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Can Brands Circumvent Marketing Regulations? Exploiting Umbrella Branding in Financial Markets

Yan Lu,[a] Debanjan Mitra,[b] David Musto,[c] Sugata Ray[d]

[a] College of Business, University of Central Florida, Orlando, Florida 32816; [b] School of Business, University of Connecticut, Storrs, Connecticut 06269; [c] The Wharton School, University of Pennsylvania, Philadelphia, Pennsylvania 19104; [d] Culverhouse College of Business, University of Alabama, Tuscaloosa, Alabama 34587
Contact: yan.lu@ucf.edu (YL); debanjan.mitra@uconn.edu; http://orcid.org/0000-0003-2545-3017 (DeM); musto@wharton.upenn.edu (DaM); sugata.ray@cba.ua.edu (SR)

Abstract. Governments often regulate marketing activities to ensure marketers do not misinform consumers and obtain "unfair" advantages. Yet, ample research finds such regulations may be ineffective since marketers are able to circumvent them. We examine if umbrella branding, a marketing strategy of multiple products sharing a common brand, can be used to circumvent marketing regulations on a given product. Specifically, in the asset management industry, we examine if hedge funds, faced with a comprehensive marketing ban, benefited from the advertising by their umbrella brand mutual fund affiliates and, if so, whether the hedge funds exploited this effect. We find that higher advertising by mutual fund affiliates leads to a significant increase in sales of umbrella brand hedge funds and that hedge funds' circumstances in a trailing period impact the likelihood of advertising by their umbrella brand mutual fund affiliates. More importantly, using the 2012 JOBS Act that removed hedge funds' marketing restrictions as a natural experiment, we find that hedge funds' trailing circumstances had significantly less impact on umbrella branded mutual fund advertising after the passage of the JOBS Act. These findings are consistent with hedge funds using umbrella branding to circumvent the marketing ban.

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1. Introduction

Governments enact and enforce regulations to ensure that marketers do not misinform consumers and obtain "unfair" advantages in the marketplace. Regulations on marketing range from mandatory disclosures of standardized information to restrictions or even outright bans on marketing activities. For example, alcoholic beverages are mandated to carry warnings on packaging, life insurance policies are restricted from using phrases like "investment" or "interest plan" in their promotional materials, and credit cards are banned from offering free gifts to college students. Beyond the common objective of protecting consumers from incomplete, misleading, or deceptive information, each of these regulations share a common characteristic: they restrict specific marketing activities. That provides marketers opportunities to circumvent the regulations using alternative means of marketing that are not restricted, at least explicitly. In fact, it is widely known that alcohol marketers spend heavily on in-store displays that might interfere with package warnings at the point

of purchase (Patrick 2009). Likewise, life insurance marketers provide incentives for sales agents who might use the restricted phrases in their verbal sales pitches (Henriques 2004), and credit card marketers strike deals with universities who might provide them access to students (Korn and Rexrode 2018).

These anecdotal examples show that marketers devise workarounds for circumventing marketing regulation, especially when the scope of the regulation is narrow. Can marketers still bypass regulations that are more comprehensive? Hypothetically, what would happen if the alcohol warning had to be included as prominently as on the package anywhere the product is mentioned, or the restricted words for life insurance be expanded to include verbal or other informal communication, or if credit cards were restricted from reaching students at all, directly or indirectly. In the extreme, what if there is a complete ban on all marketing activities by a product, would it still be possible for marketers to circumvent such regulation?

One such instance of a comprehensive marketing regulation existed for alternative investment products

like hedge funds. The ban originated from the Securities Act of 1933, enacted in response to the 1929 stock market crash, with the dual goals to ensure transparency in financial statements and to prevent misrepresentation and fraud. The 1933 Act imposed a blanket ban on general solicitation, including advertising, promotion, or even just reaching out to potential customers, for all securities not registered with the SEC. In fact, under the general solicitation ban, managers of companies issuing such securities (e.g., hedge fund managers), were "advised not to establish websites . . . , [not] make public statements that reference the name of the fund . . . , [not] make presentations about the fund to an unscreened or large audience at a conference or industry event, [not] give interviews to the financial press, etc." (Babbit et al. 2012). In other words, it should be impossible for their marketers to circumvent such comprehensive marketing regulations. In this paper, we ask if that inference is necessarily true.

While hedge funds were banned from advertising, mutual funds, regulated under the Investment Company Act of 1940, *were* allowed to advertise.[1] We examine whether umbrella branding of hedge funds and mutual funds could have been used to circumvent even the comprehensive marketing ban for hedge funds. Specifically, could hedge funds that were interested in, but banned from, advertising spur their affiliated umbrella branded mutual funds to advertise in order to reap spillover benefits from such advertising? More generally, our empirical examination relates to the question of whether decisions of one business unit within a firm are actually influenced by the circumstances of another.[2]

The asset management industry context fits our research objective and provides us with a unique empirical opportunity on five counts. First, hedge funds and mutual funds are sometimes operated under a common umbrella brand in this industry.[3] There existed a complete ban on any form of solicitation (including advertising, sales promotion, and personal selling) by hedge funds,[4] while mutual funds *were* allowed to advertise. This difference enables us to estimate whether umbrella branded affiliate mutual fund advertising had any impact on hedge fund sales, without the distraction of the hedge fund's own advertising.

Second, the nature of the asset management product makes it possible to estimate an umbrella branded hedge fund's sales (i.e., its inflows) and quality (i.e., its risk-adjusted returns) circumstances.[5] Moreover, sales and quality can be further decomposed in terms of the category and the product. For example, all hedge funds with a particular investment style may obtain increasing sales on average on a given month versus a specific hedge fund that may obtain sales even higher than the category average. To the best of

our knowledge, prior research on umbrella branding seldom examines or controls for quality as it is hard to measure. Third, the presence of longitudinal information for every time period of the hedge fund's sales *following* umbrella brand mutual fund advertising enables us to demonstrate temporal order (Granger 1969). Likewise, longitudinal information on sales and quality before umbrella brand mutual fund advertising enables us to identify prior circumstances of the hedge fund that *leads* to such advertising. Fourth, the presence of umbrella brand as well as standalone mutual funds in our sample allows us to examine if our results might be driven by unobserved common shocks. Fifth, and perhaps most importantly, the fortuitous enactment of the Jumpstart our Business Startups Act (JOBS Act) in 2012 lifting restrictions on hedge fund advertising provides a natural experiment to critically reexamine our findings and establish hedge funds' intent "using simpler and transparent research methods" on publicly available data (Sudhir 2016, p. 3).[6]

Our contribution is to document whether umbrella branding can circumvent any marketing regulation in a given product category, irrespective of its comprehensiveness. Our analysis uses data from the area of asset management products where hedge funds, faced with marketing restriction, could potentially exploit umbrella brand advertising by their affiliate mutual funds. However, our inferences are likely generalizable across industries. To the best of our knowledge, this strategic possibility has not been studied in marketing and regulatory economics and, hence, establishing it contributes to branding literature. An ancillary contribution is to document cross-business-unit influence on decision making, and in particular, on advertising decisions. This phenomenon of unadvertised products' circumstances influencing decisions of affiliate products in multidivisional firms should be of interest to organization theory and industrial organization researchers. Our findings should also be of interest to policy makers and regulators. If marketers are indeed able to bypass even comprehensive marketing regulations using branding, policy makers may need to reassess such bans, as they may have unintended consequences such as aiding umbrella brand firms over their standalone peers.

The rest of this paper is divided into four sections. In Section 2, we discuss the regulation and the umbrella branding literatures to conceptualize how umbrella branding could be used to circumvent marketing regulations. Specifically, we discuss how advertising by umbrella brand affiliate mutual funds could benefit hedge fund sales.[7] Next, we hypothesize how hedge funds benefiting from affiliate mutual funds' advertising could, in theory, exploit such benefits depending on their circumstantial needs. We also

introduce how we use the JOBS Act as a natural experiment and hypothesize how our results pertaining to hedge funds' exploiting of affiliate mutual fund advertising are likely to change after the passage of the JOBS Act. In the Section 3, we describe the data including collection, merging procedures, as well as operationalization of key variables. The fourth section provides econometric models and reports estimates that test our hypotheses. The final section summarizes, discusses implications, and concludes.

2. Marketing Regulations and Umbrella Branding

Marketing activities can unquestionably benefit society by providing information (e.g., Mayzlin and Shin 2011), developing new products (e.g., Hoffman et al. 2010), and spurring entry into new markets (e.g., Johnson and Tellis 2008). At the same time, they could also result in driving out competition (e.g., Bakos and Brynjolfsson 2000), reducing competition by lowering cross-price elasticities (e.g., Amaldoss and He 2010), and increasing costs (e.g., Janssen and Non 2009). More worryingly, marketers can take undue advantage of information asymmetry between firms and customers by providing incomplete, misleading, or even false information (Petty 2015). Indeed, Parker (1995) finds that low-quality, high-price optometrists used marketing activities to gain market share from their high-quality, low-price counterparts. In fact, the United States established the Federal Trade Commission (FTC) in 1914 specifically to prevent such "unfair" methods that mislead customers. Since then, policy makers have instituted many regulations on marketing including disclosures of standardized information (e.g., restaurants, automobiles), licensing (e.g., hospitals, lawyers), and, in some cases, outright bans on marketing activities (e.g., tobacco, alcohol).

Effectiveness of Marketing Regulations
In spite of all of the regulatory efforts and initiatives of policy makers and government agencies, there is skepticism on the effectiveness of marketing regulations. Historically, marketing regulations have been depicted as "impotent" (House Committee on Government Operations 1958), having "recurrent flaws" (American Bar Association 1969), and "not rigorous" (Wilcox and Shepherd 1975). Empirical evidence regarding the effectiveness of marketing regulation is also mixed, at best. Ellert (1976) and Burns (1977) find no significant effect of regulatory divestitures related to antitrust cases in marketing. But Peltzman (1981) finds that investors penalize firms that violate FTC advertising regulations by "essentially a wiping out of the brand's advertising (expenses)." This implies that FTC regulations are effective, assuming rational

financial markets. Other studies that directly examine the effectiveness of marketing regulations for tobacco products find them to be either ineffective (Hamilton 1972, Warner 1977, Schneider et al. 1981, Nelson 2006, Capella et al. 2008) or only mildly effective (Baltagi and Levin 1986). In fact, Hamilton (1972, p. 401) claims "the net effect of the (tobacco advertising) ban may be to increase consumption, not decrease it." Outside of the tobacco industry, Iizuka and Jin (2005) find that the U.S. Food and Drug Administration's 1997 pharmaceutical advertising rule change has significant impacts in only three out of their five model specifications, implying that such rules may only be consequential only under select conditions. Reviewing a large amount of research on the effectiveness of disclosures, Dranove and Jin (2010) find "heterogeneous consumer responses," depending on whether the disclosed information is easy to access and whether consumers pay attention. Again, the implication is that the effect of regulation is contingent and, on average, may be small. Indeed, Moorman (1998, p. 92) examines the effectiveness of the Nutrition Labeling and Education Act (NLEA) and only finds "small effect sizes . . . (that) are weak and limited." Further examinations by Moorman and Huber (2012, p. 717) even "indicate that the NLEA resulted in *lower* brand nutrition," the opposite of what was intended. Jin and Sorensen (2006, p. 248) too admit "a very small fraction of individual decisions were materially affected by the (provision of quality) information" on health plans. In sum, ample evidence points to marketing regulations not being too effective, at least on aggregate. Why so? Next, we discuss the limited research on this aspect.

Dating back to George Stigler's pioneering work on regulations' effects, researchers have speculated why regulations might be ineffective. Many of these relate to regulations' lack of application breadth, which could be exploited by the regulated firms. For example, Stigler and Friedland (1962, p. 12) reasoned that businesses, based on their detailed knowledge, could always come up with alternative "variables whose effect is of the same order of magnitude in their effects on profits" as those that regulators sought to control. In the case of marketing regulations, this means marketers could bypass regulations through alternative, unregulated strategies that could achieve the same goals. These strategies can be difficult to empirically identify and, even if identified, difficult to establish as intentional. In fact, we could only find three studies that show or even imply that marketers skirt regulations using alternative strategies.

Goldfarb and Tucker (2011a) find the internet to have "reduced the effectiveness of government regulation of advertising" of alcoholic products. The authors in another study find lawyers to use online

advertising when regulations prevented them from reaching their potential clients by mail (Goldfarb and Tucker 2011b). Both studies show that marketers have used the internet to bypass regulations directed toward traditional modes of advertising. A third study conducts a metaanalysis of tobacco regulations' effects to conclude "a limited set of advertising bans will have little or no effect . . . (but) a comprehensive set of tobacco advertising bans can reduce tobacco consumption" (Saffer and Chaloupka 2000, p. 1,117). This implies that when regulations are limited, marketers are able to bypass them, while they cannot easily do so for comprehensive regulations. Of course, in the extreme case, comprehensive regulations may be imposed on all forms of marketing by a product. It is in this context that we draw from existing research on cross-product marketing effects to conceptualize and then examine if such effects can be used to bypass even the most comprehensive of marketing regulations.

Umbrella Branding to Circumvent Marketing Regulations

The marketing literature shows, both theoretically and empirically, that consumer demand for a product can be influenced by other products' marketing in a number of ways (see, for example, Shocker et al. 2004). One way, which our paper focuses on, is *umbrella* branding. Umbrella branding, a ubiquitous marketing strategy, involves the use of a single brand name for the sale of two or more products sometimes spanning multiple categories (Wernerfelt 1988, Aaker 1990).

Using experimental and econometric methods, many studies have established that advertising by a given umbrella brand product increases sales of other products that share the brand (Erdem 1998, Smith and Park 1992). There is also evidence of a new umbrella brand product's advertising increasing sales of existing umbrella brand products (Balachander and Ghose 2003). Studies that probe why umbrella brands are beneficial arrive at two broad reasons. One, it mitigates customer uncertainty—i.e., variance of the random component of customer utility "declines over time on the basis of advertising (and use experience) in either category" (Erdem and Sun 2002). Two, customers may prefer an umbrella brand multiproduct firm over others since the umbrella brand name could serve as a quality signal and/or as a memory cue driving attention (Meyvis and Janiszewski 2004, Anand and Shachar 2004). Note that for either reason to operate, the two products should share commonalities in terms of product benefits, customers, or preferably, both. Indeed, a large marketing literature examines when the umbrella brand cross-product marketing effect (referred to as *spillover* effect) is

high—that is, when marketing activities of one product leads to increased sales of an affiliate umbrella brand product.

The unanimous finding is that when there is a "fit" between the two product categories, spillover effects are more likely (Völckner and Sattler 2006)—however, there is no consensus on the precise definition of fit. Some studies view fit as a similarity between products (e.g., Boush and Loken 1991, Herr et al. 1996), some view fit as the relevance in terms of key benefit attributes (e.g., Aaker and Keller 1990, Broniarczyk and Alba 1994), and still others view fit as cultural, prestige, or style consistency (Park et al. 1991, Spiggle et al. 2012).

Irrespective of the exact nature of "fit," if cross-product marketing effects exist, we reason that it could benefit, intentionally or not, a product facing restrictions on its marketing. In fact, even if there exists a comprehensive marketing restriction (i.e., a complete ban) in a given product category, marketing a different category's products can benefit the restricted category's products. For example, in our specific context, hedge funds faced a marketing ban that was comprehensive. Yet, the existence of cross-product effects of marketing activities by affiliate mutual funds, which do not face such a ban, could benefit the hedge funds.[8]

Hedge Funds and Affiliate Mutual Fund Advertising

As discussed, the extent of cross-product marketing effect depends on fit, broadly defined as the similarity, relevance, or consistency between the product categories. For our specific context of hedge funds and mutual funds, if all of these notions of fit work well, we should have more confidence in cross-product spillover from an affiliate mutual fund's advertising on a hedge fund's sales. Alternatively, if there is a poor fit between the hedge fund and mutual fund products, cross-product marketing spillover effects will be minimal.

Both mutual funds and hedge funds are managed investment portfolios. This means a fund manager (or a group of managers) will pick securities and the customers of the fund will participate in the gains or losses of the holdings. This makes it seem that the products can be viewed as similar and, hence, the fit should result in cross-product spillover. There are two other forces that should also lead to higher spillover. One, the organizational culture of an investment firm, its history, and style should be shared among all its products irrespective of mutual funds and hedge funds. Two, though hedge funds are restricted to high-net-worth and institutional customers (e.g., at least $5 million in investment or annual income higher than $200,000), these same customers may sometimes invest in mutual funds

(Copeland and Zuckerman 2014). These commonalities tend to favor spillover of an affiliate mutual fund's marketing on a hedge fund.

In contrast, one could argue that high-net-worth customers, even if they may sometimes buy mutual funds, tend to be more sophisticated and analytic in their investment choices. Monga and John (2010) find such analytic thinkers to be roadblocks for firms seeking benefits from extending its brand to different categories. Moreover, there are also differences between hedge fund and mutual fund products that may make information on a mutual fund irrelevant with respect to a hedge fund. For example, hedge fund managers have fewer investment constraints comapred to mutual funds, which generally cannot sell short, use derivatives, or employ leverage. Hedge funds can also lock up invested capital, making it illiquid over extended periods, as opposed to mutual funds that have to provide daily liquidity. Finally, hedge fund managers are also expected to put significant amounts of their own capital in the fund, whereas there is no such expectation for the mutual funds.[9] These technical differences may render the attributes of mutual funds to be less relevant for hedge funds, reducing the fit between the two product categories. That would mean the spillover from an affiliate mutual fund's marketing could be zero just like the "Levi name did not fit the concept" of Levi Tailored men's suits, or even negative just like "the Sears association hurt Dean Witter" (Aaker 1990, pp. 50 and 52). Taken together, though spillover seems plausible, whether there is a significant positive spillover effect from affiliate mutual funds on hedge fund sales remains an open empirical question. Therefore, we ask

R1: *Does an affiliate mutual fund's advertising lead to an increase in an advertising-restricted hedge fund's sales?*

If an affiliate mutual fund's advertising leads to an increase in hedge fund sales, it could create an economic incentive for the hedge fund to spur its affiliate's advertising and reap the benefit of spillovers from such advertising (e.g., see the work of Ashley et al. (1980), who find that consumption drives advertising, and that of Aaker et al. (1982) and Lee et al. (1996), who find that sales and advertising drive each other). In this way, it would have successfully skirted the marketing regulations. If hedge funds were actually doing so, then we should find a link between hedge funds' circumstantial needs and subsequent affiliate mutual fund advertising.

We consider two such measures of affiliate hedge funds' circumstantial needs: sales and quality. We further decompose each of these measures into a category average component and an offering-specific component. Therefore, there are four types of hedge fund circumstances we consider: category-average sales, offering-specific sales, category-average quality, and offering-specific quality. We examine the links between these hedge fund circumstances and subsequent affiliate mutual fund advertising. Any significant relationship between these four circumstances and subsequent affiliate mutual fund advertising would be suggestive of hedge funds' circumstances influencing advertising decisions on their affiliate mutual fund.[10] Therefore, we hypothesize the following:

Hypothesis 1. *An advertising-restricted hedge fund's circumstances (category-average sales, offering-specific sales, category-average quality performance, and offering-specific quality) significantly influences the likelihood of an affiliate mutual fund's subsequent advertising, after controlling for the mutual fund's own sales and quality.*

As stated, support for this hypothesis would indicate an affiliate hedge fund's circumstances influence on the affiliate mutual fund's advertising. However, this influence may or may not be strategic on the part of the hedge funds. For example, the umbrella brand hedge fund may intentionally seek affiliate mutual fund's advertising. But it is also possible that this influence is incidental, and not intentional. This could happen if an affiliate mutual fund changes its advertising spend in response to its affiliate hedge funds' circumstances so as to manage the firm's overall revenues and compensate for any shortfall from its hedge fund business.[11] Thus, documenting a link between a hedge fund's circumstances and its affiliate mutual fund's advertising is not *sufficient* in establishing whether hedge funds strategically exploited an affiliate's advertising. Next, we discuss a potential way to tease apart the intentional versus incidental influence of affiliate hedge funds.

In April 2012, the Jumpstart our Business Startups Act (or JOBS Act) was enacted to help businesses raise funds in public capital markets by minimizing regulatory requirements. It was written broadly to encompass raising capital for stakes in hedge funds. The JOBS Act allowed advertising by hedge funds, since "Congress reasoned it doesn't matter who views advertisements … as long as [the hedge fund securities are] only sold to wealthy institutions or individuals" (Ackerman 2014). Prior to the JOBS Act, hedge funds attempting to benefit from affiliate mutual fund advertising needed to actively influence such advertising. Post–JOBS Act, such hedge funds would be able to advertise on their own. They could still benefit from affiliate mutual fund's advertising, but arguably there would be less of a need to influence such advertising. Additionally, umbrella brand firms and affiliate mutual funds would be less receptive to a hedge fund's influence given that the hedge fund could advertise on its own. If the influence of a hedge

fund's circumstances on subsequent affiliate mutual fund advertising (Hypothesis 1 above) were intentional, we would expect this influence to decline after the passage of the JOBS Act. Thus, the JOBS Act provides us a natural experiment to isolate hedge funds' intent to circumvent regulations in the period prior to its enactment.

Specifically, a decrease in any observed links between hedge fund circumstances and subsequent advertising of affiliate mutual funds post–JOBS Act should be attributable to this exogenous deregulation event. Such a decrease will suggest that, prior to JOBS Act, hedge funds were possibly circumventing advertising restrictions by strategically influencing affiliate mutual fund advertising based on their circumstances. The decrease after the JOBS Act helps rule out other, incidental, explanations such as revenue management as there is no reason revenue management would cease after the JOBS Act. Consequently, we examine the following hypothesis, which is based on an affiliate hedge fund's intention to circumvent advertising restrictions by exploiting umbrella branding.

Hypothesis 2. *Any significant links between a hedge fund's circumstances and subsequent affiliate mutual fund advertising diminish after the passing of the JOBS Act.*

Next, we describe the data to address our research question and evaluate our hypotheses.

3. Data

Prior empirical research on umbrella branding employed two types of data. Early studies use experimental data from individual subjects, usually students (Aaker and Keller 1990, Boush and Loken 1991, Rangaswamy et al. 1993, Dacin and Smith 1994). More recently, household scanner panels have enabled researchers to estimate demand at the individual level using secondary data. In conjunction with other econometric advances in structural modeling, scanner panel data allowed researchers to arrive at identification of the underlying process (Erdem 1998, Erdem and Sun 2002, Balachander and Ghose 2003, Anand and Shachar 2004).

We take a different approach that complements those of prior studies. We exploit naturally occurring aggregate-level data in which the context provides the opportunity for isolating effects. It so happens that a number of asset management firms operating mutual funds also operate umbrella branded hedge funds. Until April 2012, there existed a ban on advertising hedge funds. Mutual funds, however, were allowed to advertise during this period.

Databases

Our data are the result of merging information on asset management firms that operate both hedge funds and mutual funds under an advertised umbrella brand from three databases. The source of hedge fund brand name, sales, performance, and other details over time is the Lipper TASS database. The source of mutual fund brand name, sales, performance, and other details over time is the Center for Research in Security Prices (CRSP) survivor-bias free mutual funds database.[12] The third key database we use is Ad$pender. Ad$pender monitors advertising expenditures and occurrence information for more than 3 million branded products across 18 media including magazines, newspapers, TV, Radio, and U.S. internet, and is widely used in the marketing literature (e.g., Bronnenberg et al. 2010). The merged information from the three databases during our observation period starting January 2006 through March 2012 form our data prior to JOBS Act. In addition, we also exploit the chance occurrence of the JOBS Act as a natural experiment. For this, we collect similar data up to April 2017. Though JOBS Act was signed into law on April 5, 2012, the part of the act relevant to hedge fund advertising was implemented only on July 10, 2013.[13] Hence, we use data between August 2013 and April 2017 to signify the post–JOBS Act period. Next, we describe the merging procedures and data.

Merging Procedures and Data Description

To link hedge funds to mutual funds and their advertising, we construct a sample of all mutual funds and hedge funds for each month by combining the TASS and CRSP datasets. We define hedge funds as umbrella branded if they share a common brand name with a mutual fund during a given month. These hedge funds are then connected to their respective umbrella brand mutual funds during that month. The combined fund data set is then merged with the Ad$pender data set.

A hypothetical example may clarify the merging process. Using TASS, we obtain details of monthly sales (inflows), quality (performance), and other hedge fund information for a hedge fund branded, say, Blackrock.[14] Then, using CRSP, we link all Blackrock-branded hedge funds with mutual funds that are also Blackrock branded and obtain their monthly sales (inflows), quality (performance), and other mutual fund information. Finally, using Ad$pender, we find if and how much the Blackrock-branded mutual funds advertised in a given month.

The final merged data set contains the sales (inflow) and quality (risk-adjusted return) data for 1,299 hedge funds that have affiliate mutual funds who advertise during the observation period between January 2006 and April 2017. It also contains affiliate mutual funds' advertising spending, sales, and quality for each month. Note, in addition to the primary data on umbrella brand hedge funds and mutual

funds that advertise, we also obtain information on the complete population of hedge funds and mutual funds. This information includes standalone hedge fund and mutual fund firms that operated during our observation period. Later we describe how we use this information to arrive at robust findings.

Table 1 provides averages of the quality, sales, and other control variables for all funds that constitute our primary data.[15] Since we examine how these variables are likely to affect affiliate mutual fund advertising, we form quartiles of umbrella brand hedge funds based on the advertising frequency of their affiliate mutual funds. We report quartile averages of our explanatory variables for the highest and lowest quartiles. We find that those hedge funds with higher advertising frequency of their affiliate mutual fund, on average, attract higher inflows but do not generate any higher risk-adjusted returns. Of course, these cross-sectional differences cannot help establish or rule out longitudinal effects. For affiliate mutual funds, those with highest advertising frequency, on average, attract higher flows than those funds with lowest advertising frequency. They also outperform their low-advertising counterparts' returns, charge lower 12-1b marketing/distributing fees, and have lower expenses ratio.

Next, we describe the operationalization of our variables: advertising, quality, sales, and other hedge fund and mutual fund characteristics.

Measures of Relative Advertising

Our focal variable is relative advertising. Whether relative advertising is high or low depends on the amount of advertising, the duration of advertising, and the comparison standard. We use several measures, both continuous and discrete, to quantify advertising based on these three aspects. The objective is to ensure that our findings are generally robust across alternative measures.

The first measure, *Ad_High*, captures whether advertising spend in a given month is more or less than "usual." We capture this concept through a binary variable that compares the advertising spend of a month with an average across the industry. *Ad_High* is 1 if a mutual fund's advertising in a month divided by its average advertising during the year is higher than the industry's expenditure in that month divided by the industry's average during the year, and 0 otherwise. In unreported robustness tests, we also use other measures to capture the same concept in spirit based on alternate versions of what may be considered as *usual*.[16]

Advertising decisions are often implemented over an extended period. Our second measure, *Ad_Clock*, controls for this fact by focusing on the decision to commence a potentially multimonth advertising campaign. The *Ad_Clock* variable indicates the first month of advertising spending after at least one month of no spending. It takes the value of the number of months of consecutive advertising in the advertising data. The value in the subsequent consecutive months of advertising is set to missing. The *Ad_Clock* variable is 0 for all months without advertising. For example, if a fund advertises in months 2, 3, and 5 during a calendar year, *Ad_Clock* is 0 for month 1, 2 for month 2 (since it is the start of a two-month campaign), missing in month 3, 0 for month 4, 1, and 0 for all the remaining months of the year.

A third measure, *Ad_Ratio*, is a continuous measure that captures the proportion of advertising by a fund in a given month during a particular year. *Ad_Ratio* is a month's normalized share of all money spent

Table 1. Descriptive Statistics

	Mean	Q1 Most	Q4 least	Q1–Q4
Advertising frequency (% advertising months)	0.1732	0.5681	0.0017	0.5664***
Sample size	1,299	325	324	
Umbrella brand hedge fund attributes				
Sales (net fund inflow %)	0.34	1.22	−0.1	1.32***
Quality (risk adj. return %)	0.75	0.79	0.74	0.05
Management fee (%)	1.52	1.39	1.45	−0.06
Incentive fee (%)	13.16	11.54	14.82	−3.28***
High-water mark	0.38	0.39	0.47	−0.08*
Lockup period (months)	13.65	14.13	12.94	1.19
Log size at inception (log $)	16.48	16.57	16.23	0.34
Umbrella brand mutual fund attributes				
Sales (net fund inflow %)	2.08	2.86	0.38	2.48***
Quality (return %)	0.40	0.52	0.30	0.22***
12b-1 fee (%)	0.46	0.47	0.47	0
Expense ratio (%)	1.16	1.18	1.41	−0.23
Portfolio turnover ratio	0.83	0.75	0.99	−0.24
Log size (log MM$)	8.52	8.96	5.99	2.97***

* and *** indicate statistical significance at the 10% and 1% level, respectively.

advertising a fund, compared with money spent advertising in the average advertising month, looking forward and back during the year. For example, if an umbrella brand mutual fund were to exhibit the advertising spend 0 in the first month, $1,000 in the second month, and $3,000 in the third month and 0 in the fourth month, with no other observations, the money spent advertising in the average advertising month is $2,000. *Ad_Ratio* would be computed as 0, 0.5, 1.5, and 0.

Finally, we use a fourth measure of advertising *Ad_Netraw* that uses the raw advertising dollar spend that is mean-centered for each fund. This measure is closely correlated with raw dollar ad spend of the fund, and adjustments based on demeaning allow us analyze funds with varying sizes in a comparable manner.

Table 2 provides a definition summary of the advertising variables as well as all hedge fund and mutual fund variables in our final data set.

In panel A of Table 3, we provide correlations between our advertising measures. Most of the correlations range between low and moderately positive, reflecting the fact that our three measures are able to capture different elements of the relative advertising level. Note that

we also computed other relative advertising measures but drop them from our analyses since they are highly correlated with one of the four measures that we use.

Measures of Quality and Sales

A key feature of our data context is that it provides the opportunity to track both sales and quality information over time. We capture a fund's sales based on its net inflow as a percent of its assets under management (*AUM*). We compute net inflow using changes in *AUM*, after adjusting for the returns of the funds. Specifically, sales of a mutual fund *MSales* or that of a hedge fund *HSales* at a given time period t is operationalized as $(AUM_t - AUM_{t-1} \times Return_t)/AUM_{t-1}$. Moreover, we further decompose *HSales* in terms of the category (i.e., similar style hedge funds) average *HCSales* plus the remainder that is attributed to the specific hedge fund offering *HOSales*.

For any investment fund, quality is reflected by its risk-adjusted return during a given period. Risk adjustment is done in the spirit of Ippolito (1992), and quality is computed as the return of the fund in a given period, minus the expected return of the fund, computed using the beta exposures of the fund

Table 2. Definitions of Variables

Variable	Unit	Definition
Hedge funds		
$HCSales_{t-1,t-12}$	%	Hedge Fund Sales: Monthly average percent net inflows of funds sharing the same style for the trailing 12 months.
$HOSales_{t-1,t-12}$	%	Hedge Fund Sales: Monthly average percent net inflows of a fund subtracting monthly average percent net inflows of funds sharing the same style for the trailing 12 months.
$HCQuality_{t-1,t-12}$	%	Hedge Fund Category Quality: Monthly average risk-adjusted returns of funds sharing the same style for the trailing 12 months.
$HOQuality_{t-1,t-12}$	%	Hedge Fund Offering Quality: Monthly average risk-adjusted returns of a fund subtracting average risk-adjusted returns of funds sharing the same style for the trailing 12 months.
HMgmtFee	%	Hedge Fund management fee.
HPerfFee	%	Hedge Fund performance fee.
HWaterMark	Dummy	1 if the Hedge Fund has a high-water mark, and 0 otherwise.
HLockUp	Months	Hedge Fund lockup period, 0 if fund does not have a lockup.
HSize	ln $	Hedge Fund log value of assets at inception.
Mutual funds		
$MSales_{t-1,t-12}$	%	Mutual Fund Sales: Monthly average % net inflows for the trailing 12 months.
$MQuality_{t-1,t-12}$	%	Mutual Fund Quality: Monthly average risk adjusted returns for the trailing 12 months.
MMktgFee	%	Mutual Fund 12-b1 fee.
MExpense	%	Mutual Fund net expense ratio.
MSize	ln million $	Mutual Fund log value of assets under management in $ million.
MTurnover	%	Mutual Fund asset turnover ratio.
Relative advertising		
Ad_High	Dummy	Ad Spending relative to industry average: 1 if a mutual fund's advertising in a month divided by its average advertising during the year is higher than the industry's expenditure in that month divided by the industry's average during the year, and 0 otherwise.
Ad_Ratio	%	A month's normalized share of all money spent advertising a fund: Indicates a month's relative share of all money spent on advertising a mutual fund.
Ad_Clock	Months	Ad spending duration: Indicates the number of consecutive months advertised after at least one month of no spending.
Ad_NetRaw	$	Raw advertising dollar spend that is mean-centered for each fund.

Table 3. Correlations

	Panel A: Advertising measures		
Correlation	*Ad_High*	*Ad_Clock*	*Ad_Ratio*
Ad_High			
Ad_Clock	0.4386		
Ad_Ratio	0.7204	0.3662	
Ad_NetRaw	0.2799	0.0211	0.3379

	Panel B: Sales and quality measures				
Correlation	$MSales_{t-1,t-12}$	$MQuality_{t-1,t-12}$	$HOSales_{t-1,t-12}$	$HCSales_{t-1,t-12}$	$HCQuality_{t-1,t-12}$
$MSales_{t-1,t-12}$					
$MQuality_{t-1,t-12}$	0.3255				
$HOSales_{t-1,t-12}$	−0.1746	−0.3302			
$HCSales_{t-1,t-12}$	0.2268	0.3842	−0.8797		
$HCQuality_{t-1,t-12}$	0.0840	0.2816	−0.4279	0.4743	
$HOQuality_{t-1,t-12}$	−0.0232	−0.0205	0.1053	−0.0461	−0.0161

estimated using the past 24 months of data, multiplied by the factor returns in the period. Specifically, a.

$$HQuality_{i,t} = Return_{i,t} - \beta_{PTFSBD,i,t} \times PTFSBD_t$$
$$- \beta_{PTFSFX,i,t} \times PTFSFX_t - \beta_{PTFSCOM,i,t}$$
$$\times PTFSCOM_t - \beta_{SNPMRF,i,t} \times SNPMRF_t$$
$$- \beta_{SCMLC,i,t} \times SCMLC_t - \beta_{BD10RET,i,t}$$
$$\times BD10RET_t - \beta_{BAAMTSY,i,t} \times BAAMTSY_t$$

b.

$$MQuality_{i,t} = Return_{i,t} - Rf_t - \beta_{Mkt,i,t} \times (Mkt_t - Rf_t)$$
$$- \beta_{HML,i,t} \times HML_t - \beta_{SMB,i,t} \times SMB_t,$$

where $\beta_{X,i,t} \times X_t$ represents the beta exposure of a fund to factor X multiplied by the return to factor X in time period t. The factors are as defined by Fung and Hsieh (1997) for *HQuality* and Fama and French (1993) for *MQuality*.

We use the seven-factor model of Fung and Hsieh to estimate hedge fund quality and the three-factor Fama–French model to estimate mutual fund quality.[17] *HQuality* and *MQuality* denote the percent risk-adjusted return of a hedge fund or mutual fund during a period. Like sales, the quality of an offering can also be decomposed in two parts—one that can be attributable to a class of products and the other to the specific product. We decompose a hedge fund's quality as Hedge Fund Category Quality (*HCQuality*) and Hedge Fund Offering Quality (*HOQuality*). *HCQuality* of a hedge fund is operationalized as the average risk-adjusted return of all hedge funds using its broad style (long/short equity, multistrategy, fund of funds, others) during a given period of

time. *HOQuality* is operationalized as fund specific risk-adjusted returns that are calculated by taking the difference of the hedge fund's risk-adjusted returns in a given period from the average risk-adjusted returns of same style hedge funds during the same period.[18]

In panel B of Table 3, we report the contemporaneous correlations between the sales and quality variables of the umbrella brand mutual funds and hedge funds. The absolute size of the correlations varies, but only 1 of the 15 is larger than 0.5. The high negative correlation between *HCSales* and *HOSales* seems mechanical, since fund inflows are generally stable. Other moderate levels of correlation relate to those between hedge fund sales and hedge fund quality, which seem to be the result of hedge fund investors chasing high returns offered by the category (Berk and Green 2004). In contrast, mutual fund sales and quality are largely uncorrelated with hedge fund offering-specific sales and offering-specific quality. This is consistent with the fact that at the offering level, "hedge funds follow strategies . . . dramatically different" from those of the mutual funds (Fung and Hsieh 1997, p. 277; Ackermann et al. 1999).

Control Variables
In addition to our focal variables pertaining to hedge funds' and their affiliate mutual fund's sales and quality, we include several additional fund attributes as control variables. These include a mutual fund's marketing and distribution fee (*MMktgFee*), net expense ratio (*MExpense*), log size (*MSize*), and asset turnover ratio (*MTurnover*), and a hedge fund's management fee (*HMgmtFee*), performance fee (*HPerfFee*), lock-up period (*HLockUp*), log size (*HSize*), and whether it has a high-water mark (*HWaterMark*). The empirical finance literature has found these mutual

fund and hedge fund control variables as having an important role on several operational decisions made managers [see, e.g., the work of Jain and Wu (2000), Jones and Smythe (2003), Reuter and Zitzewitz (2006), and Gallaher et. al (2015) for relevant mutual fund studies, and Aragon (2007) and Agarwal et al. (2009) for relevant hedge fund studies]. Including these variables as controls mitigates the possibility that some of these variables could be driving our results.

Next, we relate our research question and the two hypotheses by specifying and estimating our model, report model results, and conduct several robustness analyses with alternative model specifications, variable operationalizations, and model assumptions.

3. Models and Findings
Effect of Affiliate Mutual Fund Advertising on Hedge Fund Sales

We start by examining whether hedge funds derive sales benefits from their affiliate mutual fund's advertising—that is, if the leading sales increases after the advertising. To address this research question, we need to first choose a duration that is appropriate in capturing advertising's carryover. Prior advertising literature suggests the optimal data interval to be the purchase decision horizon (Clarke 1976, Weiss et al. 1983, Bass and Leone 1986). Researchers in finance find such a horizon for hedge fund investors to be at least a year in view of liquidity restrictions and high search costs (Baquero and Verbeek 2009). Accordingly, we use a year as the data interval as our main specification and report those findings.[19] The model also controls for the hedge fund's leading quality since contemporaneous quality can affect sales. Moreover, leading hedge fund sales could also be affected by prior hedge fund and mutual fund sales, prior, and contemporaneous quality given investors' perception or decision-making lags. Finally, we need to focus on hedge fund's offering-specific sales, since that is the part of sales that can be attributed to the specific hedge fund.[20] We can then formalize our model as

$HOSales_{j,t+1,t+12}$
$$= \beta_{10} + \beta_{11} Ad_{i,t} + \beta_{12} HOSales_{j,t-12,t-1}$$
$$+ \beta_{13} HCSales_{j,t-12,t-1} + \beta_{14} HCQuality_{j,t-12,t-1}$$
$$+ \beta_{15} HOQuality_{j,t-12,t-1} + \beta_{16} HCQuality_{j,t+1,t+12}$$
$$+ \beta_{17} HOQuality_{j,t+1,t+12} + +\beta_{18} MSales_{j,t-12,t-1}$$
$$+ \beta_{19} MQuality_{j,t-12,t-1} + \gamma_1 C_H + \phi_1 S + \tau_1 T + \varepsilon_{1,i,j,t},$$
(1a)

where $Ad_{i,t}$ is a measure of advertising, C_H is a vector of hedge fund characteristics listed in Table 2, S is a vector of fund style dummies, T is a vector of time

period dummies, subscript j refers to a hedge fund, and all other variables are as defined in Table 2.

Note this model relies on Granger causality—that means affiliate mutual fund advertising predicts future offering-specific sales of hedge fund affiliate after controlling for its past offering-specific sales among others.[21] However, if hedge funds' sales are persistent or mean reverting, the Granger model may generate spurious results. To rule out that possibility, instead of using the complete sample of umbrella brand hedge funds, we use a matched sample.

In choosing our matched, non-advertising sample, we match a hedge fund with an affiliate mutual fund that advertises in a given month (an "advertising" hedge fund-period) to a similar hedge fund with an affiliate mutual fund that does not advertise during that period (a "non-advertising" hedge fund-period). The matched non-advertising hedge fund-period is chosen based on the closest trailing 12-month sales (i.e., fund inflow), both for the hedge fund as well as for the affiliate mutual fund. The difference in sales for the hedge fund as well as its affiliate mutual fund are weighted equally for determining the closest match. Thus, the matching score is

$$\frac{\left[|HSales_{j,t-12,t-1,ad} - HSales_{j,t-12,t-1,non\text{-}ad}| + |MSales_{i,t-1,t-12,ad} - MSales_{i,t-1,t-12,non\text{-}ad}|\right]}{2}$$

where subscript *ad* refers to a fund that experiences umbrella brand advertising in period t, subscript *non-ad* refers to a fund that does not experience umbrella brand advertising in period t, subscript j refers to an umbrella brand hedge fund, and subscript i refers to an affiliate mutual fund.[22]

The final model we estimate on the matched sample of observations is

$HOSales_{j,t+1,t+12}$
$$= \beta_{10} + \beta_{11} Ind(Ad_{i,t}) + \beta_{12} HOSales_{j,t-12,t-1}$$
$$+ \beta_{13} HCSales_{j,t-12,t-1} + \beta_{14} HCQuality_{j,t-12,t-1}$$
$$+ \beta_{15} HOQuality_{j,t-12,t-1} + \beta_{16} HCQuality_{j,t+1,t+12}$$
$$+ \beta_{17} HOQuality_{j,t+1,t+12} + +\beta_{18} MSales_{j,t-12,t-1}$$
$$+ \beta_{19} MQuality_{j,t-12,t-1} + \gamma_1 C_H + \phi_1 S + \tau_1 T + \varepsilon_{1,i,j,t},$$
(1b)

where $Ind(Ad_{i,t})$ is an indicator variable computed using one of four advertising measures of mutual fund i at time t: *Ad_High*, *Ad_Clock*, *Ad_Ratio*, or *Ad_Netraw* as defined in Table 2; C_H is a vector of hedge fund and mutual fund characteristics listed in Table 2; S is a vector of fund style dummies; T is a vector of time period dummies; subscript j refers to a hedge fund; and all other variables are as defined in Table 2.

The matched sample analysis relies on a binary transformation of our advertising variables using an indicator of high or low advertising. This is straightforward for *Ad_High* since it is a discrete variable. *Ad_Clock* is easily discretized as 1 for nonzero observations and 0 otherwise. For the continuous variables, *Ad_Ratio* and *Ad_Netraw*, we use the median cutoffs to discretize $Ad_{i,t}$ as 1 if the advertising measure is above the median, and 0 otherwise. Note that only funds that advertise at least once are included in the matched sample. Such a matching process makes our results conservative in light of potential carryover from advertising in other periods. However, recently, Tellis and Franses (2006) show such carryover to be limited to a multiple of the advertising's exposure time as opposed to that of the purchase decision horizon. This could be as short as few months in the case of mutual funds that overwhelmingly advertise in television and magazines.

Before formally estimating the regression as per Equation (1b), we use our sample of advertising and matched non-advertising hedge fund-periods to produce a graph of average monthly net fund flows, aggregated quarterly, over the year before and after the advertising period. This is presented in Figure 1. The net inflows of the two types of funds are very similar before the advertising by construction, but after the advertising period, the advertising funds have significantly higher net flows. Net inflows are about 1% higher for the advertising funds than for the matched funds.[23]

Next, we formally estimate Equation (1b) using multivariate regression techniques. Note the quasi-experimental design yields a simple comparison between the difference in sales for hedge funds that experience umbrella brand advertising during a given period and those that do not in that same period, while controlling for past sales and other observed characteristics of the funds used for propensity matching. Consequently, the results are easily interpretable. The coefficient β_{11} in Equation (1b) can be interpreted as the effect of affiliate mutual fund advertising on hedge fund offering-specific sales. It will address our research question: a significant positive finding is suggestive of cross-product marketing spillover in the hedge fund/mutual fund context and confirms that hedge funds garner increased offering-specific sales as a result of affiliate mutual fund advertising.

The results of this analysis are presented in Table 4. The table presents results that use the four alternate measures of advertising. Control variables include hedge fund characteristics as defined in Table 2. The model is estimated using an OLS regression with errors clustered at the hedge fund level. Table 4 shows that key parameters are generally consistent across the four models that use alternative measures of relative advertising, our variable of interest. Specifically, β_{11} is significantly positive. This means that affiliate mutual fund advertising benefits hedge funds since it increases hedge fund's leading offering-specific sales after controlling for its leading quality as well as its lagging sales and quality. It establishes that even though mutual funds and hedge funds are distinct product categories and may attract different investors, advertising by mutual funds increases sales of their affiliate hedge funds.

This positive link between mutual fund advertising and leading hedge fund sales presents a possibility of which asset management firms with an umbrella brand could take advantage: using mutual fund

Figure 1. (Color online) Average Monthly Net Flows to Advertising Funds and Matched Non-advertising Funds
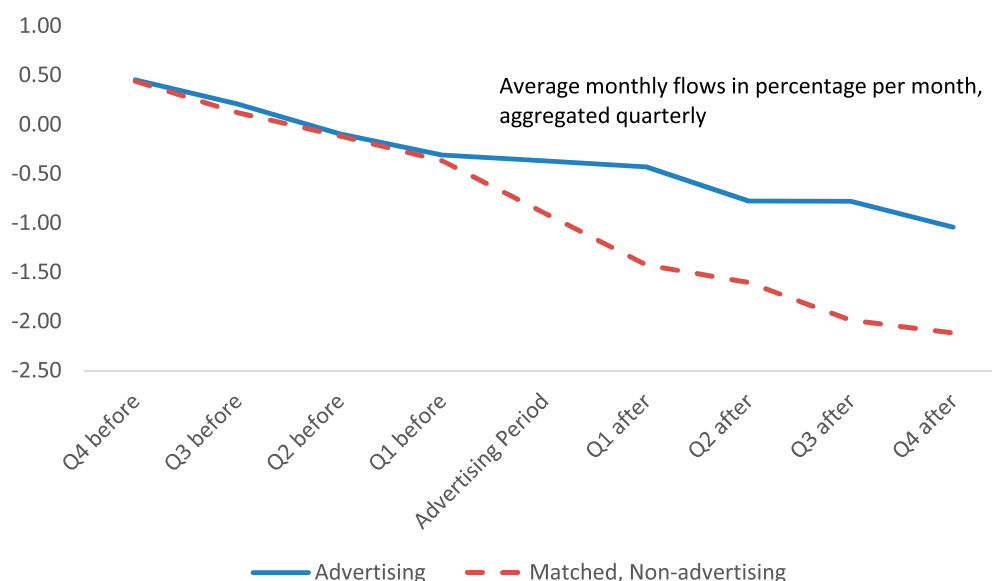
Table 4. Effect of Mutual Fund Advertising on Leading Hedge Fund Offering Sales

	HOSales $_{t+1,\ t+12}$	HOSales $_{t+1,\ t+12}$	HOSales $_{t+1,\ t+12}$	HOSales $_{t+1,\ t+12}$
Ind (Ad_High)[a]	0.796***			
	(2.873)			
Ind (Ad_Clock)[a]		1.169***		
		(2.897)		
Ind (Ad_Ratio)[a]			0.928***	
			(4.486)	
Ind (Ad_Netraw)[a]				0.910***
				(3.492)
HOSales$_{t-1,t-12}$	0.303***	0.291***	0.291***	0.285***
	(10.329)	(7.607)	(10.710)	(8.994)
HCSales$_{t-1,t-12}$	0.120***	0.015	0.153***	0.049
	(2.871)	(0.300)	(3.954)	(1.093)
HCQuality$_{t-1,t-12}$	−1.534***	−1.282**	−0.877**	−0.323
	(−4.019)	(−2.065)	(−2.213)	(−0.753)
HOQuality$_{t-1,t-12}$	−0.340***	−0.239*	0.011	0.324**
	(−3.289)	(−1.727)	(0.102)	(2.355)
HCQuality$_{t+1,t+12}$	1.212***	−1.424**	1.630***	0.811*
	(2.899)	(−2.254)	(4.243)	(1.896)
HOQuality$_{t+1,t+12}$	1.010***	0.982***	1.136***	0.835***
	(7.507)	(5.352)	(9.240)	(4.821)
MSales$_{t-1,t-12}$	−0.064	−0.020	−0.189***	−0.321***
	(−1.493)	(−0.437)	(−4.947)	(−5.423)
MQuality$_{t-1,t-12}$	−0.650**	−1.234***	−1.623***	−0.512*
	(−2.431)	(−4.130)	(−5.708)	(−1.704)
HMgmtFee(HF)	−0.242	−0.343	−0.464**	−0.861***
	(−1.072)	(−1.218)	(−2.444)	(−3.730)
HPerfFee	−0.070***	−0.031	−0.060***	−0.016
	(−3.498)	(−1.200)	(−3.401)	(−0.747)
HWaterMark	1.327***	0.564*	1.144***	2.202***
	(5.190)	(1.730)	(4.900)	(7.101)
HLockup	−0.059***	0.004	−0.028	0.015
	(−2.955)	(0.153)	(−1.358)	(0.765)
HSize	−0.101	0.068	−0.072	−0.053
	(−1.563)	(0.845)	(−1.259)	(−0.797)
MMktgFee	−348.312***	−424.312***	−321.319***	−292.224***
	(−4.003)	(−3.877)	(−3.522)	(−3.045)
MExpense	95.480*	78.002	11.701	74.162
	(1.735)	(1.025)	(0.194)	(0.947)
MTurnover	−1.569***	−0.882**	−1.767***	−1.005**
	(−6.317)	(−2.028)	(−5.016)	(−2.222)
MSize	−0.054	−0.184	−0.095	−0.005
	(−0.539)	(−1.312)	(−0.803)	(−0.043)
Style fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R^2	0.769	0.705	0.762	0.731
N	4,196	2,384	4,196	4,196

Note. Based on matched sample of advertising and non-advertising umbrella brand hedge fund-periods.
  [a]Based on an indicator transformation of the advertising variables specified in Equation (1b).
  *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

advertising to skirt the advertising ban on hedge fund advertising. Next, we explore that possibility by examining our hypothesis on whether a hedge fund's trailing circumstances (i.e., its past sales and quality) influence its affiliate mutual funds' advertising.

Effect of Hedge Fund Circumstance on Affiliate Mutual Fund Advertising and How This Effect Changes After the JOBS Act

We empirically study the link between trailing sales and quality of hedge funds and their affiliate mutual

fund's advertising to identify any effect that a hedge fund's circumstances may have on an affiliate mutual fund's subsequent advertising (Hypothesis 1). However, as noted when presenting the hypotheses, empirical evidence linking hedge fund circumstances to subsequent affiliate mutual fund advertising may be the result of revenue management, rather than an attempt to circumvent the advertising ban. Thus, we also examine whether the link between hedge fund circumstances and subsequent mutual fund advertising weakens after the passage of the JOBS Act to provide further support for our interpretation of these results as evidence suggestive of hedge funds circumventing the advertising ban (Hypothesis 2).

We use regression analysis techniques to test whether trailing hedge fund circumstances affect mutual fund advertising. Our model of advertising is

$$
\begin{aligned}
Ad_{i,t} = {} & \beta_{20} + \beta_{21} HOSales_{j,t-1,t-12} + \beta_{22} HCSales_{j,t-1,t-12} \\
& + \beta_{23} HCQuality_{j,t-1,t-12} + \beta_{24} HOQuality_{j,t-1,t-12} \\
& + \gamma_{2H} C_H + \beta_{25} MSales_{i,t-1,t-12} \\
& + \beta_{26} MQuality_{i,t-1,t-12} + \gamma_{2M} C_M + \phi_2 S + \tau_2 T \\
& + \varepsilon_{2,i,j,t},
\end{aligned}
$$

(2)

where $Ad_{i,t}$ is one of four advertising measures of mutual fund i at time t: *Ad_High*, *Ad_Clock*, *Ad_Ratio*, or *Ad_Netraw* as defined in Table 2; C_H and C_M are vectors of hedge fund and mutual fund characteristics respectively listed in Table 2; S is a vector of fund style dummies; T is a vector of time period dummies; and all other variables are as defined in Table 2.

We estimate our model in Equation (2) using the sample of all hedge funds with an affiliate mutual fund that advertised during our pre–JOBS Act observation period (January 2006 through March 2012) to test whether trailing hedge fund circumstances did have a significant effect on mutual fund advertising. For estimating the models where *Ad_High* is the dependent variable, we use a logistic regression. For *Ad_Clock*, we use a Poisson regression, for *Ad_Ratio* we use a Tobit regression, and for *Ad_Netraw* we use ordinary least squares regression. We find that there is inertia in *Ad_Netraw* time series. Therefore, we add a lagged dependent variable in the model. Including lagged dependent variable violates the exogeneity assumption that we address by using Arellano–Bond first difference estimator (Arellano and Bond 1991). Errors are clustered at the fund level, and model fit is evaluated using McFadden's pseudo-R^2.

In conjunction with estimating Equation (2) using pre–JOBS Act data, we also estimate an interaction analysis, using data from before and after the JOBS Act and interacting all variables with a *Pre-JOBS* dummy (set as 1 for periods before the JOBS Act and 0 for periods after) to see how the relationship between hedge fund trailing circumstances and mutual fund advertising changes after the JOBS Act. These results are presented in Table 5. For brevity, we only present results for hedge fund trailing circumstances, although a full vector of controls, including hedge fund characteristics, mutual fund circumstances, and mutual fund characteristics, is included when conducting the analysis.

Before the JOBS Act (first four columns of Table 5), we find that lower prior year sales inflows in excess of the category average by a hedge fund significantly increases the affiliate mutual fund's advertising. We also find that lower category average quality of the hedge fund significantly increases the affiliate mutual fund's advertising. Therefore, we find support for Hypotheses 1 in terms of two hedge fund circumstances (offering-specific sales and category-average quality) that influence affiliate mutual fund advertising.

In the interaction analysis using pooled data from both before and after the JOBS Act (last four columns of Table 5), the coefficient on the interaction terms provide the difference in estimates of the sensitivity of the effect of hedge fund trailing circumstances on mutual fund advertising before and after the JOBS Act.[24] We find the effects of both trailing hedge fund offering-specific sales and trailing hedge fund category-average quality on mutual fund advertising is significantly stronger before the JOBS. This provides support that a hedge fund's circumstances had a significantly greater effect on subsequent mutual fund advertising before the JOBS Act was passed.

We also conduct a model-free analysis in which we sort hedge funds based on circumstances that significantly affect subsequent mutual fund advertising (offering specific sales inflows and category average quality). We group hedge fund months to be either low, medium, or high across these circumstances depending on a tercile split. We compute average mutual fund advertising in these three sorted groups using each of our four advertising measures. We do this computation for periods before and after the JOBS Act and present the results graphically for *Ad_Netraw* in Figure 2. Panel A of Figure 2 presents the results plotting mutual fund *Ad_Netraw* against trailing hedge fund offering sales (*HOSales*). Panel B of Figure 2 presents an analogous plot for trailing hedge fund category quality (*HCQuality*).

Graphically, it is clear that (1) mutual fund advertising decreases in both trailing *HOSales* and trailing *HCQuality* before the JOBS Act, and (2) the sensitivity of mutual fund advertising to trailing hedge fund circumstances decreases after the JOBS Act, compared with before the JOBS Act (i.e., the slope of the line is flatter after the JOBS Act). These graphs confirm our regression evidence above and provide additional support for both our hypotheses. We next test

Table 5. Difference in Effect of Hedge Fund Trailing Circumstances on Mutual Fund Advertising—Pre–JOBS Act vs. Post–JOBS Act

	Pre–JOBS Act data only				Data both before and after the JOBS Act			
	Ad_High	*Ad_Clock*	*Ad_Ratio*	*Ad_Netraw*	*Ad_High*	*Ad_Clock*	*Ad_Ratio*	*Ad_Netraw*
$HOSales_{t-1,t-12}$	−8.237***	−2.413***	−7.370***	−0.434**	−1.070	−0.037	0.237	0.854**
	(−6.270)	(−21.920)	(−2.741)	(−2.559)	(−0.849)	(−0.084)	(0.300)	(2.521)
$HCSales_{t-1,t-12}$	1.568	1.246***	−0.241	0.089	3.484*	1.066	−0.475	−0.316
	(0.968)	(8.678)	(−0.085)	(0.528)	(1.955)	(1.602)	(−0.326)	(−0.940)
$HOQuality_{t-1,t-12}$	7.783*	0.567*	−3.339	−0.404	−1.978	3.968*	−13.989***	0.667
	(1.855)	(1.722)	(−0.339)	(−0.913)	(−0.173)	(1.756)	(−3.752)	(0.379)
$HCQuality_{t-1,t-12}$	−198.726***	−7.038***	−163.472***	−20.308***	−74.082***	54.669***	−45.992***	−10.616**
	(−8.906)	(−5.175)	(−8.877)	(−9.392)	(−3.014)	(6.707)	(−3.833)	(−2.494)
Pre-JOBS Dummy					0.147	−0.337	1.073	0.171
					(0.067)	(−0.767)	(0.566)	(0.502)
Pre-JOBS × $HOSales_{t-1,t-12}$					−7.168***	−2.376***	−7.607***	−1.288***
					(−3.996)	(−5.213)	(−2.714)	(−3.322)
Pre-JOBS × $HCSalesy_{t-1,t-12}$					−1.916	0.180	0.234	0.405
					(−0.794)	(0.265)	(0.074)	(1.055)
Pre-JOBS × $HOQuality_{t-1,t-12}$					9.762	−3.400	10.650	−1.071
					(0.795)	(−1.489)	(1.010)	(−0.596)
Pre-JOBS × $HCQuality_{t-1,t-12}$					−124.644***	−61.707***	−117.478***	−9.692**
					(−3.838)	(−7.468)	(−5.345)	(−2.026)
Control variables	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A
Control variables and interactions	N/A	N/A	N/A	N/A	Yes	Yes	Yes	Yes
Style fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	Yes	No	No	No	Yes
Lag DV	No	No	No	Yes	No	No	No	Yes
Pseudo-R^2	0.498	0.214	0.277	0.501	0.478	0.273	0.333	0.583
N	9,749	8,349	9,749	8,881	13,708	10,977	13,665	12,670

Note. Estimates based on all umbrella brand mutual funds that advertised and their affiliate hedge funds.
　*, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

whether the sensitivity of mutual fund advertising to trailing hedge fund circumstances is, indeed, statistically weaker after the JOBS Act by computing the difference in the advertising measures for the *High* and *Low* tercile groups and seeing if the difference in these differences between pre– and post–JOBS Act periods is significant. We summarize the results in Table 6.

We find that all of our measures of mutual fund advertising are significantly higher for low trailing hedge fund offering-specific sales than high trailing hedge fund offering-specific sales in the pre-JOBS observation period. A similar result holds for and hedge fund category-average quality. In the post-JOBS period, the difference between low and high hedge fund offering sales or category quality is generally insignificant for most measures of advertising. A difference-in-difference (DID) analysis also shows a significant difference between pre-JOBS and post-JOBS observation periods in average differences between low and high hedge fund offering sales (*HOSales*) or between low and high hedge fund category quality (*HCQuality*). This analysis indicates that after the JOBS Act, hedge funds'
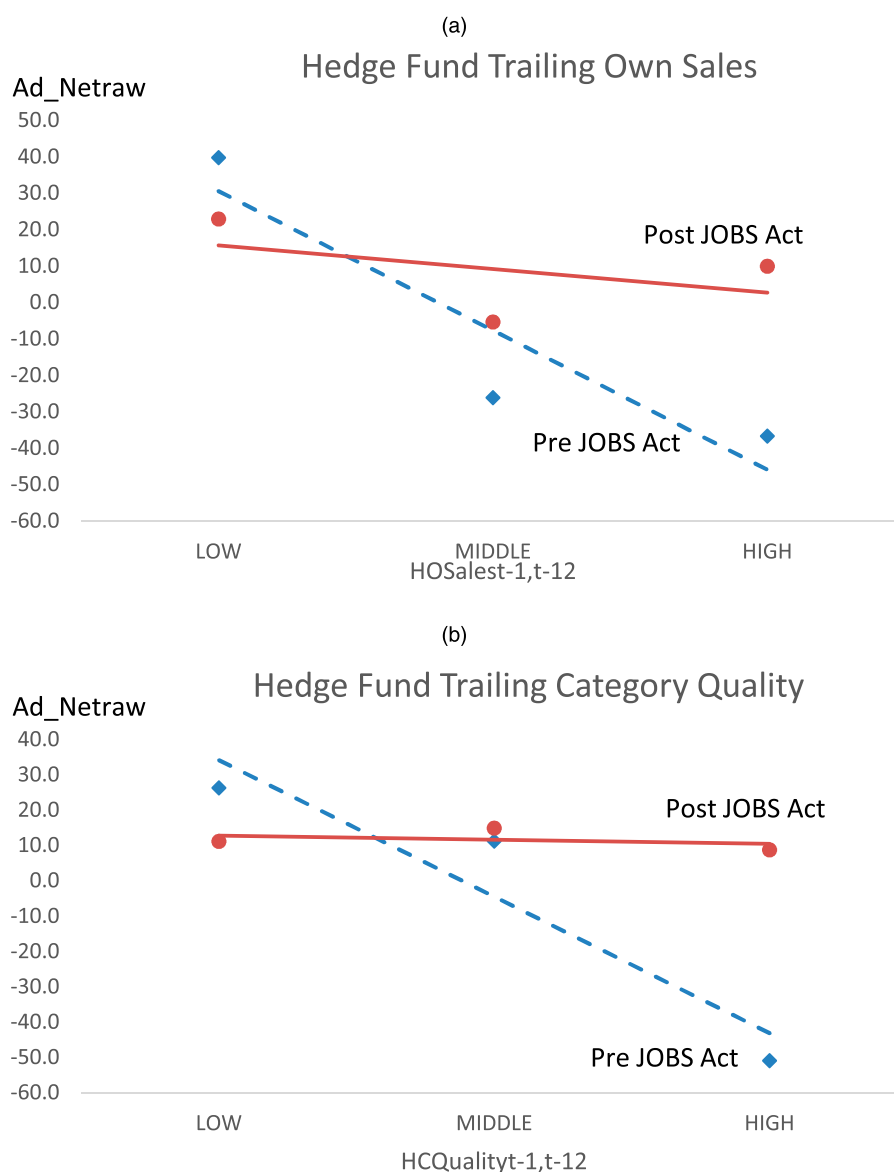
circumstances influence on affiliate mutual fund advertising seems to have largely diminished.

Overall, these results show that hedge funds' trailing circumstances did affect mutual fund advertising prior to the JOBS Act, providing support for Hypothesis 1, and that hedge funds' influence on affiliate mutual fund's advertising diminished after the JOBS Act, providing support for Hypothesis 2. This evidence is consistent with our argument that hedge funds have strategically influenced their affiliate mutual funds to advertise, depending on their own circumstances, and perhaps circumvented the advertising ban.

Alternative Explanations and Sensitivity Analyses

While unlikely, it is still possible that our results can be explained by some unobservable shock that is perfectly timed with the occurrence of the JOBS Act. To rule out unobserved shocks that may have affected the overall hedge fund and mutual fund industries, we replicate our analysis on artificial "placebo" combinations of standalone hedge funds and standalone mutual funds matched on the style, sales, and

Table 6. Model-free Difference in Difference Analysis: Hedge Fund Circumstances and Mutual Fund Advertising Pre–JOBS Act and Post–JOBS Act

		Ad_High		Ad_Clock		Ad_Ratio		Ad_Netraw	
		Pre-JOBS	Post-JOBS	Pre-JOBS	Post-JOBS	Pre-JOBS	Post-JOBS	Pre-JOBS	Post-JOBS
$HOSales_{t-1,t-12}$	Low	0.107	0.138	0.203	0.200	0.334	0.156	26.360	11.180
	Middle	0.079	0.098	0.149	0.229	0.173	0.310	11.250	14.920
	High	0.051	0.113	0.121	0.211	0.165	0.166	−50.910	8.780
	Low – high	0.056***	0.025*	0.082***	−0.011	0.169***	−0.010	77.27***	2.400
	DID	0.031***		0.093***		0.179***		74.870***	

		Ad_High		Ad_Clock		Ad_Ratio		Ad_Netraw	
		Pre-JOBS	Post-JOBS	Pre-JOBS	Post-JOBS	Pre-JOBS	Post-JOBS	Pre-JOBS	Post-JOBS
$HCQuality_{t-1,t-12}$	Low	0.122	0.122	0.249	0.218	0.327	0.224	39.790	22.927
	Middle	0.084	0.100	0.169	0.187	0.301	0.314	−26.102	−5.380
	High	0.041	0.120	0.082	0.241	0.168	0.156	−36.627	10.004
	Low – high	0.081***	0.002	0.167***	−0.023	0.159***	0.068*	76.417***	12.923
	DID	0.079***		0.190***		0.091***		63.494***	

* and *** indicate statistical significance at the 10% and 1% level, respectively.

unobserved shocks. As a caveat to our interpretation of empirical results and our subsequent conclusions, it is still possible, although unlikely, that an unobserved shock to umbrella branded firms (but not standalone ones) occurring at the same time as the JOBS Act is driving our results.

Table 7. Difference in Effect of Hedge Fund Circumstance on Mutual Fund Advertising Before and After the JOBS Act: Actual vs. Placebo Umbrella Brand

	Split sample		
	Actual umbrella brand *Ad_High*[a]	Placebo umbrella brand *Ad_High*[b]	Interaction *Ad_High*[b]
Pre-JOBS Dummy	0.147	−1.989	−1.989
	(0.067)	(−0.652)	(−0.652)
$HOSales_{t-1,t-12}$	−1.070	7.048	7.048
	(−0.849)	(1.048)	(1.048)
$HCQuality_{t-1,t-12}$	−74.082***	−10.157	−10.157
	(−3.014)	(−0.870)	(−0.870)
Pre-JOBS × $HOSales_{t-1,t-12}$	−7.168***	−1.673	−1.673
	(−3.996)	(−0.741)	(−0.741)
Pre-JOBS × $HCQuality_{t-1,t-12}$	−124.644***	3.352	3.352
	(−3.838)	(1.494)	(1.494)
Actual × *Pre-JOBS Dummy*			2.136
			(0.051)
Actual × $HOSales_{t-1,t-12}$			−8.118
			(−1.291)
Actual × $HCQuality_{t-1,t-12}$			−63.925***
			(−5.812)
Actual × *Pre-JOBS* × $HOSales_{t-1,t-12}$			−5.495*
			(−1.748)
Actual × *Pre-JOBS* × $HCQuality_{t-1,t-12}$			−127.996***
			(−3.047)
Control variables and interactions	Yes	Yes	Yes
Style fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
R^2	0.478	0.498	0.483
N	13,078	12,944	26,022

[a]Based on sample of all umbrella brand mutual funds that advertise and affiliate hedge funds.
[b]Based on sample of artificial umbrella brand consisting of a combination of standalone mutual funds and standalone hedge funds matched by investment style, sales, and quality.
*and *** indicate statistical significance at the 10% and 1% level, respectively.

Next, we examine various changes in variable operationalization, alternative estimation approaches, and model assumptions to see if our findings are sensitive to such changes.

First, it is possible that the relationship between past hedge fund circumstances and current umbrella brand advertising is nonlinear, and potentially nonmonotonic. To examine this possibility, we perform a nonparametric two-way sort analysis. We first sort mutual funds by their advertising likelihood based on a logistic model of *Ad_High* that uses all variables in our primary analysis (i.e., Table 5, first four columns) *except* the relevant variable capturing past hedge fund circumstances (either *HOSales* or *HCQuality*). We term these likelihoods of advertising based on all information *except* past hedge fund circumstances *P(Ad|ALL~HOSales)* and *P(Ad|ALL~HCQuality)*, respectively. Within each *P(Ad|ALL~HOSales)* and *P(Ad|ALL~HCQualiy)* tercile, we further sort by past *HOSales* and *HCQuality* to form three subterciles and present the average value of *Ad_High* for each of these classifications. Table 8 presents the results. Panel A of Table 8 shows that the relationship between current period advertising and past hedge fund offering-specific sales is consistent and generally monotonically decreasing for all terciles of *P(Ad|ALL~HOSales)*. Panel B presents analogous results for hedge fund category quality. These results mitigate concerns regarding nonlinearity in the regression analyses.[26]

Second, our findings are based on multivariate regressions of observations at the fund-month level. We include sales and quality in trailing 12 months as independent variables of interest. This enables us to make maximum use of the data but could raise

Table 8. Advertising Frequency Based on Two-Way Sorting Using Hedge Fund Trailing Circumstances and Mutual Fund Advertising Propensity Score

	Propensity score of mutual fund advertising *P(Ad_High|ALL~HOSales)*		
HOSales	1 (Lowest)	2	3
1 (lowest)	0.028	0.072	0.252
2	0.021	0.059	0.199
3 (highest)	0.003	0.026	0.139
Difference (1–3)	0.025**	0.035**	0.113***

	Propensity score of mutual fund advertising *P(Ad_High|ALL~HCQuality)*		
HCQuality	1 (Lowest)	2	3
1 (lowest)	0.029	0.071	0.270
2	0.013	0.043	0.196
3 (highest)	0.007	0.030	0.137
Difference (1–3)	0.022**	0.041***	0.133***

** and *** indicate statistical significance at the 5% and 1% level, respectively.

questions related to overlapping observations. To mitigate this problem, we redo both Table 5 and Table 6 with single observation of a given fund per year (January observations only). The coefficient estimates on hedge fund circumstances driving subsequent affiliate mutual fund advertising for this January-only analysis remain significant and consistent with our original analysis.

Third, we employ several alternative sets of fund sales and quality variables—e.g., one set included hedge fund sales, hedge fund quality, mutual fund sales, and mutual fund quality only; another contained hedge fund sales, hedge fund category quality, hedge fund offering quality, mutual fund sales, mutual fund quality, etc. Our main findings related to effect of hedge fund sales and quality on mutual fund advertising are robust to these changes in model specification.

Fourth, our model uses a trailing window of 12 months for hedge fund and mutual fund sales and quality. Traditionally, advertising plans are often made a year in advance, which is aligned with our trailing window (Ohrt 2010). However, with the fast-paced changes in managerial decision-making, one may argue in favor of smaller windows in our analysis. Accordingly, we ran our primary analysis (as in Tables 5 and 6) using 6- and 3-month trailing windows. We find that the effect of trailing hedge fund sales remains robust, while that of hedge fund category quality is more sensitive to the window length. Perhaps determining a downturn in category quality (i.e., fund style returns) requires a judgment over an extended period, which could be why we do not obtain results using shorter windows.

Fifth, in case our findings on the differences between pre- and post-JOBS effects are influenced by the longer observation time window in the pre–JOBS Act period, we reduce that observation period in the pre–JOBS Act period to match exactly with the 45-month observation window of the post–JOBS Act period. Results are similar, and the interaction term remains significant.

The robustness of our results across multiple analyses, operationalizations, and methods show that our findings are robust. Next, we conclude by summarizing our findings and discussing their implications.

4. Conclusions

We find that umbrella brand affiliate mutual funds' advertising increases hedge funds' 1-year leading sales. We also find evidence that marketing-restricted hedge funds offering-specific sales and category-average quality influenced affiliate mutual fund's advertising prior to the JOBS Act. The JOBS Act, which removed hedge funds' marketing restrictions, provided us with a fortuitous opportunity to isolate whether hedge funds intentionally circumvented

marketing restrictions. We find that the influence of hedge funds' circumstances on affiliate mutual funds' advertising significantly diminished after the JOBS Act, which supports our assertion that hedge funds may have exploited umbrella branding to circumvent marketing restrictions prior to the JOBS Act.

We believe that these findings have important public policy implications. First, they imply that umbrella branding can potentially be used to circumvent marketing regulations, and was likely used to do so in at least one important empirical context. Though startling to some, our findings substantively match anecdotal evidence. In the U.S. cigarette industry, a ban on advertising in the broadcast media since 1970 resulted in umbrella brands' team and tourney sponsorships (e.g., Winston 500, Marlboro Team Ferrari, etc.), thus circumventing the ban (see the paper by Pollay et al. (1996) for a survey of this literature). Likewise, in India, where liquor advertising is banned, the industry relies on "surrogate" product advertising (Benegal 2005). For example, since alcoholic beverages and tobacco products are banned from advertising in India, firms advertise products like club soda, music CDs, and sports memorabilia using the same brand as the banned products. Of course, in our context, the advertising by affiliate mutual funds is less insidious, as it straightforwardly markets a relevant product.

Second, our findings imply that regulators should consider umbrella branding if they intend to impose a broad-based marketing regulation. If not, a marketing regulation may have an unintended consequence of creating a playing field that is biased in favor of those who are able to employ umbrella branding: usually large, multibusiness, incumbent firms. Lifting the advertising ban may ensure fairness to the smaller firms by leveling the playing field. Yet, lifting marketing regulations may end up hurting vulnerable customers, often the primary objective of regulations in the first place. In light of our findings, regulators also need to reassess existing marketing regulations that provide unfair advantages to umbrella brand products over their standalone peers.[27]

For organizations, too, our findings hold important implications. First, while umbrella brand advertising provides benefits to the firm, it is important to understand that it also exposes a product manager to the pulls and pressures of their product's umbrella brand affiliates, potentially leading to suboptimal decisions. This organization-level problem imposed by umbrella branding is in addition to umbrella branding's customer-level problem of negative associations between products (Aaker 1990, Lei et al. 2008).

Second, prior research has often found that marketing managers tend to overspend (e.g., Aaker and Carman 1982, Prasad and Sen 1999). Such overspending is often attributed to agency problems. Our findings provide an alternative possibility in contexts when one product overspends to cover for affiliate products faced with regulations or constraints. In other words, do certain products overspend to favor their less fortunate umbrella brand affiliates? Further research can illuminate how much of overspending is driven by such organizational forces as opposed to agency costs. More generally, our findings provide support to the phenomenon that one business unit of a firm does, at least sometimes, act to benefit the other.

Third, our findings' limitations provide several promising avenues for future research. Since our analysis depends on secondary data, we are unable to specify the underlying individual or organizational process that relates a regulated product with the advertising of its umbrella brand affiliates. Future research can provide direct evidence by surveying or interviewing managers and/or identifying these processes through field experimentation. Also, we examine an umbrella brand affiliate product's cross-product benefits on a regulated product in the context of advertising decisions only. Future research can examine cross-product benefits of other marketing decisions—for example, pricing, distribution, etc. Researchers may also examine these effects in different competitive contexts—for example, when advertising benefits the category more than an individual product (Sahni 2016, Shapiro 2016).

Finally, standalone hedge funds, which may benefit from advertising, could still be waiting for the dust to settle after the JOBS Act (Stevenson 2014). In fact, though SEC lifted the hedge fund advertising ban, other regulators (e.g., those who regulate trading in commodities, derivatives, etc.) are still in the process of following suit. Surely, a few years from now, we will have a broader observation period necessary to better understand the differences between hedge funds in terms of advertising effects both within and across categories, and to examine how these relate to the intended as well as unintended consequences of regulation.

Acknowledgments

Endnotes

[1] While the 1933 Act regulated operating companies and regulated marketing by such companies, it had no provisions for financial companies that existed solely to invest in securities of other companies (e.g., mutual funds). The 1940 Act addressed this omission and explicitly regulated mutual funds and permitted and regulated marketing by such funds. Hedge funds, however, are not regulated under either the 1933 Act or the 1940 Act and hence faced a complete marketing ban, until the JOBS Act was passed in 2012.

[2] In a recent AT&T–Time Warner antitrust trial, presiding Judge Richard Leon questioned whether there exists any empirical evidence that Turner Networks, the newly acquired business unit of AT&T, will act to the benefit of DirecTV, an existing AT&T-owned business unit. The government expert economist Carl Shapiro "didn't have evidence" and, arguably, the case turned against the government on that ground (Johnson 2018).

[3] Cici et al. (2010) and Nohel et al. (2010) find numerous such firms, operating identically named mutual funds and hedge funds, which they label as "side-by-side" mutual funds and hedge funds. In this paper, we use a more appropriate marketing term, "umbrella brand," to describe this setup.

[4] That is until the Jumpstart our Business Startups (JOBS) Act was passed in 2012.

[5] Following prior research, we use sales and net inflows as well as quality and risk-adjusted returns interchangeably (Ippolito 1992, Jones et al. 2007).

[6] The JOBS Act has been used by several researchers as a natural experiment to address various research questions (Gupta and Israelsen 2016, Chaplinsky et al. 2017).

[7] Going forward, we will refer to funds under a common umbrella brand simply as "affiliate funds."

[8] There are numerous examples outside of our context. For instance, Gerber Life Insurance faces many restrictions in advertising its juvenile insurance products. Gerber baby products, on the other hand, face relatively fewer marketing restrictions. We contend that when Gerber baby products advertise, it benefits its juvenile insurance product and that this benefit can be used by Gerber strategically.

[9] See, for example, the analysis by Agarwal et al. (2009) of the incentive effects of high managerial ownership in the hedge fund context.

[10] We do not make directional hypotheses on this influence—for example, an increase or decrease in sales and/or quality of an affiliate hedge fund can spur it to influence its umbrella brand mutual fund's advertising. Whether a product would advertise more during periods when its sales or its quality increases or during periods when its sales or quality declines relates to the offensive and defensive effects of advertising (Hauser and Shugan 2008, Rajiv et al. 2002). There is empirical support for both. However, in our case, it is immaterial which of the two effects is at work—a significant effect in either direction would indicate that circumstances of an affiliate hedge fund that is not able to advertise influences the umbrella brand mutual fund's advertising.

[11] We thank an anonymous referee for highlighting this possibility.

[12] Both the Lipper TASS hedge fund data and CRSP mutual fund data are widely used in finance research (e.g., Agarwal et al. 2016, Cooper et al. 2005).

[13] See SEC Release No. 33-9354; File No. S7-07-12, for Final Rule on "eliminating the prohibition against general solicitation and general advertising in rule 506 and rule 144a offerings," effective 2013 (available at http://www.sec.gov/rules/final/2013/33-9415.pdf).

[14] Since this research was partially supported by the U.S. Securities and Exchange Commission, we are unable to provide specific names of hedge funds or mutual funds that are included in our data.

[15] In addition to the effective sample used in most of our analysis, we also use a matched sample to estimate the effects of advertising on sales, and a placebo sample to rule out industry-wide shocks driving our results. The summary statistics for these samples are broadly consistent with those for the effective sample and are available in the online appendix.

[16] For example, we use measures such as *Ad_High_own*, which is 1 in months when the fund spends above its own average level across the observation period, and 0 otherwise. *Ad_High_any* is 1 in months when the umbrella brand spends on advertising, and 0 otherwise.

[17] Ippolito (1992) uses a one-factor market model to compute risk-adjusted returns. Our results are robust to using alphas from such a model, as well as using raw returns as a measure of quality.

[18] In our presented operationalization, we use decomposed measures of hedge fund quality and sales, and combined measures of mutual fund quality and sales. In robustness tests, we check alternate specifications, such as using decomposed measures of mutual fund sales and quality. Additionally, we also run a specification using only combined measures of hedge fund quality and sales. Our results are robust to these specifications.

[19] We find the findings replicate for shorter data intervals—3 months and 6 months. Shorter intervals make it less likely for carryover effects to interfere with our results but more likely to have a downward bias on the advertising effect size.

[20] In separate tests, we repeat this analysis using overall hedge fund sales instead of offering specific hedge fund sales. Our results are robust to this specification.

[21] We do not control for leading mutual fund sales since it would be influenced by mutual fund advertising and, therefore, cannot be on the same side of the regression.

[22] In unreported tests, we also match based on a propensity scores estimated using the regression from equation (2). Our results are robust to this specification. However, we acknowledge that even with this robustness test, we are unable to account for the possibility that unobservables, for which propensity matching is unable to account, could potentially influence these effects.

[23] More specifically, advertising funds experience net outflows that are about 1% lower than the matched funds. However, hedge funds do not report in- and outflow data separately, so we cannot determine conclusively whether advertising funds are reducing outflows, or attracting new inflows to compensate for outflows.

[24] This analysis is similar in spirit to a difference in difference (e.g., Edelman and Lai 2016, Wang et al. 2016), but the first difference is a sensitivity, rather than simply a difference.

[25] For brevity, we suppress the parameter estimates for hedge fund category sales and hedge fund offering quality since we did not find them to have any consistent effect across the advertising specifications in our original analysis in Table 5.

[26] In addition to the presented bivariate sort, we also perform bivariate sort analysis controlling for mutual fund sales and quality to ensure that hedge fund circumstances still affect subsequent mutual fund advertising after controlling for mutual fund characteristics in a nonlinear setting. Our unreported results confirm that this is the case.

[27] Indeed, one of the first hedge funds to advertise in the limited period after the JOBS Act lifted the marketing regulation was the standalone hedge fund firm Balyasny Asset Management (see Stevenson 2014).

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