to multiple offerings, a quality failure or reputation crisis affecting an entity anywhere in the brand family can spill over and tarnish all of the firm's offerings (Erdem and Sun 2002). Reputation spillover risks are bi-directional: when one product under the corporate umbrella fails or suffers from lower quality evaluations, or when the corporate umbrella is negatively affected, the corporate brand and other portfolio brands weaken (Roedder-John et al. 1998). Dilution risks are also heightened in the BH since the meanings of all new offerings must be accommodated under the umbrella brand (Keller and Sood 2003). Further, the BH has high stretch risk in light of brand meaning constraints on market opportunities imposed by the parent brand (Aaker 2004). In contrast to a BH, the independent, multi-brand structure of the HOB offers superior risk protection. The HOB offers flexibility and increased market coverage, thus reducing stretch risk and yielding lower volatility in cash flows. Without constraints on positioning, the HOB can take advantage of market opportunities and respond with new offerings to market evolution. Risks of brand dilution are minimized since each offering is uniquely targeted and positioned. Reputation risk is minimized since spillover is controlled through the use of stand-alone brands. Micro-targeting within a category (e.g., P&G's Cheer and Era) exposes the HOB to higher levels of brand cannibalization risk, however (Aaker 2004). The risk framework thus helps clarify expected out-performance of HOB versus BH structures in terms of idiosyncratic risk control.

Hypotheses development for the three expanded strategies

Below, we develop hypotheses concerning risk/reward profiles for the three architecture strategies added or clarified in our expanded scheme. Hypotheses build from (1) consideration of the three strategies in terms of their benefits and

[1] To evaluate the success of new products, managers consider not only to what extent this demand comes at the expense of (cannibalizes) their own products (Carpenter and Hanssens 1994) but also to what extent it comes at the expense of a competing firm's products (brand switching). Cannibalization is often not beneficial since the net number of products sold does not increase and profits may decrease too, depending on the respective margins (Van Heerde et al. 2010). Brand switching, in contrast, comes at the expense of a competing firm's brands, and is always beneficial to the firm. Our focus from a risk perspective is on the former downside risk.

shortcomings arising from the supply- and demand-side returns factors listed above (see Table 1, Panel A) and (2) exposures to different sources and levels of idiosyncratic risk (see Table 1, Panel B). In framing the hypotheses, we draw upon paired contrasts that best highlight the comparative advantages and disadvantages of the different strategic approaches and the managerial intentions behind the choice of a particular architecture option. For example, we compare sub-branding to BH for the risk-control benefits expected in this strategy shift, and endorsed branding to sub-branding for risk reductions anticipated through distance from the corporate brand.

Sub-branding: improvements over branded house?

Sub-branding is a strategy that retains the benefits of the BH philosophy while gaining leverage offered in secondary brands. A key motivation for sub-branding is to gain some supply-side economies in marketing, communication, operations, and distribution (Srivastava et al. 1998; Pauwels et al. 2004) through associations with the corporate brand while also benefiting from demand-side advantages associated with (1) increased ability to target new segments with distinctive brands and (2) trial and awareness benefits that accrue for new offerings introduced under the corporate brand (Aaker 2004; Franzen 2009; Lane and Jacobson 1995). Since two brands are developed and maintained in a sub-branding strategy, supply-side advantages are inferior to those of the BH but still substantial (Aaker and Joachimsthaler 2000). Demand-side advantages, however, are much greater than with a BH umbrella (Sheinin and Biehal 1999). Sub-branding allows the opportunity to customize brand meanings and offerings and target niche segments, albeit with less precision than endorsed branding or HOB (Kapferer 2012). Through the opportunity for both demand- and supply-side economies, cash flow advantages accrue from sub-branding that are not delivered through a BH (Aaker 1990; Keller 2012). Comparing these two strategies across the six returns factors (see Table 1, Panel A) suggests:

H1: Sub-branding architecture strategy is associated with higher abnormal returns than branded house architecture strategy.

The secondary brand connection maintained in the sub-brand structure also reduces resultant risk (Aaker 2004). The secondary brand under the umbrella in sub-branding offers a risk buffer, diverting attention in a crisis or quality failure situation away from the corporate brand (Sood and Keller 2012). In this regard, the risk-mitigation benefits through sub-branding are somewhat similar to the risk-mitigation benefits of high customer portfolio diversity or high brand dispersion (Grewal et al. 2010; Luo et al. 2013). The secondary brand also relieves pressure on brand stretch capability (Sood and Keller 2012). However, the reality is that sub-brands maintain a strong connection to a prominent corporate brand, exposing rather than controlling risks. Sub-branding exposes a brand to increased risks of cannibalization (Sullivan 1990). With sub-brands, the corporate master brand loses clarity, exacerbating dilution risk (Franzen 2009). Each sub-brand also carries with it incremental risk for reputation crises and quality failures (Aaker 2004). Dilution and reputation risks can in fact be heightened with sub-branding since the presence of separate brands offers a "perceived sense of protection against cautions not to overextend the corporate brand" (Keller 2012; Sood and Keller 2012). Aaker (2004) declares that the risks of sub-branding "can be fairly described as scary" (p. 216): "Sub-brands are always risky … and the truth is that management underestimates risks to the master brand. Sub-brands can fail to help or they can actually hurt" (p. 202). Summary logic (Table 1, Panel B) goes against managerial convention and suggests:

H2: Sub-branding architecture strategy is associated with higher idiosyncratic risk than branded house architecture strategy.

Endorsed branding: the best-of-all-worlds?

The managerial literature portrays endorsed branding as a best-of-all-worlds architecture that grants (1) supply- and demand-side returns benefits derived from a corporate brand connection, (2) returns advantages from micro-targeting with a prominent second brand, and (3) a distanced corporate connection that offers a powerful cushion against contamination and risk (Aaker 2004; Aaker and Joachimsthaler 2000). Endorsed branding is thought not only to outperform the other two-brand alternative—sub-branding—in its risk profile through virtue of a more distanced corporate connection, but also to improve upon the HOB by delivering enhanced bottom-line-driven returns.

Endorsed branding seeks advantages of having a known corporation back the brand but, in contrast to sub-branding, minimizes association spillover and hence mitigates risk (Milberg et al. 1997; Rajagopal and Sanchez 2004). Endorsed brand architectures, by squarely shifting focus away from the corporate brand to a second, super-ordinate brand, also lessen brand dilution and reputation risks while preserving the desired effects of corporate brand association (Park et al. 1993). Vis-à-vis sub-branding, endorsed branding also enables each brand to build its own identity (Dooley and Bowie 2005; Kim et al. 2001; Sood and Keller 2012), resulting in lower brand stretch risk. Summary logic (Table 1, Panel B) favors endorsed branding over sub-branding in terms of idiosyncratic risk control:

H3: Endorsed branding architecture strategy is associated with lower idiosyncratic risk than sub-branding architecture strategy.

While experimental consumer research supports predictions of risk reduction for endorsed branding versus sub-branding by virtue of a more distanced corporate brand connection, expectations for returns advantages over HOB architectures may be overstated, nullifying endorsed branding as the "best-of-all-worlds." Through the use of an umbrella corporate brand that offers economies of scale in marketing, endorsed branding is expected to gain supply-side returns advantages not obtained with a HOB. However, endorsed branding bears significant costs as companies struggle to support adequate investments in and operations for an active portfolio of secondary brands (Dooley and Bowie 2005). The costs of building and sustaining a brand are substantial, and these costs are consistently underestimated (Aaker 1991); managers maintain "unrealistic assumptions about a firm's ability and will to adequately fund brands" (Aaker 2004, p. 216). Even marginal brands absorb dollars, time and talent, creating financial strains (Aaker 2004). These diseconomies of scale are significant in light of research findings that (1) investors value supply-side efficiencies over demand-side gains (Srinivasan et al. 2009) and (2) managers are subject to a bias wherein losses are discounted when options are compared (Kunda 1990). We contend that the returns picture is not advantaged for endorsed branding over HOB from either the supply or demand perspective and therefore do not offer a directional hypothesis.

Hybrid: improved performance through complementarity?

The hybrid provides the most flexibility of all brand architecture structures and allows the firm to selectively leverage particular brand entities to address emergent and conflicting strategy needs (Rajagopal and Sanchez 2004). The financial performance of the hybrid architecture will vary according to its composition since each strategy possesses a unique profile of demand- and supply-side costs and advantages and exposes the firm to different sources and levels of risks. Since Franzen (2009) defines the core of the hybrid using the most common BH-HOB combination, our hypotheses are focused on this mixed-structure form.

The BH-HOB hybrid typically manifests due to conflicts between a stock market that commands growth through targeted brand positioning and segmentation and a company that seeks to protect its central asset, the corporate brand. The Coca-Cola Company provides one such exemplar, wherein the flagship corporate brand Coke is fiercely protected while an HOB arsenal (e.g., Tab, Sprite, Fanta) is cultivated to take advantage of new tastes. Mergers and acquisitions serving growth goals fuel Coca Cola's BH-HOB hybrid structure as new brands are continually added to the HOB list (e.g., Glaceau VitaminWater, Odwalla, Schweppes). As a combination of strategies at the extremes of the brand architecture continuum, the BH-HOB hybrid can be expected to deliver performance improvements over its two ingredient strategies: one of which (BH) is disadvantaged in terms of higher risks and the other (HOB) burdened through lower returns (Varadarajan et al. 2006, p. 196). From a risk perspective, as Table 1 illustrates, and as the philosophy of diversification would suggest, a BH-HOB combination should reduce risk exposure versus the BH strategy: stand-alone brands mitigate dilution, reputation, and brand stretch risk. Further, improvements to the returns profile versus the HOB are added through marketing efficiencies on the supply-side. We thus hypothesize:

H4: The hybrid architecture strategy is associated with higher abnormal returns than house-of-brands architecture strategy.

H5: The hybrid architecture strategy is associated with lower idiosyncratic risk than branded house architecture strategy.

Data and operationalization of variables

Sample and data sources

The data comes from multiple sources. The CRSP dataset provides monthly stock returns (January 1996–December 2006) for all companies. Monthly data for the Fama-French/Carhart factors derive from French's website.[2] Accounting and financial data are obtained from COMPUSTAT. In coding brand architecture strategies a host of primary and secondary data sources were consulted, as described below.

From the initial sample of 400 firms listed on the NYSE, 98 companies were excluded due to insufficient data, intractable corporate structures (e.g., partly-owned subsidiaries), or suspicious accounting activity (e.g., Enron). Firms with M&As or consequential new product introductions that precipitated a change in brand architecture strategy during the study period were also excluded when such activity contributed more than 1% of firm revenues over the data period. The usable sample consists of 302 firms as follows: manufacturing (50%), retail (14%), information (9%), finance (8%), and other (19%), with the most frequent other categories being accommodation and food services (3%) and utilities (3%). The sample compares favorably with S&P 500 firms on two critical performance

[2] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

variables, stock returns and operating margins, as per a multivariate T-test resulting in a Hotelling's T^2 value of 2.280, which is not significant.

Operationalization of brand architecture strategy

The coding process qualified a firm's brand architecture strategy by considering the differential use of the corporate brand name across product/service offerings. The corporate brand connection was operationalized using two indicators: (1) percent of revenues attributed to products/services bearing the corporate brand name, and (2) visibility, emphasis, and prominence of the corporate brand name on branded products/services, packaging, and marketing materials (Keller 1999). These variables serve to distinguish BH and HOB strategies as well as the two-brand variants (sub-branding and endorsed branding). The coding of these four strategies allowed subsequent classification of the hybrid, as discussed below.

To obtain relevant information for the classifications, four trained coders searched multiple data sources to obtain a comprehensive representation of a firm's branded offerings. We coded brand architecture strategies based on the final year of the data time frame, 2006, in order to take full advantage of all the data available for the task (e.g., packaging, brand advertising, corporate annual reports). Sources included brand information from company websites, annual reports, brochures, advertising, and other company communications; filings with the U.S. Securities and Exchange Commission (SEC); brand information in Datamonitor, Nielsen, Wikiinvest, Mergent Online, Hoover's Online, and Mintel; and LexisNexis articles that mentioned company brands. Pictures of branded products obtained from Google images and store visits were also scrutinized for strategy evidence and clues. The task was complex as many firms participated in both B2B and B2C markets using a broad array of customer-facing brands.

Classification of brand architecture strategies proceeded as follows. If 0% of firm revenues derived from products/services bearing the corporate name in any capacity, the firm was coded as adopting a HOB strategy. If 100% of the firm's revenues derived from products/services bearing the corporate brand name, the branded offerings were examined to determine if the strategy was more appropriately considered a BH, sub-branding, or endorsed branding. Firms with branded offerings identified *only* using the corporate brand or by the corporate brand plus simple descriptors were classified as adopting a BH strategy. If two brands were used as part of the naming convention—the corporate brand plus some other second brand—a coding rule regarding the visibility, emphasis, and prominence of the corporate brand was considered to allow classification of sub-branding versus endorsed branding strategies. Information sources including branded communications, advertising, brand logos, and corporate brochures were carefully scrutinized with attention to the order or placement of brand names as foreground versus background, font styles, and the relative size of fonts (Keller 1999). Strategies in which the corporate brand was dominant and prominent on all offerings, or received equal visibility to the second brand, were coded as sub-branding. Strategies in which the corporate brand was sub-ordinate to a more prominent and dominant second brand were coded as endorsed branding. Coders confirmed that all of the remaining firms (Other) went to market using two or more architecture strategies. The BH-HOB hybrid was identified as a sub-set in this category, using the identifiers for BH and HOB above. The Web Appendix provides representative examples and details on the coding process illuminating the five brand architecture strategies.

Initial agreement on strategy classifications among the team of coders was high at 90%; final agreement after discussion was 98%. The brand architecture strategies for the final sample of 302 firms are: 81 BH firms (27%), 31 sub-branding (10%), 18 endorsed branding (6%), 38 HOB (13%), and 134 other (44%). Within the Other category, the breakdown is as follows: 91 firms (68%) with a combination of BH-HOB, 12 firms (9%) with BH-HOB-endorsed branding, 11 firms (8%) with BH-HOB-sub-branding, 11 firms (8%) with HOB-sub-branding, 2 firms (2%) with BH-sub-branding, and 7 firms (5%) across remaining combinations. The hybrid strategy thus consists of the 91 firms with a combination of BH-HOB. In order to assess stability of the coding, we classified the brand architecture strategies for a sample of 25 firms, i.e., five firms per brand architecture strategy type, at three points in time: 1996 (start of the data timeframe), 2001 (mid-point), and 2006 (end). These repeated measures allow us to conclude that brand architecture strategies remained constant (please see Web Appendix for details). The overall sample composition for our study compares favorably with Rao et al. (2004) and with reports on architecture strategies among contemporary firms (Laforet and Saunders 1994).

Control variables

We include marketing and accounting control variables following previous research. Marketing controls include advertising, brand portfolio breadth, and brand equity. We operationalize brand equity in terms of placement on Interbrand's list of the World's Strongest Brands in light of past research (Madden et al. 2006) and support of the validity and information value of the Interbrand metric (Barth et al. 1998). Accounting controls include operating margins, sales growth rate, profit volatility, leverage, and dividend payouts. In addition, we include firm diversification, industry sector, and business type (B2B versus B2C versus Mixed) controls. The B2B/B2C classifications are captured using two dummy variables to expand on Rao et al. (2004), wherein the corporate branding strategy was largely in B2B firms. Finally, to

Table 2 Definitions, sources, and prior literature for dependent and control variables

Variable	Definition/Operationalization	Source	Prior literature
Dependent variables			
Abnormal returns (α_i) Systematic risk (β_i) Idiosyncratic risk (σ^2_{it})	R_{it}-$R_{rf,t}$=α_i+$\beta_i(R_{mt}$-$R_{rf,t})$+s_iSMB_t+ h_iHML_t+u_iUMD_t+ε_{it} where $\varepsilon_{it} \sim N(0, \sigma^2_{it})$	CRSP; Kenneth French's website	Carhart (1997); Fama and French (1993)
Control variables			
Advertising	The ratio of advertising expenditures to total assets	COMPUSTAT	Osinga et al. (2011)
Number of brands	The number of brands in the company's brand portfolio	Hoover's; Mergent	Morgan and Rego (2009)
Brand equity	Dummy variable captures presence of a brand on the Interbrand Top 100 List of Strong Brands at least once from 1996 to 2006	Interbrand	Madden et al. (2006)
Operating margin	The ratio of net income before depreciation to sales	COMPUSTAT	Ferreira and Laux (2007)
Sales growth rate	The compound sales growth rate	COMPUSTAT	Rao et al. (2004)
Profit volatility	The standard deviation of return on assets which is the ratio of net income before extraordinary items to total assets	COMPUSTAT	Rego et al. (2009)
Leverage	The ratio of total liabilities to total assets	COMPUSTAT	Rao et al. (2004); Rego et al. (2009)
Dividend payouts	The total amount of cash dividends paid	COMPUSTAT	Luo and Bhattacharya (2009)
Firm diversification	The number of segments in which a firm markets its brands	NAICS	Morgan and Rego (2009)
Business type	Two dummy variables indicate whether the company is in a B2B market (1,0), mixed (0,0), or B2C market (0,1)	Company website	Kumar and Shah (2009)
Industry sector	Four dummy variables indicate that the company is in manufacturing (1,0,0,0), retail trade (0,1,0,0), information (0,0,1,0) or finance & insurance (0,0,0,1); all other industry sectors are reflected in the base case	NAICS	Nijssen et al. (2003)

Control variables calculated using three-year windows to obtain time-varying measures similar to the dependent variables (McAlister et al. 2007).

control for industry-specific effects, we include sector dummy variables. Table 2 contains definitions, measurements, data sources, and literature-based justification for these controls.

Research methodology

Our methodology to assess the impact of brand architecture on stock returns and risks proceeds in two steps. First, we estimate the four-factor explanatory model to obtain three components of shareholder value: levels of abnormal returns, systematic risk, and idiosyncratic risk. Next, we assess the impact of brand architecture strategy on each of the shareholder value components estimated in the first stage.

Step 1: assessing stock returns and risks

The Carhart four-factor explanatory model (Carhart 1997) is estimated as follows:

$$R_{it}-R_{rf,t} = \alpha_i + \beta_i(R_{mt}-R_{rf,t}) + s_iSMB_t + h_iHML_t + u_iUMD_t + \varepsilon_{it} \quad (1)$$

where R_{it} is the stock return for firm i at time t, $R_{rf,t}$ is the risk-free rate of return in period t, R_{mt} is the average market rate of return in period t, SMB_t is the return on a value-weighted portfolio of small stocks minus the return of big stocks, HML_t is the return on a value-weighted portfolio of high book-to-market stocks minus the return on a value-weighted portfolio of low book-to-market stocks, and UMD_t is the average return on two high prior-return portfolios minus the average return on two low prior-return portfolios.[3] The parameter α_i captures abnormal stock returns that should not be present in the case of an efficient market. The parameter β_i measures systematic risk. Finally, the variance of the residuals (σ^2_{it}) is a measure of idiosyncratic risk. Table 2 provides a summary of these firm value components.

The dependent variables of interest—stock returns, idiosyncratic risk, and systematic risk—are inherently long-

[3] The parameter s_i indicates the extent to which the firm's stock returns move with those from a portfolio of small stocks (higher value for s_i) or those from large stocks (lower value for s_i); similarly, h_i takes on a higher value when the stock returns show more correspondence with those from high book-to-market equity firms and lower values when they are closer to the returns from low book-to-market equity firms. The parameter u_i indicates the extent to which a firm's stock has momentum. Short-term excess returns appear in the form of ε_{it}.

term constructs whose changes manifest slowly over time (Braun et al. 1995; Ghysels 1998). The risk parameters in both the CAPM and four-factor model are typically estimated over long data windows. For example, Carhart (1997) uses 30 years of data with differing portfolios, while McAlister et al. (2007) use five-year moving windows of firm-level data to estimate CAPM. We base specifications for returns and risks on the moving-window methodology to capture dynamic patterns in these measures. Specifically, we use monthly stock returns of each company and three-year moving windows to estimate the dependent variables, resulting in nine observations per firm. For the first window, we use the data from 1996 to 1998, for the second window we use data from 1997 to 1999, and so on. For the final window, we use data from 2004 to 2006. This process results in time-varying estimates of stock returns and risk which we relate to brand architecture strategies. We apply the three-year moving windows to the control variables to facilitate estimation at the same levels of aggregation (McAlister et al. 2007). Our interest is in the cross-sectional variation in returns, systematic risk, and idiosyncratic risk for the different brand architecture strategies.

Step 2: assessing the impact of brand architecture strategy on stock returns and risks

We assess the impact of brand architecture strategy on the components of shareholder value obtained from the first stage. This results in the following equation for abnormal returns, α_{iw}:

$$\begin{aligned}\alpha_{iw} = \pi_1 &+ \theta_1 BH_i + \rho_1 SB_i + \delta_1 EB_i + \gamma_1 HOB_i + \omega_1 Hybrid_i + \varphi_{1,1} Advertising_{iw} \\ &+ \varphi_{1,2} Number\ of\ Brands_i + \varphi_{1,3} Brand\ Equity_i + \varphi_{1,4} Operating\ Margin_{iw} \\ &+ \varphi_{1,5} Sales\ Growth\ Rat\ e_{iw} + \varphi_{1,6} Profit\ Volatilit\ y_{iw} + \varphi_{1,7} Leverag\ e_{iw} \\ &+ \varphi_{1,8} Dividend\ s_{iw} + \varphi_{1,9} Firm\ Diversificatio\ n_i + \eta_{1,1} B2B_i + \eta_{1,1} B2C_i \\ &+ \sum\nolimits_{j=1}^{4} \tau_{1,j} Sector_{ij} + \varepsilon_{1iw}\end{aligned} \tag{2}$$

where α_{iw} is abnormal return for firm i at window w. The *BH*, *SB*, *EB*, *HOB*, and *Hybrid* architecture strategies are specified in the empirical model using five separate dummy variables and their effects are reflected in the parameters θ_1, ρ_1, δ_1, γ_1, and ω_1, respectively. The effects of the hybrid strategy for firms that have a pure combination of BH-HOB are captured in the *Hybrid* dummy while the effects for firms with remaining variants of hybrid (i.e., BH-EB-HOB, BH-SB-HOB, SB-HOB, BH-SB, and other combinations) are captured in the model intercept. The various control variables have descriptive labels in Eq. 2 above. Additional dummy variables are included in the model for B2B and B2C business types and for the industry sectors (manufacturing, retail trade, information, finance, and insurance); their effects are captured through the η_1 and τ_1 parameters, respectively. The intercepts π_1 capture the baseline effects of the combined sets of dummy variables. Equations for β_{iw}, systematic risk, and σ^2_{iw}, idiosyncratic risk, are similarly specified.

To account for uncertainty in the parameter estimates of the dependent variables and to avoid heteroskedasticity issues, we use weighted least squares estimation for the three second-stage equations (Srinivasan et al. 2004), with weights as the inverse of the standard errors of the dependent variable. The bootstrap method (repeating 1000 times) is applied to obtain corrected standard errors (see Bradley and Tibshirani 1993 for details). We use list-wise deletion of missing values following standard practice (Little and Rubin 2002).

Empirical results

Table 3 provides descriptive statistics and correlations among the variables in the dataset. The variance inflation factors (VIF) range from 1.09 to 3.52, indicating that multicollinearity is not an issue in the model.

Comparison of the three- and five-category architecture models

Central to our contribution is a demonstration of the incremental value of our five-part architecture over Rao et al.'s (2004) three-part scheme. As a first step, we assess the fit of the three- versus five-category brand architecture models. A comparative summary of the model fit statistics is shown in Table 4. We compare three model fit statistics for the two models: the adjusted R-squared, the well-

Table 3 Descriptive statistics of key variables and their correlations

Variable	Mean	Standard deviation	Corr $(x_t, x_{t-1})^+$	1	2	3	4	5	6	7	8	9	10	11
1. Abnormal returns	0.51	1.91	0.47	1.00										
2. Systematic risk	1.02	0.72	0.39	−0.14**	1.00									
3. Idiosyncratic risk	9.06	4.63	0.65	0.19**	0.30**	1.00								
4. Advertising	0.05	0.06	0.83	0.01	−0.19**	−0.01	1.00							
5. Number of brands	30.82	92.88	–	0.03	−0.08**	−0.08**	0.03	1.00						
6. Operating margin	0.06	0.11	0.58	0.18**	−0.18**	−0.29**	−0.04	0.13**	1.00					
7. Sales growth rate	0.06	0.13	0.48	0.27**	−0.06**	0.01	−0.02	−0.01	0.04**	1.00				
8. Profit volatility	0.03	0.06	0.49	0.01	0.13**	0.32**	0.09**	−0.03	−0.25**	−0.04*	1.00			
9. Leverage	0.67	0.81	0.78	−0.09**	0.03	0.01	0.16**	−0.03	−0.09**	−0.02	0.57**	1.00		
10.Dividend payouts	338.62	867.85	0.73	−0.05**	−0.10**	−0.22**	−0.07*	0.06**	0.16**	−0.03	−0.05*	0.01	1.00	
11.Firm diversification	7.66	6.05	–	−0.04*	−0.09**	−0.22**	0.03	−0.04*	−0.08**	0.01	−0.05**	0.07**	0.23**	1.00

*$p<0.05$, **$p<0.01$

$^+$ Demeaned variables

Table 4 Comparison of the three-category model with the proposed five-category model

Panel A. Abnormal returns		
	Three-category model	Proposed five-category model
-LL	2161.22	2148.31**
SBC	4449.88	4445.30
AIC	4358.44	4338.62
Adjusted R^2	11.1%	12.8%
Panel B. Systematic risk		
-LL	1072.65	1059.92**
SBC	2272.74	2268.52
AIC	2181.30	2161.83
Adjusted R^2	12.9%	14.5%
Panel C. Idiosyncratic risk		
-LL	2984.84	2926.16**
SBC	6097.12	6001.01
AIC	6005.68	5894.33
Adjusted R^2	26.1%	32.9%

** denotes the significance at $p<0.01$ of the Likelihood Ratio Chi-square Statistic based on a comparison of the three-category and proposed five-category models

known Akaike Information Criterion (AIC), and Schwarz Bayesian Criterion (SBC). In addition, we perform the likelihood ratio test of the expanded model versus the three-category model (Greene 2007). The adjusted R-squared for the three-category model for the three components of firm value, namely abnormal returns, systematic, and idiosyncratic risk are 11.1, 12.9, and 26.1%, and the corresponding figures for the five-category model are 12.8, 14.5, and 32.9%. Given the cross-sectional nature of the data, the models offer a good fit and are in line with R-squared values obtained in related research (McAlister et al. 2007; Srinivasan et al. 2009). The improvements in fit are 15.3, 12.4, and 26.1% respectively for the proposed five-category model's outperformance of the extant three-category model. A comparison of the AIC and SBC criterion further confirms these findings. Finally, likelihood ratios lead us to the inference that the proposed model represents a statistically significant improvement ($p<0.01$) over the extant three-category model. In summary, it is crucial to use the proposed five-category classification in order to better explain the components of firm value, which we proceed with by testing the main hypotheses.

Results for returns and idiosyncratic risk

Results for the effects of the brand architecture strategies on returns, idiosyncratic risk and systematic risk are

provided in Table 5.[4] We use *t*-tests to compare relevant regression coefficients pertaining to the hypotheses and summarize these findings in Table 6, placing them in the context of the literature. To facilitate comparisons across strategies, Fig. 2 provides a visual representation of the estimation results. Panels A, B, and C in the Figure display results for the three dependent variables, while Panel D offers an illustration of risk-adjusted returns.

Sub-branding is associated with higher abnormal returns than a BH strategy (sub-branding: 0.984 vs. BH: 0.455, $p<0.01$), in support of H1. This result suggests that investors appreciate the demand-side benefits afforded by sub-branding's ability to target niche market segments with semi-customized brand offerings while also maintaining some supply-side scale and scope economies afforded through use of a unified corporate brand. For further diagnostic insight, sub-branding also provides higher returns versus the HOB architecture (sub-branding: 0.984 vs. HOB: 0.326, $p<0.01$) stemming from added supply-side benefits. When combined with the finding that the BH strategy and the HOB strategy offer equivalent returns (BH: 0.455 vs. HOB: 0.326, *n.s.*), these three tests together allow us to conclude that Rao et al.'s (2004) finding of superior returns for the BH strategy versus HOB is driven by the sub-branding variant rather than the pure BH itself.

In support of H2, sub-branding is associated with higher idiosyncratic risk relative to BH (sub-branding: 4.105 vs. BH: 1.841, $p<0.01$). This finding refutes the common assumption of risk advantages for sub-branding strategies through use of a two-brand system. The result also challenges the implicit assumption that there exists a linear ordering of risks from highest to lowest along the BH→HOB continuum wherein sub-branding would be placed sequentially after BH in this list (see Fig. 2, Panel B).

Endorsed branding lowers idiosyncratic risk relative to sub-branding (endorsed branding: −0.004 vs. sub-branding: 4.105, $p<0.01$) in line with H3. This suggests that investors recognize that in shifting focus away from the corporate brand to a superordinate endorsed brand, reputation risk, dilution risk, and brand stretch risk are mitigated. In fact, endorsed branding provides significant risk control benefits that are similar in magnitude to the independent HOB (endorsed branding: −0.004 vs. HOB: 0.379, *n.s.*). However, endorsed branding provides no returns advantages versus the HOB (endorsed branding: 0.163 vs. HOB: 0.326, *n.s.*); the corporate brand connection does not deliver cost advantages to offset incremental brand-building costs.

[4] The number of observations is 9*302=2718 provided there are no missing values. We use the list-wise deletion of missing values in the empirical analysis following standard practice (Little and Rubin 2002). Since COMPUSTAT does not comprehensively report advertising and accounting variables for all years for all firms, this approach yields 1188.

Table 5 Estimation results for brand architecture strategies

Variables	Alpha (Returns)	Beta (Systematic risk)	Sigma (Idiosyncratic risk)
Branded house	0.455**	0.208**	1.841**
	(2.91)	(3.34)	(6.13)
Sub-branding	0.984**	0.375**	4.105**
	(4.88)	(4.64)	(10.45)
Hybrid	0.101	0.120*	0.536*
	(0.76)	(2.27)	(2.09)
Endorsed branding	0.163	−0.038	−0.004
	(0.70)	(−0.40)	(−0.01)
House-of-brands	0.326*	−0.092	0.379
	(2.22)	(−1.58)	(1.33)
Brand equity	−0.013	−0.132**	−0.521*
	(−0.11)	(−2.89)	(−2.39)
Advertising	2.105*	−1.207**	3.925*
	(2.40)	(−3.59)	(2.31)
Number of brands	0.0002	−0.0004	0.0002
	(0.48)	(−1.68)	(0.18)
Operating margin	2.153**	−0.609**	−2.512**
	(5.08)	(−3.97)	(−3.04)
Sales growth rate	4.110**	−0.170	0.885
	(8.52)	(−0.92)	(0.93)
Profit volatility	2.174	2.301**	29.79**
	(1.70)	(4.58)	(11.53)
Leverage	−0.239	−0.039	1.287**
	(−1.05)	(−0.44)	(2.86)
Dividend payouts	−0.0001**	−0.0001*	−0.0004**
	(−2.81)	(−1.97)	(−5.24)
Firm diversification	0.013	−0.006	−0.087**
	(1.58)	(−1.96)	(−5.53)
B-to-B	0.206	0.010	0.471
	(1.22)	(0.15)	(1.46)
B-to-C	−0.157	−0.012	0.544*
	(−1.25)	(−0.24)	(2.26)
Manufacturing	0.285	−0.105	0.161
	(1.80)	(−1.61)	(0.53)
Retail Trade	0.415*	−0.180**	0.925**
	(2.42)	(−2.58)	(2.80)
Information	0.516*	−0.123	0.139
	(2.35)	(−1.37)	(0.33)
Finance & Insurance	0.323	−0.173	−1.385**
	(1.14)	(−1.49)	(−2.58)
Intercept	−0.548*	1.220**	5.452**
	(−2.09)	(11.64)	(10.67)
N	1188	1188	1188
Adjusted R^2	0.128	0.145	0.329
F	9.720**	11.050**	30.030**

t statistics in parentheses

* $p<0.05$, ** $p<0.01$

Table 6 Empirical tests of hypotheses

Hypothesis	Focal comparison	Hypothesis test/Expected sign	Estimates (from Table 5)		Test of significance (t statistics)	Support of hypothesis
H1: Sub-branding is associated with higher abnormal returns than BH.	Sub-branding vs. Branded house	H_0: $\rho_1=\theta_1$ (+)	0.984	0.455	2.67**	Yes
H2: Sub-branding is associated with higher idiosyncratic risk than BH.	Sub-branding vs. Branded house	H_0: $\rho_3=\theta_3$ (+)	4.105	1.841	5.89**	Yes
H3: Endorsed branding is associated with lower idiosyncratic risk than sub-branding.	Endorsed branding vs. Sub-branding	H_0: $\delta_3=\rho_3$ (−)	−0.004	4.105	−8.23**	Yes
H4: The hybrid is associated with higher abnormal returns than HOB.	Hybrid vs. House-of-brands	H_0: $\omega_1=\gamma_1$ (+)	0.101	0.326	−1.68	No
H5: The hybrid is associated with lower idiosyncratic risk than BH.	Hybrid vs. Branded house	H_0: $\omega_3=\theta_3$ (−)	0.536	1.841	−5.14**	Yes

In column 3 titled "Hypothesis test/Expected sign" the subscripts 1 and 3 denote the coefficients from the returns and idiosyncratic risk equations respectively

* $p<0.05$, ** $p<0.01$

Overall, results for H1–H3 suggest that the pure (BH) versus superordinate (sub-branding) versus subordinate (endorsed branding) use of a corporate brand linkage investigated using the five-part brand architecture classification has important, differential effects on risk and returns.

Finally, the hybrid architecture does not offer consistent performance improvements over the component HOB and BH strategies of which it is comprised. The BH-HOB hybrid does not offer returns advantages versus the HOB (hybrid: 0.101 vs. HOB: 0.326, *n.s.*; H4 is not supported). Returns for the hybrid are in fact lower than sub-branding (hybrid: 0.101 vs. sub-branding: 0.984, $p<0.01$) and tied with endorsed branding and HOB (hybrid: 0.101 vs. endorsed branding: 0.163 and HOB: 0.326, *n.s.* for each comparison) for the lowest levels of returns. The BH-HOB hybrid does significantly improve the firm's idiosyncratic risk profile versus the pure BH (hybrid: 0.536 vs. BH: 1.841, $p<0.01$; H5 is supported). It also offers an improved idiosyncratic risk profile versus the sub-branding alternative (hybrid: 0.536 vs. sub-branding: 4.105, $p<0.01$) and equivalent risk control as endorsed branding and HOB (hybrid: 0.536 vs. endorsed branding: −0.004 and HOB: 0.379, *n.s.* for each comparison). Overall, the relative risk control benefits of this diversified architecture are compelling.

Results for systematic risk

Per Table 5 and Fig. 2, Panel C, patterns for systematic risk largely mirror those for idiosyncratic risk. Sub-branding (0.375, $p<0.01$) is associated with higher systematic risk relative to other strategies, and sub-branding has higher systematic risk than BH and hybrid (sub-branding: 0.375 vs. BH: 0.208 and hybrid: 0.120, $p<0.05$ for each comparison). The hybrid does not perform as favorably as HOB in systematic risk control (hybrid: 0.120 vs. HOB: −0.092, $p<0.01$). In fact, the endorsed branding and HOB offer similar effects on controlling systematic risk (endorsed branding: −0.038 vs. HOB: −0.092, *n.s.*). Overall, findings on systematic risk suggest that it is only via architecture strategies that forcefully pursue new segments, industries, and targets through prominent secondary or fully-independent brands (i.e., endorsed branding and HOB) that the firm grants protection from market and industry risk sources, most likely through the logic of diversification of risks.

Results for control variables

Findings with regard to the control variables are in line with published research (Baca et al. 2000; Madden et al. 2006; Osinga et al. 2011; Srinivasan et al. 2009; Steliaros and Thomas 2006). With respect to the marketing controls, brand equity and advertising affect all components of firm value while the number of brands in the portfolio does not. Strong brands have lower systematic (−0.132, $p<0.01$) and idiosyncratic risks (−0.521, $p<0.05$). In addition, increased advertising expenditures enhance stock returns (2.105, $p<0.05$), lower systematic risk (−1.207, $p<0.01$), and increase idiosyncratic risk (3.925, $p<0.05$). For the accounting control variables, higher operating margins are associated with higher returns (2.153, $p<0.01$), and lower levels of systematic (−0.609, $p<0.01$) and idiosyncratic risk (−2.512, $p<0.01$). Sales growth rate is positively associated with stock returns (4.110, $p<0.01$). Also as expected, profit volatility is positively associated with systematic (2.301, $p<0.01$) and idiosyncratic risk (29.79, $p<0.01$), while leverage is positively associated with idiosyncratic risk (1.287, $p<0.01$). Dividend payouts are negatively associated with returns (−0.0001, $p<0.01$), systematic risk (−0.0001, $p<0.05$), and idiosyncratic risk (−0.0004, $p<0.01$) with small but significant effect sizes. Firms operating in a large number of diversified segments have lower idiosyncratic risk (−0.087, $p<0.01$). B2C firms

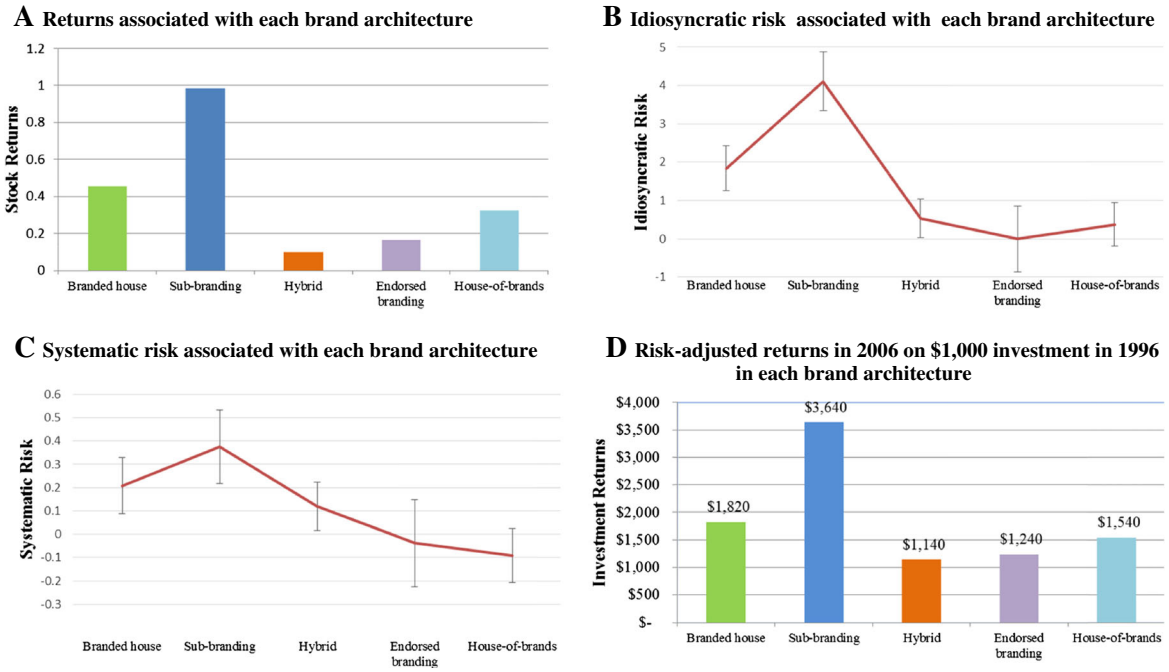

Fig. 2 The impact of brand architecture strategy on firm performance. *Note*: Systematic risk is the risk that is attributable to the overall market volatility. Idiosyncratic risk is the risk that is related to the firm's specific volatility (Bali et al. 2005)

exhibit higher idiosyncratic risk (0.544, $p<0.05$) relative to other firms.[5] The industry-specific effects captured via sector dummies explain variations in risk consistent with previous literature. Importantly, brand architecture effects hold over and above the effects of these controls.

Test of endogeneity

The paper's central hypothesis is that a company's brand architecture strategy influences its firm value above and beyond the known impact of other important variables such as net operating income. However, one could also construct an argument in favor of the reverse causal effect wherein a firm's brand architecture is based in part on that firm's value. In this context, marketers seek to incorporate investor behavior in their actions, realizing the reverse causality between marketing and firm performance (Markovitch et al. 2005). Under the reverse-causation scenario, brand architecture is endogenously determined; that is, the company applies a specific brand architecture strategy in response to investors' action as opposed to investors reacting to brand architecture strategy information in their stock evaluations.

We tested for the presence of endogeneity using both the Hausman-Wu and Durbin-Wu-Hausman tests (Davidson and MacKinnon 1993; Gielens and Dekimpe 2001; Rinallo and Basuroy 2009). Drawing upon empirical research, we use five instruments to assess endogeneity. Although there are no established instruments related to brand architecture strategies (Bahadir et al. 2008), the approach builds from the observation that a firm's assets and spending levels are related to its branding strategy (Morgan and Rego 2009; Krasnikov et al. 2009). Thus, we use total assets, SGA expenses, market-to-book ratio, revenue, and acquisition expense as instruments and include all the other variables in the test equation.[6] For the abnormal returns equation, the Wu-Hausman and Durbin-Wu-Hausman tests both fail to reject the null hypothesis of no statistical difference between estimators of the exogenous model and estimators of the endogenous model ($F(5, 1048)=1.818$ and $\chi^2_{df=5}=9.234$, respectively). For the systematic risk equation, both tests again fail to reject the null hypothesis that parameters of the endogenous and exogenous models are statistically the same ($F(5, 1048)=1.177$ and $\chi^2_{df=5}=5.996$, respectively). For the idiosyncratic risk equation, the Wu-Hausman ($F(5, 1048)=1.741$) and Durbin-Wu-Hausman tests ($\chi^2_{df=5}=8.848$) once again fail to reject the null hypothesis. We conclude that endogeneity does not present a problem; our findings are robust to endogeneity effects.

[5] Rao et al. (2004) suggest a confound between brand portfolio strategy and the firm's status as a B2B versus B2C player. Though our sample suggests that B2B firms are highly likely to pursue BH strategy, our sample diversity allows a significant number of B2C firms in the BH strategy to tease out these two effects. We find that performance results for the BH strategy are not constrained to B2B firms only; the BH risk/return profile holds when controlling for B2B vs. B2C firms. As an additional check, we added the interaction effects of the brand architecture strategy variables with the business-type dummy variables; our findings remain robust.

[6] We perform endogeneity test using the "IVREG2" and "IVENDOG" procedure in STATA 12.1.

Robustness checks

In a test of robustness we use a more direct measure of risk, namely the variance of stock returns as an alternative measure of equity risk, as has been sometimes used in finance (e.g., Schwert 1989) and marketing applications (e.g. Rego et al. 2009). The results on the hypotheses involving risk, namely H2, H3, H5, are consistent with those using the Carhart four-factor model (please see Table 7).

In addition, we test robustness of the main findings to five issues: (1) use of a two-year and five-year moving window instead of the focal three-year window, (2) inclusion of two brand equity metrics as alternatives to Interbrand: the total number of strong brands in the firm's brand portfolio [7] and *Fortune's* brand reputation score,[8] (3) inclusion of R&D expenditures as a proxy for new product activity,[9] (4) potential violation of the IID assumption on errors (given that the moving window method consists of repeated observations of each firm, both the dependent and independent variables may be auto-correlated for a given firm) [10], and (5) in line with emergent practice in empirical modeling papers towards mixed models as a better approach to test for heterogeneity concerns (see Hanssens et al. 2014), we estimated a mixed model with random intercepts and random coefficients using "MIXED" procedure in STATA 13.1. In all five instances, the substantive findings are found to be robust (in the interests of space, these results are available upon request from the authors).

Table 7 Robustness check: variance of stock returns as an alternative measure of risk

Variables	Variance of stock returns
Branded house	0.008**
	(5.44)
Sub-branding	0.015**
	(7.75)
Hybrid	0.003*
	(2.14)
Endorsed branding	0.002
	(0.98)
House-of-brands	0.002
	(1.00)
Brand equity	−0.004**
	(−3.87)
Advertising	0.008
	(0.98)
Number of brands	−0.00001
	(−1.44)
Operating margin	−0.018**
	(−4.85)
Sales growth rate	0.025**
	(7.77)
Profit volatility	0.151**
	(14.82)
Leverage	0.004
	(1.88)
Dividend payouts	−0.000002**
	(−3.49)
Firm diversification	−0.0003**
	(−3.82)
B-to-B	0.004**
	(2.68)
B-to-C	−0.0002
	(−0.18)
Manufacturing	0.002
	(1.06)
Retail Trade	−0.001
	(−0.29)
Information	0.004*
	(2.07)
Finance & Insurance	−0.004
	(−1.27)
Intercept	0.007**
	(2.74)
N	1213
Adjusted R^2	0.411
F	43.250**

t statistics in parentheses; * $p<0.05$, ** $p<0.01$

Conclusions, implications, and future research

This paper responds to the call for studies linking marketing strategy and firm value by assessing the impact of five brand architecture strategies on abnormal returns and risk. Results show improved fit to the data as evidenced in model outperformance for an expanded brand architecture scheme

[7] To illustrate, Yum! Brands has two strong brands on the Interbrand list, KFC and Pizza Hut, and hence the brand equity variable = 2 for Yum! Brands.

[8] Fortune's metric is reported on a ten-point scale, as derived through ratings on a variety of factors predictive of brand strength. We collect each company's annual Fortune's brand reputation score from 1996 to 2006 and substitute, for missing values, the average reputation score for U.S. firms in the relevant industry for that firm.

[9] We use R&D to measure new product introductions as in Kelm et al. (1995). Since R&D expenditures are reported in COMPUSTAT only for a small subset of 197 firms, we report these results as a part of robustness and not as a formal control variable in the model.

[10] Our results confirm the conclusion of Hanssens et al. (2001, p. 293) that "it is seldom necessary to engage in such an iterative procedure, though, as the OLS identification results alone are typically satisfactory." We perform ARMA (2,0) model using the "xtgee, corr(ar 2)" procedure in STATA 12.1.

that considers not only BH and HOB architectures but also sub-branding, endorsed branding, and the BH-HOB hybrid. The expanded scheme captures strategies that are prevalent in the marketplace but about whose performance we know little. The improved explanatory power for our five-part brand architecture typology helps guide a literature that variously proposes three-, four-, and five-part brand architecture schemes (Aaker 2004; Franzen 2009; Keller 2012; Kapferer 2012).

Our research validates that what may appear as subtle distinctions in brand architecture strategy matter in a practical sense: the strengths and weaknesses of the different brand architectures manifest in distinctly different risk/return profiles. To gauge the significance of our results, we offer a numerical illustration assuming that $1000 is invested in January 1996 in each of five portfolios of firms with different brand architectures (See Fig. 2, Panel D). By December 2006, the investment in sub-branding companies triples to $3640; this same $1000 investment in BH companies increases to $1820 by year-end 2006. In contrast, $1000 invested in the HOB increases by 50% to $1540 and for endorsed branding and the BH-HOB hybrid, the investment yields only insignificant increases to $1240 and $1140, respectively. This pattern of risks and returns along the architecture continuum is nonlinear; risk/return tradeoffs do not manifest in an ordered manner moving from BH to HOB with increased distance from the corporate brand.

Importantly, risk/return profiles not only differ significantly across these popular brand architecture structures, they also do so in unexpected ways. Many new substantive and managerial insights emerge from our investigation:

- Corporate branding strategies that vary in their leverage of the corporate brand connection are not created equal, and their strategic differences yield important consequences for firm value. Pure (BH) versus superordinate (sub-branding) versus subordinate (endorsed branding) use of a corporate brand linkage have important, differential effects on risk and returns. These consequential distinctions represent new insights to empirical research within this domain. Of note, our finding that sub-branding offers enhanced returns versus the pure BH strategy suggests that Rao et al.'s (2004) result concerning the outperformance of the BH architecture was likely driven by the sub-branding variant rather than by the pure BH itself.
- Our findings show that although sub-branding offers superior returns through shared brand investments and demand-side targeting benefits, managers face a tradeoff in the higher risk that goes hand-in-hand with these advantages. Sub-branding registers the highest risk profile of all architecture strategies and the scope and extent of these risks are underestimated in expert recommendations that favor sub-branding architectures and in consumer research on brand leverage. Our results suggest that the branding literature offers managers a false sense of protection against risks of overextension, dilution and cannibalization in sub-branding. The very qualities that Sood and Keller (2012) commend in this strategy—its ability to encourage broader participation in markets and extensions that are farther afield from the base brand—exacerbate risk.
- Managerial expectations for performance advantages through distanced, secondary connections to the corporate brand (Dolan 1998; Keller 1999; Keller 2012) are not supported by our empirical findings. Endorsed branding, a strategy with heretofore no empirical attention in the firm value literature, has been granted a best-of-all-worlds accommodation that grants authentication from the corporate brand while also maximizing the positioning and targeting capacities of separate brands. We find that endorsed branding does reduce idiosyncratic risk versus the closer corporate brand connections in sub-branding, but this strategy generates performance in the lowest rung in terms of abnormal returns. A tendency for managers to underestimate the costs of building brands—even secondary ones—while also overestimating returns benefits from a second brand possibly result in inflated managerial expectations for this strategy.
- Since the BH-HOB hybrid offers but mediocre performance on risk-adjusted returns, this raises questions about the prevalence and popularity of this strategy among management, and its perceived ability to combine advantages of the BH and the HOB.

Our results inform the general question of whether the financial markets appropriately value brand portfolio strategies and recognize the advantages and disadvantages the various options entail. Counter to Rao et al. (2004), who concluded that "the investor community might underappreciate that a multitude of brands (i.e., HOB strategy) distributes risks" (p. 139), our findings suggest that investors are aware that the HOB and its attendant concept of segmentation effectively distribute risks among portfolio brands. Results also suggest investor sensitivity to the risks of architectures that leverage the corporate brand connection. There exists sophistication within the financial community concerning strategic options for organizing brands.

Few marketing papers have considered risk within the brand–shareholder value environment, and those that do view brands as wholesale insurance-like protection mechanisms that help firms weather difficult times. We show how four types of brand-relevant idiosyncratic risk may be exacerbated or controlled through brand portfolio strategy and in so doing offer a theoretical framework for considering how brand strategy increases or decreases risk. This taxonomy advances the discipline by not only usefully clarifying the branding–

shareholder value linkage, but also framing brand decisions theoretically in risk management terms.

Limitations of the research can be noted and these suggest useful directions for future research. While we follow the tradition of Rao et al. (2004) and study manifest brand architecture strategies, structures as perceived by consumers may differ from revealed managerial intent. It would be useful to consider as a mediator of the strategy–financial performance relationship a customer-centric classification for brand architecture that incorporates the brand driver role in consumer decision making in addition to visual/verbal brand dominance cues. Unpacking the risk effects of sub-branding by clarifying the type of sub-brands in the portfolio will also prove useful. Value-based sub-branding that accesses downscale markets (e.g., Coach Poppy) is particularly risky as it exposes the firm to significant cannibalization and brand dilution; access to upscale markets through supra-branding (e.g., VW Phaeton) is also high risk as this strategy often stretches the brand beyond its natural boundaries.

Relatedly, we assess the long-term financial impact of brand architecture strategies using abnormal stock returns in line with previous research; future research can assess robustness of the findings using alternative metrics such as buy-and-hold models and Tobin's Q. Event studies exploring brand-related crises, recalls, or new product announcements can also be considered to provide additional insight into the risk/return properties of the various architectures. A focus on available performance data from public firms traded on the U.S. stock exchange also constrains our findings, suggesting replications in other markets and with different global firms.

This research leaves open the question of whether companies proactively manage their brand architectures as mechanisms for risk control. If brand portfolio strategy is purely a consequence of corporate growth, marketing loses a powerful lever for the management of risks through branding. Aaker (2004) claims that for most firms, the strategic management of the brand portfolio is deficient or non-existent compared to the operational management of individual brands. Future research might consider assessing the firm value impact of discrete shifts in brand architectures resulting from M&A activity with methods such as event-study and calendar time portfolio approaches. A related topic is to examine the role of endogeneity in discrete shifts in architecture strategy driven by the firm's intangible value. These issues need clarification if marketing is to reach its potential in the firm.

Also of future value is the operationalization and measurement of our typology of brand-relevant drivers of idiosyncratic risk. While these constructs played for us a diagnostic role in hypothesis formulation, their estimation can prove a valuable contribution for the fields of marketing as well as finance. The charge is an ambitious one as it suggests refinement of Fama-French and Carhart models, but the benefits to marketing theory would be significant.

This research also highlights the need for investors and analysts to obtain clear and accessible information about a firm's brand architecture and sounds a call for transparency in reporting this information. The coding process used in this study to determine manifest architectures was time-intensive and qualitative in nature, and through better reporting from companies its validity can be improved. We came across only two companies that provided a clear articulation of the firm's architecture strategy: The Gap and Coca-Cola Company.

We urge academics and practitioners to incorporate the five-category brand architecture scheme in their strategic and empirical investigations and to consider our risk framework for its potential value in shedding light on the brand–shareholder value link.

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