

THREE ESSAYS ON THE BRAND-CHANNEL INTERFACE:
HOW BRAND EQUITY INFLUENCES DISTRIBUTION CHANNEL
GOVERNANCE AND MANAGEMENT

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GOVERNANCE AND MANAGEMENT

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Lay Abstract

The relationship between brand equity and distribution channel strategy is recognized in practice and is of particular interest to senior managers. However, research in marketing on the topic is scant and our understanding of this relationship remains limited. This dissertation endeavors to advance our knowledge in that area by investigating how a firm's brand equity affects its channel management and channel governance behavior.

Using a variety of research methods and statistical techniques, along with two large multi-year, multi-sector data samples, I document some interesting strategic interactions taking place at the *brand-channel interface*. Notably, I detect a causal influence for brand equity on the way a firm governs its distribution network. Additionally, I observe that brand equity is not only a major driver of certain strategic channel management initiatives (e.g., gray market combating), but also a key determinant of the financial efficacy of those initiatives.

The findings of this research pose significant implications for theory, practice, and policymaking and address some questions that puzzled practitioners and scholars for more than three decades.

Abstract

In this dissertation, I explore some facets of the strategic interaction between brand equity and distribution channels. Specifically, I examine how brand equity influences the firm's channel governance and channel management strategies. In this regard, I address the following two general research questions: (a) does a firm's brand equity influence the way it governs its distribution channel? How? (b) Does a firm's brand equity influence the way it manages its distribution channel? How?

Using a wide assortment of archival data sources (e.g., Bond's Franchise Guide, Entrepreneur's Franchise 500, Factiva, LexisNexis, University of Chicago's Center for Research in Security Prices, Compustat, Statista, firms' annual reports, Bloomberg and Wall Street Journal databases, and companies' official websites), two large multi-year data sets, a variety of econometric techniques (e.g., Event Study, Multiple Regression, Probit, Multi-level Mixed-Effects Linear Models, Multinomial Logistic Regression, Generalized Linear Models, Multinomial Probit, Maximum Likelihood, Bayesian Panel Vector Autoregression), and drawing on several theories from marketing, economics, business law, and strategic management, I uncover some interesting strategic interactions taking place at the *brand-channel interface*. This dissertation comprises five chapters: three empirical studies (chapters 2, 3, and 4), an introduction, and a conclusion chapter.

In the introduction chapter, I provide a snapshot of the current state of knowledge in the brand-channel interface research domain and illustrate how I situate this dissertation within that body of research. Besides, I provide a more nuanced view about the specific research questions

each study addresses and a glimpse into the findings and implications of each study, as an entry to the dissertation.

In chapter 2, using a large panel data set of North American, franchise-level annual observations for the period from 2001 to 2009, I assess the causal link between brand equity and channel governance structure, and discuss the managerial implications of this relationship in the areas of channel governance and capital allocation decision-making.

In chapters 3 and 4, I stay within the same overarching theme of this dissertation and delve into a business phenomenon taking place at the brand-channel interface – gray markets. Despite the interdisciplinary research interest in gray markets, it remains one of the least empirically researched topics in business management due to the well-known data accessibility issues. To circumvent those data barriers that impede empirical research on gray markets, I adopt a novel approach for data collection and analysis. To that end, I study the gray market combating behavior of more than 3,000 public companies, company-by-company, for a period of twenty years. Then, using a collection of archival data sources I assemble a unique data set to use in my analyses. In chapter 3, I undertake the first empirical inquiry into the effect of gray market combating on firm performance and the contingencies that govern this effect. In chapter 4, I conduct a comprehensive review of the gray market combating mechanisms present in the literature, review available theoretic arguments about them, posit theoretical relationships, and conduct the first assessment of the financial efficacy of those different combating mechanisms. Then, I identify a number of firm-level factors that may drive the firm's choice of gray market combating mechanism. The findings of these two studies address some long-standing, focal research questions in the gray market literature, provide managers with many valuable, actionable insights and recommendations, and put before policymakers some novel, revealing

scientific evidence that may help them in dealing with the gray market controversy (e.g., whether the net impact of gray markets on firm performance and social welfare is benign or harmful, the necessity and/or merit of an active legislative role).

The conclusion chapter closes this dissertation by reflecting on the new knowledge created by this research and highlighting its significance to theory, practice, and policymaking.

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1. Introduction

The majority of extant marketing research focuses on a particular element of the marketing strategy such as channel, brand, or pricing (Srinivasan, 2006). But, in reality, firms craft their marketing strategy as an intertwined whole and consider synergies, tradeoffs, and interdependencies among different elements of marketing strategy (Capon, Farley, & Hoenig, 1990; Gatignon & Hanssens, 1987). Hence, exploring such interactions and interdependencies is crucial for both scholarship and practice.

Several scholars (e.g., Gatignon & Hanssens, 1987; Srinivasan, 2006) have pointed to the relative deficit in this line of research and called for more academic work on “marketing interactions”, as Gatignon & Hanssens (1987) refer to it. This three-essay dissertation adds to the growing marketing interactions research stream, which is concerned with understanding the interactions among different elements of marketing strategy (e.g., Gatignon & Hanssens, 1987; Srinivasan, 2006; Yoo, Donthu, & Lee, 2000), by investigating some aspects of the interaction between brand and distribution. Specifically, this dissertation examines two facets of the influence of brand equity on distribution channel strategy: an influence on channel governance structure and another on channel management.

In their review of the literature on the influence of brand equity on different elements of marketing strategy, Hoeffler and Keller (2003) conclude that the most neglected research area in this literature is how brand equity impacts distribution channels strategy and tactics. Indeed, extant research on the brand-channel interface is not only scant, but also restricted to a single aspect of channel strategy, *channel coordination*, and relies almost completely on grocery stores scanner data (e.g., Farris, Olver, De Kluyver, 1989; Besanko, Dubé, & Gupta, 2005). This

dissertation advances the brand-channel interface literature, and the larger marketing interactions literature, by extending our knowledge of brand-channel interactions beyond channel coordination to reach other aspects of channel strategy: *channel governance and channel management*. Table 1.1 provides an overview of extant research on the brand-channel interface and illustrates how this dissertation departs from prior research to advance our knowledge in that domain.

In essay 1, *Channel Governance through Brand Equity: How Brand Equity Shapes Distribution Channel Structure*, I assess the causal link between brand equity and channel governance structure. Theoretically, I draw on transaction cost theory and the theory of self-enforcing contracts. Methodologically, I use dynamic empirical modeling, with a large panel dataset, to examine the causal influence of brand equity on channel governance structure. In doing so, I primarily address the following two research questions: (a) does a firm's brand equity influence the way it governs its distribution channels? How? And (b) what are the managerial implications of this influence in terms of distribution channel governance and marketing investment decision-making?

The results of this study, which to the best of my knowledge is the first study in marketing on the impact of brand equity on channel governance structure, reveal that brand equity has a direct, powerful, but lagging effect on channel governance such that higher brand equity leads to (Granger-causes) less hierarchical channel governance structure (i.e. lower levels of forward vertical integration). This study provides empirical support for the argument that as brand equity increases, firms lean more on their brands to curb downstream channel members' opportunism, and hence reduce the need for extensive forward vertical integration. Managerially, we suggest that when contemplating two marketing investment decisions (one in forward vertical

integration and the other in boosting brand equity), senior executives should note that investments in brand equity may offer a lower risk/reward ratio and a better hedge against uncertainty because of their nature as dual investments directly in the brand and indirectly in the channel. By investing in its brand, the firm reduces the need for investing in the capital-intensive forward vertical integration because, as this essay argues and empirically demonstrates, brand equity functions as an alternative governance mechanism that enables the firm to govern its channel through contractual self-enforcement.

Staying within the same overarching theme of this dissertation (i.e. brand-channel interface or the strategic interactions between brand and distribution channels), Essay 2 explores the influence of brand equity on a certain aspect of channel management: the firm's gray market strategy. In this essay, which is titled '*Gray is Good? The Effect of Gray Market Combating on Financial Performance and the Role of Brand Equity*', I investigate the effect of gray market combating on the financial performance of public firms, as reflected by stock returns.

Theoretically, I draw on extant gray market theory, as well as relevant channel management and marketing strategy literatures, and develop a conceptual framework that illustrates the influence of gray market combating on financial performance and the role brand equity plays in this relationship. More specifically, I address the following research questions:

- (a) do firms with higher brand equity manage their distribution channels differently? In particular, are firms with stronger brand equity more likely to engage in gray market combating?
- (b) What is the effect of gray market combating on financial performance? What factors govern this effect? And (c) what role does brand equity play, if any, in the relationship between gray market combating and financial performance?

To test this framework, I study the gray market combating behavior of more than 3,000 public firms, firm-by-firm, over two decades. Methodologically, I rely on choice models, event study, and regression analyses, in addition to other econometric techniques. The results of this study reveal that gray market combating, on average, has a negative bearing on the firm's financial performance. However, there are significant variations in this effect depending on a number of contingencies and factors such as brand equity, profitability, sales growth, innovation, and some attributes of the combating action (target and nature of action). Besides, the results unveil a crucial role for brand equity in this relationship: brand equity is not only a major driver of the firm's decision to engage in gray market combating, but also a key determinant of the financial efficacy of such behavior. These results are robust to a battery of robustness checks and model specifications. This study departs from extant gray market research on several dimensions and addresses some of the focal unanswered questions in this domain.

Essay 3, *Gray Market Combating Mechanisms: An Empirical Investigation of Financial Efficacy and Drivers of Choice*, explores the financial efficacy and drivers of choice of the different gray market combating mechanisms available in the literature. This more nuanced analysis provides a number of valuable, novel, and actionable insights to practitioners by pinpointing the few financially-effective gray market combating mechanisms, as well as illustrating the firm-level factors that drive the firm's choice of those mechanisms and all other combating mechanisms in general. Methodologically, this study relies on event study, multiple regression, and multinomial logistic regressions in its analyses, along with the same data set used in essay 2. Empirical results reveal that the majority of available gray market combating mechanisms are financially ineffective, as

argued by many scholars and practitioners (e.g., Howell et al., 1986; Eagle et al., 2003). Indeed, out of the 17 gray market combating mechanisms under examination, only three mechanisms were found financially effective. Interestingly, the most popular combating mechanisms (e.g., legal action, supply control, lobbying, anti-gray alliances, dealer punishment) seem to be the least effective financially, and the most effective ones (e.g., raising consumers' awareness, product differentiation, conversion of gray sellers into authorized sellers) tend to be the least popular; in other words, the majority of practitioners are indeed prescribing the '*wrong pill*'. Besides, the results reveal that a number of firm-level factors such as resources availability, brand equity, innovation and technological capabilities, profitability, firm growth, and firm age play an instrumental role in shaping the firm's choice of its gray market combating mechanisms. Moreover, I find that brand equity is not only a major driver of the firm's choice of certain gray market combating mechanism, but also enhances the financial efficacy of gray market combating in general, regardless of the combating mechanism in use. The findings of this research address some of the fundamental questions that puzzled both practitioners and scholars for more than three decades such as: (a) do different gray market combating mechanisms differ in their financial efficacy? Which ones are the most effective? (b) Are there any gray market combating mechanisms that do not have a negative impact on the firm's financial performance? What drives the firm's choice of those mechanisms? And (c) what firm-level factors influence the firm's choice of each individual gray market combating mechanism? What role does brand equity play in this choice?

The findings of this dissertation advance the brand-channel interface literature by shedding the light on two instrumental roles for brand equity in distribution channel strategy.

First, a role in channel governance: brand equity functions as an alternative governance mechanism that enables the firm to safeguard itself against downstream channel members' opportunism, and hence diffuses pressures for more vertical integration into distribution. In general, as firms accumulate brand equity they rely more on indirect distribution to facilitate the appropriation of due economic rents while leaning on their brands to effectively govern their channels without the need for deep involvement in direct distribution. Second, brand equity not only influences the firm's channel management strategy (firms with higher brand equity are more likely to engage in gray market combating), but also shapes this strategy (brand equity is a major driver of the firm's choice of certain gray market combating mechanisms) and determines its financial efficacy (brand equity alleviates the negative financial consequences of gray market combating).

Table 1.1: Overview of Extant Empirical Research on the Brand-Channel Interface

Study	Context	Channel Coordination / Governance	Channel Member Under Study	Brand Equity Operationalization	Key Relevant Findings
Montgomery, 1975	Grocery Store / Supermarket	Channel Coordination	Brand Seller (Downstream firm)	Advertising (formative indicator).	Stronger brands have a better chance of being accepted at stores and in gaining shelf-space.
Farris, Olver, De Kluyver, 1989	Grocery Store / Supermarket	Channel Coordination	Brand Seller (Downstream firm)	% of survey subjects who would choose the brand over rivals (reflective indicator).	Retailers provide better in-store merchandising and stocking to stronger brands.
Fader & Schmittlein, 1993	Grocery Store / Supermarket	Channel Coordination	Brand Seller (Downstream firm)	Market share (reflective indicator).	Stronger brands have higher availability at retailers. Retailers who carry few brands carry those with higher brand equity.
Lal & Narasimhan, 1996	Not Applicable (Analytical model)	Channel Coordination	Brand Seller (Downstream firm)	Advertising (formative indicator)	Retailers are willing to accept lower margins on stronger brands because they see them as drivers of store traffic. Retailers are more likely to advertise stronger brands because customers use them to gauge the store's overall price levels.
Bell, Chaing, & Padmanabhan, 1999	Grocery Store / Supermarket	Channel Coordination	Brand Seller (Downstream firm)	Average number of purchases of the brand per consumer (reflective indicator)	During promotions, retailers stockpile stronger brands more than weaker brands.
Besanko, Dubé, & Gupta, 2005	Grocery Store / Supermarket	Channel Coordination	Brand Seller (Downstream firm)	Market share (reflective indicator)	Stronger brands receive higher promotion pass-through (by retailers) than weaker brands.
<i>This Dissertation</i>	<i>45 industries</i>	<i>Channel Governance</i>	<i>Brand Owner (Upstream firm)</i>	<i>Advertising (formative indicator), Brand Ranking (reflective indicator)</i>	<i>As brand equity increases, firms rely less on hierarchical channel governance structures (high levels of forward vertical integration). This is because brand equity functions as an alternative channel governance mechanism that solves many channel issues, via contractual self-enforcement.</i>
	<i>S&P 1500 Constituents (multiple industries)</i>	<i>Channel Management</i>	<i>Brand Owner (Upstream firm)</i>	<i>Advertising (formative indicator)</i>	<i>Brand equity is a major stimulus for gray market combating and a key determinant of the nature and financial efficacy of this behavior. Firms with higher brand equity are not only more likely to engage in gray market combating, but also less-susceptible to the negative financial consequences of doing so. Brand equity influences the firm's choice of gray market combating mechanisms</i>

2. Channel Governance through Brand Equity: How Brand Equity Shapes Distribution Channel Structure

2.1. *ABSTRACT*

The relationship between brand equity and channel governance is recognized in practice and is of particular interest to senior managers. However, research in marketing on the topic is limited, and both practitioners and researchers seem divided on the nature of this relationship. To guide practice, we investigate the causal impact of brand equity on channel governance and offer some scholarly insights. We advance a theoretical framework and estimate a Bayesian Panel Vector Autoregression, on a large panel data set ($n=6,292$) covering 44 sectors. Our results reveal that brand equity has a direct, powerful, but lagging impact on channel governance such that higher brand equity leads to a less hierarchical channel governance structure. Furthermore, reverse causality analysis suggests that this effect is more powerful, pronounced, and persistent than the reverse effect. We contribute to three literature streams and provide actionable managerial insights, primarily in the areas of channel governance and capital allocation decision-making.

Keywords: brand equity, distribution channel governance, marketing strategy, vertical integration, Bayesian Panel Vector Autoregression (BPVAR).

“...[we take] vertical integration to the extreme... We prefer to train all our own people and operate all our own stores, so that each cup of coffee you buy from Starbucks is the real thing.”

(H. Schultz, Starbucks CEO, 1997)

“...vertical integration successfully created coordination, allowing Pepsi and Coke to build their brands. Once brand equity was firmly established, Coke and later Pepsi realized they no longer needed to [vertically integrate].”

(Coughlan, Anderson, Stern, & El-Ansary, 2006, p.354)

2.2. INTRODUCTION

Brand equity, that is the differential value added by the brand name to a product in comparison with an unbranded duplicate (Yoo, Donthu, & Lee, 2000), is a central concept in marketing theory and practice. It is a vital market-based asset that benefits the firm at various stakeholder levels such as customers (Keller, 2003; Wilson, Giebelhausen, & Brady, 2017), employees (Tavassoli, Sorescu, & Chandy, 2014), distributors (Fader & Schmittlein, 1993; Montgomery, 1975), and shareholders (Conchar, Crask, & Zinkhan, 2005; Kerin & Sethuraman, 1998; Srivastava, Shervani, & Fahey, 1998). As a result, the role brand equity plays in marketing strategy is not only a focal one that shapes the firm’s overall marketing strategy, but also a

multifaceted one that influences how the firm approaches other elements of marketing strategy. Marketing scholars have extensively researched this multifaceted role and explained how brand equity impacts a firm's product (e.g., DeIVecchio & Smith, 2005; Sinapuelas, Wang, & Bohlmann, 2015), price (e.g., Ailawadi, Lehmann, & Neslin, 2003; Taylor & Bearden, 2002), and promotion (e.g., Keller, 1993; Mazodier & Merunka, 2012) strategies. Interestingly, the impact of brand equity on another primary element of marketing strategy, *distribution strategy*, has not received commensurate research attention in marketing. Indeed, the impact of brand equity on distribution, as a general phenomenon, is still an underresearched topic in marketing despite practitioners' and scholars' recognition of the crucial role brands play in distribution channels. Hoeffler and Keller (2003) conduct a review of the literature on the impact of brand equity on various elements of marketing strategy and conclude that the effect of brand equity on channel strategies and tactics appears to be the most neglected research area in this literature. In their review, they document only three studies that examine the impact of brand equity on distribution, none of which is on distribution channel governance. Our current survey of marketing literature reveals a few additional studies that examine the impact of brand equity on distribution but still no empirical work on the impact of brand equity on distribution channel governance. This study, which to the best of our knowledge is the first study in marketing that investigates the influence of brand equity on distribution channel governance, is an initial effort to attend to this research imperative. Table 2.1 presents a summary of existing marketing research on the impact of brand equity on distribution and illustrates the positioning of our contribution within this limited body of research.

Table 2.1: Overview of Marketing Research on the Impact of Brand Equity on Distribution

Study	Context	Channel Coordination / Governance	Channel Member Under Study	Brand Equity Operationalization	Key Relevant Findings
Montgomery, 1975	Grocery Store / Supermarket	Channel Coordination	Brand Seller (Downstream firm)	Advertising (formative indicator).	Stronger brands have better chance of being accepted at stores and in gaining shelf-space.
Farris, Olver, De Kluver, 1989	Grocery Store / Supermarket	Channel Coordination	Brand Seller (Downstream firm)	% of survey subjects who would choose the brand over rivals (reflective indicator).	Retailers provide better in-store merchandising and stocking to stronger brands.
Fader & Schmittlein, 1993	Grocery Store / Supermarket	Channel Coordination	Brand Seller (Downstream firm)	Market share (reflective indicator).	Stronger brands have higher availability at retailers. Retailers who carry few brands carry those with higher brand equity.
Lal & Narasimhan, 1996	Not Applicable (Analytical model)	Channel Coordination	Brand Seller (Downstream firm)	Advertising (formative indicator)	Retailers are willing to accept lower margins on stronger brands because they see them as drivers of store traffic. Retailers are more likely to advertise stronger brands because customers use them to gauge the store's overall price levels.
Bell, Chaing, & Padmanabhan, 1999	Grocery Store / Supermarket	Channel Coordination	Brand Seller (Downstream firm)	Average number of purchases of the brand per consumer (reflective indicator)	During promotions, retailers stockpile stronger brands more than weaker brands.
Besanko, Dubé, & Gupta, 2005	Grocery Store / Supermarket	Channel Coordination	Brand Seller (Downstream firm)	Market share (reflective indicator)	Stronger brands receive higher promotion pass-through (by retailers) than weaker brands.
This Study	45 industries	Channel Governance	Brand Owner (Upstream firm)	Advertising (formative indicator), Brand Ranking (reflective indicator)	As brand equity increases, firms rely less on forward vertical integration. This is because brand equity functions as an alternative channel governance mechanism that solves many channel issues, via contractual self-enforcement, which provides an effective safeguard against downstream channel partners' opportunism.

2.2.1 Managerial Relevance and Importance to Practice

On the managerial front, our inquiry is of particular interest to senior managers for a number of reasons. First, as evident in the opening quotes, practice seems divided on whether higher brand equity calls for more forward vertical integration (a more hierarchical channel governance structure) or diffuses pressures for doing so. Hence, more scholarly work on the topic would be useful in guiding practice in making better strategic decisions. Second, Chief Executive Officers (CEOs) often find themselves dealing with a capital allocation conundrum where different marketing strategies (e.g., invest in acquiring downstream channel members vs. invest in strengthening the brand) compete for financial resources. Remarkably, whereas “gaining organization support and resources for brand building activities is often difficult, even with a consensus that brands are strategically important to the organization,” (Biel & Aaker, 1993, p.333) the temptation of control compels many executives to pursue vertical integration, even though it is a costly, risky investment that demands large resource commitments that often outweigh the foreseeable gains of such a venture (Bateman, 2016; Hitt, Harrison, & Ireland, 2001). Therefore, a better understanding of the relationship between brand equity and vertical integration, and whether these two strategic controls are substitutable, would help CEOs in making better capital allocation decisions. Third, despite falling from grace as a distribution strategy in the past three decades, vertical integration is witnessing a renewed interest from practice (Bateman, 2016; Economist, 2016). “It seems to be making a comeback... [and] it’s been given a new label ... the “full stack” business model. Some companies are migrating upstream: Take Netflix and Amazon ... Others are integrating downstream. Consider Apple ... and Google ... Some companies are even doing both. Tesla, for instance ...” (Favaro, 2015) which led some practitioners to believe that “the pendulum has shifted from disintegration to

integration” (Worthen & Scheck, 2009). This is interesting considering that (a) companies’ track record of vertical integration had been “ugly” (Rumelt, 1974); (b) recent business memory is still packed with unsuccessful vertical integration adventures by prominent brand names (e.g., Google acquiring Motorola Mobility in 2011, Bank of America buying Countrywide in 2008, Allianz purchasing Dresdner in 2001, AOL purchasing Time Warner in 2000, Merck buying Medco in 1990); and (c) financial markets have developed a habit of harshly punishing vertical integration ventures from their commencement (Moeller, Schlingemann, & Stulz, 2005). Against this backdrop, we examine the impact of brand equity on channel governance to provide practitioners with additional insights on the factors to consider before taking the resource-intensive vertical integration decision.

2.2.2 *Study Overview*

On the theoretical front, we draw on the theory of self-enforcing contracts from new institutional economics, on marketing’s extensions of transaction cost theory, and on the relevant literatures in marketing strategy and brand equity to develop our theoretical arguments. Our primary argument is that *brand equity affects channel governance directly and functions as an alternative governance mechanism (alternative to hierarchical governance) that enables the firm to effectively govern its channel by escalating the opportunity cost of opportunistic behavior for downstream channel partners and amplifying their replaceability. This motivates them to exercise self-enforcement and diffuses pressures for instituting a more hierarchical governance structure in the channel (higher levels of forward vertical integration).*

On the methodological front, we overcome the limitations of previous empirical work on the topic by estimating a Bayesian Panel Vector Autoregressive model using a large panel data

set. The data set we use in our research is an unbalanced panel of 6,292 observations from North American franchise chains. Our results reveal that brand equity has a direct, powerful, but lagging impact on channel governance such that higher brand equity leads to (Granger-causes) less hierarchical channel governance structure - as indicated earlier and in the rest of this paper, less hierarchical channel governance structure indicates lower levels of forward vertical integration. The impulse response functions indicate that a shock to one of the proxies of brand equity takes a year or two to start materially impacting the governance structure of the channel. However, that effect keeps building momentum over time leading to a total decrease of 1.5% to 3% in the degree of forward vertical integration in the channel. Reverse causality analysis suggests that the effect in this direction is more pronounced, more powerful, and more persistent than the reverse effect.

Our study contributes to three marketing research streams, the brand equity literature, the channel governance literature, and a third stream focusing on the interactions among various elements of marketing strategy (e.g., Gatignon & Hanssens, 1987; Srinivasan, 2006). Substantively, we put in the hands of the senior marketing manager (e.g., CMO) empirical evidence that aids her in selling brand building initiatives to the board of directors by arguing that investments in brand equity are *dual investments* directly in the brand and indirectly in the channel which makes their risk/reward ratio superior to many other investment alternatives, especially investments in acquiring downstream channel members. This makes the challenging task of gaining organizational support for brand building activities easier considering that companies trade off competing marketing strategy options based on projected financial return (Rust, Lemon, & Zeithaml, 2004).

This paper proceeds as follows. First, we review the relevant literature and introduce our theoretical arguments. Then, we describe our research methodology and present our results. Thereafter, we discuss our findings, contributions, and managerial implications. Finally, we highlight the limitations of our work and suggest some directions for future research.

2.3. *LITERATURE REVIEW*

Extant research in marketing on the impact of brand equity on distribution focuses mostly on channel coordination and primarily investigates how an upstream firm's (brand owner) brand equity influences the behavior of its downstream channel partners (brand sellers). In his classic paper, Montgomery (1975) observes that stronger brands have a better chance of being accepted at stores and in gaining shelf-space. In the same vein, Farris, Olver, and De Kluyver (1989) report that retailers provide better in-store merchandising and stocking to stronger brands. Subsequently, and within the same context of grocery stores, Fader and Schmittlein (1993) find that stronger brands have higher availability at retailers, and that retailers who carry few brands often carry those with higher brand equity. Lal & Narasimhan (1996) develop an analytical model that shows how retailers are willing to accept lower margins on stronger brands, and are more likely to advertise stronger brands than weaker ones. In the same spirit, Bell, Chiang, and Padmanabhan (1999) document evidence that retailers stockpile stronger brands more than weaker brands during promotion times. Similarly, Besanko, Dubé, and Gupta (2005) establish that stronger brands receive higher promotion pass-through from retailers. As evident (see Table 2.1), a common theme in these studies seems to be that stronger brands get better distribution, receive preferential treatment from sellers, and are less prone to downstream channel partners'

opportunism. Consequently, the logical inference from this would be that brand equity helps in overcoming many channel issues and mitigates the channel coordination problem. Therefore, this should reflect on how the firm governs its channel, and the natural manifestation of this would be a less hierarchical channel governance structure i.e. lower levels of forward vertical integration (Rindfleisch & Heide, 1997). In line with this conclusion are the only two arguments we found in marketing literature on this topic. The first argument is by Ghosh and John (1999) who posit that when brand equity is high, the firm is more capable of using market governance, whereas weaker brands “handicap” the firm from doing so. The second argument is by Coughlan, Anderson, Stern, and El-Ansary, (2006, p.351) who argue that when brand equity is high, vertical integration into distribution is not only unnecessary but rather “wasteful.” However, empirical evidence on this view is yet to be comprehensively documented in marketing. Aside from the abovementioned two theoretical arguments, marketing theory seems relatively silent on the subject despite its recognition that “brand equity influences governance directly.” (Ghosh & John, 1999, p.140).

In response to this research need, we undertake the first empirical effort in marketing toward studying the influence of brand equity on channel governance structure – we define channel governance structure as the institutional structure within which the firm organizes its distribution transactions (Heide, 1994; Williamson & Ouchi, 1981). In doing so, we test whether the theoretical conclusion we laid out previously, which reflects the general view in marketing, holds empirically or not. Interestingly, this view is in sharp contrast with the prevalent view on the matter in extant research (as detailed in the next section). Hence, we put these two opposing theoretical views to the test and examine which one holds empirically.

2.4. THEORY

The relationship between brand equity and the governance structure of a distribution channel has been investigated to some extent in other disciplines, mainly organizational economics. Much of the existing research approaches the question from a pure economic organization point of view, relying on the theoretical lenses of transaction cost theory (TCT) and/or agency theory (AT)¹. The central idea here is that an upstream firm's brand equity is an intangible specific asset to be safeguarded against downstream channel members' opportunism (Minkler & Park, 1994; Nickerson & Silverman, 2003; Norton, 1988a) or free riding (Brickley & Dark, 1987; Lafontaine & Shaw, 2005; Mathewson & Winter, 1985). Hence, an increase in brand equity, calls for a more hierarchical channel governance structure i.e. higher levels of forward vertical integration².

Proponents of transaction cost theory perceive brand equity as an intangible specific asset that stimulates opportunistic behavior (e.g., poor service quality) by downstream channel members. Hence, as brand equity increases, the threat of opportunism rises, and the brand owner rationally relies on a more hierarchical channel governance structure to safeguard this valuable specific asset – the brand. For example, Norton (1988a) examines a sample of franchise chains, from the eating places and motel industries in the U.S., and finds that as brand equity increases, firms rely more on vertical integration because brand equity “creates opportunistic incentives” (Norton, 1988a, p.108). In the same vein, and within the context of the U.S. trucking industry,

¹ Gallini and Lutz (1992) provide a game theoretic signaling argument suggesting that when brand equity is low, firms own a portion of the channel to signal their commitment to the brand to their partners. Then, as brand equity increases, vertical integration decreases.

² An exception is Norton (1988b). He argues that when brand equity is high, a brand owner forfeits more economic gains to shirking managers than to independent agents. Hence, as brand equity increases, vertical integration should decrease.

Nickerson and Silverman (2003) observe that the more a trucking company (motor carrier) invests in its brand name, the more likely it is to employ company drivers, as opposed to owner-operators i.e. the more vertically integrated it is. Along the same lines, Minkler and Park (1994) study a sample of public American firms from three industries (restaurants, hotels, and professional services) and document evidence that an increase in brand equity is positively related to increase in the degree of downstream vertical integration.

In a similar spirit, agency theorists viewed brand equity as a motivation for free riding by downstream channel members due to the inherent incentive divergence between the brand owner and the brand seller. Hence, as brand equity increases, distributors' incentive to free ride on the brand, by under-delivering the pledged service outputs or lowering quality standards, increases. Therefore, an increase in brand equity, calls for a more hierarchical channel governance structure to alleviate the risk of distributors' moral hazard. In their 1987 paper, Brickley and Dark study a sample of American firms from nine industries and report evidence on a positive relationship between brand equity (trademark value) and forward vertical integration. Similarly, Lafontaine and Shaw (2005) establish, using a multi-industry longitudinal sample of franchise chains, that companies with more valuable brand names are more vertically integrated and argue that they do so to protect their brands from channel partners' free-riding. In the same vein, Mathewson and Winter (1985) demonstrate, using a game theoretic model, that when brand equity increases, distributors' temptation to free ride on the brand name increases which consequently increases monitoring costs. In response to that, brand owners rely more on forward vertical integration.

An interesting observation on the aforementioned body of research is that despite the differences in the theoretical underpinnings and methodological approaches of those studies,

there is clearly a strong convergence in their conception of the subject matter. First, all those studies view the relationship between brand equity and channel governance as a pure economic organization concern and thus approach it from a cost-centered perspective that is focused primarily on managing transaction/agency costs. Second, they all perceive brand equity as a relatively static, external transactional attribute rather than a conscious strategic choice. Therefore, with this cost-centered and static view, it is no surprise that research in this space has predicted a positive relationship between brand equity and hierarchical channel governance structures (see Table 2.2). To represent this line of thinking we introduce the following view:

View 1: Higher brand equity leads to a more hierarchical channel governance structure.

In contrast with the previous view (which perceives brand equity as a relatively static, external transactional attribute), and in line with a deep-rooted view in economics (Hoos, 1959; Nerlove & Arrow, 1962) and marketing (Fischer & Himme, 2017), we recognize brand equity as a conscious, strategic choice that involves substantial investments and carries long-term implications on the firm. Then, we draw on the theory of self-enforcing contracts from new institutional economics (Bull, 1987; Klein, 1985; Telser, 1980) as well as marketing strategy and brand equity literatures, and on marketing's extensions of TCT (primarily the alternative governance mechanisms literature e.g., Rindfleisch and Heide, 1997), to establish our theoretical arguments. Our primary argument is that the role of brand equity in interorganizational relationships is too significant to be reduced to simply being a passive transactional attribute or a stimulus for moral hazard, as proposed by previous research. Hence, we argue for a more strategic role for brand equity in governing the channel and contend that *brand equity functions as an alternative governance mechanism that enables the firm to effectively govern its channel*

by increasing the opportunity cost of opportunistic behavior (incentives for compliance) for downstream channel partners and amplifying their replaceability. This carrot-and-stick mechanism motivates them to exercise self-enforcement which provides an effective safeguard against their opportunism, and subsequently diffuses pressures for instituting a more hierarchical governance structure. In what follows, we provide a more detailed explanation of our argument and the underlying theoretical logic.

What Are Alternative Governance Mechanisms?

Alternative governance mechanisms are arrangements or investments that solve governance issues without the need for vertical integration (Rindfleisch & Heide, 1997). Examples of such mechanisms include pledges (Anderson & Weitz, 1992), partner selection, incentive design, and monitoring (Stump & Heide, 1996), relational norms (Heide & John, 1992), and dependence balancing (Heide & John, 1988). In this study, we extend this literature by suggesting brand equity as an additional alternative governance mechanism.

What Is a Self-Enforcing Agreement?

Most real world contracts are incomplete because the ex-ante costs (search costs, negotiation costs, and “ink costs”) associated with covering all future risks and contingencies are prohibitively high (Klein, 2002). Besides, not all aspects of a business relationship can be contracted upon or can be adequately measured due to the significant information asymmetries, several contingencies, and performance measurement issues that surround such relationships (Klein, 1985, 2002). However, contracting parties must be prevented from “taking advantage of the unspecified elements of contractual performance to opportunistically breach the contractual understanding.” (Klein, 1985, p.90). In most business relationships, performance is secured

Table 2.2: Existing Empirical Studies vs. Our Study

Study	Measure of Brand Equity	Method				Theory		
		Controlled for Endogeneity	Modeled Lagged Effects	Controlled for Unobserved Heterogeneity	Examined Causality	Investigated Reverse Causality	Theoretical Lens	Impact of BE on VI
Brickley & Dark, 1987	Repeat Customers (reflective indicator)						Agency Theory	+
Norton, 1988a	Travel Intensity (reflective indicator)						Transaction Cost Theory	+
Minkler & Park, 1994	Market Value minus Book Value (reflective indicator)			X			Transaction Cost Theory	+
Nickerson & Silverman, 2003	Advertising (formative indicator)						Transaction Cost Theory	+
Lafontine & Shaw, 2005	Advertising (formative indicators)			X			Agency Theory	+
This Study	Advertising (formative), Brand Ranking (reflective)	X	X	X	X	X	Theory of Self-enforcing contracts, Transaction Costs Theory	-

BE: Brand Equity; VI: Forward Vertical Integration

through contractual self-enforcement rather than legal enforcement (Klein, 2002). Contractual self-enforcement occurs when the party facing termination believes that it is better off by keeping its promises than by violating them (Stump & Heide, 1996; Telser, 1980). In other words, when the rents an individual expects to gain in a relationship are greater than those available outside, the termination sanction is sufficient to make him provide the desired effort level and not act opportunistically (Klein, 2002; Wathne & Heide, 2000). Therefore, the higher and/or more stable the expected future rents from a business relationship, the more self-enforcing is that relationship, and the lower is the threat of opportunism within it.

Wathne and Heide (2000) maintain that contractual self-enforcement can be facilitated by a variety of instruments such as price premiums, margin premiums, and “hostages” – assets that have limited salvage value outside the relationship. In this paper, we propose brand equity as an additional instrument of contractual self-enforcement in distribution partnerships. In the following sections, we discuss how brand equity leads to contractual self-enforcement by increasing the opportunity cost of opportunism for downstream channel partners and amplifying their replaceability.

How Does Brand Equity Increase The Opportunity Cost of Opportunism (Incentives for Compliance) for Downstream Channel Partners?

Srivastava, Shervani, and Fahey (1998) provide a detailed explanation of how brand equity translates into growing, persisting economic rents³ by boosting the firm’s financial performance in four ways. First, brand equity enhances cash flow through price premiums, higher market share, products cross-selling, increased revenues from the development/extension

³ Fischer and Himme (2017) provide a summary of existing empirical evidence on this.

of product lines, lower sales and service cost, working capital reduction, and cobranding. Second, brand equity accelerates cash flow through faster response to marketing efforts, earlier brand trials and referrals, and reduced market penetration time. Third, brand equity reduces volatility in cash flow by enhancing customer loyalty and retention, increasing customer switching costs, improving operational stability, and enabling the firm to generate additional cash flows from services and consumables that are less vulnerable to competitive actions. Fourth, brand equity enhances the residual value of cash flow by growing the installed base, allowing cross-selling of products and services, and capitalizing on product upgrades. As a result, the economic rents of an upstream firm's brand equity boost the channel's overall financial performance by *growing the pie* and constituting a credible promise of continuing to do so. This increases the opportunity cost of opportunistic behavior for downstream channel members and increases the self-enforceability of the relationship which discourages downstream members from engaging in opportunism so as to avoid losing their share of those persisting, growing future rents (Klein, 1985, 2002). This view is consistent with Davis and Mentzer's (2008) argument that brand equity increases retailers' dependence on manufacturers. In addition to growing the pie, an upstream firm's brand equity increases the opportunity cost of opportunism to downstream channel partners through the generation of *excess rents*. Studies in economics and finance provide evidence on this practice of *opportunity cost escalation* via excess rents. Kaufmann and Lafontaine (1994) found evidence that McDonald's intentionally leaves rents on the table for its downstream partners as a mechanism for countering their opportunism and incentivizing them to exercise self-enforcement. Michael and Moore (1995) report that this practice is also common among European franchisors who deliberately leave "well-above-average returns" for their franchisees as a mechanism for curbing their opportunism through self-

enforcement. Furthermore, they report that these excess rents vary from one franchisor to another where larger brands tend to leave more rents on the table for their channel partners. Therefore, the economic rents of an upstream firm's brand equity boost the channel's overall financial performance which, in turn, raises the opportunity cost of opportunism to downstream channel partners (growing and persisting pie, excess rents) and incentivizes them to uphold their promises and rein their opportunism.

How Does Brand Equity Amplify Downstream Channel Partners' Replaceability?

First, brand equity reinforces customers' loyalty (Russell & Kamakura, 1994) and intensifies their switching costs (Boulding, Lee, & Staelin, 1994). This makes *customers' attachment to the brand less dependent on retailers* and consequently increases retailers' replaceability. Second, brand equity builds barriers against competition (Srivastava, Shervani, & Fahey, 1998), creates sustainable competitive advantage (Barney, 2014), reduces the threats of new entrants (Breivik & Thorbjørnsen, 2008), facilitates innovation (Brexendorf, Bayus, & Keller, 2015), and strengthens demand (Keller, 2003). This fortifies the firm's market position and increases its attractiveness to high-quality distribution partners should it be interested in substitutes. Moreover, the temptation of excess rents and persisting, growing financial returns discussed earlier creates a large queue of qualified replacements ready to step in whenever the upstream firm wants to replace an incumbent downstream partner. This gives the upstream firm more *partnering optionality*. Third, brand equity not only expands the firm's partnering optionality, but also enhances its *bargaining position* (Ghosh & John, 2009). This makes the process of replacing an incumbent downstream member much easier and enables the firm to extract even more favorable contractual terms. Therefore, the brand equity of an upstream firm

connects current and future customers to the brand rather than the seller, increases the firm's partnering optionality, and enhances its bargaining position, all of which amplifies the replaceability of its downstream channel partners should they choose to prefer the short-term gains of opportunism to the long-term rewards of compliance. This reasoning is similar in spirit to Heide and John's (1988) work on dependence balancing via offsetting investments wherein they argue that retailers safeguard themselves against manufacturers' opportunism by investing in customer relationships that increase manufacturers' replaceability, and consequently reduce the retailers' dependence on them. In our reasoning, we examine the situation from the opposite angle: manufacturers safeguarding themselves against retailers' opportunism by investing in brand equity to increase retailers' replaceability by connecting current and future customers to the brand, rather than the retailer, and by enhancing their partnering optionality and bargaining position.

Channel Governance through Brand Equity

The economic rents of an upstream firm's brand equity constitute a *credible promise* of continuing and improving overall financial performance of the channel. This escalates the opportunity cost of opportunistic behavior for downstream members and acts as an incentive for compliance. In addition to that, an upstream firm's brand equity constitutes a *credible threat* of replaceability to downstream channel members by connecting customers to the brand rather than the seller, and enhancing the upstream firm's partnering optionality and bargaining position. This intensifies the cost of opportunism to downstream members and acts as a deterrent against deviance. Taken together, these two effects discourage downstream channel partners from engaging in opportunistic actions and motivates them to exercise self-enforcement which makes

brand equity an effective channel governance mechanism. In other words, by investing in brand equity, an upstream firm sends two messages to its downstream channel partners. First, there is too much at stake in the long-term (a growing pie for all channel members and excess future rents for the downstream channel member) to jeopardize for some short-term gains from opportunistic actions. Second, if a downstream partner chooses to overlook this *carrot* and engage in opportunism, he is more replaceable (stronger customer attachment to the brand, more partnering optionality, enhanced bargaining position). This *carrot-and-stick* mechanism⁴ leads to a *self-enforcing contractual relationship* that effectively curbs opportunism and reduces the need for hierarchical governance (for a graphical step-by-step illustration of this logic, please refer to Appendix A - Figure A.1). To reflect our line of thinking (which, as we discussed earlier, is in line with the general view in marketing on the topic), we advance the following rival view:

View 2: Higher brand equity leads to a less hierarchical channel governance structure.

2.5. DATA AND MEASUREMENTS

2.5.1. Research Context

To empirically test the two theoretical views we discussed earlier, we choose the context of franchising. We believe that franchising is an appropriate empirical setting for our research for the following reasons. First, *Economic Prevalence*: Franchising is a ubiquitous business format that occupies a significant place in the business landscape. Large franchises such as Subway, McDonald's, Hilton, Radisson, Petland, Baskin-Robbins, Cinnabon, Coldwell Banker, Radio

⁴ In addition to this carrot-and-stick mechanism, other potential mechanisms could be at work here. For instance, higher brand equity often demands higher services and specialization from dealers which translates into higher investments into specific assets. These specific assets function as a safeguard against dealers' opportunism and hence enhance the self-enforceability of the relationship.

Shack, and Hertz are leading brands that constitute a part of consumers' everyday life all around the globe. More than 40% of all retail sales in the U.S. and around one third of all retail sales in the U.K. go through franchise chains (Lindblom & Tikkanen, 2010). In 2016, there were 795,932 business establishments in the U.S. franchise systems, which employed more than nine million people, with direct economic output close to \$552 billion (IHS Economics, 2016). Second, *Industrial and Organizational Diversity*: Franchising offers a rich empirical environment in that it spans a broad range of industries and comprises a diverse universe of companies: large and small, private and public, local and global, which increases the generalizability of our results. As observed in Appendix A - Table A.1, our sample includes brands from more than 40 industries. Third, *The Salience of Brand Equity*: Brand equity is a vital asset that can be employed to generate future rents, boost market position, enhance customer loyalty, and increase trustworthiness (Keller, 2003). In the franchising context, brand equity plays an even more crucial role and is often considered as “the most distinguishing feature of a franchise” (Wu, 1999, p.87). Brand equity can serve as a magnet that attracts high quality partners, who are the cornerstone of any successful franchise system, and may act as a reliable signal that mitigates the high informational asymmetry between the franchisor and its would-be franchisees. The entire franchising business model can be thought of as a “leasing of the brand name” as Brickley and Dark (1987, p.402) refer to it. This makes franchising an ideal setting for our research question that has brand equity at its core. Fourth, *Significant Variations in Channel Governance and in Brand Equity*: Franchise chains exhibit substantial variations in their degree of vertical integration: Some are almost 100% integrated (hierarchies), others are less than 0.01% integrated (markets), and the rest are distributed along the continuum between these two endpoints. A similar level of variation is present in brand equity as well: Some franchise chains carry global

brand names such as McDonald's, Radisson, and Hertz while others reflect small local brands. These variations provide an excellent setting for our research question, which is assessing the causal link between brand equity and channel governance.

2.5.2. *Data*

The data sources we use in this study are *Bond's Franchise Guide* and the *Annual Franchise 500 Ranking* by *Entrepreneur* magazine. Both sources have been used in prior research, and their consistency and reliability have been verified by a number of researchers (Lafontaine, 1995; Shane, Shankar, & Aravindakshan, 2006). Researchers from various disciplines have used *Bonds'* (e.g., Gillis, Combs, & Ketchen, 2014; Jindal, 2011; Kacker et al., 2016; Scott, 1995) and *Entrepreneur's* (e.g., Lafontaine, 1992; Shane, 1998; Shane, Shankar, & Aravindakshan, 2006) data in their work, and some (e.g., Antia, Zheng, Frazier, 2013; Lafontaine & Shaw, 2005) have used the two sources jointly, as we do in this study. Using these two sources, we compiled a panel data set of North American, franchise-level annual observations for the period from 2001 to 2009. Our data set is an unbalanced panel that consists of 6,292 observations⁵ from 1,261 companies.

2.5.3. *Measures*

Dependent variable. We operationalize channel governance structure as the degree of vertical integration in the franchise system and measure it as the percentage of company-owned units in the overall chain. We obtain this measure by dividing the number of company-owned

⁵ Consistent with previous research (e.g., Bagwell & Staiger, 2011; Caselli & Tesei, 2016; Ishida, Spilerman, & Su, 1997; Jeon & Ligon, 2011), we do not include observations with missing/censored-at-zero dependent variables in our sample to obtain consistent estimators (Maddala, 1992; Rigobon & Stoker, 2007). However, as a robustness check, we also ran our model on the full sample including those observations with missing/censored-at-zero dependent variable. The results remained very consistent under both Bayesian prior distributions (results are reported in Appendix A – Figures A.19 and A.20).

outlets by the total number of outlets (company-owned plus franchised) in the chain. This measure has frequently been used in the channel governance literature (e.g., Anderson & Weitz, 1992; John & Weitz, 1988; Vinhas & Anderson, 2005) to represent the continuum of governance structures extending between the two polar extremes: market and hierarchy. In our model, the higher the percentage of forward vertical integration, the more hierarchical is the channel governance structure; the lower the percentage, the less hierarchical the governance structure.

Independent variable. We recognize that our independent variable brand equity is a complex, multidimensional construct and that, similar to all previous research in this space (see Tables 2.1 and 2.2), we use proxies to measure this construct. However, for a proxy to be valid, the link between the proxy and the target construct should be based on “reasonable assumptions” (Antia, Mani, & Wathne, 2017). To achieve this, we (a) rely on existing, established proxies that were used by previous research in this space and whose link to brand equity is explicit and/or reasonable, and (b) use two proxies, rather than one, one formative and one reflective to capture both *actions* that enhance brand equity (e.g., advertising) and *indications* of brand equity (e.g., brand rankings or media recognition). In so doing, we depart from previous research, which relied on either reflective or formative proxies for operationalizing brand equity (see Tables 2.1 and 2.2) and mostly used a single proxy.

Our first proxy - a formative proxy - is the *advertising fee*, which is an ongoing fee that is contractually imposed by the franchisor on all its franchisees for the sake of promoting the brand through advertising. This fee is in the form of a percentage of total sales that is paid periodically by each franchisee toward an advertising fund that is managed by the franchisor. In this regard, Windsperger (2004) notes that “The more important the franchisor’s brand name ... the more

marketing investments (national advertising and promotion measures) are required to maintain the brand name value, and the higher are the advertising fees paid by the franchisees.” Prior research in marketing (e.g., Agrawal and Lal, 1995; Windsperger, 2004), economics (Lafontaine & Shaw, 2005), and management (Nickerson & Silverman, 2003) has employed this proxy in its operationalization of brand equity.

The second proxy – a reflective proxy - is *media recognition*. We measure media recognition as the reverse coded ranking of the franchise system by *Entrepreneur Magazine’s Franchise 500* annual ranking of the top 500 North American franchises. *Entrepreneur* states that it uses a proprietary algorithm developed by its panel of experts to rank franchise systems based on a set of factors that include the brand. Scott and Spell (1998, p.50) maintain that when it comes to franchise systems, an “indication of brand name value is the system’s ranking in *Entrepreneur Magazine*.” In the same spirit, Combs, Ketchen, and Hoover (2004) assembled a panel of experts consisting of hospitality executives and academics, asked them to rank the franchise chains in their sample, and then used this ranking as a proxy for brand equity. Rao (1994) and Shane & Foo (1999) provide a detailed justification for this approach for measuring “intangible capabilities” such as brand equity. Shane and Foo (1999) provide a detailed description of the ranking process and the magazine.

Control variables. A firm’s decision to operate at a high or low level of forward vertical integration is a strategic decision that can be influenced by several factors. Hence, to rule out some alternative explanations, we control for a number of possible confounding effects. First, some firms have substantial resources that enable them to own their entire distribution network, or a large part of it, which translates into higher levels of downstream vertical integration in their

channels. To account for the confounding effect of firm resources, we use two control variables, chain age and financing support - whether the franchisor provides financing support to its current and prospective franchisees. Previous research (e.g., Lafontaine, 1992; Minkler & Park, 1994) has used these two measures as indicators of firm resources based on the arguments that (a) the more established the firm, the higher its capital availability and (b) a firm should already have substantial resources to be able to finance its downstream channel partners. Second, a firm's ability to extensively engage in direct distribution might be influenced by whether it possesses or lacks the required knowledge and expertise for doing so. Some firms do not rely heavily on direct distribution simply because they do not have the required skill and experience to do that, regardless of any other consideration, whereas others do it simply because they can. To address this, we control for the business development time, which is the period for which the company operated as a non-franchising business, directly dealing with end customers before licensing its first franchisee. Third, following prior research, we control for chain size as a proxy for firm performance (Kacker et al., 2016; Shane, Shankar, & Aravindakshan, 2006) or firm responsiveness (Nickerson & Silverman, 2003). Fourth, we control for the geographic scope of the firm – whether the firm is active in international markets or not. Finally, there could be some systematic characteristics or prevailing trends within an industry, as a whole, that influence firms' behavior in that industry when it comes to channel governance. To account for this, we control for industry-specific effects. Furthermore, in the robustness analyses section we conduct several validation checks to rule out other possible alternative explanations and statistical biases. Among those robustness tests is running the model on trimmed subsamples (e.g., Raassens, Wuyts, & Geyskens, 2012) that exclude firms with very high or very low levels of vertical integration (we excluded the ± 5 , ± 10 , ± 15 , and ± 20 percentiles), and running the model with and

without control variables to test the robustness of the results to the inclusion or exclusion of control variables. In Table 2.3 we provide a summary of the measures we use, along with their symbols as they appear in the empirical model (see Appendix A - Table A.2 for data examples). The descriptive statistics and correlations are presented in Table 2.4.

Table 2.3: Variables and Measures

Variable	Symbol	Measure
<i>Dependent Variable</i>		
Degree of Vertical Integration	<i>VI</i>	Percentage of company-owned units in the overall chain.
<i>Independent Variables</i>		
Advertising Fee	<i>Ad</i>	Percentage of sales contributed by the franchisees to the brand advertising fund.
Media Recognition	<i>Media</i>	<i>Entrepreneur Magazine's Franchise500</i> annual ranking coded in reverse order (501-Rank).
<i>Control Variables</i>		
Chain Size	<i>lnSize</i>	The natural logarithm of the total number of outlets in the chain (franchised + company-owned).
Industry-Specific Effects	<i>Industry</i>	A categorical variable (dummy coded) representing the industry the company operates in as classified by <i>Bond's Guide</i> .
Business Development Time	<i>BDT</i>	Period in years between the year of business inception and the start of franchising.
Geographic Scope	<i>International</i>	A dummy variable that is set to 1 if the brand has one outlet overseas and 0 otherwise.
Chain Age	<i>Age</i>	The number of years from the start of franchising till the data collection year.
Financing Support	<i>Financing</i>	A dummy variable that is set to "0" if the franchisor provides no financing option to its franchisees and "1" otherwise.

Table 2.4: Descriptive Statistics and Correlations

Variable	1	2	3	4	5	6	7	8	9
1. VI	1								
2. Ad	0.2427	1							
3. BDT	0.2617	-0.0997	1						
4. Media	0.0066	0.2188	0.0681	1					
5. Age	0.0174	0.2448	-0.0895	0.2641	1				
6. lnSize	0.0231	0.2405	0.1359	0.7369	0.5311	1			
7. Industry	-0.0028	-0.1354	0.1626	0.0004	-0.1133	-0.0059	1		
8. International	-0.1425	0.1133	0.0028	0.2442	0.288	0.3742	0.0082	1	
9. Financing	-0.1111	0.0113	0.0059	-0.0548	-0.0717	-0.0987	0.0653	-0.0626	1
M	21.7113	1.6941	8.9685	286.6457	18.0561	4.3487	19.9798	0.2991	0.5756
SD	25.6391	1.6946	13.8321	144.2307	12.275	1.7547	11.6702	0.4579	0.4943
n	6,272	6,081	6,285	1,493	6,292	6,273	6,290	6,282	6,265

M: Mean; SD: Standard Deviation; n: sample size

2.6. ECONOMETRIC MODELING

2.6.1. Limitations of Prior Studies

As highlighted earlier, the impact of brand equity on channel governance has been investigated by a number of researchers, mainly in organizational economics, during the past three decades. However, existing empirical work reveals several methodological limitations, most of which are acknowledged by the authors themselves. First, previous research does not model *lagged effects* which is a crucial concern when dealing with such a research question due to the logically lagged, slowly unfolding nature of the effect of one variable on the other, and the strategic long-term nature of many channel and brand decisions. Marketing researchers have long established that only a small portion of the total effect of brand equity appears in the short run, while the majority of the impact is often realized in the long run (Aaker & Jacobson, 1994; Mizik, 2014). Second, several extant studies on the impact of brand equity on vertical integration do not control for *endogeneity*, which could be a significant source of bias considering that (a) the firm's decision to increase its downstream vertical integration or to invest in the brand are strategic decisions that could be influenced by several financial and non-financial factors and (b)

both brand and distribution are elements of the firm’s overall marketing strategy. Third, earlier empirical work does not assess any form of *causality* and focuses mainly on examining whether there is a significant association between brand equity and vertical integration. Fourth, existing research does not investigate *reverse causality* which is quite plausible in such a relationship. To overcome these methodological limitations and provide deeper insights into the impact of brand equity on channel governance, we use a Bayesian Panel Vector Autoregressive model (BPVARX) – full details on this are provided in the next section. A comparison between the methodological approaches of prior studies and our study is presented in Table 2.2.

2.6.2. *The Empirical Model*

Model motivation. To overcome the methodological limitations described earlier, we need an econometric modeling approach that enables us to (a) investigate lagged effects while controlling for endogeneity and firm-level heterogeneity, (b) estimate the “long-term or cumulative effects of causal variables” (Borah & Tellis, 2016, p.148), (c) conduct an assessment of reverse causality, and (d) “get as close to causality as possible with nonexperimental data” (Kang, Germann, & Grewal, 2016, p.72). These modeling needs suggest the use of a *Bayesian Panel Vector Autoregressive* model (e.g., Canova & Ciccarelli, 2013; Chakravarty & Grewal, 2011) with exogenous variables (BPVARX). In general, Panel Vector Autoregressive (PVARX) models (e.g., Borah & Tellis, 2016; Kang, Germann, & Grewal, 2016; Hewett et al., 2016) are powerful empirical models in that they bring together the ability of panel data models to capture unobserved individual heterogeneity with the dynamism of vector autoregressive models in their ability to model lagged effects while treating variables as endogenous and allowing for feedback loops among them. Bayesian Panel Vector Autoregressive (BPVARX) models bring in an

additional layer of power by addressing some of the limitations of unrestricted (traditional) VAR models. First, as Chakravarty & Grewal (2011, p.1601) note, “traditional VARX techniques work well with individual time series only if there are a substantial number of observations over time. With panel data, the time series for each cross-sectional unit typically is limited [as in] most firm-level panel data used in marketing, whereas consistent estimation of the parameters requires dozens of observations of both endogenous and exogenous variables (e.g., Holtz-Eakin et al., 1988; Kiviet, 1995). Econometrics research suggests dealing with small time-series observations for cross-sectional units by pooling the data from different units and allowing for heterogeneity in individual effects (e.g., Binder et al., 2005; Holtz-Eakin et al., 1988). With the BVARX approach, we can pool all cross-sectional units and allow for heterogeneity in the associations between variables (random effects parameterization)”. Second, “Unrestricted VAR models suffer from the problem of overparameterization” (Maddala, 1992, p.602) and hence “can handle only a few variables, because the number of parameters to be estimated grows at a quadratic rate with the number of variables, often leading to the omission of important variables and inconsistent parameter estimations (e.g., Leeper et al., 1996). The BVARX approach overcomes this limitation by allowing for shrinkage of the parameter space through the imposition of prior distributions on the parameters (e.g., Doan et al., 1984; Leeper et al., 1996).” (Chakravarty & Grewal, 2011, p.1601). Third, Bayesian models are known for their ability to “account for individual firm differences” (Hansen, Perry, & Reese, 2004, p.1280) and “adequately model” the heterogeneity in response parameters (Mackey, Barney, & Dotson, 2016) which provides stronger “predictive performance” (Rossi & Allenby, 1993, p.180). Moreover, “large samples cause Bayesian methods to become less dependent on subjective aspects of the prior distribution and therefore more objective” (Allenby, 1990, p.379). For these reasons, it is

no surprise that PVAR researchers such as Canova and Ciccarelli (2004, p.329) maintain that “Bayesian VARs are known to produce better forecasts than unrestricted VARs.”

Model specification. VAR models can be specified in levels, first differences, or as a mixture of both (Chakravarty & Grewal, 2011). This depends on the stationarity of the endogenous variables such that stationary variables enter the VAR model in levels and nonstationary variables enter in their first difference (Steenkamp et al., 2005). As we discuss next, our variables have different orders of integration (some are stationary and others are not), and therefore we use a mixed specification (e.g., Hewett et al., 2016). The first and foremost step in any VAR model is to test for the order of integration to identify the presence of unit roots that could lead to spurious regressions (Granger & Newbold, 1974; Phillips, 1986). Hence, we used two tests of panel data stationarity, a Levin-Lin-Chu (Levin, Lin, & Chu, 2002) test - which assumes a common unit root process for all variables - and an Augmented Dickey-Fuller (ADF) test (Choi, 2001) - which assumes individual unit root processes. Due to the unbalanced nature of our panel, we cannot use the Im-Pesaran-Shin (2003) test (Kang, Germann, & Grewal, 2016). For the first endogenous variable, *VI*, both the Levin-Lin-Chu ($p < 0.03$) and the ADF ($p < 0.0001$) tests rejected the null hypothesis of unit root presence. So, this variable enters the BPVARX system in level. Turning to the rest of the endogenous variables, a unit root was detected in the other two endogenous variables *Ad* and *Media*. So they are represented in the BPVARX model in their first differences. Next, we conducted a Johansen procedure (Johansen, 1995) to test for the presence of cointegrated vectors among the endogenous variables. The test reported no cointegrating equations by both the trace test ($p < 0.05$) and the maximum Eigenvalue test ($p < 0.05$). For lag length specification, we followed previous studies (e.g., Borah & Tellis, 2016; Hewett et al., 2016) and used the Schwartz Bayesian Information Criterion for identifying the

optimal lag length. As per the results presented in Appendix A - Table A.3, the optimal lag length is five. So, all our endogenous variables are represented in the model by five lags. This lag length is sufficient to eliminate any residuals correlation from the model which was further confirmed by the results of a Ljung-Box test (Box & Pierce, 1970; Ljung & Box, 1978) where the test failed to reject the null hypothesis of no serial correlation in residuals ($Q=11.62$; $p>0.23$).

Model construction. To explore the causal relationship between brand equity (operationalized via two proxies advertising fee ‘Ad’ and media recognition ‘Media’) and channel governance structure (operationalized as the degree of forward vertical integration in the channel ‘VI’), we develop the following BPVARX model:

$$\begin{pmatrix} VI_{it} \\ \Delta Ad_{it} \\ \Delta Media_{it} \end{pmatrix} = \begin{pmatrix} C_{VI,0} \\ C_{Ad,0} \\ C_{Media,0} \end{pmatrix} + \sum_{l=1}^L \begin{pmatrix} \beta_{11}^l & \beta_{12}^l & \beta_{13}^l \\ \beta_{21}^l & \beta_{22}^l & \beta_{23}^l \\ \beta_{31}^l & \beta_{32}^l & \beta_{33}^l \end{pmatrix} \begin{pmatrix} VI_{i,t-l} \\ \Delta Ad_{i,t-l} \\ \Delta Media_{i,t-l} \end{pmatrix} + \begin{pmatrix} \gamma_{1,1} & \dots & \gamma_{1,6} \\ \vdots & \ddots & \vdots \\ \gamma_{6,1} & \dots & \gamma_{6,6} \end{pmatrix} \begin{pmatrix} X1_{i,t} \\ X2_{i,t} \\ X3_{i,t} \\ X4_{i,t} \\ X5_{i,t} \\ X6_{i,t} \end{pmatrix} + \begin{pmatrix} \varepsilon_{VI,i,t} \\ \varepsilon_{Ad,i,t} \\ \varepsilon_{Media,i,t} \end{pmatrix} \quad (1)$$

which can be compactly written as:

$$Y_{it} = C_0 + \sum_{l=1}^L \beta^L Y_{i,t-l} + \gamma X_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $i = 1, 2, \dots, N$ firms is the cross-sectional index; $t = 1, 2, \dots, T$ years is the longitudinal time index; $l = 1, 2, \dots, L$ lags is the lag index; Y is the vector of endogenous variables: VI, Ad, and Media; C_0 is the intercepts vector; betas and gammas are coefficients vectors to be estimated; $X1, X2, \dots, X6$ are exogenous control variables; ε_{it} is a vector of normally distributed errors.

2.7. RESULTS

We present our results in the following order: (1) generalized impulse response functions, (2) Granger causality analysis, (3) reverse causality analysis, and (4) robustness analyses.

2.7.1. Generalized Impulse Response Functions (GIRFs)

One of the distinctive features of the VAR-family of models is their ability to demonstrate the causal long-term effect of one variable on another through dynamic graphical intuitions known as impulse response functions or IRFs. Hence, researchers (e.g., Dekimpe & Hanssens, 1999; Kang, Germann, & Grewal, 2016) often rely on IRFs to isolate the effect of a shock in one of the endogenous variables on another, while holding all other endogenous variables constant. So, for the ease of exposition, we report the Bayesian PVARX estimates (using Eviews) in Appendix A–Figure A.2 and discuss the IRFs outputs in the following section.

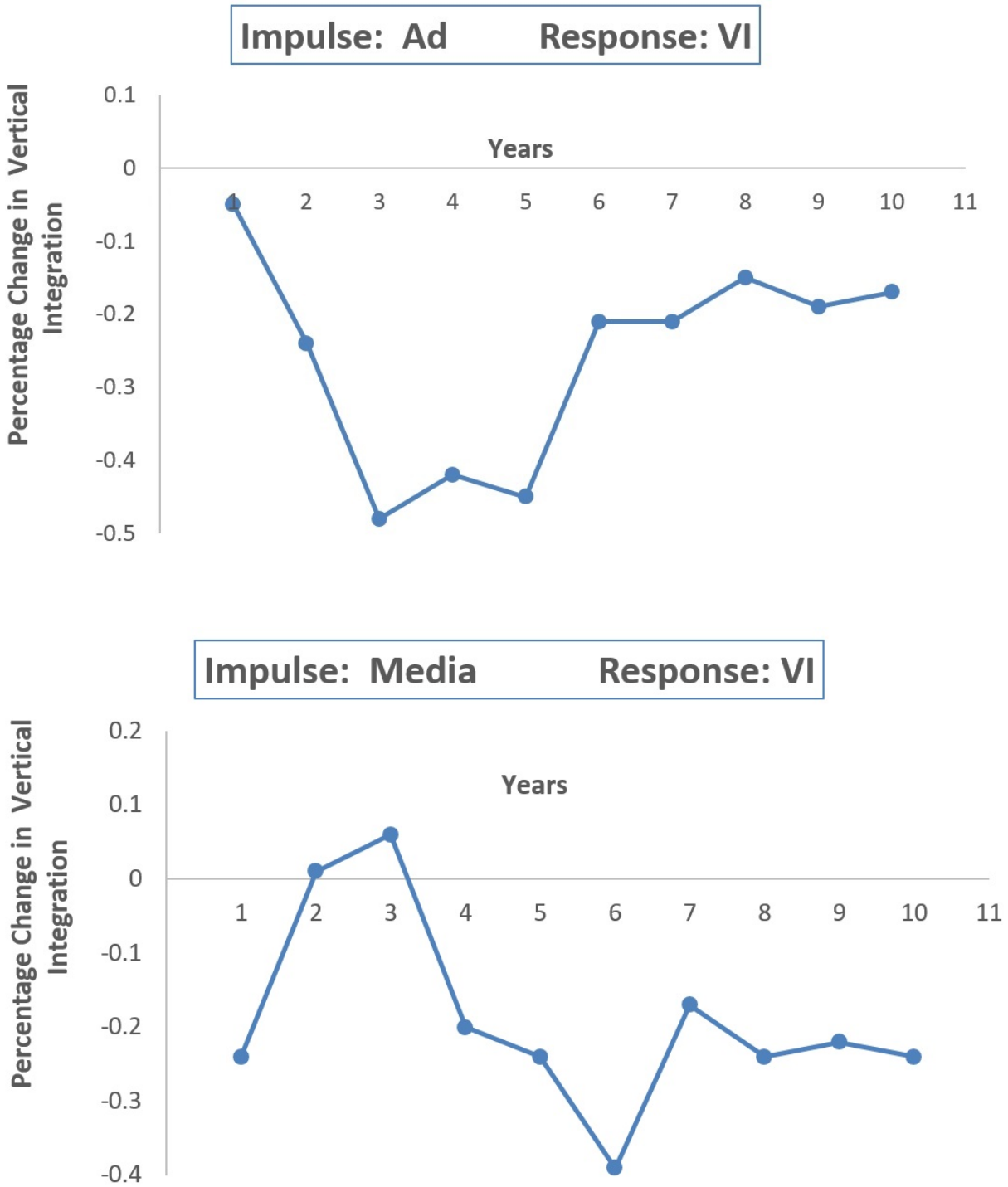
To describe the effect of a shock in brand equity on channel governance over time, we present the graphs of the generalized impulse response functions (GIRFs) in Figure 2.1. The GIRFs displayed are based on generalized shocks (one standard deviation). However, for robustness purposes, we also produced (see Appendix A – Figure A.3) the impulse response functions that are based on orthogonalized shocks (one standard deviation) obtained from a causal ordering procedure using Cholesky's decomposition of the residuals matrix (Hamilton, 1994). In addition to the GIRFs, we report the accumulated GIRFs, which represent the cumulative sum of the impact of the shock to one of the proxies of brand equity on the degree of vertical integration in the channel over time (see Appendix A – Figure A.4). As evident in all four IRF graphs, a shock to one of the proxies of brand equity (Ad or Media) negatively impacts the degree of forward vertical integration in the channel leading to a less hierarchical channel

governance structure. Furthermore, the effect seems persistent and keeps building up over time rather than fading away. These results provide strong empirical support for the second theoretical view (V_2) over the rival view V_1 .

Additionally, the GIRFs indicate that the majority of the effect of brand equity on channel governance tends to be lagged in nature. This is not surprising when we consider the strategic nature of both channel and brand decisions, and the fact that governance adjustment is a time-consuming process that demands significant resource allocation and careful execution. Previous research in marketing has documented similar trends (e.g., Mela, Gupta, & Lehmann, 1997) and established that, in general, only a small portion of the total impact of brand equity materializes in the short run, while the bulk of the impact is often realized in the future (Aaker & Jacobson, 1994; Mizik, 2014). The GIRFs graphs in Figure 2.1 provide a more granular description of the effect dynamics and allow for a better understanding of the phenomenon. As demonstrated in these graphs, a shock to the first proxy of brand equity, Advertising Fee, has a slight initial impact (-0.05%) on the degree of vertical integration in the channel. However, starting from year 2, the impact starts to emerge (-0.25% in year 2) and then it keeps gaining momentum over time (getting to -0.48% in year three) before it stabilizes from year 5 onwards. On the other hand, a shock to the second proxy of brand equity, Media Recognition, has a stronger initial impact (-0.24% in year 1) but it takes a while before it starts building momentum from year four onwards and then it stabilizes from year seven onwards. Therefore, the effect of the first proxy, advertising fee, starts at a slower pace but accelerates faster and delivers a stronger total effect, whereas the effect of the second proxy, Media Recognition, starts at a faster pace, but accelerates slowly and leads to a smaller total effect (see the accumulated IRFs in Appendix A – Figure A.4).

Figure 2.1: The Dynamic Impact of Brand Equity on Channel Governance

Generalized Impulse Response Functions for the Effect of a Shock in Brand Equity on Vertical Integration



A possible explanation for this could be that the first proxy is a formative indicator, which represents actions that could enhance brand equity in the future, such as advertising, and hence it takes a while to reflect on the brand and consequently on the channel structure. On the other hand, the second proxy is a reflective indicator i.e. a current manifestation or indication of an increase in brand equity, and hence carries a more immediate impact on channel structure.

Due to their Bayesian nature, the GIRFs of BPVARX models do not come with confidence intervals in most statistical packages. However, in the next section, we provide evidence on the statistical significance of the effect in three ways: (a) by reporting the results of the Autoregressive Distributed Lag Model, which indicate significance levels (please see Table 2.5); (b) in our robustness analyses section, we confirm statistical significance by providing the GIRFs of the unrestricted PVARX model, which are accompanied by confidence intervals (see Appendix A – Figures A.7 and A.8); and (c) we present the variance decomposition analysis results as a further confirmation (see Appendix A – Figure A.5).

2.7.2. *Granger Causality*

Another distinctive feature of VAR models is their ability to assess a certain form of causality known as *Granger causality* (Granger, 1969). Granger causality is a form of *predictive causality* that relies on a set of Wald tests to investigate whether (a) the cause is correlated with the effect; (b) the cause precedes the effect, and (c) the cause carries a significant predictive ability about the future values of the effect i.e. $Y(\text{effect})$ can be better predicted using the lagged values of both $X(\text{cause})$ and $Y(\text{effect})$ than it can by using the lagged values of Y only (Granger, 1980). Statistical software such as EViews, which we use in our analysis, do not provide direct tests for Granger causality for BPVARX models. However, since the explanatory variables are

the same in each equation in the BPVARX model and since our model is free from any residuals correlation (see the model specification section earlier), the individual ARDL (Autoregressive Distributed Lag) estimates are equivalent to those of the system-of-equations, and so are their estimated variances (Borah & Tellis, 2016; Kang, Germann, & Grewal, 2016; Zellner, 1962). Therefore, to test for Granger causality, we extract from the BPVARX system-of-equations the equation in which the degree of vertical integration (VI) is the dependent variable, estimate it by OLS, and then apply the Granger causality procedure (Wald tests) on the estimates. As expected, the fit statistics (Adjusted R-square= 95.16%) for the individual ARDL are similar to those of the system of equations (Adjusted R-square=94.98%). The results reveal that both proxies of brand equity - Advertising Fee ($F=9.26$; $p<0.001$) and Media Recognition ($F=3.62$; $p<0.05$) - Granger-cause the degree of forward vertical integration in the channel (see Table 2.5). To test the robustness of our results to non-response selectivity bias, we extracted the balanced sub-panel from our unbalanced panel and ran the same model on it (Balestra & Nerlove, 1996). The result remained highly consistent.

2.7.3. *Reverse Causality Analysis*

In response to recent editorial calls in leading marketing journals (e.g., Hanssens, Rust, & Srivastava, 2009; Tellis, 2017), we explore the possibility of reverse causality in the relationship under examination. Having established that brand equity Granger-causes channel governance (operationalized as the degree of forward vertical integration in the channel), we investigate Granger causality in the opposite direction i.e. whether channel governance has a causal impact on brand equity. Interestingly, we find evidence that Granger causality goes in the other direction as well ($F=45.97$; $p<0.001$ for Advertising Fee, and $F=3.84$; $p<0.05$ for Media Recognition).

Table 2.5: Results of the Autoregressive Distributed Lag Model

Dependent Variable Degree of Vertical Integration (VI)	Unbalanced Panel		Balanced Sub-Panel	
	Betas	SE	Betas	SE
Independent Variables				
Degree of Vertical Integration Lags				
VI_{t-1}	0.7798 [†]	(0.1225)	0.7519 [†]	(0.1365)
VI_{t-2}	0.0422	(0.1138)	-0.1598	(0.1518)
VI_{t-3}	0.1760**	(0.0832)	0.6862*	(0.3578)
VI_{t-4}	-0.0590	(0.0765)	-0.1386	(0.2259)
VI_{t-5}	0.0363**	(0.0161)	-0.1587 [†]	(0.0236)
Advertising Fee Lags				
ΔAd_{t-1}	-0.8478 [†]	(0.2070)	-0.6334	(0.3833)
ΔAd_{t-2}	-1.1784*	(0.6710)	-1.2546*	(0.7444)
ΔAd_{t-3}	-0.3605 [†]	(0.0768)	-1.5342**	(0.7627)
ΔAd_{t-4}	-0.3991	(0.4074)	-1.1245	(0.9743)
ΔAd_{t-5}	1.0137 [†]	(0.2773)	1.0728 [†]	(0.2007)
Media Recognition Lags				
$\Delta Media_{t-1}$	0.0010	(0.0032)	0.0011	(0.0050)
$\Delta Media_{t-2}$	0.0011	(0.0075)	0.0007	(0.0115)
$\Delta Media_{t-3}$	-0.0025	(0.0022)	-0.0052**	(0.0024)
$\Delta Media_{t-4}$	-0.0037	(0.0031)	0.0002	(0.0033)
$\Delta Media_{t-5}$	-0.0057*	(0.0031)	-0.0039	(0.0042)
Control Variables				
Business Development Time	-0.0018	(0.0176)	-0.0151	(0.0150)
Chain Age	-0.0721***	(0.0258)	-0.0755*	(0.0390)
Geographic Scope	-0.1794	(0.6363)	0.0040	(0.8305)
Financing Support	0.8525	(0.6208)	0.9328	(0.7419)
Chain Size	0.3256*	(0.1747)	0.0557	(0.3650)
Industry Effect	0.0135	(0.0272)	0.0477	(0.0326)
Intercept	-1.1452	(1.2287)	0.2376	(2.5778)
Adjusted R-square	95.16%		94.93%	
(F-statistic, P-value)	(165.685, p<0.00001)		(123.269, p<0.00001)	
Schwarz Information Criterion	5.91		6.15	

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; [†] $p < 0.001$

To get a better understanding of the dynamics of the effect in each direction, we turned to the GIRF graphs. The GIRFs suggest that the impact of brand equity on channel governance (Figure 2.1) is more pronounced, persistent, and powerful than that of channel governance on brand equity (Figure 2.2). The same results are further confirmed by the accumulated GIRFs (Appendix A – Figure A.4 vs. Figure A.6). Therefore, we can conclude that *reverse causality exists but it is relatively weaker. The effect is more pronounced, powerful, and persistent from brand equity to channel governance than in the opposite direction.*

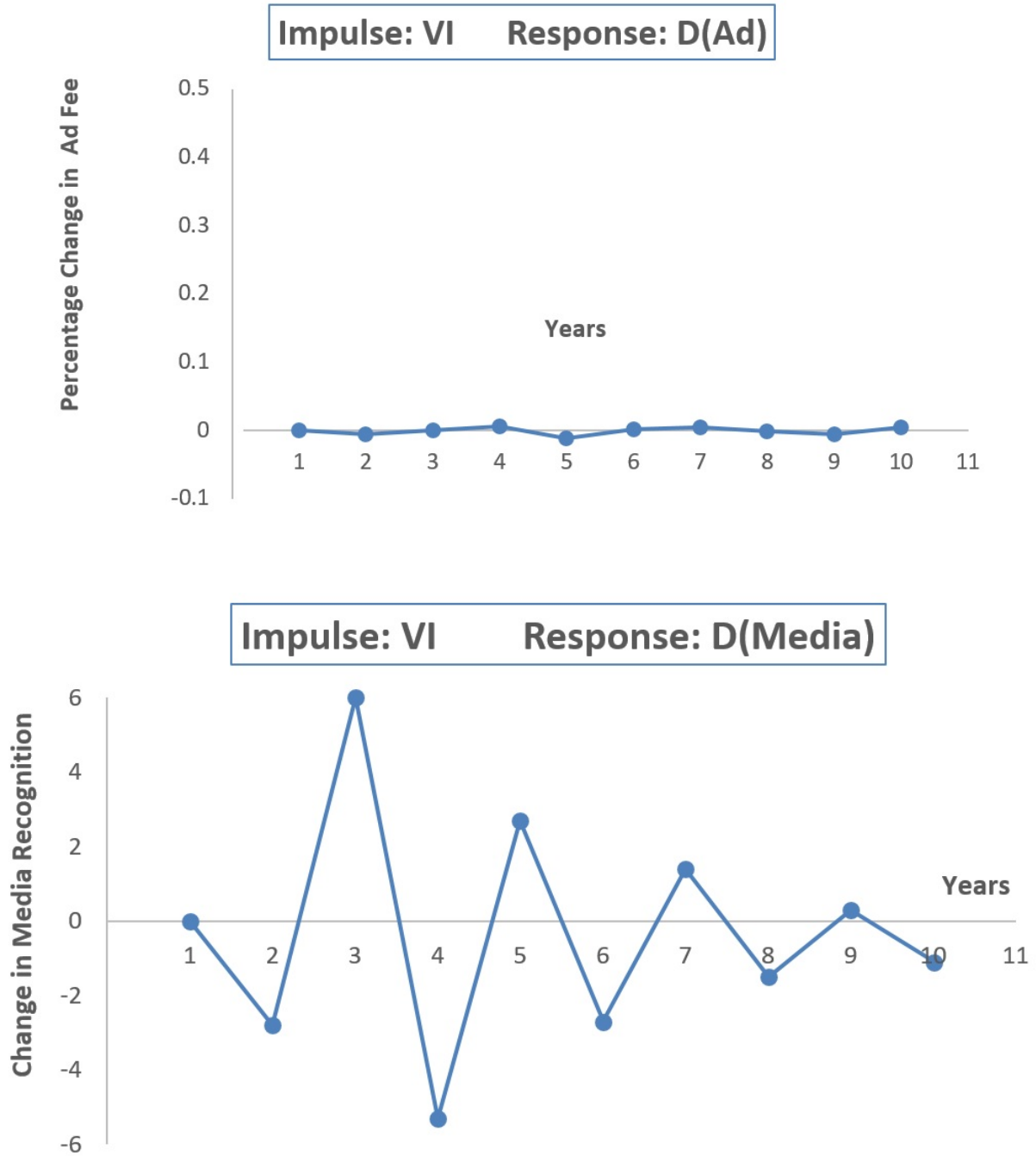
2.7.4 Robustness Analyses

To further validate our results and exclude some alternative explanations and statistical biases, we conducted several robustness checks. We discuss them below.

Unrestricted vs. Bayesian PVARX. As discussed earlier, “unrestricted VAR models suffer from the problem of overparameterization” (Maddala, 1992, p.602) which leads to forecasts with large standard errors and imprecise coefficient estimates (Canova, 2007, p.373). In addition to that, they do not work well with short panels, which is often the case in most marketing strategy panel data where we often have many individual units and few time periods (Chakravarty & Grewal, 2011). This makes them less consistent than their Bayesian counterparts, which “has been found to give better results and has a good forecasting record.” (Maddala, 1992, p.602). That said, we ran an unrestricted PVARX model to see whether our results remain consistent and to further confirm the temporal causation argument. Our results remained consistent - both the GIRFs (Appendix A–Figure A.7) and the accumulated GIRFs (Appendix A–Figure A.8) confirm the results of the Bayesian PVARX model in terms of statistical significance and directionality.

Figure 2.2: The Dynamic Impact of Channel Governance on Brand Equity

Generalized Impulse Response Functions for the Effect of a Shock in Vertical Integration on Brand Equity



Alternative prior distributions. In this study, we followed previous research (e.g., Chakravarty & Grewal, 2011) in our choice of the Bayesian prior distribution and applied a Wishart prior. To test the robustness of our results against alternative prior distributions, we ran the model using a Minnesota prior. The results remained consistent (see Appendix A – Figure A.9).

Orthogonalized vs. generalized IRFs. In our results section, we followed prior research (e.g., Borah & Tellis, 2016; Kang, Germann, & Grewal, 2016) and presented the IRFs that are based on generalized shocks. To further validate our results, we produced the IRFs that are based on orthogonalized shocks obtained from a causal ordering procedure using Cholesky's decomposition of the residuals matrix. We found them to be very similar to the generalized IRFs. We report them in Appendix A - Figure A.3.

Alternative lag lengths. To check the robustness of our results to alternative lag length selection criteria (e.g., Akaike Information Criterion, Hannan-Quinn Information criterion, and Akaike's Final Prediction Error), we ran our BPVARX model using the lag lengths suggested by different selection criteria (L=3,4,6). The results remained consistent (see Appendix A – Figures A.10, A.11, and A.12).

BPVAR vs. BPVARX. To test the robustness of our results against the potential influences of some of the control variables, we ran a BPVAR model i.e. the model with the endogenous variables only excluding all controls. The results remained consistent for both prior distributions (see Appendix A – Figures A.13 and A.14).

All-in-first-difference model specification. As we have discussed earlier in the model specification section, the standard practice in VAR models is to specify stationary variables in

levels regardless to the order of integration of other endogenous variables (e.g., Hewett et al., 2016). However, some researchers choose to first difference stationary variables as well in the presence of some nonstationary endogenous variables to have an all-in-first-difference model specification. To further validate our results, we ran an all-in-first difference model by first differencing all variables. The results remained robust for both prior specifications (see Appendix A – Figure A.15 and A.16).

Non-response selectivity bias. To test the robustness of our results to non-response selectivity bias, we extracted the balanced sub-panel from our unbalanced panel and ran the same model on it (Balestra & Nerlove, 1996). The results remained consistent for both prior distributions. We present the IRFs in Appendix A – Figures A.17 and A.18.

Outliers. To test the robustness of our results to the exclusion of extreme values, and to further confirm the presence of the effect, we ran the BPVARX model on different trimmed subsamples (excluding ± 5 , ± 10 , ± 15 , and ± 20 percentiles). The results remained consistent under both prior distributions, Wishart and Minnesota (see Appendix A – Figure A.21 to A.28).

Temporal causation verification. Panel VAR models combine the characteristics of panel regressions with those of vector autoregressions which enables them to capture both the temporal effect and its cross-sectional variation. However, to further confirm the temporal effect, we conducted two additional analyses. First, as we discussed earlier, we ran an individual ARDL model (e.g., Borah & Tellis, 2016; Kang, Germann, & Grewal, 2016) which provided additional support to the temporal effect suggested by the BPVARX model as indicated by the results in Table 2.5. Second, in the robustness analyses section we further validated the temporal effect by running an unrestricted PVARX model which captures unobserved firm-level heterogeneity

(fixed-effects). Again, the unrestricted PVARX results confirmed the temporal effect in terms of both statistical significance and directionality. Further validation of this using individual brand-specific VARs is almost impossible due to the strategic nature of such decisions. Firms do not change their channel governance strategy or brand strategy monthly or quarterly. Such initiatives take time to implement and require even more time (years) before their results fully materialize and an objective assessment can be conducted. This is why such data (e.g., degree of vertical integration, brand ranking) are by nature of low frequency and mostly annual. Basically, if we were to run a VAR model using a single brand, then a case to variable ratio of 5:1 would require 315 years of data (3 endogenous variables with 5 lags each, plus 6 control variables, multiplied by 3 equations i.e. 63 coefficients to be estimated). Even if we run the model only with two variables, using two lags, and two controls only, that would still require 120 years of data. Even if we assume that such decisions are taken quarterly, and we have quarterly data, that would still require more than thirty years of data to run a brand-specific VAR. This is where a Bayesian Panel VAR helps in overcoming the problems of overparameterization and the short nature of most strategic variables panels (Chakravarty & Grewal, 2011).

2.8. *DISCUSSION*

In our endeavor to calibrate the impact of brand equity on channel governance, we drew on the theory of self-enforcing contracts from new institutional economics, the marketing strategy and brand equity literatures, and marketing's extensions of transaction cost theory (primarily the alternative governance mechanisms literature e.g., Rindfleisch and Heide, 1997). Then, we advanced a theoretical view that contrasts with the prevalent view in extant research,

which observed the relationship from a pure economic organization perspective. To provide empirical evidence for our view while overcoming the methodological limitations of earlier research, we employed a Bayesian Panel Vector Autoregressive (BPVARX) model. Our results reveal a direct, powerful but lagging impact for brand equity on channel governance such that higher brand equity leads to (Granger-causes) a less hierarchical channel governance structure (lower levels of downstream vertical integration).

2.8.1. Theoretical Contributions

In this study, which to the best of our knowledge is the first study in marketing that examines how brand equity influences channel structure, we investigated the impact of brand equity on channel governance. In so doing, we scratched the surface of an important relationship that is recognized by both practitioners and scholars (e.g., “brand equity influences governance directly” – Ghosh and John, 1999, p.140), but yet not sufficiently researched in marketing. In responding to this research need, we contribute to the advancement of marketing theory in a number of ways. First, we extend the brand equity literature by identifying a new strategic role for brand equity that goes beyond customers, competitors, employees, and shareholders to reach channel partners. Brand equity is a vital asset that helps the firm in governing its channel by curbing downstream members’ opportunism through contractual self-enforcement. Second, we contribute to the channel governance literature by proposing brand equity as an additional alternative governance mechanism that enables the firm to govern its channel without the need for extensive downstream vertical integration. This points to the important role brand equity plays in channel coordination and governance. Third, we contribute to an under-researched stream in marketing strategy that is concerned with understanding the interactions among

marketing mix elements. Most marketing strategy research focuses on a particular element of the marketing mix such as channel, brand, or pricing (Srinivasan, 2006). But, in reality, firms craft their marketing strategy as an intertwined whole and consider synergies, tradeoffs, and interdependencies among marketing mix elements (Capon, Farley, & Hoenig, 1990; Gatignon & Hanssens, 1987). Hence, exploring such interactions and interdependencies is crucial for both scholarship and practice. In this spirit, we add to this growing stream of research (e.g., Gatignon & Hanssens, 1987; Srinivasan, 2006; Yoo, Donthu, & Lee, 2000) by probing into one of the aspects of the dynamic association between brand and distribution. Finally, our modeling approach, which is new to the channels literature, offers many methodological advantages and presents a practical example of how sophisticated, dynamic research methods can assist in overcoming some of the limitations of previous research (see Table 2.2), and therefore provide deeper, richer, and more discerning insights into a number of phenomena.

2.8.2. Managerial Implications

On the managerial front, our study offers a number of valuable insights that assist senior executives in their strategic decision making, especially in terms of capital allocation to competing marketing investments (see Appendix A – Table A.4) . First, marketing managers are often faced with the challenge of justifying marketing investments to the board of directors and other stakeholders. When it comes to investments in brand equity, it becomes even more challenging due to the intangibility and the long-term nature of the beneficial outcomes of such investments. In this study, we put in the hands of the marketing manager empirical evidence that aids her in selling brand building initiatives to the board of directors by arguing that investments in brand equity could enhance channel performance. By strengthening its brand equity, a firm

increases its influence on its downstream channel members which, in turn, improves channel coordination and subsequently boosts the firm's financial performance. Second, in line with a substantial body of scholarly work in marketing, we advise against unnecessary vertical integration especially in situations where the firm enjoys a moderate to high level of brand equity. Whereas the temptation of control might compel some managers to pursue vertical integration, it is a costly, risky investment that demands large resource commitments that often outweigh the foreseeable gains of such a venture (Hitt, Harrison, & Ireland, 2001, p.3).

Therefore, it should only be considered in situations of low or unstable brand equity and only after exhaustive scrutiny. As evidenced in this study, as brand equity increases firms lean more on their brands to curb downstream members' opportunism, and hence reduce the need for extensive involvement in direct distribution. Finally, when contemplating two marketing investment decisions (one in forward vertical integration and the other in boosting brand equity), senior executives should note that investments in brand equity may offer a lower risk/reward ratio and a better hedge against uncertainty because of their nature as *dual investments* directly in the brand and indirectly in the channel. By investing in the brand, the firm reduces the need for investing in forward vertical integration because, as we have just theorized and empirically assessed in this study, brand equity functions as an alternative governance mechanism that enables the firm to govern its channel through contractual self-enforcement.

2.8.3. *Limitations and Research Directions*

In this study, we strived to overcome the theoretical and methodological limitations of existing research on the topic. Notwithstanding that, our work has several limitations that offer opportunities for future research. First, despite the broadness of our context and its adequacy to

the research question, and our reliance on well-established measures from the literature, the generalizability of our results could be further enhanced through the convergence of findings from other studies using alternative measures in different contexts. Hence, future research could examine the robustness of our results to different contexts and measures. Second, regarding causality, as Granger himself cautioned, predictive causation is not natural causation (Granger, 2004), and an investigation of natural causality requires experimental research designs (Shadish, Cook, & Campbell, 2002). Therefore, despite our detection of empirical evidence about the presence of predictive causality, a contention that higher brand equity causes less hierarchical channel governance could be overstated due to the non-experimental setting of our research. Third, due to data restrictions and because the focus of this study is to establish the causal impact of brand equity on channel governance, we do not test the underlying process by which higher brand equity leads to lower levels of downstream vertical integration. Moreover, doing so would require measuring concepts such as replaceability, opportunity cost of opportunism, degree of self-enforceability, incentives, and opportunistic behavior. Such constructs lend themselves naturally to survey data and cannot be easily captured using the data sources at hand. Fourth, we do not control for some relevant factors such as environmental uncertainty - a common element in many channel governance models. Future research may apply different measurements, use alternative contexts, test some of the links in the underlying process, control for some of the factors that we could not control for, and perhaps apply experimental designs to validate the consistency of our results. In addition to that, future research could examine whether the same effect holds for backward vertical integration, especially since there is considerable anecdotal evidence that retailers such as Walmart and Amazon rely on their brand equity to govern their supply chain without the need to buy their suppliers. Fifth, both brand equity and channel

governance are complex, multidimensional constructs and the relationship between them may be more complex. Future research can delve into the nuances of this relationship by examining moderators and mediators of this relationship, as well as how different dimensions of brand equity influence channel governance. Finally, as we have explained earlier, the effect of brand equity on various aspects of distribution strategy is a much underresearched topic in marketing. Hence, future research is urged to delve into this research area and explore other facets of how brand equity influences distribution strategy.

2.8.4. Conclusion

We conclude that brand equity has a powerful, direct but lagging impact on channel governance, in that higher brand equity leads to a less hierarchical channel governance structure (lower levels of forward vertical integration). Brand equity functions as an alternative governance mechanism that enables the firm to safeguard itself against downstream channel members' opportunism, and hence diffuses pressures for more vertical integration into distribution. In general, as firms accumulate brand equity they rely more on indirect distribution to facilitate the appropriation of due economic rents while leaning on their brands to effectively govern their channels without the need for deep involvement in direct distribution. Therefore, senior executives should be aware that investments in brand equity are dual investments directly in the brand and indirectly in the channel. This may make their risk/reward ratio superior to many other investment alternatives, especially investments in acquiring downstream channel members. We hope that this effort provides valuable, actionable insights to practice and motivates further academic research on the topic.

3. Gray is Good? The Effect of Gray Market Combating on Financial Performance and the Role of Brand Equity

3.1. *ABSTRACT*

Gray marketing or the unauthorized distribution of genuine, branded products is a controversial business phenomenon. Despite its massive scale and extensive scope, and despite existing for decades, our understanding of this phenomenon remains incomplete due to the scarcity of empirical research on the topic. To attend to this research imperative and to inform practice, we explore the impact of gray market combating on manufacturers' financial performance. We advance a conceptual framework that demonstrates how gray market combating affects financial performance and the contingencies and factors that govern this effect. To empirically test our framework, we examine the gray market combating behavior of more than 3,000 public firms over two decades. Our results reveal that gray market combating, on average, has a negative bearing on financial performance. However, there are significant variations in this effect depending on a number of contingencies and factors such as brand equity, profitability, sales growth, innovation, and some attributes of the combating action (target and nature of action). Our results point to a crucial role for brand equity in this equation: firms with higher brand equity are not only more likely to engage in gray market combating, but also less susceptible to the negative financial consequences of doing so. Our findings contribute to several research streams (gray market theory, channel management literature, brand theory, marketing-finance interface research) and provide a number of valuable insights for managers and policymakers.

Keywords: gray market, parallel importation, brand equity, distribution channel management, unauthorized distribution, event study.

"One of the themes of the conference will be around profitable growth and one of the things that influences our collective profitability is grey. It's a huge issue. We've really ramped up in terms of the teams that are focused on brand protection."

*John Ansell, Channel Director, HP
(Computer Reseller News, 2014)*

"That sort of business just makes figures, shows sales, but it hurts the brand and its image."

*Rose Marie Bravo, CEO, Burberry
(Forbes, 2000)*

3.2. INTRODUCTION

Gray marketing, aka product diversion or parallel importation, is the selling of genuine, branded products through unauthorized distribution channels (Bucklin, 1993; Duhan & Sheffet, 1988). It is a pervasive business phenomenon that spans several sectors and transpires all around the world. Its scope extends from luxury goods, to technology products, to automobiles, to drugs, to apparel, to industrial equipment, to published material, and to basic consumer goods (see Table 3.1 for relevant examples). Its scale is huge and has always been so: the size of luxury fashion gray market was assessed at 5-10% percent of total sales (Shannon, 2018); the international gray market for watches was estimated at around one billion dollar (Shannon, 2017); gray exports at a certain stage accounted for one tenth of Europe's medicine trade (Jack, 2010); Gartner estimated the cell phone grey market, in 2009,

at 145 million phones (Reuters, 2010); more than 54 per cent of Canon’s SLR camera sales in India were gray imports (New Indian Express, 2009); Deloitte estimated the US consumer products gray market at \$63 billion per year (Wolf, 2009a); and KPMG estimated the information technology gray market in the US at \$58 billion a year (KPMG, 2008).

Table 3.1: The Scope of Gray Markets

Sector	Example	Source
Luxury Goods	Parallel exports of LVMH bags, watches, and champagnes between Asia and Europe.	Retail Jeweller, Factiva, 25 October 2001; The Age, Factiva, 26 November 2012.
Technology Products	Parallel importation of Cisco and Hewlett Packard hardware into Europe.	Computer Reseller News, Factiva, 3 November 2015; MicroScope, Factiva, 12 December 2005.
Automobiles	Gray importation of Canadian Ford and Mercedes Benz cars into the US.	Dow Jones Business News, Factiva, 30 May 2002.
Drugs	Parallel importation of Abbott diabetes test strips from international markets into the US, parallel exportation of Pfizer and Merck drugs from Greece into other EU countries.	New York Law Journal, Factiva, 4 November 2016; IHS Global Insight Daily Analysis, Factiva, 15 April 2016.
Apparel	Gray market Levis jeans and Ralph Lauren polo shirts sold in the UK.	The Times, Factiva, 14 December 1998.
Industrial Equipment	Parallel importation of European made Deere agricultural machines into the US.	Business Wire, Factiva, 16 January 2004.
Published Material	Gray marketing of foreign editions of Wiley’s and Pearson’s textbooks in the US.	Associated Press Newswires, Factiva, 16 August 2011.
Consumer Goods	Unauthorized importation of foreign-made Coke and Pepsi beverages into the US, selling of gray imported Energizer batteries in the US and Australia, parallel importation of the British version of Cadbury chocolate into the US, distribution of gray market Marlboro cigarettes made for overseas markets in the US, parallel importation of Unilever personal care products into the UK.	Dow Jones News Service, Factiva, 18 January 2001; The Independent, Factiva, 27 January 2015; Dow Jones News Service, Factiva, 8 July 1999; The Grocer, Factiva, 11 April 2009.

Despite being around for decades, and notwithstanding the considerable amount of attention it received from scholars, practitioners, and legislators, gray markets remain a highly controversial commercial phenomenon that puzzles researchers, managers, and lawmakers alike. On one hand, numerous industry reports underscore the acute financial toll it has on affected firms (Computer Reseller News, 2004; Marcelo, 2003; Kodak, 2010), the industry (KPMG, 2008; Wolf, 2009_a), and even the economy as a whole (e.g., Maltz, 1976). On the other hand, both business press and academic literature repeatedly emphasize that most firms intentionally turn a blind eye to the gray market, “frequently choose to tolerate violations” (Bergen, Heide, & Dutta, 1998), “ignore the parallel importers” (Ahmadi, Irvani, & Mamani, 2015), “look the other way on gray-market goods” (Chu, 2014), are “encouraging gray market activities without officially authorizing it” (Shao, Krishnan, & McCormick, 2016), and even are “willing participants” in such activity (Coughlan & Soberman, 1998). Furthermore, lawmakers, in many parts of the world, developed and developing, have often chosen to legalize gray marketing (Autrey, Bova, & Soberman, 2014; Lim, Lee, & Tan, 2001; Kelly, 2018) or at most adopt a mixed policy (Bucklin, 1993; Cross, Stephans, & Benjamin, 1990) toward it.

This paradox can be attributed to two main intertwined causes: (1) the ambiguity of the net financial effect of gray markets i.e. whether the rewards of gray markets outweigh their risks, and (2) the lack of scientific evidence on the financial efficacy of combating the gray market i.e. whether the benefits of combating gray market activity outweigh the costs. Unsurprisingly, this poor understanding of the net effect of gray markets or the financial efficacy of combating them translated into a plethora of strategies for dealing with the gray market phenomenon. In this regard, some researchers call for deterring gray market activity

and eradicating it (e.g., Antia et al., 2006; Cavusgil & Sikora, 1987; Howell et al., 1986; Myers & Griffith, 2000). Others recommend a selective enforcement approach that tolerates a certain level of gray market activity (e.g., Dutta, Bergen, & John, 1994; Bergen, Heide, & Dutta, 1998). Others argue for intentionally ignoring the gray market (Ahmadi & Yang, 2000; Lim, Lee, & Tan, 2001; Hu, Pavlin, & Shi, 2013; Bucklin, 1993) or even learning to live with it (Tsay & Agrawal, 2004; Su & Mukhopadhyay, 2012; Altug, 2017). Others suggest encouraging gray market activity (Shao, Krishnan, & McCormick, 2016; Coughlan & Soberman, 1998). Another group of researchers emphasize that many manufacturers willingly participate in this activity and present arguments that validate such behavior (Weigand, 1991; Ahmadi & Yang 2000; Antia, Bergen, & Dutta, 2004; Lim, Lee, & Tan, 2001).

Therefore, an objective, scientific assessment of: (a) the net impact of gray markets on firm performance or (b) the financial efficacy of gray market combating is imperative for guiding practice and for the advancement of scholarship in this area. Indeed, after more than three decades of interdisciplinary scholarly research on gray markets, we still do not have any solid empirical evidence on the net effect of gray markets or on the financial efficacy of combating them (see Table 3.2 for an overview of existing empirical research on gray markets).

Recent technological and business developments such as the rise of powerful electronic marketplaces (e.g., Amazon, eBay, Alibaba) and the proliferation of social commerce (through such platforms as Facebook, Instagram, and Twitter) have added more complexity and relevance to the gray market issue and brought it to the fore. “With online sales representing more than 20% of sales in most physical good categories and the ability to

buy unauthorized goods from anywhere in the world, the gray market is more present than ever.” (Forbes, 2019). This amplifies the need for more conclusive scientific findings, especially with the ongoing regulatory debate about protectionism, trade barriers, and Section 230 of the Communications Decency Act, which if overturned will mandate online marketplaces to conduct more policing of gray products.

Against this backdrop, we explore the impact of gray market combating on manufacturers’ financial performance and the role that brand equity plays in this relationship. In doing so, we address the following three research questions: RQ (1): Are firms with stronger brand equity more likely to engage in gray market combating to protect their brands? RQ (2): What is the effect of gray market combating on manufacturers’ financial performance? RQ (3): What are the factors and contingencies that govern this effect?

Apparently, the main reason behind the lack of empirical research on the impact of gray market combating on financial performance is the unavailability or inaccessibility of relevant data. In general, this tends to be the foremost challenge for empirical work in the gray market area as a whole. Many researchers (Myers & Griffith, 2000; Yeung, Mok, 2013; Ahmadi & Yang, 2000) in this domain have frequently underlined that. Bucklin (1993) states that “because of the sensitivity of gray market activities, evidence of harm ... is difficult to verify” and hence, the majority of research in this domain “turns to a modeling approach.” This is clearly evident in our comprehensive review of academic research on the gray market topic, which reveals that more than 85% of research in this area is either conceptual, qualitative, or analytical with only eight empirical studies that rely mostly on survey/experimental data.

Table 3.2: Summary of Existing Empirical Research on Gray Markets

Study	Empirical Context	Data Description	Firms Under Study	Time Horizon of Study	Data Type	Dependent Variable	Method	Research Stream	Research Question	Key Findings
Bergen, Heide, & Dutta (1998)	US industrial machinery & electric equipment industries	Mail survey answered by key informant	37	1 year	Primary	Percentage of sales to the gray market that lead to the termination of an authorized dealer	Regression analysis	Living with the gray market	What factors determine a firm's decision whether to tolerate or enforce in response to a gray market incident?	Importance of dealer services and presence of dual distribution reduce level of tolerance. Difficulty of violation detection increases level of tolerance.
Myers (1999)	US manufacturing exporters	Mail survey answered by key informant	404	1 year	Primary	Manager response on a 7-point Likert scale about degree of gray market activity and impact on performance	Ordered logit, MANOVA	Drivers and risks of gray markets	What factors facilitate gray market activity? What is the impact of gray market on export performance?	Vertical integration, decision making centralization, and product standardization are associated with lower gray market activity. Gray markets affect the strategic but not the economic performance of firms.
Myers & Griffith (2000)	US manufacturing exporters	Mail survey answered by key informant	404	1 year	Primary	Manager response on a 7-point Likert scale about degree of gray market activity	Regression analysis	Drivers of gray markets	What factors facilitate gray market activity?	A firm's commitment to a market reduces gray market activity in it. Firm size increases gray market activity.
Iqbal & Feick (2002)	Experiment, MBA students	Scenario-based experimental data	67	1 year	Primary	Perception about the gray market (favorable vs. not) using Likert scales	ANOVA	Living with the gray market	What factors influence sales managers' perception of gray markets?	A regional sales manager perception of the favorability of gray market activity depends on the direction of this activity, his incentive scheme, and offender's channel power.

Antia et al. (2006)	US manufacturers of personal care products; experiment MBA students	Mail survey by key informant; Scenario-based experiment	104	2 years	Primary	Dummy indicating whether gray market activity occurred or not.	Logit, analysis of variance	Combating gray markets, drivers of gray markets	Is enforcement severity sufficient to deter gray market activity?	Severity of enforcement alone does not deter gray market activity but rather the interaction between severity, speed, and certainty of action.
Chen (2007)	Experiment, undergraduate students	Scenario-based experimental data	200	1 year	Primary	Student response on 7-point scale about his brand perception.	ANOVA	Positive side of gray markets	Which channel (gray or authorized) impacts brand equity more?	Authorized channel products have a stronger effect on brand equity than do gray-market products.
Huang, Lee, Hsiao (2008)	Experiment, undergraduate students	Scenario-based experimental data	236	1 year	Primary	Student response on 7-point scale about his brand perception.	Structural equation modeling	Negative side of gray markets	How gray markets affect brand equity?	Gray markets negatively impact brand loyalty.
Zhao, Zhao, Deng (2016)	China. Online shopping platform. Single brand of bags	Weekly data for 6 months per bag model extracted using a web crawler	one	Less than 1 year	Secondary	Number of gray sellers on the platform, number of purchase transactions	Count regression models	Drivers of gray markets	What factors increase gray market activity?	Price differentials, product popularity, and product availability through authorized channels increase gray market activity.
<i>This study</i>	<i>S&P 1500 Constituents (multiple industries)</i>	<i>Press reports and releases, historical stock prices, companies' financials, and annual reports (for more details see Table 4)</i>	<i>3,164</i>	<i>20 years</i>	<i>Secondary</i>	<i>Cumulative abnormal stock returns; dummy indicating the announcement of an anti-gray market action</i>	<i>Probit, Event study, Multiple regression</i>	<i>Combating the gray market</i>	<i>What is the effect of gray market combating on financial performance? What factors govern this effect? What role does brand equity play in this relationship?</i>	<i>On Average, gray market combating has a negative effect on financial performance. Firms with higher brand equity are more likely to engage in gray market combating and less-susceptible to its negative financial consequences. Other factors (e.g., profitability, sales growth) also moderate this effect.</i>

In this paper, we adopt a novel empirical approach to overcome the aforementioned data challenges. For doing so, we turn to the stock market to disentangle the impact of gray market combating on the firm's financial performance, from a shareholder perspective. As per the efficient market hypothesis, the stock market reflects the collective rationality of all market participants. Hence, it serves as an authoritative and rational, risk- and time-discounting mechanism that measures the financial implications of firms' actions from a forward-looking perspective (more details on the merits of this approach are presented in the next paragraph). Using event study method, we examine stock market reaction to the announcement of anti-gray market initiatives by public firms over a period of two decades. In the absence of any reliable accounting-based or customer-based data, the financial approach is perhaps the only feasible approach for conducting an objective assessment of the effect of gray market combating on financial performance.

In doing so, we depart from extant research in a number of ways. First, to the best of our knowledge, this is the first scientific study that empirically explores the financial impact of gray market combating on any member of the supply chain. Second, unlike the majority of existing gray market research, which relies mostly on subjective, survey-based measures of firm or product performance, we use stock returns as a measure of firm performance. Stock returns are widely recognized as an objective, reliable, and forward-looking measure of firm performance (Hibbard, Kacker, & Sadeh, 2017) because they “integrate multiple performance dimensions (sales, cash flow)” (Fang, Palmatier, & Grewal, 2011), are less susceptible to manipulation by managers than other performance measures (Srivastava, Shervani, & Fahey 1998), provide better valuation of intangible assets (Katsikeas et al., 2016), “combine the best of perceptual and factual operational performance measures”

(Hibbard, Kacker, & Sadeh, 2017), and hence are more effective than their backward-looking/perceptual counterparts in assessing the performance implications of firm actions (Gielens & Geyskens, 2012). Third, this is the first empirical study in the gray market literature that relies on archival, firm-level data rather than survey, experiment, or product-level data. Fourth, to date, this is by far the largest study in the gray market literature, in terms of the number and scope of companies under investigation, as well as the period of investigation. Fifth, this is the first empirical study that explores the role of brand equity, the central element in the gray marketing story, in the relationship between gray market combating and firm performance. At the end of the day, the core concern in the entire gray market story is brand equity and this is exactly why tackling gray market activity is considered a brand protection task that is often handled by the brand protection department/team, at many leading organizations such as Cisco Systems (Cisco, 2019, Brand Protection and Partnership Integrity Section), Hewlett Packard (McGrath, 2016), and Kodak (Kodak, 2010). Table 3.2 presents a summary of existing empirical research on the gray market phenomenon and illustrates how this study departs from extant research on several dimensions.

Theoretically, we draw on gray market theory and channel management literature (as well as relevant literature in marketing strategy) and develop a conceptual framework that illustrates how gray market combating affects financial performance, and what factors and contingencies govern that effect. Empirically, we test this framework and related hypotheses by examining the gray market combating behavior, along with the consequential financial implications, for a sample of 3,164 public firms, over a period of 20 years. Our results suggest that: (a) on average, gray market combating has a negative effect on the firm's

financial performance, (b) firms with higher brand equity are more likely to engage in gray market combating and are less-susceptible to the consequential, negative financial implications, and (c) several factors (e.g., profitability, sales growth, brand equity, target of combating action, nature of combating action) have a bearing on the relationship between gray market combating and financial performance. These results are robust to a battery of robustness checks and model specifications.

This study contributes to the advancement of marketing theory in a number of ways. First, we contribute to the gray market literature by documenting the first empirical evidence on the financial efficacy of gray market combating and the factors that determine this efficacy. Besides, whereas we do not directly examine or test for the net effect of gray markets on firm performance, our results may serve as an initial empirical indication in favor of the positive view on gray markets and their net effect on firm performance. These findings are of considerable relevance to researchers in adjacent disciplines as well due to the interdisciplinary nature of the gray market literature, which spans different disciplines (e.g., marketing, operations management, international business, economics, and accounting). Second, we extend the brand equity literature by identifying a new role for brand equity – a role in distribution channel management. Brand equity is not only an important driver of certain channel management strategies (e.g., gray market combating), but also a major determinant of the financial consequences of such strategies. Third, from a broader marketing strategy perspective, gray marketing is an authentic business phenomenon that occurs at the *brand-channel interface*. Indeed, it is a channel management concern that is often handled by the brand protection department/team at many leading organizations. By investigating the impact of gray market combating on firm performance, and the focal role brand equity plays

in this relationship, we contribute to the marketing interactions literature -- a literature stream that focuses on studying the interactions among different elements of marketing strategy such as brand, channel, and price (Gatignon & Hanssens, 1987; Srinivasan, 2006; Yoo, Donthu, & Lee, 2000). Fourth, we contribute to the marketing-finance interface and distribution channels literatures by examining stock market reaction to the announcement of a channel management initiative -- gray market combating. Finally, on the method front, we contribute to the ongoing debate on certain aspects of the application of event study method in marketing. In addition to its theoretic and methodological contributions, this study provides valuable, actionable insights to managers and policymakers.

This article is organized as follows. First, we review the gray market literature and illustrate the positioning of our contribution within that literature. Second, we discuss our conceptual framework, its theoretical underpinnings, and the relevant hypotheses. Then, we describe our data, measures, and econometric models. Next, we present our results and robustness analyses. Afterwards, we illuminate on the theoretical contributions and managerial and policymaking implications of our research. Finally, we wrap up with a discussion of the limitations of our work and suggest avenues for future research.

3.3. *LITERATURE REVIEW*

The gray market literature can be organized under five main research streams. First, a stream that enquires into the presence and drivers of the gray market phenomenon. Research in this domain has identified a number of factors that lead to the formation of gray markets such as price differentials (Chaudhry & Walsh, 1995; Cespedes, Corey, & Rangan, 1988; Duhan & Sheffet, 1988; Zhao, Zhao, & Deng, 2016), product popularity (Zhao, Zhao, & Deng, 2016),

product availability through authorized channels (Duhan & Sheffet, 1988; Yeung & Mok, 2013; Zhao, Zhao, & Deng, 2016), quantity discounts (Cespedes, Corey, & Rangan, 1988; Duhan & Sheffet, 1988; Shulman, 2013), manufacturer's production and marketing strategy (Myers, 1999; Myers & Griffith, 2000; Yeung & Mok, 2013), difference in product specifications (Yeung & Mok, 2013), unmet demand (Duhan & Sheffet, 1988; Lim, Lee, & Tan, 2001), and excess inventory (Cespedes, Corey, & Rangan, 1988; Dasu, Ahmadi, & Carr, 2012).

Second, a stream that investigates the problems and risks associated with gray markets. Research in this stream have identified a number of negative effects for gray market activity such as demand cannibalization (Altug, 2017; Myers & Griffith, 1999; Myers, 1999), damage to channel equity (Antia, Bergen, & Dutta, 2004; Myers & Griffith, 1999; Cespedes, Corey, & Rangan, 1988), undermining of pricing policy (Antia, Bergen, & Dutta, 2004; Myers, 1999), dilution of brand equity (Myers & Griffith, 1999; Duhan & Sheffet, 1988; Myers, 1999), legal liabilities (Myers & Griffith, 1999; Antia, Bergen, & Dutta, 2004), and poor customer service (Myers & Griffith, 1999).

Third, a stream that explores the positive side of gray markets. Gray market activity can benefit the firm in a number of ways such as: excess inventory correction (Altug, 2017; Hu, Pavlin, & Shi, 2013), serving a price-sensitive market segment that otherwise will be lost (Shao, Krishnan, & McCormick, 2016; Xiao, Palekar, & Liu, 2011; Antia, Bergen, & Dutta, 2004), new market penetration (Autrey, Bova, & Soberman, 2015; Lim, Lee, & Tan, 2001), sales growth (Xiao, Palekar, & Liu, 2011; Antia, Bergen, & Dutta, 2004; Duhan & Sheffet, 1988), and profitability enhancement via price discrimination (Ahmadi & Yang 2000; Coughlan & Soberman, 1998; Duhan & Sheffet, 1988).

Fourth, a line of research that assumes that gray markets will never disappear and firms need to learn how to live with them. Hence, the focus of this research stream is on finding mechanisms for effective channel coordination in the presence of gray markets. Researchers in this stream suggest a number of mechanisms such as: formulating pricing policy with the anticipation that consumers and resellers have access to gray markets (Hu, Pavlin, & Shi, 2013; Altug, 2017), selective enforcement that tolerates a certain level/type of gray market activity (Dutta, Bergen, & John, 1994; Iqbal & Feick, 2002), and certain forms of wholesale pricing contracts (Altug, 2017).

Finally, a research stream that explores strategies and mechanisms for combating gray market activity. Earlier research in this stream in the 1980's and 1990's (e.g., Howell et al., 1986; Duhan & Sheffet, 1988; Cespedes, Corey, & Rangan, 1988; Weigand, 1989, 1991; Myers & Griffith, 1999) focused on conceptualizing various anti-gray market mechanisms (e.g., legal action, raising consumer awareness on the dangers of gray market products, removing pricing differentials, converting gray sellers into authorized dealers, involved dealer termination, product tracking, and channel surveillance) and examining the effectiveness of these mechanisms. Cavusgil and Sikora (1987) provide an exhaustive discussion of these anti-gray market strategies, classify them under proactive or reactive, and explain the financial costs, difficulty of implementation, risks, and effectiveness (in long-run and short-run) of each strategy. The next wave of research in this stream, in the early 2000's, sought to empirically test the effectiveness of those mechanisms in reducing gray market activity (Huang, Lee, & Hsiao, 2008, Antia et al., 2006). Recent research in this stream uses analytical models to show how certain mechanisms can mitigate the gray market problem without the need to target the gray seller, the product diverter (rogue distributor or dealer), or the consumer. These mechanisms include revenue-

sharing contracts (Su, Mukhopadhyay, 2012), uniform/strategic pricing (Ahmadi, Iravani, & Mamani, 2015), buyback contracts and multiple replenishments (Dasu, Ahmadi, & Carr, 2012), transfer price increase (Autrey & Bova, 2011), and pricing decision decentralization or centralization (Autrey, Bova, & Soberman, 2014). Our study extends this line of research by addressing some of the focal unanswered questions in the gray market literature such as: the effect of gray market combating on the firm's financial performance, the factors that govern this effect, and the role of brand equity in this equation.

A general distinctive feature of the gray market literature is the scarcity of empirical research where “most work on gray markets has been descriptive in nature, with little predictive research” (Myers & Griffith, 2000) due to the scarcity and inaccessibility of relevant data. Data on gray markets are difficult to obtain because: (1) “trademark owners and gray market operators alike are understandably unwilling to part with sensitive information about international sales, prices, gray market sources, and profits.” (Bucklin, 1993), (2) “trade statistics does not distinguish between authorized and unauthorized intermediaries.” (Yeung, Mok, 2013), (3) “the secret nature of channel leakage on the dealer's side and the manufacturer's reluctance to disclose the problem for fear of tarnishing brand image.” (Ahmadi & Yang, 2000), (4) the nature of gray market activity where both parties to the transaction are benefiting which makes reporting rate and scope very slim, and (5) the undisclosed participation by many manufacturers and their channel intermediaries in the gray market. Our comprehensive review of gray market literature, over the past three decades, documents only eight empirical studies that rely mostly on survey and experimental data. This underscores the pressing need for more empirical work on gray markets to enhance our understanding of this interesting phenomenon. In Table 3.2, we present a summary of existing empirical evidence on the gray market phenomenon, along with an

illustration of how this study departs from extant research, addresses some focal unanswered questions, and significantly advances knowledge in that domain.

3.4. *CONCEPTUAL FRAMEWORK AND HYPOTHESES*

In this section, we discuss our conceptual model, the related hypotheses, and their theoretical underpinnings.

3.4.1. *Brand Protection as a Major Motive for Gray Market Combating*

One of the main arguments for combating gray markets is brand protection. Gray markets can lead to the erosion of brand equity in many ways. First, gray market activity harms brand equity “by making products available to segments that manufacturers deliberately avoid” (Ahmadi, Iravani, & Mamani, 2017) which undermines brand positioning and image. Second, gray marketing weakens brand esteem, especially for status and luxury products, due to product placement in “an incompatible retail environment” (Eagle et al., 2003) and selling at discounted and inconsistent prices (Cavusgil & Sikora, 1987). This leads to unintended brand associations and a distortion of the brand image that the manufacturer invested years and substantial resources in building. Third, when consumers buy gray market goods they do not often receive the associated pre- and post- sales services designed by the manufacturer (Duhan & Sheffet, 1988; Myers & Griffith, 2000), such as product demonstration/trial, periodic maintenance, and quality guarantee/warranty, which an authorized dealer is typically mandated and trained to provide. This reduces the perceived quality of the brand and dents its image. In addition to these

theoretical arguments, the gray market literature provides some empirical evidence on the detrimental impact of gray markets on brand equity. From an experimental study on a sample of 236 undergraduate students and using structural equation modeling, Huang, Lee, and Hsiao (2008) document evidence that gray market goods negatively influence brand trust and subsequently brand loyalty. In the same vein and from another experiment, Chen (2007) reports that the main dimension of brand equity that is affected by gray marketing is the brand's perceived quality. In light of these serious threats, it is logically expected that firms with higher brand equity be more inclined to battle gray market activity to limit the unauthorized distribution of their products and the consequent adverse effects on their brands. Perhaps, the most obvious evidence on the fundamental role brand equity plays in stimulating firms to battle gray market activity is the fact that in many leading organizations (e.g., Cisco Systems, Hewlett Packard, Kodak) the responsibility for gray market combating is assigned to the brand protection team. Therefore, we hypothesize as follows:

H₁: Firms with higher brand equity are more likely to engage in gray market combating.

3.4.2. The Effect of Gray Market Combating on Financial Performance

Understanding the effect of gray market combating on financial performance entails answering two interrelated questions. First, a question about the effect of the gray market itself on financial performance i.e. does gray market activity boost or hurt the firm's financial performance? Second, a subsequent question about the financial efficacy of combating gray market activity i.e. do the benefits of battling the gray market outweigh the costs?

Regarding the first question, “as to benefit and harm, opinions about gray markets are mixed” (Ahmadi, Iravani, & Mamani, 2015) where some scholars view the gray market as a blessing and others view it as a curse. In what follows we provide a detailed discussion of these two opposing views.

The case against gray markets. Gray market theorists identified a number of ways through which gray market activity can adversely affect firm performance. First, as discussed earlier, product availability through unauthorized gray market channels can damage brand loyalty and dilute brand equity (Duhan & Sheffet, 1988; Huang, Lee, & Hsiao, 2008; Myers, 1999). Second, gray marketing complicates pricing decisions (Myers, 1999) and weakens manufacturers’ control over prices (Cespedes, Corey, & Rangan, 1988) which undermines manufacturers’ pricing policy, puts them under the mercy of powerful retailers, and consequently hurts their profit margins. For instance, in the late 1990s, British retailer Asda accused top perfume makers of setting “artificially high prices” and in response to that it imported \$3 million worth of perfumes from the US and Europe, through the gray market, and sold them to UK consumers at highly discounted prices (The Guardian, 1998). Similarly and in the same year, its main competitor, Tesco, declared a battle on a group of the world’s largest brands such as Sony, Nike, Levis, and Adidas and challenged their “outrageous prices” by importing large amount of stock, including tens of thousands of Sony’s PlayStations, from the gray market and selling them to UK customers at discounted prices (Millar, 1998). Third, gray market activity leads to the erosion of channel equity by antagonizing authorized sellers and making them “feel betrayed, vulnerable, and frustrated” (Eagle et al., 2003). This weakens their commitment to the business relationship, shakes their trust in the brand, discourages them from further investing in the channel (Hibbard, Kumar, & Stern, 2001; Kim, Hibbard, & Swain, 2011), and consequently

leads to “a loss of strength within the channel.” (Duhan & Sheffet, 1988). Fourth, gray marketing causes demand cannibalization due to intra-brand competition between authorized and unauthorized channels which may have an undesirable effect on profitability. Fifth, gray market activity decreases product traceability and reduces the quality of sales forecasts due to reliance on poor sales data (Myers, 1999). Finally, gray marketing may result in legal liabilities for the manufacturer (Antia, Bergen, & Dutta, 2004) because “unauthorized imports are often not made to the import markets' safety or local content specifications” (Myers, 1999). In light of these serious concerns, several scholars (e.g., Antia et al., 2006; Assmus & Wiese, 1995; Weigand, 1991; Cespedes, Corey, & Rangan, 1988; and Cavusgil & Sikora, 1987) adopted a negative view of gray markets arguing that “the problems associated with this activity tend to outweigh its benefits” (Myers & Griffith, 2000). Anecdotal evidence from different industries provides further validation for this view. For instance, a senior executive from Hewlett Packard stated that, “HP took a roughly \$250 million hit to its bottom line in fiscal 2002 because of gray-market activity.” (Computer Reseller News, 2004). On a larger scale, industry reports estimate the loss in profit due to gray market activity at around \$2.5 billion in the European pharmaceutical sector alone (Kanter, 2006) and \$5 billion in the information technology sector (Reuters, 2006).

The case for gray markets. In contrast with the aforementioned negative view, a larger body of academic research adopts a very positive position on the gray market and its effect. Proponents of this view underline a number of benefits for gray market activity. First, gray markets help in inventory correction by sourcing excess inventory to gray market channels (Altug, 2017; Antia, Bergen, & Dutta, 2004; Hu, Pavlin, & Shi, 2013). Second, it leads to sales growth by reaching a price-sensitive, service-insensitive market segment that otherwise would have been lost (Duhan & Sheffet, 1988). Yeung and Mok (2013) suggest that gray markets

function as “supplemental channels for exploring untapped markets that authorized dealers are unable to or find too costly to access.” Coughlan and Soberman (1998) argue that “authorized retailers prefer a channel that includes gray marketing to one with only authorized retailing” because “gray markets have the potential to siphon (or leak) price sensitive customers out of the authorized market, giving authorized channels the opportunity to provide more service and charge higher price to those who remain.” Lim, Lee, and Tan (2001) echo similar insights and provide evidence from case studies on the same idea stating that authorized dealers find it strategically optimal to accommodate gray marketers when the authorized dealer’s marketing strategy is target marketing (rather than mass marketing), because the gray channel will serve those customers who seek low price and low service. Third, gray marketing enhances firm profitability through sales growth and excess inventory elimination. In this regard, many researchers have studied the effect of gray markets on manufacturer’s profitability, as well as the overall channel profitability, and reported a positive effect. Lowe & McCrohan (1988) contend that gray marketing increases both manufacturers and dealers sales volume without any loss in manufacturers’ profit margin. Bucklin (1993) develops an analytical model to explore the impact of gray market activity on manufacturers’ profitability and echoes similar insights confirming that “In all distribution channel models, the manufacturer never earns less than his base profit. Indeed, the benchmark may even be exceeded despite the gray market. The manufacturer’s profit resists decline because the gray market increases total unit sales.” In the same spirit, Xiao, Palekar, and Liu (2011) demonstrate using a game theoretic model that gray market activity not only benefits the manufacturer, but also enhances the financial performance of the overall channel via two mechanisms: market segmentation and alleviating the double marginalization problem. Similarly, Dasu, Ahmadi, and Carr (2012) show using an analytical model that gray

marketing benefits both the producer and the authorized retailer. Along the same lines, Autrey, Bova, and Soberman (2014) find that “a manufacturer does not always optimize its profitability by minimizing gray market volume.” Coughlan and Soberman (1998) argue that “even if gray goods are leaked at marginal cost to a third party (hence, generating no profit to the manufacturer), gray marketing can increase profits for manufacturers when the differences in price sensitivity between customers are high.” Besides, they also “show that vertically integrated manufacturers have even more incentive to supply gray markets than manufacturers who operate through independent retailers. It is interesting that the role of gray markets is just as important even when manufacturers have full control of both the service function and retail pricing.” Xiao, Palekar, Liu (2011) present similar argument using a game theoretic model arguing that gray marketing can benefit the manufacturer under different channel structures including the fully vertically integrated setting. Fourth, it increases product availability by making new products and popular models available to enthusiastic and loyal international customers, who are willing to pay gray marketers a premium just to get their hands on these products before their official launch in their countries (e.g., cars, smart phones, video games...etc.). For example, it was gray marketers, based on a permission from the federal government, who first made Mercedes Benz’ *Smart* available to US consumers before it became available through authorized dealerships (Kurylko, 2004). Also, during the period from 2006 to 2008, Toyota’s *Wish* gray imports into Singapore were competing with its bestselling model there, even though *Wish* was not yet officially available in that market. The sales volume was too high that it later forced Toyota to make *Wish* available through its official dealers (Ee, 2006). In point of fact, this is one of the major arguments underlying the idea that *the gray market phenomenon is much more than just a price game*. Yeung & Mok (2013) argue that “Parallel imports compete in price and availability

in terms of earlier delivery of newly launched models or supply of certain non-mass manufactured specifications/models. Such competition can explain why some parallel imported automobiles are more expensive than those from authorized distribution channels.” Lim, Lee, and Tan (2001) confirm that gray markets may exist even when the gray market product is indeed higher in price than the one sold by the authorized seller. They point to the Mercedes Benz situation in Singapore where many customers turn to the gray market to buy their cars because “The demand for Mercedes Benz is so strong that, at one stage, buyers had to endure a waiting period of up to eighteen months for purchase delivery.” In the same vein, Zhao, Zhao, and Deng (2016) argue that “gray marketing could meet buyers’ demand unfulfilled by brand owners’ official channels, as well as offer buyers a sense of exclusivity since others cannot get those styles locally.” Fifth, it is an effective way for penetrating into foreign markets where an authorized channel is not viable due to entry barriers or absence of scale economics. Hence, gray markets can serve the manufacturer by functioning as “supplemental channels for exploring untapped markets that authorized dealers are unable to or find too costly to access.” (Yeung & Mok, 2013). In light of the abovementioned, many scholars (e.g., Autrey et al., 2015; Bucklin, 1993; Lim, Lee, & Tan, 2001; Coughlan & Soberman, 1998; Ahmadi, Iravani, & Mamani, 2015) have adopted a very positive view of gray markets arguing that all these benefits make “gray markets anything but disadvantageous for manufacturers.” (Coughlan & Soberman, 1998). Moreover, anecdotal evidence and industry reports provide further validation for this positive view. A report by the New Zealand Institute of Economic Research to the Ministry of Commerce (NZIER, 1998) states that in a survey of UK drug makers, 30.6% of the manufacturers mentioned that they see some benefits from the gray market. Also, a white paper by KPMG, in 2008, revealed that not only manufacturers but also authorized distributors see some benefits

from the gray market. Besides, it indicates that many authorized dealers admitted diverting products to the gray market citing quantity discounts and other incentives as the main reasons for doing so.

The financial efficacy of combating the gray market. As illustrated in the previous sections, neither scholars nor practitioners view the gray market as a pure blessing or a complete curse but rather a more nuanced, multi-layered commercial phenomenon that benefits the firm in some areas and harm it in others (see Table 3.3 for a summary of gray markets pros and cons). Unsurprisingly, this “gray” nature, coupled with the absence of any solid empirical evidence on the net effect of gray markets on firm performance, left both scholars and practitioners perplexed about the best course of action when dealing with gray markets. This is strongly evident in the broad range of strategies recommended by theorists and/or implemented by managers vis-a-vis the gray market, which range from one extreme (fighting it) to the other (participate in it).

The first strategy for dealing with the gray market is to *combat it*. This strategy reflects earlier scholarly wisdom (e.g., Cavusgil & Sikora, 1987; Duhan & Sheffet, 1988; Weigand, 1991), which contends that “the problems associated with this activity tend to outweigh its benefits.” (Myers & Griffith, 2000). Therefore, “exporters of manufactured goods can hardly afford to remain vulnerable to this phenomenon” (Myers & Griffith, 1999) and hence “it is always in the manufacturer's best interest to deter/contain [the] gray market” (Su & Mukhopadhyay, 2012).

Table 3.3: Pros and Cons of the Gray Market

Pros	Cons
<ol style="list-style-type: none"> 1. <i>Eases excess inventory elimination:</i> firms can offload excess inventory to international or local gray market channels. 2. <i>Facilitates foreign market penetration:</i> gray marketing is an effective means for penetrating foreign markets (e.g., developing countries) where an authorized channel is not viable due to the absence of scale economics or due to entry barriers. 3. <i>Enhances sales growth:</i> gray market activity increases sales by reaching a segment of price-sensitive, service-indifferent consumers who otherwise would have never bought the product. 4. <i>Boosts profitability:</i> gray marketing grows sales, enables effective price discrimination, and enhances inventory management which boosts profitability. 5. <i>Increases product availability:</i> by making products available to enthusiastic and loyal international customers, who are willing to pay a premium to gray marketers to get their hands on new products or hot models before their official launch in their countries (e.g., cars, smart phones, video games...etc.) 	<ol style="list-style-type: none"> 1. <i>Antagonizes authorized sellers:</i> gray market activity demotivates authorized sellers, who invested in the channel (e.g., services, training, promotion, and accreditation), from promoting the brand due to unauthorized sellers' free-riding on their efforts. 2. <i>Reduces product traceability:</i> product diversion to unauthorized channels makes it difficult for manufacturers to track where their products end. 3. <i>Loosens sales forecasts:</i> manufacturer's reliance on poor sales data reduces the accuracy of their sales forecasts. 4. <i>Undermines pricing policy:</i> by weakening manufacturer's control over prices and complicating pricing decisions. 5. <i>Diminishes channel equity:</i> by shaking authorized sellers' trust in and commitment to the brand. 6. <i>Dilutes brand equity:</i> gray market goods harm brand image via unintended brand associations (wrong price, low-quality service, inappropriate product presentation, poor customer experience ...etc.). 7. <i>Weakens brand loyalty and perceived quality:</i> when misinformed/uninformed customers find out that the genuine product they purchased does not come with the anticipated post-sale services and warranties. 8. <i>Demand cannibalization:</i> an intra-brand competition between unauthorized and authorized channels. 9. <i>Legal liabilities:</i> due to gray imports non-compliance with local safety and content regulations.

The second strategy converges with the first in adopting the idea that the risks of gray market activity outweigh the rewards; nonetheless, it diverges on the need for fighting this activity by admitting that such fight is a “futile” one. Therefore, the best strategy for dealing with gray market activity is simply *ignore it* since “most strategies to combat gray market activities are expensive, ineffective, or both.” (Howell et al., 1986). Representing this viewpoint, Myers (1999) suggests that “managers may wish to consider what degree of complex, and often costly, anti-gray market activity they undertake if the profit margins within the export market are not jeopardized.” Besides, several researchers have observed that “firms frequently choose to tolerate violations, rather than pursuing complete enforcement” (Bergen, Heide, & Dutta, 1998) and “despite the tremendous amount of gray market activity going on in the global marketplace, few firms have instituted strategies to minimize their vulnerability.” (Myers & Griffith, 1999). Eagle et al. (2003) interviewed a group of brand managers (of different manufacturers) and reported that only 13% have said that they have “international controls in place to minimize future parallel import attacks.” In the same spirit, Autrey, Bova, & Soberman (2015) maintain that “technology companies do not always implement systems to control or monitor gray market distribution. For example, KPMG (2008) reports that 42% of its survey respondents did not have a process to identify or monitor gray market activity. Additionally, in a firm survey conducted by Deloitte (2011), respondents felt that gray markets persisted primarily because of poor channel internal controls (33% of respondents’ number one response) and a lack of monitoring/detection processes – (25% of respondents’ number two response).”

The third strategy intersects with the second on accepting the futile fight premise, which suggests that “gray market activity is not going to disappear” (Cross, Stephans, & Benjamin, 1990), but departs from it by recommending that companies should actually *learn how to live*

with gray markets rather than just simply ignore them. Representing this strategy, Hu, Pavlin, and Shi (2013) argue that many suppliers choose “not to pursue enforcement through monitoring and legal action. Instead, [they] anticipates the reseller’s access to the gray market and formulates the pricing strategy accordingly.” Altug (2017) and Ahmadi, Iravani, and Mamani (2017) provide pricing mechanisms for effective channel coordination in presence of gray markets.

The fourth strategy is a major departure from the previous three in that it suggests that the manufacturer’s optimal response to the presence of gray market activity is to *encourage it*. Coughlan and Soberman (1998) strongly argue in favor of this strategy suggesting that “it is often in the interest of manufacturers to encourage the availability of gray goods” and even wondering whether authorized dealers themselves are “willing participants” rather than “unwitting victims.” Shao, Krishnan, and McCormick (2016) reiterate similar insights and provide a price discrimination argument suggesting that “by encouraging gray market activities without officially authorizing it, the manufacturer may also be trying to target new (low-value) customers without alienating existing (high-value) customers.” Practitioners further validate this practice confirming that “It’s one of the worst-kept secrets that brands look the other way on gray-market goods... A lot of brands will let their country managers flush out products through the gray market.” (Chu, 2014). A case in point is when Sony announced in a recall for some of its laptops, in Hong Kong, that customers who bought their products from the gray market are not exempt from the recall but rather fully qualify for free repairs (Taylor, 2003). Another similar incident is when Toyota not only included gray imports in its recalls in Singapore (Tan, 2006), but also invited owners of gray market cars to service their vehicles at its official service facilities with the promise to honor their warranties if they do so (Tan, 2003).

The fifth strategy, which represents the polar opposite of the first, advocates that manufacturers should *participate in* the gray market themselves. Illustrating the rationale for this strategic choice, Weigand (1991) argues that when it comes to combating gray markets, “capitulation is tempting... Not surprisingly some manufacturers have decided it is easier to join that to fight.” Ahmadi and Yang (2000) echo similar insights confirming that some manufacturers “knowingly use this alternative channel.” Antia, Bergen, and Dutta (2004) confirm that “sometimes a manufacturer itself will sell into the gray market as salespeople struggle to meet quotas or managers attempt to cover costs or make year-end goals. This has been a common scenario at computer and cell phone manufacturers.” Lim, Lee, and Tan (2001) take it a step further to argue that “recognizing the futility of fighting against the gray marketers, some authorized dealers have adopted the strategy of if you can’t beat them, join them.” Various industry reports provide validation for this view and confirm that “Brands themselves sell unsold and obsolete stock directly to the grey market” (Shannon, 2017). 67% of surveyed exporters in the consumer durable, nondurable, and industrial goods sectors reported that they are aware of the presence of gray market channels or are even adeptly using them as supplementary distribution channel (Michael, 1998). Dutta, Bergen, and John, (1994) state that some companies not only turn a blind eye to the gray market but may also be implicated in fostering gray themselves. They refer, among others, to Banerji’s (1990) work in which he mentions that “internal IBM studies cited in court documents suggest that there was “almost universal interest” [in gray marketing] on the part of authorized IBM resellers, including the company's own distribution division. About 5% of IBM's total PC sales volume actually came from bootlegged sales.”

These different strategies, which extend from one extreme to the other, speak strongly to the controversial nature of the gray market phenomenon and to the mixed view, in both scholarship and practice, on the net effect of gray market combating on firm performance. That said, our position on this topic leans toward the view that argues that the costs of combating the gray market outweigh the benefits and hence the net effect of gray market combating on financial performance is negative. We adopt this view for a number of reasons. First, theoretically, our extensive review of the literature reveals that whereas existing research provides arguments for and against the gray market, the majority of available evidence and theory suggests that the benefits of gray markets outweigh their harms and that most of the concerns associated with gray markets are either overplayed or nonconcrete. Second, empirically, the limited amount of available empirical evidence provides some support, although inconclusive, for this view. Based on a survey of key informants from 404 US manufacturing exporters, Myers (1999) finds that gray market activity has no effect on the economic performance of firms. Also, Ertekin, Sorescu, and Houston (2018) examined stock market reaction to a sample of 1,918 trademark infringement (counterfeiting, false advertising, copycats, brand misappropriation...etc.) lawsuits, which included 50 gray-market-related lawsuits. They found that investors react negatively to the filing of such court cases, as well as to the winning of these cases, even when damages are awarded. Third, anecdotally, there is sufficient industry evidence to substantiate this view. For example, Richemont, the parent of Cartier and other luxury brands, admitted that they will be “forfeiting hundreds of millions of pounds to keep stock out of the grey market” (Ritson, 2018). Conversely, in 2010, Nokia’s shares rose significantly in the wake of some industry reports about the large gray market for its cell phones in Asia and other emerging markets, with some leading analysts referring to that as “a good thing for

Nokia... an opportunity for them to go after and try and actually win over users in that segment as well” (Reuters, 2010). In the same vein, a Wells Fargo analyst cited a recent crackdown on *daigou* -a gray market of luxury goods in China- as one of the reasons for downgrading Tiffany’s stock (Schultz, 2018). In light of the above and to reflect our position on gray market combating, we hypothesize as follows:

H₂: Gray market combating by brand owners has a negative effect on brand owners’ financial performance.

3.4.3. What Factors and Contingencies Govern the Effect of Gray Market Combating on Financial Performance?

Gray market theory and channel management literature suggest a number of factors and contingencies that can moderate (strengthen, weaken, or even reverse) the effect of gray market combating on financial performance. Our conceptual framework, depicted in Figure 3.1, illustrates these factors and their effects. In what follows, we discuss these moderators and present the relevant theoretical hypotheses.

The gray market triangle. As discussed earlier, and as evident in the opening quotes, the influence of gray markets on firm performance boils down to the interplay of three main effects: a negative effect on market-based assets (brand equity and channel equity), a positive effect on sales, and an ambiguous effect on profitability. Together, these three effects form what we refer to as the *gray market triangle* (see Figure 3.2). Therefore, it is logically expected that these three factors (brand, sales, and profitability) play a crucial role in moderating the effect of gray market combating on financial performance.

Figure 3.1: Conceptual Framework

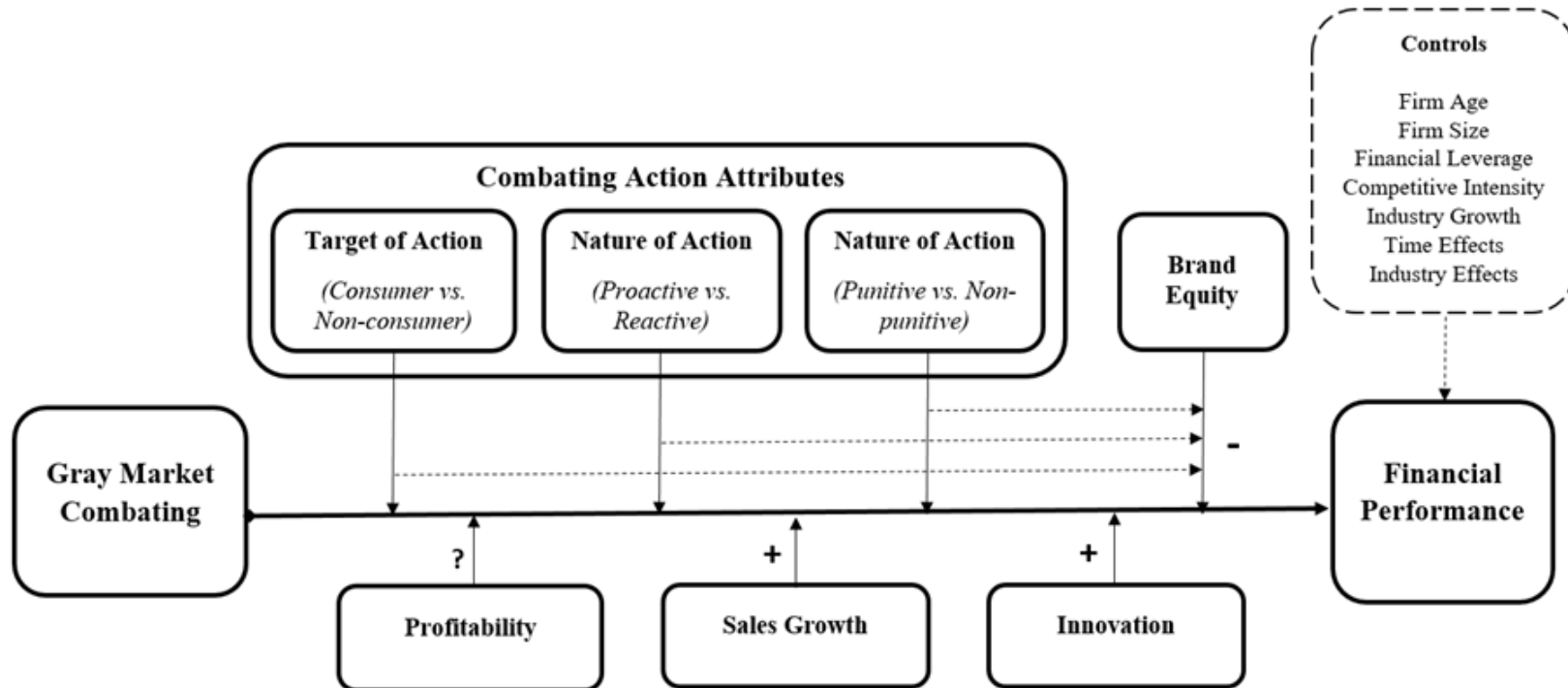
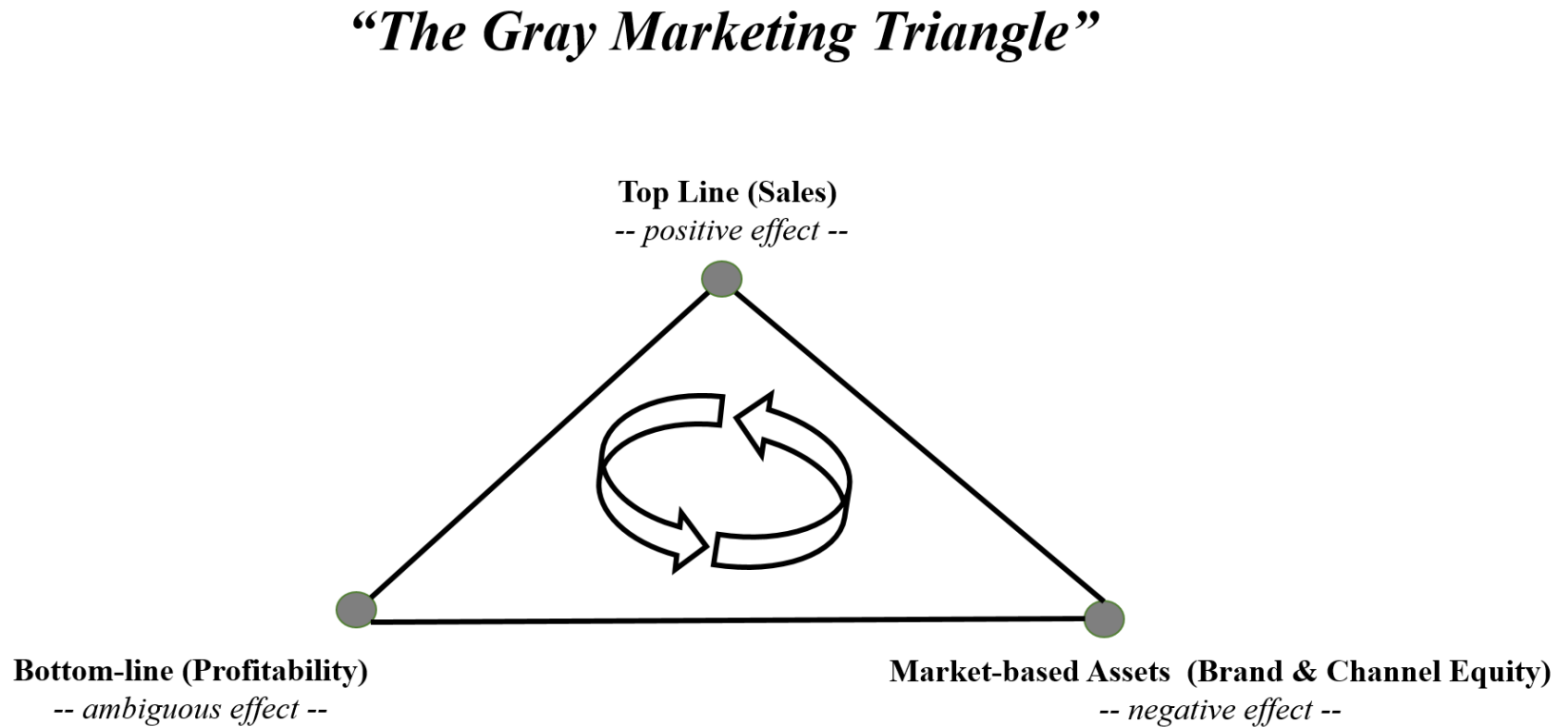


Figure 3.2: The Gray Market Triangle



Brand equity. In developing hypothesis H₁, we presented a detailed discussion about the detrimental effect of gray markets on brand equity in the long-term and argued that brand protection is often a major driver for fighting gray markets. Therefore, as brand equity increases, the extent of harm caused by gray market activity increases and consequently the rewards of battling this activity become larger and more pronounced. Reasonably, this should make the negative effect of gray market combating on financial performance relatively weaker. In view of that, we hypothesize as follows:

H₃: Brand equity mitigates the negative effect of gray market combating on the firm's financial performance.

Sales growth. Gray market activity boosts sales (Myers, 1999; Bucklin, 1993; Lowe & McCrohan, 1988) by (a) reaching an otherwise lost segment of price-sensitive, service-insensitive consumers (Duhan & Sheffet, 1988; Lim, Lee, & Tan, 2001), (b) functioning as a supplemental distribution channel for reaching untapped markets (Yeung & Mok, 2013), (c) facilitating foreign market penetration by evading entry barriers, (d) helping salespeople meet annual sales targets (Antia, Bergen, & Dutta, 2004), and enhancing product availability (Zhao, Zhao, & Deng, 2016; Lim, Lee, & Tan, 2001). Therefore, when a firm is in a growth phase, an anti-gray market action may be considered as a counterproductive, unwarranted, or at least untimely interference in the face of a growing demand. An interesting example in this regard is when Nokia, in collaboration with Russian customs, launched a fierce attack on gray imports which led to the confiscation of \$15 million worth of cell phones. In the wake of that, a number of industry experts cautioned that Nokia's loss in sales due to its attack on the gray market can be

too severe to the extent that it may slash Nokia's market share in Russia by half (Izvestia, 2006). In the same spirit and from an experimental study, Iqbal and Feick (2002) reported that sales managers view gray markets more favorably when their incentives are tied to sales figures which points to the benign effect for gray markets on sales. As a result, we argue that firms with higher sales growth lose more by combating gray market activity than firms with lower sales growth.

Thus, we hypothesize as follows:

H₄: Sales growth aggravates the negative effect of gray market combating on the firm's financial performance.

Profitability. Undoubtedly, the most equivocal part of the gray market story, for both theorists and practitioners, is the net effect of gray markets on the firm's bottom line. As discussed earlier (see section 3.4.2), gray markets affect firm profitability in a number of contrasting ways. On one hand, gray markets hurt profitability by weakening control over prices (Cespedes, Corey, & Rangan, 1988), causing demand cannibalization (Ahmadi, Iravani, & Mamani, 2015), inciting intra-channel competition (Bucklin, 1993), and denting brand equity and loyalty (Ahmadi, Iravani, & Mamani, 2017; Huang, Lee, & Hsiao, 2008). On the other hand, gray markets boost profitability through price discrimination (Duhan & Sheffet, 1988; Coughlan & Soberman, 1998), inventory correction (Ahmadi, Iravani, & Mamani, 2015), and sales growth (Myers, 1999; Bucklin, 1993). Expectedly, this multi-layered nature of the effect of gray markets on firm profitability translated into opposing views on the matter, on both sides of the fence: scholarship and practice. A number of scholars (e.g., Antia et al., 2006; Assmus & Wiese, 1995; Weigand, 1991; Cespedes, Corey, & Rangan, 1988; Cavusgil & Sikora, 1987) have argued that

the net effect of gray market on profitability is negative and hence gray markets should be combated. Conversely, another group of scholars (e.g., Autrey, Bova, & Soberman, 2015; Bucklin, 1993; Lim, Lee, & Tan, 2001; Ahmadi & Yang, 2000) have argued that the net effect of gray market on profitability is positive under most channel structures, including a vertically integrated one (Ahmadi, Irvani, & Mamani, 2015; Coughlan & Soberman, 1998; Xiao, Palekar, & Liu, 2011), and hence gray markets should be seen as a blessing. In the same spirit, every now and then an industry report comes out pointing to the detrimental effect of gray markets on firms' and industries' profitability (Kanter, 2006; Reuters, 2010), or a group of industry leaders openly criticize gray markets and call for combating them in pursuit of "profitable growth" rather than just "sales growth" (see opening quotes). Yet, many scholars (Coughlan & Soberman, 1998; Antia, Bergen, & Dutta, 2004; Dutta, Bergen, & John, 1994) have emphasized that manufacturers themselves are implicated in such activity by participation, encouraging, or at least suspicious silence.

In light of the above, our view on this matter is as follows. First, in terms of the existence of an effect, it is strongly evident that theory suggests that there is an effect, one way or another, for gray markets on firm profitability. Accordingly, we argue that firm profitability must have a bearing on the link between gray market combating and financial performance. Second, in terms of effect directionality, we do not suggest a direction due to the several conflicting forces that come into play in this relationship and the fact that "the net interplay of these factors may be impossible to identify absent empirical verification." (Bucklin, 1993). Therefore, following previous research (e.g., Tipton, Bharadwaj, & Robertson, 2009), we hypothesize as follows:

H₅: Profitability moderates the negative effect of gray market combating on the firm's financial performance. The direction of this moderation is an empirical issue.

Innovation. More innovative firms that invest heavily in R&D “create technologically superior products (Cohen and Levinthal 1989), which, ceteris paribus, will increase inventory holding, either in anticipation of higher demand or a result of increased product line breadth (Bayus and Putsis 1999; Cohen and Levinthal 1989). Thus, as [innovation] increases, we expect inventory holding to increase.” (Sridhar, Narayanan, & Srinivasan, 2014, p.281). One of the foremost benefits of gray markets is their effective role in eliminating excess inventory (Altug, 2017; Antia, Bergen, & Dutta, 2004). Several scholars (Hu, Pavlin, & Shi, 2013; Yeung & Mok, 2013; Eagle et al., 2003) have pinpointed excess inventory as one of the major causes underlying the formation of gray markets. Indeed, Dasu, Ahmadi, and Carr (2012) identify excess inventory, due to demand uncertainty, as the main driver of gray markets. Thus, when a firm combats gray market activity, it consequently undermines its ability to manage excess inventory. This makes more innovative firms more vulnerable to the negative impact of gray market combating on financial performance, especially that gray markets do not constitute a threat to product authenticity. Hence, we hypothesize as follows:

H₆: Innovation exacerbates the negative effect of gray market combating on the firm's financial performance.

Combating action attributes. As a form of unauthorized distribution, gray marketing naturally leads to channel conflict instigated by territorial exclusivity violation and/or intra-brand competition between authorized and unauthorized sellers. This makes the act of combating gray

market activity a typical channel management activity. As with most channel management and conflict resolution actions, some attributes of the gray market combating action itself, such as the target and nature of action, can define its efficacy. Hence, we consider the effects of three key attributes of the combating action and theorize about them. In addition to that, we also theorize about the interaction of these attributes with brand equity since brand equity is the fundamental driver of gray market combating (as illustrated earlier, gray market combating is widely recognized as brand protection task and is often organized under the brand protection function which makes exploring such interactions rather relevant). These three attributes are: (1) target of action: consumer vs. non-consumer (Lim, Lee, & Tan, 2001; Huang, Lee, & Hsiao, 2008; Weigand, 1991), (2) nature of action: proactive vs. reactive (Cavusgil & Sikora, 1987; Myers, 1999), and (3) nature of action: punitive vs. non-punitive (Duhan & Sheffet, 1988; Ahmadi, Iravani, & Mamani, 2015; Howell et al., 1986).

Target of action (consumer vs. non-consumer). Anti-gray market actions targeted at consumers (e.g., awareness campaigns, denial of after-sales services) are less likely to disrupt distribution or distract product availability than actions targeted at the channel (e.g., punishing/terminating noncompliant dealers, limiting supply) or the industry (e.g., lobbying for anti-gray regulations). Hence, such actions are often perceived as “soft” combating mechanisms because they discourage consumers from buying gray products, and illustrate the potential risks of doing so, yet, they do not threaten the availability of the gray alternative i.e. they give consumers choice. Therefore, the impact of consumer-targeting, anti-gray actions on financial performance is expected to be less harmful to performance relative to anti-gray actions targeting other parties than the consumer. Furthermore, a number scholars (Duhan & Sheffet, 1988;

Weigand, 1989; Cavusgil & Sikora, 1987) have highlighted the efficacy of these actions in addressing the gray market issue. Hence, we hypothesize as follows:

H₇: When the target of the gray market combating action is the consumer, the negative effect of gray market combating on the firm's financial performance is weaker than when the target is other parties.

Additionally, since consumers' attitudes, perceptions, emotions, and actions toward the brand is one of the foundations of brand equity (Mizik & Jacobson, 2008; Fournier, 1998; Shachar et al., 2011), we expect that anti-gray market actions that target consumers will have a reinforcing influence on the benign effect of brand equity on the link between gray market combating and financial performance. Thus, we advance the following hypothesis:

H₈: When the target of the gray market combating action is the consumer, the mitigating effect of brand equity on the negative link between gray market combating and financial performance becomes stronger.

Nature of action (proactive vs. reactive). One of the earliest and most common classifications of gray market combating actions is Cavusgil and Sikora's (1987) classification as proactive or reactive actions. In their work, Cavusgil and Sikora identify seven proactive (e.g., lobbying for anti-gray market laws, product differentiation, product availability) and seven reactive (e.g., raising consumers awareness, turning gray marketers into authorized dealers, reducing price differentials) mechanisms for combating gray market activity. Following extant research in the gray market space, we adopt this classification for exploring the impact of the nature of gray market combating action on financial performance. In this regard, we argue that

proactive anti-gray market actions have a more detrimental effect on financial performance than reactive actions for the following reasons. First, gray marketing is not necessarily a harmful activity, at least not under all circumstances. As discussed earlier, the case for gray market in the literature seems considerably stronger than the case against it. Indeed, many researchers (Autrey, Bova, & Soberman, 2015; Bucklin, 1993; Lim, Lee, & Tan, 2001; Coughlan & Soberman, 1998; Ahmadi, Iravani, & Mamani, 2015) contend that the gray market is an absolute blessing for brand owners in all situations, even under a vertically integrated channel. Hence, by being proactive in combating gray market activity and attempting to eradicate or limit it before it even materializes, the firm forsakes the numerous benefits of gray markets (e.g., price discrimination, inventory correction, sales growth, market segmentation), which often outweigh the risks i.e. it is *'throwing out the baby with the bathwater.'* Furthermore, by being proactive the firm is not only denying itself the potential benefits of gray markets, but also is incurring significant upfront costs for implementing such proactive measures against an activity that is not certainly disadvantageous. In fact, even those who argue for combating the gray market and make the case against it, admit that a certain level of gray market activity is beneficial to the firm. This is why many researchers (e.g., Bergen, Heide, & Dutta, 1998; Iqbal & Feick, 2002; Dutta, Bergen, & John, 1994) argue that the optimal level of enforcement against gray marketing tolerates some level of activity i.e. a reactive rather than a proactive approach. In light of this, and in line with our aforementioned position on the negative net effect of gray market combating on financial performance, we argue that proactive anti-gray market actions are more detrimental to financial performance than reactive ones because they aim at eradicating gray market activity rather than managing it. Hence, we hypothesize as follows:

H₉: Gray market combating actions that are of proactive nature aggravate the negative effect of gray market combating on the firm's financial performance.

Besides, prospect theory (Tversky & Kahneman, 1992) suggests that by being proactive in combating gray market activity, the firm sends a signal that may be interpreted unfavorably by the public as an indication that the brand is not strong enough to withstand some level of gray market activity or that the threat from gray markets is rather serious. Conversely, when a firm adopts a reactive approach for combating gray markets, it sends a signal that it is always attentive to its brand and is ready to defend it whenever a threat looms. However, the brand is strong enough that it can tolerate a certain level of gray market activity without being tarnished. Similar arguments are present in the literature for a number of firm actions such as product recalls (Chen, Ganesan, & Liu, 2009) and trademark infringement lawsuits (Ertekin, Sorescu, & Houston, 2018). Therefore, we hypothesize as follows:

H₁₀: When the gray market combating action is of a proactive nature, the mitigating effect of brand equity on the negative link between gray market combating and financial performance becomes weaker.

Nature of action (punitive vs. non-punitive). Channel management literature provides several arguments against the use of punitive actions for addressing channel conflict such as gray marketing. First, punitive actions often engender negative emotions, tension, and distrust inside the relationship that binds the penalized channel member (e.g., noncompliant dealer selling gray products, opportunistic distributor supplying gray sellers) to the manufacturer (Geyskens, Steenkamp, & Kumar, 1999). This motivates dysfunctional behavior and bad attitude which

eventually leads to a “sick relationship” (Morgan & Hunt, 1994). Second, the use of punitive actions to address channel conflict leads to reciprocation by the target party (Frazier & Rody, 1991). Third, the negative emotions and bad attitude resulting from punitive actions often transcend the manufacturer-penalized intermediary dyad to reach other channel members who are observing one of the peers being punished (Wang, Gu, & Dong, 2013). Fourth, those negative feelings and dysfunctional behavior get amplified when the applied punitive action does not remedy the problem (Scheer & Stern 1992), which is the likely outcome in this case because “gray markets aren’t going away” (Antia, Bergen, & Dutta, 2004). When dealing with gray market issues in particular, punitive actions (e.g., dealer termination, dealer punishment, litigation) are even more ineffective due to the disruption of distribution and/or distraction of product availability they might cause, and the equivocal nature of the gray market phenomenon itself. A case in point is when Cisco, in 2013, put around 1,000 resellers in the EMEA region on the ‘Denied Partner List’ and prevented them from further selling its products due to involvement in gray market activity (Kunert, 2013). Indeed, several researchers (Weigand, 1989, 1991; Cavusgil & Sikora, 1987) have emphasized on the ineffectiveness of most punitive actions in combating gray market activity. For example, Howell et al. (1986) maintain that “Direct legal action against unauthorized dealers seems attractive, but is both expensive and seldom successful.” Therefore, we hypothesize as follows:

H₁₁: Gray market combating actions that are of punitive nature aggravate the negative effect of gray market combating on the firm’s financial performance.

Additionally, the dysfunctional behavior and “sick relationships’ generated within the channel due to reliance on punitive actions, may have a negative influence on brand equity because it is highly dependent on the services, commitment, and investments of all channel members. Furthermore, as with proactive actions, a punitive action, in response to a gray market incident, may signal to the public that the threat to the brand is serious and the damage is material, as proposed by prospect theory. Therefore, this may have a negative bearing on the benign effect of brand equity on the link between gray market combating and financial performance. Thus, we advance the following hypothesis:

H₁₂: When the gray market combating action is of a punitive nature, the mitigating effect of brand equity on the negative link between gray market combating and financial performance becomes weaker.

3.5. DATA AND METHODOLOGY

To test our conceptual framework and the related hypotheses, we use a number of econometric techniques. First, for testing H₁, which investigates whether firms with higher brand equity are more likely to engage in gray market combating, we use choice models - specifically probit and panel probit. These choice models serve two purposes: (a) correcting for self-selection bias in the cross-sectional variations model via Heckman’s procedure (primary purpose) and (b) testing H₁ (e.g., Borah & Tellis, 2016). Second, for testing H₂, which explores the causal effect of gray market combating on financial performance, as reflected by abnormal stock returns, we rely on the event study method. Last, for testing the remaining hypotheses, which represent the factors and contingencies that govern the influence of gray market combating on financial

performance we use regression analyses. In the following sections, we provide a detailed description of our data sources, sample, variables, measurements, and econometric models.

3.5.1. *Data Sources and Sample Construction*

Firms sample. The universe of companies under examination in this study is the constituents of the S&P 1500 and S&P ADR indices for the period from Jan 2001 to June 2017 (e.g., Whittler, Krause, & Lehmann, 2018; Malhotra et al., 2018). “The S&P Composite 1500 combines three leading indices, the S&P 500, the S&P MidCap 400, and the S&P SmallCap 600 to cover approximately 90% of the U.S. market capitalization. It is designed for investors seeking to replicate the performance of the U.S. equity market or benchmark against a representative universe of tradable stocks.” (S&P Dow Jones Indices LLC, 2019). We obtained this list of companies from *Compustat*, through *Wharton Research Data Services* (WRDS), where they are captured by the *S&P 1500 Super Composite* and *S&P ADR* indices. This resulted in a sample of 3,164 publicly-traded companies. We extensively studied the gray market combating behavior of these companies, company-by-company, for a period of two decades.

Events sample. We define a gray market combating event, or simply hereinafter an *event*, as the public announcement of an anti-gray market action taken by one of the firms in our sample. For the announcement to be included in the sample, it has to explicitly state that the objective of the action is gray market combating. If the announcement indicated that the objective is combating both gray and counterfeit goods, we excluded it. To construct our events sample, we extensively searched, using a company-by-company approach, *Factiva* and *Lexis Nexis* news databases for press reports or news releases about relevant events, over a time period

covering two decades, from 01 Jan 1997 till 31 Dec 2017. We used the below keywords list in our search:

Grey market OR gray market OR parallel import OR parallel trade OR parallel importation OR gray imports OR parallel export OR anti-diversion OR unauthorized seller OR unauthorized distributor OR product diversion OR gray product OR grey product OR grey seller OR gray seller OR parallel trading.

Then, we conducted a content analysis for every search result returned to identify valid events. For multiple announcements of the same event, we always considered the first release of information. This resulted in a sample of 358 events. We then excluded 17 events that have no stock price data in the Center for Research in Security Prices (CRSP) database which resulted in a final sample of 341 usable events. For some examples on the events in our sample, see Table 3.4.

For identifying confounding events, i.e. concurrent or overlapping corporate events occurring around the event under study, we used a 5-day screening window centered on the event day. If any significant financial (earnings reporting, guidance/financial projections release or revision, dividend announcement, issuance of new debt/floating of private assets) or corporate (mergers/acquisitions/spinoffs/divestments, new products/services, product recalls, strategic alliances/joint ventures, top management changes) announcement occurred within this screening window, we identified the event as a confounding event. If we exclude confounding events, we obtain a subsample of 123 observations. In our empirical analyses, we use both the full sample (N=341) and the subsample without confounding events (N=123) to test the robustness of our results.

Table 3.4: Event Examples

Company	Announcement Title	Announcement Summary	Source
General Motors (GM)	GM Puts Dealers in Hot Seat Over Gray Market Vehicles	GM sent a letter to its dealers in the US informing them that dealers who sell gray imported vehicles from Canada will lose their allocations of the popular new models.	Associated Press, Factiva, 16 July 2002.
Philip Morris (PM)	PM Takes Action against Internet-Based Cigarette Vendors to Stop Illegal Importation of Cigarettes	PM files a complaint with the International Trade Commission to stop illegally imported gray market cigarettes bearing PM trademarks, including Marlboro, from entering the US.	Business Wire, Factiva, 5 Mar 2008.
Hewlett Packard (HP)	HP Shows Grey Market Grit	HP files two lawsuits, one in the US and one in the UK, against resellers involved in gray market activity.	Microscope, LexisNexis, 6 Sep 2004.
Sun Microsystems	Sun's Grey Police Puts 13 In the Dock	Sun puts in place new sales reporting measures to identify the flow of grey product which led to the company investigating 13 channel partners.	Microscope, LexisNexis, 26 Jan 2004
Daimler Chrysler	Daimler Battles Grey Market Exports	Daimler Chrysler will void the warranties on cars and trucks that were originally shipped to Canadian dealers but end up in US.	The Globe and Mail, Factiva, 2 Feb 2002.

3.5.2. *Variables and Measurements*

The data for this study come from a number of secondary data sources such as Factiva, LexisNexis, Center for Research in Security Prices (CRSP), Compustat, Statista, firms' annual reports, Bloomberg and Wall Street Journal databases, and companies' official websites. An overview of the variables used in this study, along with their measures, data sources, and supporting literature, is presented in Table 3.5. In what follows, we provide more details on these variables.

Dependent variable. Our main dependent variable is the firm's financial performance measured as the cumulative abnormal stock returns (Boyd & Kannan, 2018; Hibbard, Kacker, & Sadeh, 2017; Fang, Palmatier, & Grewal, 2011) following the announcement of an anti-gray market action. We estimate abnormal stock returns using event study method and the capital asset pricing model (four-factor model). For the choice model (selection model), the dependent variable is a dummy of whether the firm announced an anti-gray marketing action in a specific year or not.

Explanatory variables. Our array of explanatory variables includes the three sides of the gray marketing triangle (brand equity, sales growth, and profitability) in addition to innovation and a set of dummies that capture some attributes of the gray market combating action (e.g., target of action and nature of action).

Brand equity. Due to the complex nature of this construct, extant research has used a myriad of proxies for measuring brand equity (Shankar, Azar, & Fuller, 2008). Examples of such measures include market share (Besanko, Dubé, & Gupta, 2005; Fader & Schmittlein, 1993), purchase intention (Agarwal & Rao, 1996; Yoo & Donthu, 2001), price premium (Aaker,

Table 3.5: Variables, Measurements, and Data Sources

<i>Variable</i>	<i>Measure</i>	<i>Data Source(s)</i>	<i>Supporting Literature</i>
Financial Performance	Cumulative Abnormal stock Returns, CAR (-1,1) estimated using event study with the 4-factor CAPM model.	Center for Research in Security Prices (CRSP)	Boyd & Kannan (2018); Hibbard, Kacker, & Sadeh (2017); Fang, Palmatier, & Grewal (2011); Vaaler & Schrage (2009); Acemoglu et al. (2016); Gubbi et al. (2010).
Target of Action	A dummy that is set to one if the action targets the consumer and zero otherwise.	Factiva and Lexis Nexis (press reports)	Lim, Lee, & Tan (2001); Cavusgil & Sikora (1987); Huang et al. (2008); Weigand (1991).
Nature of Action - Punitive	A dummy that is set to one if the action is of punitive nature and zero otherwise	Factiva and Lexis Nexis (press reports)	Weigand (1991); Duhan & Sheffet (1988); Cavusgil & Sikora (1987); Ahmadi et al. (2015); Howell et al. (1986).
Nature of Action - Proactive	A dummy set to one if the anti-gray market action is a proactive action and zero if reactive, based on Cavusgil & Sikora (1987) classification	Factiva and Lexis Nexis (press reports)	Cavusgil & Sikora (1987); Myers (1999).
Brand Equity	Advertising-to-sales ratio (Advertising Intensity)	Compustat, Statista, Annual Reports ¹	Nath & Mahajan, 2008; Chang & Rhee (2011); Chang & Hong (2000); Malshe & Agarwal (2015); Sullivan (1998); Windsperger (2004); Bernile, Bhagwat, & Yonker (2018); Rose & Ito (2008); Huang & Li (2001); Barth, Kasznik, & McNichols (2001); Lafontaine & Shaw (2005); Datta et al. (2017).
Innovation	R&D-to-sales ratio (R&D Intensity)	Compustat, Statista, Annual Reports ¹	Nath & Mahajan, 2008; Chang & Rhee (2011); Xue et al. (2012). Chang & Hong (2000); Malshe & Agarwal (2015); Peterson & Jeong, 2010.
Profitability	Net Income/Sales	Compustat	Hope et al. (2011); Raassens, Wuyts, & Geyskens (2012).

Sales Growth	Sales in year t / Sales in year t-1	Compustat	Homburg, Vollmayr, & Hahn (2014); Tuli, Bharadwaj, & Kohli (2010); Zheng et al. (2015); Reuer & Ragozzino (2014).
Firm Size	Number of employees (in thousands)	Compustat, Statista, Annual Reports	Fang, Palmatier, & Guo (2016); Rao, Chandy, & Prabhu (2008); Sui & Baum (2014); Marano et al. (2017); Panagopoulos, Rapp, & Ogilvie (2017); Yao & Chang (2017).
Firm Age	Year of Event-Year of Incorporation	Bloomberg.com, WSJ.com, company websites	Rao, Chandy, & Prabhu (2008); Gubbi et al. (2010); Malhotra et al. (2018); Sadovnikova & Pujari (2017).
Financial Leverage	Long-term Debt /Total Assets	Compustat	Sadovnikova & Pujari (2017); Homburg, Vollmayr, & Hahn (2014); Aivazian & Qiu, 2005; Mehran (1995); Raassens, Wuyts, & Geyskens (2012); Dotzel, Shankar, & Berry (2013).
Competitive Intensity	Herfindahl-Hirschman Index (HHI), at the 4-digit SIC code level	Compustat	Gao et al. (2018); Malinova & Park (2015); Sadovnikova & Pujari (2017); Homburg, Vollmayr, & Hahn (2014).
Industry Growth	Total Industry Sales in year t / Total Industry Sales in t-1, at the 4-digit SIC code level	Compustat	Mayer, Stadler, & Hautz (2015); Whitler, Krause, & Lehmann (2018); Reuer & Ragozzino (2014); Mayer, et al., (2015); Hutzschenreuter & Groene (2009)

2009; Fernández-Barcala & González-Díaz, 2006;), survey-based consumer ratings (Fischer & Himme, 2017; Park & Srinivasan, 1994; Yoo & Donthu, 2001), revenue premium (Ailawadi, Lehmann, & Neslin, 2003; Slotegraaf & Pauwels, 2008), intercept of a demand/sales model (Kopalle, Mela, & Marsh, 1999; Sriram, Balachander, & Kalwani, 2007), financial measures (Simon & Sullivan, 1993; Swait et al., 1993), and advertising spending/intensity (Lal & Narasimhan, 1996; Lafontine & Shaw, 2005; Nath & Mahajan, 2008), with arguments for and against each of these measures (*cf.* Ailawadi, Lehmann, & Neslin, 2003; Slotegraaf & Pauwels, 2008; and Sriram, Balachander, & Kalwani, 2007). That said, it is established that “various measures of brand equity reflect the same underlying construct” (Ailawadi, Lehmann, & Neslin, 2003, p.6) and empirical research has repeatedly documented strong convergence among those different measures of brand equity, whether they are financial-based, consumer-based, company-based, market-based, or marketing-mix-based and whether they are of formative or reflective nature (Agarwal & Rao, 1996; Datta, Ailawadi, & van Heerde, 2017; Keller & Lehmann, 2006). In this study, we use the firm’s advertising intensity as a proxy for brand equity and we measure it as the advertising-to-sales ratio (e.g., Malshe & Agarwal, 2015; Sridhar et al., 2016) for the fiscal year preceding the event. Advertising intensity/spending is an established proxy for brand equity that has been used frequently in different disciplines such as marketing (Nath & Mahajan, 2008; Sullivan, 1998; Windsperger, 2004), finance (Bernile, Bhagwat, & Yonker, 2018), management (Chang & Hong, 2000; Nickerson & Silverman, 2003), international business (Chang & Rhee, 2011; Rose & Ito, 2008), economics (Bagwell, 2007; Lafontine & Shaw, 2005), operations management (Huang & Li, 2001), and accounting (Barth, Kasznik, & McNichols 2001). Furthermore, research has shown that advertising is not only a theoretically valid proxy for brand equity (e.g., Aaker, 1996, 2009; Ataman, Van Heerde, & Mela, 2010; Joshi &

Hanssens, 2010; Keller, 1993; Buil, De Chernatony, & Martinez, 2013; Srivastava, Shervani, & Fahey, 1998), but also an empirically good indicator of brand equity that strongly and positively correlates with the individual dimensions of this multi-dimensional construct (Yoo, Donthu, & Lee, 2000). Besides, given the size and diversity of our sample (N=3,164 firms), as well as the time horizon of the study (20 years), we believe that this measure is feasibly the most appropriate measure in terms of data availability and completeness. Our advertising spending data comes mainly from three sources: Compustat, Statista, and the firms' annual reports.

Innovation. Consistent with prior research (e.g., Nath & Mahajan, 2008; Chang & Hong, 2000; Xue, Ray, & Sambamurthy, 2012; Peterson & Jeong, 2010; Chang & Rhee, 2011), we proxy firm innovation by the firm's research and development (R&D) intensity calculated as the R&D-to-sales ratio⁶.

Profitability. Following previous studies (e.g., Raassens, Wuyts, & Geyskens, 2012; Hope et al., 2011), we measure profitability as the firm's net income divided by sales.

Sales Growth. Sales growth is calculated by dividing the firm's sales in year t by its sales in year t-1 (e.g., Homburg, Vollmayr, & Hahn, 2014; Tuli, Bharadwaj, & Kohli, 2010; Zheng et al., 2015).

Combating Action Attributes. We use a group of dummies to represent some aspects of the gray market combating action. First, we code the target of action using a dummy that is set to one if the action targets the consumer and zero otherwise. Second, we capture the nature of

⁶ For firms that expense advertising/R&D costs as they are incurred, or do not report them in their annual reports or the data sources we used, we followed previous research (e.g., Malshe & Agarwal, 2015) and imputed missing values by multiplying the corresponding industry's average advertising-to-SG&A ratio or R&D-to-SG&A ratio (at the 4-digit SIC code level) by the firm's SG&A expenses for that year.

action via two dummies: a dummy that is set to one if the action is of punitive nature and zero otherwise, and another dummy that is set to one if the action is of proactive nature and zero if reactive, as per Cavusgil & Sikora (1987) classification of gray market combating actions.

Control Variables. Following extant research in the marketing strategy and gray market areas, we rule some alternative explanations by controlling for a number of firm-level and industry-level factors that may influence our findings. First, we control for firm size, a common proxy for resources availability (e.g., Rao, Chandy, & Prabhu, 2008; Groening, Mittal, & Anthea Zhang, 2016). Gray marketing literature suggests that larger firms not only possess enough resources to combat gray market activity, but also are also more susceptible to this activity (Myers & Griffith, 2000). Therefore larger firms are often more capable of combating gray market activity and more likely to do so. To account for this, we control for firm size measured as the number of employees (e.g., Fang, Palmatier, & Guo, 2016; Rao, Chandy, & Prabhu, 2008). Second, we control for firm age, a proxy for firm experience and stability (Kecskés, Mansi, & Zhang, 2012; Rao, Chandy, & Prabhu, 2008). More established firms have been dealing with gray market activity for a longer time and have garnered a greater amount of experience and knowledge in that domain which makes their combating efforts more effective. Thus, we control for firm age, calculated as the difference between the year of event announcement and the year of incorporation (e.g., Rao, Chandy, & Prabhu; 2008; Malhotra et al., 2018; Sadovnikova & Pujari, 2017)⁷. Third, we control for financial leverage. Firms with higher levels of financial leverage possess less resources to invest in combating unauthorized distribution; nonetheless, they are under higher pressure to enhance their profit margins by doing so. Therefore, financial

⁷ For the choice model, due to the large number of firms, we followed previous research (e.g., Zhang 2006; Malhotra et al., 2018; Flammer, 2013) and used the first date the firm appeared in Compustat as the base year instead of the year of incorporation.

leverage is likely to have a bearing on the financial returns to gray market combating. So, we control for the firm's financial leverage calculated as the ratio of long-term debt to total assets (e.g., Sadovnikova & Pujari, 2017; Homburg, Vollmayr, & Hahn, 2014). Fourth, firms do not operate in vacuum and the dynamics of the industry (industry growth, competitive intensity) within which the firm operates influence its strategic behavior and the financial returns of this behavior (Homburg, Vollmayr, & Hahn, 2014); channel management initiatives are no exception. Hence, in addition to including industry dummies to represent industry fixed effects, we control for industry growth and competitive intensity. When an industry is in a growth phase and experiencing growing demand, shareholders are more focused on top line (sales) growth than bottom line (profitability) expansion. This puts more pressure on the firm to increase its distribution and ensure higher product availability to capitalize on that growing demand (Fang, Palmatier, & Guo, 2016). Therefore, when an industry is growing, gray market combating may be perceived as a counterproductive or at least untimely effort that may disrupt product availability and threaten sales growth. Following extant research (e.g., Mayer, Stadler, & Hautz, 2015; Whitler, Krause, & Lehmann, 2018) we measure industry growth as the total industry sales in year t divide by total industry sales in $t-1$, at the 4-digit SIC code level. Besides, the competitive intensity within an industry may have a bearing on the financial returns to gray market combating. The competitive intensity within an industry is a "central determinant of a firm's profits and also increases the relevance of market related firm actions for firm value creation" (Homburg, Vollmayr, & Hahn, 2014, p.44). As the competition within an industry intensifies, firms face more downward pressure on their profitability which amplifies the rewards for channel initiatives that may enhance profitability such as gray market combating. Thus, we control for the industry's competitive intensity, measuring it using the Herfindahl-Hirschman

Index (HHI) calculated at the 4-digit SIC code level (e.g., Rubera & Kirca, 2017; Gao et al., 2018; Malinova & Park, 2015) such that higher HHI implies lower competitive intensity. Fifth, we control for time fixed effects. For collinearity reasons, we cannot include 20 year dummies in the model (e.g., Bruno & Shin, 2014; Mayer, et al., 2015). However, to capture time fixed effects we follow an alternative approach. During these two decades, there were two major macroeconomic events that are likely to affect all firms and hence should be accounted for: the dotcom bubble and the great recession. So, in line with previous research, we introduced two dummies to represent these two periods (e.g., Cassiman & Golovko, 2011; Loh & Stulz, 2018; Dastidar, 2009). The first is set to 1 if the event occurred during the dotcom bubble (i.e. between 1997 and 2000) and zero otherwise. The second is set to 1 if the event occurred during the great recession (i.e. between 2007 and 2009) and zero otherwise. The time periods are based on the NBER definition (Kraay & Ventura, 2005; National Bureau of Economic Research, 2010) of the dotcom bubble (1995-2000) and the great recession (2007-2009). To further validate this approach, we regressed the standardized cumulative abnormal returns (SCAR) on twenty year dummies, along with industry dummies. The results revealed that only three year dummies have significant effect on stock returns: 1998, 2007, and 2008. The coefficients of all three year dummies are negative. These three years belong to the aforementioned recessionary periods which validates our approach. Finally, we control for industry fixed effects using a set of dummy variables. Industry dummies include consumer goods, industrial goods, automotive, technology, healthcare & life-sciences, and others (3% of the sample), based on the Wall Street Journal (wsj.com) classification. We also include a dummy variable to account for whether the firm trades in the US exchanges as a stock or an ADR (e.g., Edmans, 2011; Sampath et al., 2018). A

summary of all measures, along with relevant and supporting information is presented in Table 3.5.

3.5.3. *Model Specification*

In this section we discuss the three models we use for testing our hypotheses: choice model, event study, and multiple regression (cross-sectional variations model).

Choice model. This model serves two purposes. First, correcting for potential self-selection bias using Heckman's procedure (Heckman, 1979). Certain firms may choose to engage in gray market combating because of some systematic differences among firms, or because of their access to certain private information that is not visible to financial markets, which can lead to self-selection bias in the cross-sectional variations model. Thus, as per Heckman's procedure, we use the estimated parameters from the choice model to calculate the inverse mills ratio (IMR) which is then included as a regressor in the multiple regression model. Second, testing hypothesis H_1 , whether firms with higher brand equity are more likely to engage in gray marketing combating.

Therefore, we specify a panel probit choice model. In this model, the choice variable is whether a firm announced an anti-gray market action in a certain year or not. On the right-hand side of the regression, we have our predictor of interest (in H_1), brand equity, accompanied by a group of covariates representing other factors that may drive the firm's decision to engage in combating gray market activity. The model is specified as follows:

$$\begin{aligned}
 I_{i,t} = & \alpha_0 + \alpha_1 \cdot \text{Brand Equity}_{i,t} + \alpha_2 \cdot \text{Innovation}_{i,t} + \alpha_3 \cdot \text{Profitability}_{i,t} + \alpha_4 \cdot \text{Sales Growth}_{i,t} \\
 & + \alpha_5 \cdot \text{Firm Size}_{i,t} + \alpha_6 \cdot \text{Firm Age}_{i,t} + \alpha_7 \cdot \text{Tobin } Q_{i,t} + \alpha_8 \cdot \text{Financial Leverage}_{i,t} \\
 & + \alpha_9 \cdot \text{Competitive Intensity}_{i,t} + \alpha_{10} \cdot \text{Industry Growth}_{i,t} + \theta \cdot \text{Year Dummies} \\
 & + \pi \cdot \text{Industry Dummies} + \varepsilon_{i,t}
 \end{aligned} \tag{3}$$

where $I_{i,t}$ denotes the choice variable that is equal to one if firm i announced a gray market combating action in year t and zero if it did not.

Event study. For testing hypothesis H₂, which represents the effect of gray market combating on the firm’s financial performance, we use the event study method. Event study is a well-established research technique that is grounded in the efficient market hypothesis, which is widely considered the workhorse of modern financial research. The efficient market hypothesis argues that stock markets are efficient because they demonstrate the collective rationality of investors. Hence, the current stock price incorporates all available public information about a firm and when new information becomes available the stock price adjusts to reflect the economic value of this information (Fama et al., 1969; Fama, 1991). Event study relies on stock market reaction to the announcement of new corporate events to estimate the effect of an event on the firm’s financial performance, as indicated by abnormal stock returns. Abnormal stock returns are calculated as the difference between *realized* stock returns (in the presence of an event) and *expected* stock returns (based on the movement of the overall stock market in the absence of the event) over a short period of time known as the “event window”. Expected stock returns are predicted using a benchmark asset pricing model such as the market-adjusted model, market model, or capital asset pricing model. For more details on event study technique, consult Sorescu, Warren, & Ertekin (2017), MacKinlay (1997), and Brown & Warner (1985).

Our event study model is specified as follows:

$$AR_{it} = R_{it} - E(R_{it}) \quad (4)$$

where AR_{it} , R_{it} , and $E(R_{it})$ represent the daily abnormal stock returns, realized stock returns, and expected stock returns of firm i on day t respectively.

$E(R_{it})$ is estimated using the 4-factor capital asset pricing model (Fama & French, 1993; Carhart, 1997), aka the Fama-French-Carhart model as per the following equation:

$$E(R_{it}) = \alpha_i + \beta_i R_{mt} + \delta_i SMB + \theta_i HML + \varphi_i UMD \quad (5)$$

where

R_{mt} denotes the overall stock market as reflected by a benchmark index (we use the CRSP value-weighted index) on day t , SMB (Small Minus Big) is the size factor i.e. the difference between the return on portfolios of small stocks (stocks with low market capitalization) and portfolios of large stocks (stocks with high market capitalization), HML (High Minus Low) is the value factor which represents the difference between the return on portfolios of value stocks (stocks with low Market-to-Book ratio) and portfolios of growth stocks (stocks with high Market-to-Book ratio), and UMD (Up Minus Down) represents the difference between the return on portfolios of high-performing stocks (stocks with high prior return) and portfolios of low-performing stocks (stocks with low prior return).

Coefficients α , β , δ , θ , and φ , are firm-level parameters estimated using ordinary least square (OLS) over a period of 365 days ending 15 days before the event (known as the expected or normal returns calibration window).

The next step in an event study is calculating the cumulative abnormal returns (CAR) by aggregating the daily abnormal returns over a short period of time known as the “event window” or “test window.” The event window, often represented as (t_1, t_2) , is a time window around an event that the researcher uses for the estimation of abnormal stock returns. Ideally, an event window should be long enough to account for pre-event *information leakage* and post-event *information dissemination*, yet short enough to reflect stock market efficiency and avoid contamination with adjacent events. Thus, a firm’s cumulative abnormal returns (CAR) over event window (t_1, t_2) is given by:

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it} \quad (6)$$

The event window we use in this study is a three day window starting at the day before the event and ending on the day after the event i.e. the event day is $t=0$ and the event window is $(-1,1)$. This window accounts for the aforementioned methodological concerns (leakage and dissemination effects) and also has the most significant average cumulative returns as well. Then, we calculate the cumulative average abnormal return (CAAR) which is the average of CARs for firms in our sample to be used in testing hypothesis H_2 :

$$CAAR(t_1, t_2) = \frac{1}{n} \sum_{i=1}^n CAR_i(t_1, t_2) \quad (7)$$

Multiple regression model (cross-sectional variations model). As discussed earlier, our focal dependent variable is the firm’s financial performance, operationalized as its CAR around an event over event window $(-1,1)$. To adjust for potential heteroskedasticity resulting from differences in the estimated variances and covariance of the residuals of the 4-factor model

among firms (Jain, 1982), some researchers (e.g., Raassens, Wuyts, & Geyskens, 2012; Homburg, Vollmayr, & Hahn, 2014) prefer using the standardized cumulative abnormal stock returns (SCAR) in the cross-sectional analysis. SCARs are obtained by scaling CARs using their standard deviation over the estimation period. Since both standardized (SCAR) and unstandardized (CAR) stock returns were used by previous research, we use both in our analysis to test the robustness of our results.

To test the rest of the hypotheses, i.e. the ones representing factors that govern the effect of gray market combating on financial performance, we specify the following model:

Effect of Gray Market Combating on Financial Performance (SCAR)

$$\begin{aligned}
 &= \beta_0 + \beta_1. Target\ of\ Action + \beta_2. Nature\ of\ Action_{Punitive} \\
 &+ \beta_3. Nature\ of\ Action_{Proactive} + \beta_4. Brand\ Equity + \beta_5. Innovation \\
 &+ \beta_6. Profitability + \beta_7. Sales\ Growth + \beta_8. Firm\ Size + \beta_9. Firm\ Age \\
 &+ \beta_{10}. Financial\ Leverage + \beta_{11}. Industry\ Growth \\
 &+ \beta_{12}. Competitive\ Intensity + \beta_{13}. Target\ of\ Action \times Brand\ Equity \\
 &+ \beta_{14}. Nature\ of\ Action_{Punitive} \times Brand\ Equity \\
 &+ \beta_{15}. Nature\ of\ Action_{Proactive} \times Brand\ Equity + \pi. Other\ Controls \\
 &+ \sigma. IMR + error\ term \qquad (8)
 \end{aligned}$$

where ‘Other Controls’ include industry fixed effects, time fixed effects, and the ADR/stock dummy; ‘IMR’ is the inverse Mills ratio estimated using Heckman’s self-selection procedure. We mean-centered all continuous explanatory variables.

3.6. RESULTS

In this section, we discuss our empirical findings and illustrate how they address the research questions outlined earlier in this study.

Research Question 1: Are firms with stronger brand equity more likely to engage in gray market combating to protect their brands (H₁)?

The results of the choice model estimation are presented in Table 3.6. To increase confidence in our results, we used two estimators: a longitudinal panel probit and a cross-sectional pooled probit (regular probit). Results of both estimators reveal a positive and significant effect for brand equity ($\alpha_1 = 0.280$, $p < 0.05$, $N = 37,386$) on the firm's likelihood to engage in gray market combating which provides support for H₁. The results also indicate that firm size, firm age, and profitability also increase the likelihood of engaging gray market combating.

Research Question 2: What is the effect of gray market combating on the firm's financial performance (H₂)?

As discussed earlier, to address this research question, we use the event study method. The results of event study analysis, using *Eventus*, indicate that announcement of a gray market combating initiative, on average, generates negative and statistically significant abnormal stock returns for both the full sample (CAAR = -0.56%, $p < 0.01$, $N = 341$) and the sample excluding confounding events (CAAR = -0.62%, $p < 0.01$, $N = 123$) which provides support for H₂. We present the event study results in Table 3.7, along with five parametric and non-parametric test statistics. In addition to the specified event window, we analyze the daily abnormal stock returns

for 15 days around the event (see Table 3.8) and the cumulative abnormal returns for several alternative event windows during the same period (see Table 3.9). We also present a graphical representation for both the daily and cumulative abnormal stock returns in Figure 3.3.

Table 3.6: Results of the Choice Model

Variable	Panel Probit Coefficient (SE)	Probit Coefficient (SE)
Brand Equity	0.280 (0.142)**	0.387 (0.126)***
Innovation	0.028 (0.108)	-0.037 (0.072)
Profitability	0.111 (0.041)***	0.113 (0.044)***
Sales Growth	-0.106 (0.109)	-0.192 (0.071)
Firm Size	0.003 (0.001)***	0.002 (0.000) [†]
Firm Age	0.013 (0.003) [†]	0.007 (0.001) [†]
Financial Leverage	-0.430 (0.383)	-0.0796 (0.168) [†]
Competitive Intensity	-0.125 (0.545)	-0.162 (0.156)
Industry Growth	0.001 (0.001)	0.001 (0.000)***
Tobin Q	-0.001 (0.002)	-0.001 (0.001)
Intercept	-6.375 (0.738) [†]	-3.372 (0.319) [†]
Industry Fixed Effects	Included	Included
Time Fixed Effects	Included	Included
Wald chi ²	151.95 [†]	346.01 [†]
N	37,386	37,386

*SE: robust standard errors. One-tailed tests of significance. * p<0.1 ** p<0.05 *** p<0.01 †p<0.001*

Besides, in Figure 3.4, we display the percentage of positive and negative cumulative abnormal returns for both samples - the full sample and the one without confounding events. As clearly evident in this figure, although financial markets on average react negatively to the announcement of anti-gray market initiatives, their reactions exhibit significant variations. This underscores the importance of the next section. In the next section, we analyze the cross-sectional variations in stock returns to identify the moderators that govern this relationship and act as levers that amplify, suppress, or reverse the effect of gray market combating on financial performance.

Table 3.7: Results of the Event Study

<i>Magnitude and Statistical Significance of Cumulative Average Abnormal Returns</i>		
	<i>Sample Excluding Confounding Events (N=123)</i>	<i>Full Sample (N=341)</i>
Cumulative Average Abnormal Returns CAAR(-1,1)	-0.62%	-0.56%
Statistical Significance - Parametric Test Statistics		
Standardized Cross-sectional z-test (Boehmer, Masumeci & Poulsen, 1991)	p<0.01	p<0.01
Time-Series Standard Deviation t-test (Brown & Warner, 1980, 1985)	p<0.05	p<0.01
Cross-sectional t statistic (Pilotte, 1992)	p<0.01	p<0.01
Statistical Significance - Non-parametric Test Statistics		
Generalized Sign Z (Cowan, 1992)	p<0.05	p<0.05
Rank Test (Corrado, 1989)	p<0.01	p<0.05
<i>2-tailed tests of significance</i>		

Table 3.8: Analysis of Daily Abnormal Stock Returns for 15 days around the event date ($t=0$)**Panel A: Daily Abnormal Stock Returns (AR) – Sample Excluding Confounded Events**

Event Day	Observations	Mean Abnormal Returns	Standardized Cross-sectional Z	t-value (time-series standard deviation)	t-value (cross-sectional standard deviation)	Generalized Sign Z (Non-Parametric)
-7	123	-0.27%	-1.214	-1.561	-1.554	-1.668 \$
-6	123	-0.05%	0.207	-0.277	-0.300	0.135
-5	123	-0.07%	-0.383	-0.430	-0.646	-0.766
-4	123	0.11%	1.266	0.643	0.492	1.398
-3	123	-0.17%	-1.362	-0.993	-1.077	-2.390 *
-2	123	-0.02%	-0.547	-0.116	-0.133	-0.766
-1	123	-0.45%	-2.740**	-2.635 **	-3.551***	-2.750**
0	123	-0.04%	-0.569	-0.214	-0.312	0.857
1	123	-0.14%	-1.010	-0.809	-1.006	-0.406
2	123	-0.15%	-1.048	-0.862	-0.727	-0.406
3	123	-0.22%	-1.528	-1.281	-1.296	-1.488
4	123	0.21%	0.500	1.227	1.093	1.037
5	123	0.19%	0.867	1.120	1.461	1.037
6	123	-0.05%	-1.355	-0.303	-0.262	-0.225
7	123	0.07%	-0.597	0.425	0.408	0.316

The symbols \$, *, **, and *** denote statistical significance at the 0.10, 0.05, 0.01 and 0.001 levels, respectively, using a two-tail test. ... Three parametric and one non-parametric test statistics are reported.

Panel B: Daily Abnormal Stock Returns (AR) – Full Sample

Event Day	Observations	Mean Abnormal Returns	Standardized Cross-sectional Z	t-value (time-series standard deviation)	t-value (cross-sectional standard deviation)	Generalized Sign Z
-7	341	-0.05%	-0.071	-0.438	-0.401	-0.405
-6	341	0.02%	0.128	0.177	0.190	0.895
-5	341	0.16%	0.793	1.329	1.310	-0.188
-4	341	-0.03%	0.203	-0.276	-0.282	0.245
-3	341	-0.04%	-0.253	-0.318	-0.391	-1.271
-2	341	0.00%	-1.025	0.007	0.009	-0.730
-1	341	-0.13%	-1.138	-1.093	-1.088	-1.596
0	341	-0.08%	-0.632	-0.698	-0.899	0.245
1	341	-0.34%	-2.908**	-2.908**	-2.873**	-2.463*
2	341	0.04%	-0.420	0.343	0.361	0.787
3	341	-0.24%	-2.584**	-1.990*	-1.985*	-3.438***
4	341	0.02%	0.224	0.186	0.179	0.570
5	341	-0.01%	-0.077	-0.073	-0.076	0.462
6	341	-0.09%	-1.876 \$	-0.774	-0.870	-0.621
7	341	0.11%	0.690	0.897	1.092	0.787

The symbols \$, *, **, and *** denote statistical significance at the 0.10, 0.05, 0.01 and 0.001 levels, respectively, using a two-tail test. Three parametric and one non-parametric test statistics are reported.

Table 3.9: Analysis of Cumulative Average Abnormal Returns for 15 days around the event date (t= 0)**Panel A: Cumulative Average Abnormal Stock Returns (CAAR) – Sample Excluding Confounded Events**

Event Window (days)	Observations	CAAR	Standardized Cross-sectional Z	t-value (time-series standard deviation)	t-value (cross-sectional standard deviation)	Generalized Sign Z
(-7,7)	123	-1.03%	-2.347*	-1.566	-1.566	-1.668 \$
(-6,6)	123	-0.84%	-2.007*	-1.367	-1.550	-1.488
(-5,5)	123	-0.74%	-1.805 \$	-1.311	-1.476	-1.127
(-4,4)	123	-0.86%	-2.022*	-1.679 \$	-1.731 \$	-0.947
(-3,3)	123	-1.17%	-2.976**	-2.611**	-2.701**	-2.570**
(-2,2)	123	-0.79%	-2.976**	-2.073*	-2.426*	-0.947
(-1,2)	123	-0.77%	-2.658**	-2.259*	-2.552*	-2.029*
(-2,1)	123	-0.64%	-2.499*	-1.886 \$	-2.524*	-1.127
(-1,1)	123	-0.62%	-2.597**	-2.111*	-2.832**	-2.570*
(0,2)	123	-0.32%	-1.471	-1.088	-1.088	-0.586
(-1,0)	123	-0.48%	-2.561*	-2.014*	-2.953**	-2.390*
(0,1)	123	-0.17%	-1.091	-0.723	-0.889	0.316

The symbols \$, *, **, and *** denote statistical significance at the 0.10, 0.05, 0.01 and 0.001 levels, respectively, using a two-tail test. Three parametric and one non-parametric test statistics are reported.

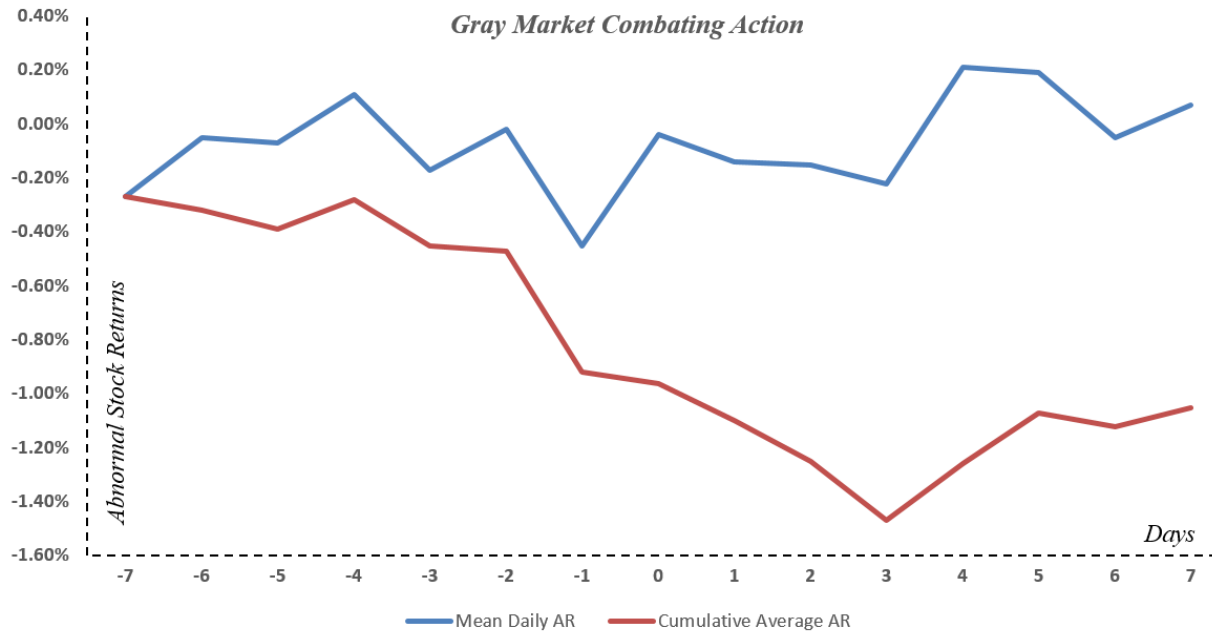
Cumulative Average Abnormal Stock Returns (CAAR) – Full Sample

Event Day	Observations	CAAR	Standardized Cross-sectional Z	t-value (time-series standard deviation)	t-value (cross-sectional standard deviation)	Generalized Sign Z
(-7,7)	341	-0.67%	-2.220*	-1.454	-1.554	-0.946
(-6,6)	341	-0.72%	-2.553*	-1.689 \$	-1.823 \$	-1.055
(-5,5)	341	-0.65%	-2.336*	-1.656 \$	-1.711 \$	-0.946
(-4,4)	341	-0.80%	-2.832**	-2.249*	-2.325*	-2.030*
(-3,3)	341	-0.79%	-3.246**	-2.516*	-2.682**	-2.571*
(-2,2)	341	-0.52%	-2.659**	-1.945 \$	-2.101*	-1.488
(-1,2)	341	-0.52%	-2.581**	-2.178*	-2.386*	-1.488
(-2,1)	341	-0.56%	-2.887**	-2.346*	-2.492*	-1.271
(-1,1)	341	-0.56%	-2.861**	-2.713**	-2.939**	-2.030*
(0,2)	341	-0.39%	-2.187*	-1.884 \$	-1.947 \$	-1.271
(-1,0)	341	-0.21%	-1.326	-1.267	-1.458	0.513
(0,1)	341	-0.43%	-2.533*	-2.550*	-2.698**	-0.838

The symbols \$, *, **, and *** denote statistical significance at the 0.10, 0.05, 0.01 and 0.001 levels, respectively, using a two-tail test. Three parametric and one non-parametric test statistics are reported.

Figure 3.3: Daily and Cumulative Average Abnormal Stock Returns over 15 days around the event date (day 0)

Sample Excluding Confounding Events (N=123):



Full Sample (N=341):

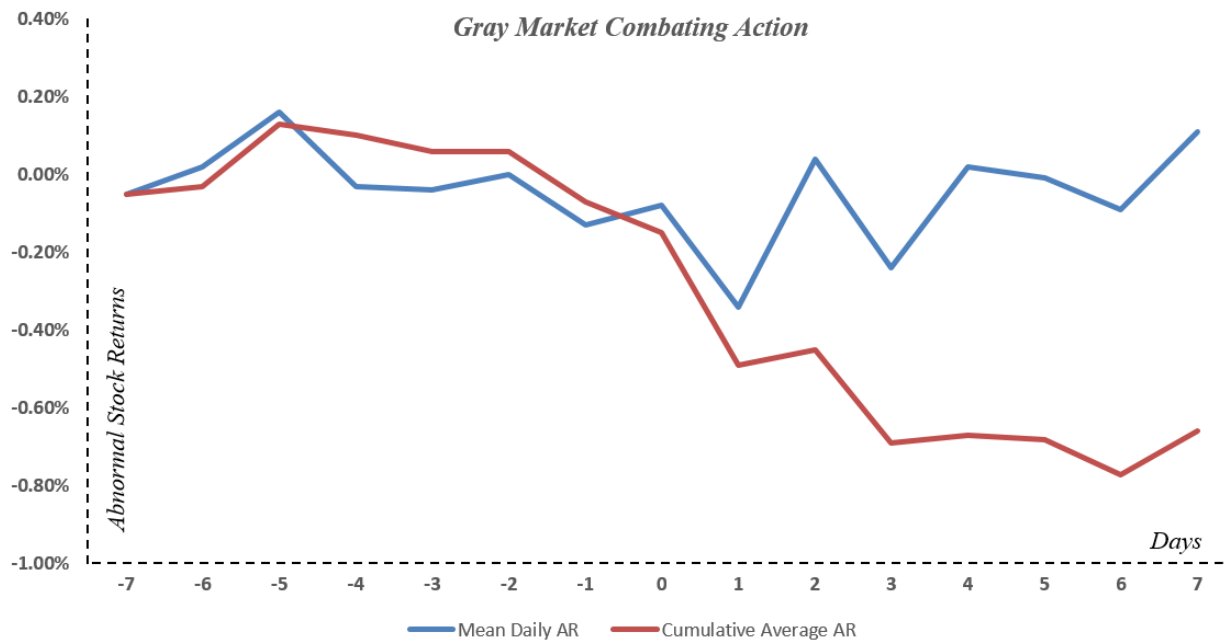
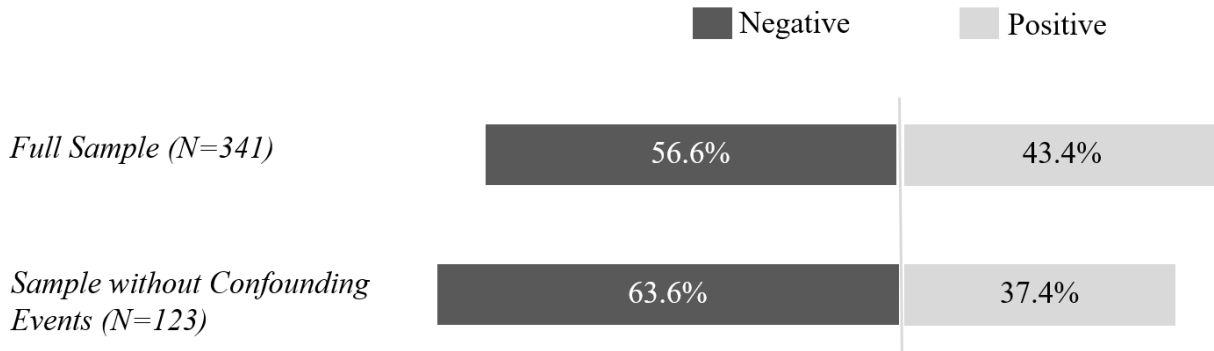


Figure 3.4: Percentage of Events Generating Positive vs. Negative Stock Returns, CAR (-1,1)



Research Question 3: What are the factors and contingencies that govern the effect of gray market combating on the firm's financial performance? Does brand equity play a role? (H₃-H₁₂).

To answer this question, we use multiple regression analysis (OLS). The descriptive statistics and correlations are presented in Table 3.10 and the regression estimation results in Table 3.11. As illustrated in Table 3.11, we use both the standardized (SCAR) and unstandardized (CAR) cumulative abnormal returns in our analysis, as well as both the full sample and the reduced sample (excluding confounding events) to check the consistency of our results. Since our main effect (the effect of gray market combating on financial performance) is negative, it is relevant here to remind that for a moderation hypothesis to be supported, the sign of the regression coefficient should be the inverse of the moderation direction in the hypothesis.

Table 3.10: Descriptive Statistics and Correlations

Variable	N	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Financial Performance (CAR)	341	-0.56	3.50	1												
2. Target of Action	358	0.19	0.39	0.13	1											
3. Nature of Action - Punitive	358	0.38	0.49	0.02	-0.06	1										
4. Nature of Action - Proactive	358	0.16	0.35	-0.03	0.08	-0.32	1									
5. Brand Equity	348	0.03	0.03	0.08	-0.06	0.06	-0.11	1								
6. Innovation	354	0.10	0.07	-0.01	-0.09	-0.29	0.05	-0.04	1							
7. Profitability	355	0.10	0.14	0.08	-0.00	-0.13	-0.07	0.08	0.11	1						
8. Sales Growth	355	1.07	0.20	-0.11	0.08	-0.00	-0.02	-0.04	0.00	0.24	1					
9. Firm Size	356	106.40	93.38	0.11	0.22	0.17	0.05	0.04	-0.30	-0.11	-0.14	1				
10. Firm Age	355	83.25	63.57	0.07	0.01	-0.10	-0.12	0.08	0.03	0.18	-0.02	0.12	1			
11. Financial Leverage	355	0.14	0.12	0.10	-0.07	0.04	-0.15	0.04	-0.19	-0.05	-0.17	0.18	0.24	1		
12. Competitive Intensity (HHI)	355	0.25	0.19	-0.06	-0.02	0.20	0.02	-0.13	-0.42	-0.32	-0.04	0.08	-0.26	-0.03	1	
13. Industry Growth	355	3.15	5.70	-0.02	-0.12	-0.10	-0.11	0.02	0.30	0.14	-0.01	-0.10	0.10	-0.00	-0.27	1

Table 3.11: The Effect of International Gray Market Combating on Financial Performance

Dependent Variable: CAR (-1,1)		Sample without Confounding Events				Full Sample	
		Standardized	Standardized	Standardized	Unstandardized	Standardized	Unstandardized
Target of Action ^a							
Consumer	H ₇		0.044 (0.232)	0.000 (0.256)	-0.047 (0.805)	0.343 (0.144)***	0.917 (0.505)**
Nature of Action							
Punitive Action ^b	H ₁₁		-0.044 (0.177)	-0.047 (0.182)	-0.115 (0.627)	0.100 (0.134)	0.069 (0.492)
Proactive Action ^c	H ₉		0.116 (0.234)	0.066 (0.225)	-0.157 (0.857)	0.084 (0.216)	-0.627 (0.793)
Brand Equity	H ₃		3.440 (1.902)**	9.636 (4.249)**	31.769 (14.397)**	10.592 (3.595)***	29.782 (12.057)***
Innovation	H ₆		-2.267 (1.919)	-2.782 (1.945)*	-7.460 (6.227)	-0.084 (1.341)	4.473 (4.415)
Profitability	H ₅		0.684 (0.471)*	0.731 (0.463)*	2.957 (2.002)*	0.509 (0.379)*	3.526 (1.562)**
Sales Growth	H ₄		-1.081 (0.500)**	-1.115 (0.520)**	-2.216 (1.410)*	-0.777 (0.293)***	-2.269 (0.947)***
Target of Action x Brand Equity	H ₈			-3.729 (12.225)	-24.147 (36.874)	-10.407 (7.537)*	-41.221 (24.057)**
Punitive Action x Brand Equity	H ₁₂			-6.631 (4.628)*	-25.484 (14.915)**	-10.840 (3.906)***	-32.013 (13.326)***
Proactive Action x Brand Equity	H ₁₀			-8.564 (4.316)**	-28.194 (14.451)**	-11.403 (4.456)***	-23.644 (15.384)*
Control Variables							
Firm Size		-0.001 (0.001)	-0.001 (0.001)	-0.002 (0.001)*	-0.004 (0.004)	-0.000 (0.001)	0.002 (0.003)
Firm Age		0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	-0.001 (0.004)	-0.000 (0.001)	-0.001 (0.003)
Financial Leverage		0.783 (0.705)	0.180 (0.771)	0.119 (0.779)	2.216 (2.599)	0.488 (0.535)	3.496 (2.110)**
Industry Growth		-0.005 (0.010)	0.000 (0.010)	-0.001 (0.010)	-0.040 (0.035)	0.002 (0.011)	-0.002 (0.030)
Competitive Intensity		-0.656 (0.368)**	-0.547 (0.407)*	-0.558 (0.455)	-2.144 (1.568)*	-0.821 (0.429)**	-1.856 (1.631)
Inverse Mills Ratio (IMR)		0.024 (0.114)	0.051 (0.108)	0.064 (0.111)	-0.092 (0.372)	-0.070 (0.109)	-0.405 (0.410)
Time Effects		Included	Included	Included	Included	Included	Included
Industry Effects		Included	Included	Included	Included	Included	Included
R ²		7.86%	16.94%	19.3%	15.81%	11.48%	11.34%
F		0.81	1.33*	3.29***	1.71**	1.92***	2.22***
N		121	121	121	121	339	339

* p<0.1 ** p<0.05 *** p<0.01

Robust standard errors are in parentheses. One-tailed tests of significance.

CAR: Cumulative Abnormal Returns.

^a A dummy set to one if the target of action is the consumer and zero otherwise^b A dummy set to one if the action is of punitive nature and zero otherwise.^c A dummy set to one if the nature of action is proactive (as per Cavusgil & Sikora (1987) classification) and zero otherwise

Time dummies, industry dummies, ADR dummy, and intercept are included but not presented for parsimony.

As illustrated in Table 3.11, the results provide support for hypothesis H₃ ($\beta = 9.636$, $p < 0.05$) indicating that brand equity mitigates the negative effect of gray market combating on the firm's financial performance. We also find support for H₅ ($\beta = 0.731$, $p < 0.1$), which argues that profitability alleviates the negative effect of gray market combating on financial performance. Likewise, our results lend support for H₄ ($\beta = -1.115$, $p < 0.05$), which represents the third leg of the gray market triangle, sales growth, confirming that sales growth aggravates the negative effect of gray market combating on financial performance. These effects remain consistent across all models and actually become more statistically significant when the full sample is used due to the enhancement in statistical power resulting from sample size increase.

Regarding H₆, which posits that innovation exacerbates the negative effect of gray market combating on financial performance, we found some evidence in support of this hypothesis ($\beta = -2.782$, $p < 0.1$). However, the results are not consistent across all models.

Concerning hypotheses H₇, H₉, and H₁₁, which represent some attributes of the gray market combating action, we do not find support for the two hypotheses capturing the nature of action. Therefore, we reject hypotheses H₉ and H₁₁. On the other hand, we identify some evidence in support of the target of action hypothesis, H₇, in some of the models ($\beta = 0.343$, $p < 0.01$). However, the evidence is not consistent across all models⁸.

With respect to the interaction terms hypotheses, we find support for H₁₂ ($\beta = -6.631$, $p < 0.1$) and H₁₀ ($\beta = -8.564$, $p < 0.05$). This suggests that, although the nature of the combating action does not have a direct effect on the link between gray market combating and financial

⁸ We also applied a more detailed taxonomy for the target of action variable by using a group of dummies that encode whether the anti-gray market action targets the sales-side (gray products seller), supply-side (product diverter), demand-side (consumer), or the industry as a whole (e.g. legislations); the results remained consistent for all tested hypothesis.

performance, it has a bearing on the influence of brand equity on that link. In particular, anti-gray market actions that have a punitive or proactive nature weaken the benign influence of brand equity on the link between gray market combating and financial performance. These two effects are consistent across all models and indeed become more significant in the larger sample due to the enhancement in statistical power. Turning to H_8 , which represents the influence of the target of action on the benign effect of brand equity on the link between gray market combating and financial performance, we find some support for hypothesis in two of the models ($\beta = -10.407, p < 0.1$). That said, the evidence is not consistent across all models. This indicates that when the target of action is the consumer, the positive effect of brand equity on the link between gray market combating and financial performance becomes weaker. For additional validation of the abovementioned results, see the robustness checks section and Appendix B – Table B.5 where additional six models are specified and tested. For a summary of hypothesized effects and their results see Appendix B – Table B.6.

Additional Robustness Tests

In addition to the various robustness tests we mentioned earlier, which are: (a) using both cross-sectional (pooled) probit and panel probit for choice model estimation, (b) using a combination of five parametric and non-parametric test statistics in the event study analysis, (c) using both the standardized and unstandardized cumulative abnormal returns in our regression analysis, and (d) using both the full sample and the sample without confounding events in all our analyses, we conducted a battery of additional robustness and sensitivity checks to further validate the consistency of our results. We detail them in the following paragraphs:

1. *Alternative estimations of abnormal returns*: our abnormal stock returns estimation is based on the four-factor model (Fama-French-Carhart model) with a value weighted CRSP index as the benchmark index. To check the robustness of our results, we re-estimated abnormal stock returns using the three-factor model (Fama-French model), the market model, and the market-adjusted model, in combination with both an equally-weighted and a value-weighted CRSP index as benchmark indices, over both the full sample and the sample without confounding events. The results remained highly consistent over five test statistics. We report the results in Appendix B – Table B.1.

2. *Alternative calibration (estimation) windows*: our calibration window for estimating normal (expected) returns, i.e. estimating the coefficients of the four-factor model, are based on a 365-day window ending 15 days before the event. We re-estimated CAAR using alternative calibration windows of the same length ending 30, 45, and 60 days before event. The results remained consistent. Furthermore, we re-estimated CAAR using shorter calibration windows (255 days and 120 days) ending at different distances from the event (15, 30, 45, and 60 days before event). The results also remained consistent for all these combinations.

3. *Alternative event windows*: in our analysis, we used a (-1,1) event window to capture the cumulative abnormal returns generated by the announcement of an anti-gray market initiative. However, as evident in Table 3.9, the results are consistent over different event windows.

4. *Alternative test statistics for testing CAAR statistical significance*: to test the sensitivity of event study results to the choice of tests statistic, we relied on a combination of five parametric and non-parametric test statistics (see Tables 3.6, 3.7, and 3.8): (a) the standardized cross-sectional z-test (Boehmer, Masumeci & Poulsen, 1991) which is robust to event-induced heteroskedasticity, serial autocorrelation, and event clustering (e.g., Chen, Ganesan, & Liu, 2009), (b) the time-series standard deviation t-test (Brown & Warner, 1980, 1985), aka the crude dependence test statistic, which enhances variance estimation by controlling for possible cross-sectional correlation in the abnormal returns (e.g., Geyskens, Gielens, & Dekimpe, 2002), (c) the cross-sectional t-stat (Pilotte, 1992; Brown & Warner, 1985) which is the simplest available parametric test statistic for event studies (e.g., Fang, Lee, & Yang, 2015), (d) the non-parametric generalized sign Z (Cowan, 1992) which is effective in the case of event-induced volatility and outliers (e.g., Swaminathan & Moorman, 2009), and (e) the non-parametric rank test (Corrado, 1989) which is powerful with short event windows, robust to even-induced volatility and outliers, and uses ordinal information on returns rather than magnitude (e.g., Wiles et al., 2010). In addition to these five test statistics, we used also the Patell Z (Patell, 1976) test, which is robust to biases resulting from stock returns with high standard deviations (e.g., Gielens et al., 2008; Sadovnikova & Pujari, 2017), and the adjusted Patell Z, which corrects for serial dependence between abnormal returns (Mikkelsen & Partch, 1988). Both test statistics reported similar robust results.

5. *Alternative estimator for abnormal returns*: as per common practice, the abnormal returns model was estimated using OLS. To test the sensitivity of CAAR to alternative estimators, we re-estimated the abnormal returns model using the Scholes-Williams estimation method, which corrects for some potential biases in betas estimation due to nonsynchronous data and price adjustment delays (Scholes & Williams, 1977). The results remained consistent (CAAR = -0.56%; $p < 0.01$).

6. *ADR-only and stock-only subsamples*: to further check the robustness of our results, we divided each of the samples, the full sample and the one without confounding events, into two subsamples: a stock-only sample and an ADR-only sample. We estimated the CAAR for each of the four subsamples. The results remained consistent (Appendix B – Table B.2).

7. *Outliers*: one of the common concerns in event studies is the presence of extreme observations (outliers) among abnormal returns. Thus, to test the robustness of our results to the presence of outliers, we calculated the cumulative average abnormal returns after trimming our sample at four different levels (e.g., Tellis & Johnson, 2007; Swaminathan, Murshed, & Hulland, 2008). Specifically, we excluded the 95% and 5% percentiles, the 90% and 10% percentiles, the 85% and 15% percentiles, and the 80% and 20% percentiles. The results remained consistent (see Appendix B – Table B.3).

8. *Bootstrapping*: despite the normal distribution assumption underlying event study, empirical evidence suggests that stock returns tend to exhibit significant levels of skewness and/or kurtosis (Brown & Warner, 1985; McWilliams & Siegel 1997). Hence, to account for this concern and to enhance the external validity of our results, we bootstrapped all parametric test statistics (e.g., Fornell et al., 2006) for all the alternative model specifications reported in Appendix B – Table B.1. The results of bootstrapped test statistics validate the earlier reported results.

9. *Long-term abnormal stock returns*: To check whether shareholders adjust or change their reactions in the long-term as more details about the event become available, we follow prior research (e.g., Raassens, Wuyts, & Geyskens, 2012; Homburg, Vollmayr, & Hahn, 2014) and examine the long-term abnormal stock returns using long-term event study. We estimated buy-and-hold abnormal returns (BHAR) for the periods 12, 18, and 24 months following the event, for both the full sample and the sample excluding confounding events. The results remained consistent. For additional validation, we bootstrapped the test statistics for the long-term event study as well, the results remained consistent. Furthermore, we re-estimated the long-term abnormal stock returns using an alternative method, the calendar-time portfolio method (e.g., Sorescu, Shankar, & Kushwaha, 2007), for the same periods and for both samples. The results remained consistent. The long-term event study results are available in Appendix B – Table B.4.

10. Alternative model specifications and estimators for the cross-sectional variations

model (multiple regression model): the most common estimator for cross-sectional variation analysis is ordinary least square (OLS). However, some researcher opt for other estimators such Maximum Likelihood estimators (e.g., Rao, Chandy, & Prabhu, 2008; Sadovnikova & Pujari, 2017; Wiles et al., 2010). To increase confidence in our results and rule out some statistical biases, we specified three alternative models and estimated them using Maximum Likelihood.

First, we specified a Generalized Linear Model (GLM). GLM models allow the dependent variable to be non-normally distributed, i.e. relaxes the normal distribution assumption underlying OLS, and allow standard errors to be non-normally distributed as well. Thus, they correct for statistical biases resulting from outliers and error autocorrelation. Besides, it is estimated using Maximum Likelihood rather than OLS. We fitted a GLM model to test the robustness of our results. As demonstrated in Appendix B – Table B.5, all supported hypotheses remained virtually unchanged and the results remained stable for both the full sample and the reduced sample.

Second, we specified two Multi-level Mixed-Effects Linear Models (hierarchical models). Mixed linear models account for intra-class correlations that might arise from the hierarchical nature of the data and the lack of independence between observations nested within the same firm (multiple events by the same firm) or within the same industry (multiple firms within the same industry). Moreover, they model both fixed and random effects to account for unobserved firm- or industry- level heterogeneity and the longitudinal nature of the data. Besides, they are estimated

using maximum likelihood rather than OLS. Hence, we specified two mixed linear models and estimated them using Maximum Likelihood. The first is a two-level hierarchical linear model nested by industry and the second is a three-level hierarchical linear model nested by industry and by firm. Results remained consistent for both the full sample and the sample without confounding events. The results of this section are presented in Appendix B – Table B.5.

3.7. *DISCUSSION*

In this section, we discuss the theoretical, managerial, and policymaking implications of our research, then we highlight some of its limitations and suggest directions for future research.

3.7.1. *Theoretical Contributions*

This study, which to the best of our knowledge is the most extensive study in the gray marketing literature (whether in terms of the number and scope of companies it involves or the time horizon it covers), contributes to the advancement of theory, both in marketing and in business management in general, in a number of ways.

First and foremost, we contribute to gray market theory. The gray marketing literature is multidisciplinary in nature and spans a number of disciplines such as marketing (e.g., Autrey, Bova, & Soberman, 2014; Antia et al., 2006), operations management (e.g., Ahmadi, Iravani, & Mamani, 2017; Shao, Krishnan, & McCormick, 2016), international business (e.g., Myers, 1999), economics (e.g., Yeung & Mok, 2013), entrepreneurship (e.g., Lim, Lee, & Tan, 2001), and accounting (e.g., Autrey & Bova, 2011). Therefore, the theoretical implications of this study

extend well beyond marketing to reach other adjacent disciplines. Gray marketing is an original business phenomenon that has received a considerable amount of research attention in different disciplines during the past three decades. That said, due to the unavailability of data and other empirical challenges, the vast majority of scholarly work on this topic remains analytical or conceptual, with very limited empirical work (see the literature review section in this article) and many focal questions unanswered. Therefore, this study adds to this limited body of empirical research by addressing some of the central unanswered questions in the gray market area.

Theoretically, we put forward a conceptual framework that illustrates the effect of gray market combating on financial performance and the contingencies that govern this effect. Empirically, we test this model using a variety of methodological approaches and document the first empirical evidence on the link between gray marketing combating and financial performance. We find that, on average, gray market combating has a negative bearing on the firm's financial performance. However, this effect exhibits significant variations depending on a number of contingencies such as brand equity, innovation, profitability, and sales growth. In particular, firms with stronger brand equity are not only more likely to engage in gray marketing combating, but also less susceptible to the negative financial consequences of such practice. Similarly, more profitable firms are more resilient to the negative financial implications of gray market combating. On the other hand, sales growth and innovation exacerbate the negative financial implications of combating gray market activity. These new insights advance our understanding of the gray market phenomenon by addressing a number of long-standing research questions about this interesting business phenomenon.

Second, we contribute to the brand equity literature. Brand equity is a central construct in marketing theory and a key element in most firms' marketing strategies. Therefore,

understanding how it influences other elements of marketing strategy, such as product, promotion, and channel, is of great theoretical and substantive importance. In their review of the literature on the influence of brand equity on different elements of marketing strategy, Hoeffler and Keller (2003) conclude that the most neglected research area in this literature is how brand equity impacts distribution channels strategy and tactics. Indeed, extant research on this topic is not only scant, but also restricted to a single aspect of channel strategy, *channel coordination*, and relies almost completely on grocery stores scanner data (e.g., Farris, Olver, De Kluyver, 1989; Besanko, Dubé, & Gupta, 2005). This study takes a different approach in that it focuses on understanding the influence of brand equity on *channel management* (gray marketing is a form of unauthorized distribution i.e. a channel management concern) and also uses a more comprehensive, novel data set. In doing so, we shed the light on an instrumental role for brand equity in distribution channels: brand equity not only shapes the firm's channel management behavior (firms with higher brand equity are more likely to engage in gray market combating), but also determines the financial efficacy of such behavior (brand equity mitigates the negative financial consequences of gray market combating).

Third, we contribute to the channel management literature in marketing. In addition to its two central constructs, channel power and channel conflict (Frazier & Sheth, 1985), this literature stream looks at other facets of distribution channel management such as supply chain logistics (e.g., Mentzer, Flint, & Hult, 2001), intra-channel communications (e.g., Mohr & Nevin, 1990), performance monitoring (Heide, Wathne, & Rokkan, 2007), exclusive territories (Dutta, Bergen, & John, 1994), and unauthorized distribution (Howell et al., 1986). This study adds to the unauthorized distribution stream within the channel management literature by

examining the financial consequences of gray marketing combating and the contingencies that govern these consequences.

Fourth we contribute to the marketing interactions literature, i.e. the research stream that focuses on understanding how different elements of marketing strategy interact with and affect each other (Gatignon & Hanssens, 1987; Srinivasan, 2006). In this study, we examine a phenomenon that occurs at the brand-channel interface, which remains one of the most underresearched areas in the literature. We discover an interesting, novel interaction between brand and channel in which brand equity not only motivates certain channel management behavior (gray market combating), but also plays a major role in determining the financial outcomes of this behavior.

Fifth, we also contribute to the burgeoning marketing-finance interface literature – a research stream that is concerned with understating the effect of marketing strategies/actions on shareholder wealth. Despite the richness and diversity of the marketing-finance interface literature, research on the impact of channel decisions on shareholder wealth remains insufficient. Indeed, our knowledge in this area is for the most part about the impact of channel expansion decisions on shareholder wealth (Homburg, Vollmayr, & Hahn, 2014; Geyskens, Gielens, & Dekimpe, 2002; Cheng et al., 2007). This study extends our understanding about the effects of distribution decisions on shareholder wealth beyond channel expansion.

Finally, on the method front, we contribute to the ongoing debate in marketing, as well as in other disciplines, on whether it is necessary to exclude confounding events before conducting an event study (e.g., Sadovnikova & Pujari, 2017), or it is an unnecessary effort (e.g., Ertekin, Sorescu, & Houston, 2018) given the reduction in sample size and loss in statistical power it

causes. In this study, we follow a novel approach and conduct all our analyses, including the cross-sectional variations analysis and robustness tests, using both the full sample and the sample without confounding events. Our results lend strong support to the view that emerged from the recent review of the event study methodology in marketing which argues that “eliminating confounded observations may be unnecessary for short-term event studies.” (Sorescu, Warren, & Ertekin, 2017, p.192).

3.7.2 *Managerial Implications*

Gray marketing is a prevalent business phenomenon that “occurs in almost every manufacturing industry” (Myers & Griffith, 1999, p.3). Its scale is huge (exceeds \$60 Billion in some industries) and its scope ranges from basic consumer goods such as beverages, polo shirts, and batteries to the most sophisticated industrial and hi-tech equipment. That said, managers, as well as scholars, are equivocal about the best course of action for dealing with gray markets. Current practices cover the entire spectrum of possible strategies: from combating, to ignoring, to learning to live with, to encouraging, or even to participating in gray marketing. This makes the findings of this research of great importance to managers since it provides them with a number of valuable, actionable insights that help them in dealing with the gray market phenomenon.

First, the effect of gray market combating on financial performance is on average negative. This suggests that: (a) either the benefits of the gray market outweigh its risks, or (b) the cost of combating gray market activity exceeds the gains, or (c) the fight against the gray market is a futile fight. That said, this effect is not uniform across all firms and several factors can aggravate, mitigate, or even reverse it. Therefore, firms should not engage in gray market

combating haphazardly, or just because the competition is doing so, but rather should be mindful and choose the right course of action that best fits their strategic assets, financial situation, and market dynamics. Specifically, more profitable firms and firms with higher brand equity seem to be less susceptible to the negative financial implications of gray market combating. Conversely, more innovative firms or firms that are in a growth phase tend to be more vulnerable to the negative financial implications of gray market combating.

Second, when a firm decides to take an action against gray market activity it should pay attention to the target of its action and the nature of that action. Combating actions that are of punitive or proactive nature should be avoided since they weaken the buffering effect of brand equity against the negative financial implications of gray market combating. On the other hand, combating actions that target the consumer seem somehow less harmful than those targeting channel intermediaries.

Third, before a firm engages in a fight against the gray market, it may be helpful to effectively communicate with its shareholders and provide them with sufficient details about the nature of its combating action and why it has decided to undertake such action. Evidence from this study suggests that investors' reaction to anti-gray market initiatives is indeed nuanced and exhibits significant variations based on several action-, firm-, and market- level factors.

In Table 3.12, we present a number of actionable takeaways for practitioners to help them in dealing with gray market activity.

Table 3.12: Managerial Takeaways

Managerial Question	Recommendation	Underlying Logic
In general, should a firm tolerate or fight the gray market?	In general, a firm is financially better off by not wrestling with the gray market, as long as its effect on profits and/or brand is not concrete and severe.	On average, gray market combating has an adverse effect on the firm’s financial performance (at least from a shareholder perspective).
Which factors make the firm in a better/worse position when battling the gray market?	Firms with higher brand equity are more resilient to the negative financial implications of gray market combating.	As evidenced in this study, brand equity has a buffering effect against the negative financial consequences of gray market combating.
	More profitable firms are less susceptible to the negative financial consequences of gray market combating.	Evidence from this study reveals that firm profitability mitigates the negative effect of gray market combating on financial performance.
	When a firm is in a growth phase, witnessing growing demand and sales growth, it should abstain from combatting gray markets.	As evidenced in this study, sales growth aggravates the negative financial implications of gray market combating.
Any advice to managers who decide to engage in a fight with the gray market?	More innovative firms are more vulnerable to the adverse financial implications of gray market combating.	Evidence from this research suggests that as firm innovation increases, the negative financial consequences of gray market combating intensify.
	Avoid actions of punitive or proactive nature.	As evidenced in this study, punitive and proactive actions weaken the buffering effect of brand equity.
	Combating actions that target the consumer, rather than the channel, tend to have a milder effect on financial performance.	This study provides some evidence that consumer-targeting anti-gray actions are relatively less harmful to financial performance, in comparison with those targeting other parties (e.g., channel intermediaries).

3.7.3 *Implications for Policymakers*

A group of scholars (Lim, Lee, & Tan, 2001; Xiao, Palekar, & Liu, 2011; Dasu, Ahmadi, & Carr, 2012; Autrey, Bova, & Soberman, 2014) argues that “gray markets [are] anything but disadvantageous for manufacturers” (Coughlan & Soberman, 1998) and even “though the global gray markets can make channel management a painful exercise, the damage is insufficient to warrant prohibition by public agency” (Bucklin, 1993). Another group (Antia et al., 2006; Assmus & Wiese, 1995; Weigand, 1991; Cespedes, Corey, & Rangan, 1988; and Cavusgil & Sikora, 1987) argues that “the problems associated with this activity tend to outweigh its benefits” (Myers & Griffith, 2000). Yet, to date, academic research does not provide regulators with any solid empirical evidence that helps them lean one way or another. In point of fact, most scholarly recommendations to policymakers are based on conceptual arguments, analytical models, or small-scale survey-based studies. Accordingly, regulatory/legal position on gray markets varies significantly from one jurisdiction to another (from legalizing, to preventing, to adopting a mixed policy, to dealing with it on a case-by-case basis) and sometimes from one incident to another. This research puts in the hands of policymakers an empirical evidence that helps them deal with this highly controversial business phenomenon, which “confronts a variety of pragmatic issues concerning financial, legal, and marketing matters... [and] also involves more ethereal philosophical and ethical questions such as property rights and the right to free ride on assets owned by others” (Weigand, 1991). Our findings substantiate the view that gray market combating is, in general, not in the best financial interest of the firm because its costs seem to outweigh the benefits. Furthermore, our results may be interpreted as an initial indication that the net effect of gray markets on firm performance is rather benign. Perhaps this why many

scholars and practitioners strongly believe that most companies choose to turn a blind eye to the gray market or are even implicated in facilitating it.

3.7.4. Limitations and Directions for Future Research

The findings of this study should only be considered and interpreted in light of the limitations and assumptions underlying the methods and data set it relies on. First, the universe of companies under investigation is limited to publicly-traded corporations that are listed on US stock exchanges. However, there are many privately-held companies that are active in gray market combating (e.g., Levis Strauss) which are not covered in this study. So, future research could examine the validity of our results for privately-held companies. Second, as with all event studies, we observe the impact of the announcement of a corporate action, rather than the enactment of the action, on financial performance as reflected by abnormal stock returns. Whereas this measure represents a strong, reliable indicator of the impact of the action itself⁹, a claim of a one to one, simultaneous relationship between the announcement and the enactment/implementation of the action cannot be objectively made. Third, we know that brand equity is a major driver of the firm's decision to engage in gray market combating and also a key determinant of the financial efficacy of such behavior. However, what we do not know or observe is whether gray market combating really enhances/preserves brand equity. To complete the picture, future research may explore the impact of gray market combating on brand equity to verify this widely accepted idea. Fourth, our measure of financial performance is stock market

⁹ Due to market efficiency and the strict statutory obligations (e.g., SEC) that mandate public firms to make proper and timely announcements about any meaningful corporate actions/news that may impact financial performance and shareholder wealth.

returns -- a reflection of investors' expectations of the future cash flows that will be generated by the event under study, discounted by time and risk -- which, though widely acceptable, reliable, and forward-looking, is not the only available measure. Future research can use alternative measures of firm performance to test the validity of our findings. Fifth, whereas this study examines the roles of all three sides of the gray market triangle (market-based assets, sales growth, and profitability) in the gray market combating equation, our investigation of market-based assets is limited to brand equity, due to data availability. Future research could extend this work by exploring whether channel equity, the other relevant market-based asset, plays a role in the relationship between gray market combating and financial performance. Channel equity reflects the relational capital a manufacturer garners throughout its relationship with its channel partners in the form of interdependence, communication, commitment, and trust. Since, gray marketing is a form of intra-brand competition between authorized and unauthorized sellers, it makes sense to explore the role of channel equity in the gray market combating equation. Sixth, whereas we follow the standard procedure in event studies and correct for self-selection bias as the common source of endogeneity in cross-sectional variations models, we do not account for other possible sources of endogeneity. For instance, some of the predictors in this model (e.g., brand equity, innovation, and firm age) might have an influence on other predictors (e.g., target of action, nature of action) while at the same time influencing the outcome variable (financial performance) which can lead to potential endogeneity issues. Seventh, whereas the results of this study may serve as an indirect indication of a net positive effect for gray markets on firm performance, it is by no means a direct test for such effect. Future research could explore this important, pending empirical question, perhaps using field experiments or some other techniques, even though it is admittedly a challenging task due to the interplay of many factors

(Bucklin, 1993). Finally, we hope that the findings of this research provide useful guidance to managers and inspire further academic research on this interesting, underresearched phenomenon.

4. Gray Market Combating Mechanisms: An Empirical Investigation of Financial Efficacy and Drivers of Choice

4.1. ABSTRACT

In their efforts to deal with gray markets, managers rely on different combating mechanisms. Whereas these mechanisms have been established in the literature for more than three decades, our understanding of their efficacy, as well as the factors that drive the firm's choice of one mechanism or another, remains limited. To inform practice and attend to this research imperative, we conduct a comprehensive review of the gray market combating mechanisms present in the literature, discuss existing theoretical views about them, and undertake the first scientific assessment of their financial efficacy using a unique data set and a novel methodological approach. Our results reveal that the majority of available gray market combating mechanisms are financially ineffective, with the exception of three mechanisms. Moreover, we observe that the most popular combating mechanisms among practitioners are indeed the financially ineffective ones, while the few effective ones seem to be largely underutilized. Then, we delve into a number of firm-level factors that may underlie the firm's choice of a particular gray market combating mechanism and provide a detailed picture of how those factors (resource availability, brand equity, innovation and technological capabilities, firm age, profitability, and firm growth) influence the choice of each combating mechanism. The findings of this study address some focal, long-standing research questions in the gray market literature and present valuable, actionable insights to managers and policymakers.

Keywords: gray market, parallel importation, brand equity, channel management, stock returns.

“Most strategies to combat gray market activities are expensive, ineffective, or both.”

(Howell et al., 1986)

4.2. INTRODUCTION

Gray markets are unauthorized distribution channels that sell authentic, branded products¹⁰ without the permission of trademark owners (Duhan & Sheffet, 1988; Myers, 1999; Bucklin, 1993). They have been around for decades and have always constituted a fixture of international commerce due to their scale, diversity, omnipresence, and impact. Industry reports estimate the gray market for information technology at around \$58 billion a year (KPMG, 2008) and for consumer products at \$63 billion a year (Wolf, 2009a), in the US alone. At a certain point of time, gray imports represented one tenth of the prescription drugs market in Europe (Jack, 2010). More recently, the size of the international gray market for luxury watches was estimated at around one billion dollar (Shannon, 2017).

Gray markets may threaten firm performance by diluting brand equity (Myers, 1999; Huang, Lee, & Hsiao, 2008; Duhan & Sheffet, 1988), diminishing channel equity (Eagle et al., 2003; Duhan & Sheffet, 1988; Antia, Bergen, & Dutta, 2004), weakening control over prices (Cespedes, Corey, & Rangan, 1988; Myers, 1999), instigating demand cannibalization (Altug,

¹⁰ Products sold through the gray market are often referred to as gray products, gray imports, parallel imports, or diverted products.

2017; Myers & Griffith, 1999), and complicating sales forecasts (Myers, 1999). On the other hand, gray markets can boost firm performance by easing excess inventory elimination (Altug, 2017; Hu, Pavlin, & Shi, 2013; Antia, Bergen, & Dutta, 2004), growing sales by serving a price-sensitive, service-insensitive segment that would otherwise have been lost (Shao, Krishnan, & McCormick, 2016; Duhan & Sheffet, 1988; Xiao, Palekar, & Liu, 2011), enhancing profitability through price discrimination (Coughlan & Soberman, 1998; Ahmadi & Yang 2000; Duhan & Sheffet, 1988), increasing product availability (Zhao, Zhao, & Deng, 2016; Yeung & Mok, 2013; Lim, Lee, & Tan, 2001), and facilitating new market penetration (Lim, Lee, & Tan, 2001; Autrey, Bova, & Soberman, 2015). This is why the net effect of gray markets on firm performance remains equivocal and views on whether gray markets are a blessing or a curse are mixed (Ahmadi, Irvani, & Mamani, 2015).

Given the controversial nature of gray markets and the ambiguity of their impact on firm performance, a variety of strategies have been suggested and implemented for dealing with gray markets. Those strategies range from aggressive confrontation and deterrence (Antia et al., 2006; Myers & Griffith, 2000; Cavusgil & Sikora, 1987; Howell et al., 1986), to selective enforcement (Bergen, Heide, & Dutta, 1998; Dutta, Bergen, & John, 1994), to disregard (Ahmadi & Yang, 2000; Hu, Pavlin, & Shi, 2013; Lim, Lee, & Tan, 2001; Bucklin, 1993) to adaptation (Altug, 2017; Tsay & Agrawal, 2004; Su & Mukhopadhyay, 2012), to promotion (Coughlan & Soberman, 1998; Shao, Krishnan, & McCormick, 2016), to even willing participation (Ahmadi & Yang 2000; Lim, Lee, & Tan, 2001; Antia, Bergen, & Dutta, 2004; Weigand, 1991).

A considerable number of firms choose to combat the gray market either based on an intrinsic belief that gray markets are detrimental to their business or in response to pressures

from antagonized authorized dealers. Whereas extant theory provides those firms with a wide assortment of gray market combating mechanisms to aid them in their battle with the gray market, it offers them little insight into the financial efficacy of those mechanisms or the drivers of choice of each mechanism. Indeed, three decades of scholarly research in this area have produced a considerable body of theoretic arguments and analytical demonstrations that argue for/caution against the use of one mechanism or another, but little empirical evidence about the efficacy of each mechanism or the factors underlying its choice. The primary reason for the paucity of empirical research on gray market combating mechanisms, as well as on gray markets in general, is the well-known data accessibility challenges (Ahmadi & Yang, 2000; Antia et al., 2006; Bucklin, 1993; Yeung, Mok, 2013; Myers & Griffith, 2000).

A comprehensive empirical investigation of the efficacy and drivers of choice of the different gray market combating mechanisms is crucial for practitioners and scholars alike for the following reason. While gray market combating costs firms hundreds of millions of dollars (Ritson, 2018), many scholars and practitioners have repeatedly questioned the efficacy of most anti-gray mechanisms and argued that they are complex, costly, and largely ineffective (e.g., Howell et al., 1986; Eagle et al., 2003; Myers, 1999), as highlighted in the opening quote. Indeed, in a study by Eagle, Kitchen, Rose, and Moyle (2003), only 6% of the brand managers interviewed stated that they believe they can stop the gray marketing of their products.

To attend to this research imperative, we undertake the first comprehensive empirical effort for studying the efficacy and drivers of choice of the different gray market combating mechanisms present in the literature. Theoretically, we synthesize existing research on gray market combating mechanisms and offer theoretically-driven predictions about the efficacy of

each mechanism. Then, by drawing on extant gray market and channel management theory, along with relevant literature in marketing, law, and strategic management, we identify an array of relevant, firm-level factors that can drive the firm's choice of one gray market combating mechanism or another. Methodologically, we circumvent the aforementioned data challenges that impede empirical research on gray markets through a novel approach for data collection and analysis. To that end, we study the gray market combating behavior of more than 3,000 public companies, company-by-company, for a period of twenty years. Then, using a variety of archival data sources we assemble a unique data set to exploit in our analyses. Our analyses rely on a number of econometric techniques such as event study, multiple regression, and multinomial logistic regression to address the research questions at hand.

In doing so, we depart from previous research on several fronts. First, to the best of our knowledge, this is the first study to assess the financial efficacy of the different gray market combating mechanisms present in the literature. Second, this is also the first empirical inquiry into the drivers of firms' choice of gray market combating mechanisms. Third, we rely in our analysis on firm-level, secondary data (rather than experimental, survey-based, or product-level data) and on a forward-looking, objective measure of firm performance (abnormal stock returns). Fourth, this is one of the most extensive studies on gray markets, whether in terms of the size and diversity of the sample of companies under investigation or the pertinent time frame. Table 4.1 presents a summary of existing empirical work on gray market combating and situate this study within that limited body of research.

Our results reveal that the majority of gray market combating mechanisms are indeed financially ineffective, as argued by several scholars and practitioners. Out of the 17 anti-gray

market mechanisms under investigation, we could only isolate three financially effective mechanisms. Remarkably, we observe that the most popular gray market combating mechanisms (e.g., legal action, implicated dealer termination, supply control, lobbying, vertical integration) are the least effective, from a financial point of view, whereas the most effective ones (e.g., product differentiation/modification, raising consumers' awareness about the risks of gray products, conversion of gray sellers into authorized sellers) are in fact under-utilized -- i.e. the majority of managers are prescribing the '*wrong pill*'. Additionally, we find that several firm-level factors such as resource availability, brand equity, innovation and technological capabilities, profitability, firm growth, and firm age play an instrumental role in shaping the firm's choice of its gray market combating mechanisms. Those findings pose significant implications for practitioners and policymakers and contribute to a number of research streams.

The rest of this paper is organized as follows. First, in the theory section, we list the gray market combating mechanisms present in the literature, provide industry examples on their use, discuss extant theoretic arguments about them, and infer theoretic predictions about their efficacy. Then, we theorize about a number of firm-level factors that can drive the firm's choice of gray market combating mechanisms. In the next section, we describe our data collection process, data sources, sample, and measures. Next, we describe our models and econometric techniques. Afterwards, we present our empirical results and discuss their implications for theory, practice, and policymaking. Last, we discuss the limitations of our research and suggest some avenues for future research in this domain.

Table 4.1: Summary of Existing Empirical Research on Gray Market Combating

Study	Empirical Setting	Data Description	Data Type	Sample Size	Time Frame	Measure of Efficacy	Econometric Techniques	Main Findings
Myers (1999)	US manufacturing exporters	Mail survey answered by key informant	Primary	404	1 year	Managers' responses on a 7-point Likert scale about degree of gray market activity	Ordered logit, MANOVA	Vertical integration, decision making centralization, and product standardization reduce gray market activity.
Myers & Griffith (2000)	US manufacturing exporters	Mail survey answered by key informant	Primary	404	1 year	Managers' responses on a 7-point Likert scale about degree of gray market activity	Regression analysis	A firm's commitment to a market reduces gray market activity in it. Firm size increases gray market activity.
Antia et al. (2006)	US manufacturers of personal care products; experiment MBA students	Mail survey by key informant; Scenario-based experiment	Primary	104	2 years	Dummy indicating whether gray market activity occurred or not	Logit, analysis of variance	Severity of enforcement alone does not deter gray market activity but rather the interaction between severity, speed, and certainty of action.
This study	S&P 1500 Constituents (multiple industries)	Press reports and releases, historical stock prices data, companies' financials, Compustat, Statista, firms' annual reports, and others	Secondary	339	20 years	Cumulative abnormal stock returns (CAR)	Event study, multiple regression, multinomial logistic regression	Most gray market combating mechanisms are financially ineffective, with the exception of three (product differentiation, raising consumers' awareness, conversion of gray sellers into authorized sellers). A number of factors (e.g., brand, resources, innovation, and age) drive the firm's choice of gray market combating mechanism.

4.3. *THEORY*

Whereas gray market theory reflects some degree of consensus about what combating mechanisms brand owners can utilize in their battle with the gray market, it is noticeably equivocal on the absolute or relative efficacy of those different mechanisms. Indeed, those combating mechanisms were first identified in the late 1980s through the early works of Howell, Britney, Kuzdrall, and Wilcox (1986), Duhan and Sheffet (1988), Cavusgil and Sikora (1988), and Cespedes, Corey, and Rangan (1988) and they remain not only theoretically established, but also reflective of what is been implemented in practice, to date. For a survey of gray market combating mechanisms, see Cavusgil and Sikora (1988) and Howell, Britney, Kuzdrall, and Wilcox (1986).

In what follows, we describe the various gray market combating mechanisms identified in the literature (see Table 4.2), present industry examples on their application, and examine extant theoretic views about them. Then, we discuss a set of firm-level factors that may influence the firm's choice of a certain gray market combating mechanism.

4.3.1 *Gray Market Combating Mechanisms*

1. *Legal action.* The most prevalent mechanism for dealing with the gray market challenge is through litigation. It can take several forms and may target different intermediaries.

Manufacturers often target the sales side of the gray market channel by litigating gray sellers for trademark infringement, or more broadly by seeking a ban of importation (aka as general exclusion order) that prevents anyone from unauthorized importation of their products. For

example, in the late 1990s, Unilever in a well-known case sued Asda for trademark infringement in the UK (Halstead, 1998). More recently, Oracle and Canon sued M-Tech and F&E Trading respectively for the same (Beckett, 2012; New York Law Journal, 2017). Conversely, Caterpillar and Deere secured general exclusion orders that banned the importation of their machinery from overseas into the US, in 2009 and 2004 respectively (US ITC Documents, 2009; Business Wire, 2004). Manufacturers may also target the supply side of the gray market channel by seeking a ban of exportation that stops the flow of gray products at the source. For example, in 2016, a group of leading drug makers secured a ban of exportation, from the Greek authorities, that prevents the re-exportation of their drugs out of Greece into other countries (Melck, 2016a).

Despite its overwhelming popularity among practitioners as a typical response to gray market violations, the majority of available theory argues against the use of this mechanism. In one of the earliest works on the gray market phenomenon, Howell, Britney, Kuzdrall, and Wilcox (1986) argue that “Direct legal action against unauthorized dealers seems attractive, but is both expensive and seldom successful.” In the same spirit, Cavusgil and Sikora (1988) emphasize that the legal route for dealing with gray market issues is costly, difficult, uncertain, and ineffective in the long-term. Moreover, law and economics scholars (Bebchuk, 1984; Klein, 1996; Sitkin & Roth, 1993; Johnson, McMillan, & Woodruff, 2002; Lumineau & Oxley, 2012) have repeatedly argued against the use of litigation as a means for handling commercial disputes due to the substantial financial costs, long delays, and high uncertainty surrounding the process. In a recent study, Ertekin, Sorescu, and Houston (2018) documented evidence that shareholders react negatively not only to the filing of trademark infringement suits (including those related to counterfeiting or gray marketing), but also to the conclusion

of those lawsuits even when the court rules in favor of the brand owner. In view of the aforementioned, we can certainly infer that extant research generally adopts a *negative* view toward the efficacy of legal proceedings as a mechanism for dealing with the gray market challenge.

2. *Denial of or discrimination in post-sales services.* One of the common mechanisms for combating gray markets is the denial of post-sales services, such as warranty nullification (Howell et al., 1986; Assmus & Wiese, 1995), exclusion from product recalls (Duhan & Sheffet, 1988), or denial of spare parts (Cavusgil & Sikora, 1988; Weigand, 1989), or at least discrimination in provision of these services (long waiting times, increased fees). For example, in 2002, Mercedes Benz announced that it will not provide warranty services for gray market vehicles imported from Canada to the US (Keenan, 2002_a) and did the same in Malaysia in 2014 (Brnama, 2014). Also, in the early 2000s, Honda denied warranties for and withheld recall information from gray market cars imported from Canada into the US (Canada NewsWire, 2002). Several scholars have questioned the efficacy of this mechanism arguing that: (a) many gray sellers adeptly circumvent this by not only providing their own in-house warranties and post-sales services (Duhan & Sheffet, 1988; Howell et al., 1986), but also sometimes by offering money-back guarantees that manufacturers themselves do not provide (Eagle et al., 2003; Weigand, 1991); (b) both consumers and gray sellers are usually confident that a good quality, genuine product will not break down during the warranty coverage period (Howell et al., 1986; Weigand, 1989); and (c) in many cases, manufacturers end up providing the necessary warranty or recall services under the pressure of complaints from unhappy customers (Cespedes, Corey, & Rangan, 1988), who are often unaware of their

exclusion from post-sales services, or regulators who mandate manufacturers to provide post-sales services as long as the product is genuine (Lim, Lee, & Tan, 2001). Interestingly, this “gives gray market sales an incentive by reducing the risks for end users.” (Cespedes, Corey, & Rangan, 1988). In addition to being ineffective, such practice will likely have a negative reputational impact on the brand name and could lead to a loss of goodwill with consumers (Duhan & Sheffet, 1988), especially that product authenticity is not in question. An experimental study by Huang, Lee, and Hsiao (2008) revealed that increasing after-sales service fees on gray products surprisingly makes consumers’ attitude toward those products more positive, and conversely it has a negative impact on authorized dealers’ image. This is why “this tactic is generally found wanting” (Weigand, 1989). In light of the abovementioned arguments, it seems that extant gray market theory adopts a fairly *negative* view toward this anti-gray market mechanism.

3. *Product tracking*. One of the cited mechanisms for combating gray markets is the development of a product tracking capability that enables the firm to track its products anytime, anywhere in the world. Such capability will allow the firm to identify the points of leakage in the channel, assess the level of leakage, and trace the routes of diverted products to the gray market, all around the globe. This can be achieved in a number of ways such as: (a) the implementation of a global product authentication system, (b) monitoring and analysis of maintenance, warranty, upgrade, recall, and repair jobs, or (c) the use of track-and-trace technology (aka anti-diversion technology) which often comes in the form of “smart labels” that incorporate a tiny chip or an RFID in the product label. This approach is particularly common in the information technology, automotive, and consumer products sectors. For

instance, Estee Lauder incorporates an advanced anti-diversion technology in many of its products to limit their diversion to the gray market (GlobeNewswire, 2014). Likewise, Zebra Technologies attaches a proprietary track-and-trace technology to its products to see what gets diverted and how (PR Newswire, 2002). Similar solutions were implemented by other companies such as P&G, Cisco Systems, Microsoft, and National Semiconductor Corp. Also, in the automotive industry, it is very common among leading car manufacturers (e.g., Nissan, Audi, Mercedes, Toyota) to implement systems and processes that analyze warranty and maintenance jobs from all around the world, at the VIN number level, and pinpoint any suspicious activity. Several gray market researchers (Cespedes, Corey, & Rangan, 1988; Chaudhry & Walsh, 1995; Cavusgil & Sikora, 1987) have pointed to this mechanism and emphasized its importance in the battle against gray marketers for the following reasons. First, despite the scale and scope of gray markets, the majority of brand managers are often “woefully uninformed” (Cespedes, Corey, & Rangan, 1988) about the magnitude and/or dynamics of the gray market for their products. This significantly limits their ability to deal with the gray market challenge because enforcement hinges in the first place on detection (Antia & Frazier, 2001; Ghosh & John, 1999; Antia et al., 2006). Product tracking bridges this information gap and enables brand managers to know “when to react, where to react and how to react to the gray marketers before they cause irreversible damage” (Cavusgil & Sikora, 1987). In their investigation of whether severity of enforcement deters gray market activity, Antia, Bergen, Dutta, and Fisher (2006) document evidence that the severity of anti-gray market measures do not deter gray market activity in the absence of the ability to detect violations. However, when severe enforcement is coupled with strong violation detection ability, the desired deterrence occurs. This is why Cavusgil and Sikora (1987) refer to this

mechanism as “a must” for manufacturers in their fight against gray marketers. Second, even when considering the costly and imperfect nature of violation detection systems (Wathne & Heide, 2000; Antia et al., 2006), firms should be aware that the collected “information is likely to be helpful to the company’s other marketing programs, and the expense of gathering the information should be viewed in this light” (Cespedes, Corey, & Rangan, 1988). Based on the abovementioned arguments, it is obvious that extant research generally adopts a *positive* view of this anti-gray market mechanism.

4. *Involved dealer punishment/warning.* In their battle against the gray market, manufacturers try to curtail channel leakage by punishing/warning noncompliant authorized distributors who divert products to gray sellers. (Antia, Bergen, & Dutta, 2004; Assmus & Wiese, 1995; Antia et al., 2006). Common disciplinary measures include but not limited to warning letters, chargebacks (monetary fines), reduction of advertising or promotional support, suspension/cutback of popular/new models quotas, delay of warranty payouts, and exclusion from sought-after corporate events or dealer awards. For instance, in the early 2000s, General Motors and Ford imposed a number of punitive measures on their Canadian dealers who export cars to the US, as well as their US dealers who perform warranty services on cars imported from Canada, by denying supply of popular models, requesting the repayment of previously paid incentives and bonuses, and imposing chargebacks equal to the difference in price between the two countries (Garsten, 2002; Dow Jones Business News, 2002). Similarly, in 2009, Unilever sent around 70 letters to UK authorized wholesalers demanding them to pay specified fines and sign a legal undertaking that they will not participate in gray marketing again or else face litigation (Cripps, 2009). Similar disciplinary measures were

implemented by leading technology companies such as Cisco Systems, Sony, and Hewlett Packard which punished product diverters by withdrawing some trading benefits, issuing warning letters, and temporarily suspending all discounts. Theoretically, a number of gray market researchers (Antia, Bergen, & Dutta, 2004; Assmus & Wiese, 1995; Antia et al., 2006) have identified this mechanism as one of the common approaches for combating gray market activity but cautioned about its efficacy. Antia, Bergen, and Dutta (2004) argue that whereas this tends to be the “standard prescription” by brand owners for dealing with the gray market challenge, it is often ineffective. Besides, channel management theory has long advised against the use of punitive actions in addressing channel conflict because they provoke negative emotions and distrust among channel partners (Geyskens, Steenkamp, & Kumar, 1999; Scheer & Stern 1992), promote dysfunctional behavior (Morgan & Hunt, 1994), and sometimes lead to reciprocation by the disciplined party (Frazier & Rody, 1991). Therefore, we can conclude that extant theory mostly provides a *negative* view toward this anti-gray market mechanism.

5. *Removal / reduction of price differentials.* The most cited cause for the formation of gray markets is the presence of arbitrage opportunities stemming from price differentials between markets (Antia et al., 2006; Cespedes, Corey, & Rangan, 1988; Duhan & Sheffet, 1988). Hence, by eliminating price differentials or at least narrowing them to levels that render gray marketing unfeasible, a manufacturer essentially addresses the root of the problem. For example, in the early 2000s, Ford revised the prices of some of its models in Canada to prevent the heavy flow of those models to the US through gray channels (Keenan, 2002_b). Likewise, and during the same period, LVMH revised the prices of a number of its luxury

champagne brands in France in a move to contain the flow of those products into the UK through gray channels (Wootton, 2000). A number of researchers (Ahmadi, Iravani, & Mamani, 2015; Cespedes, Corey, & Rangan 1988; Duhan & Sheffet, 1988; Weigand, 1989) have pointed to this mechanism and praised its effectiveness in limiting gray market activity. Indeed, Howell, Britney, Kuzdrall, and Wilcox (1986) refer to it as “the answer to the gray market problem.” Conversely, another group of researchers expressed valid concerns about the use of this mechanism for combating gray markets and questioned its efficacy for two main reasons. First, price differentials are there, in the first place, for good reasons such as “to penetrate a foreign market with high sales potentials, to ward off a competitive attack on a particular market, or to lower inventory levels” (Cavusgil & Sikora, 1988), or to serve a segment of price-sensitive, service-insensitive consumers that otherwise would have not purchased the product (Coughlan & Soberman, 1998; Lim, Lee, & Tan, 2001). Hence, by removing or narrowing price differentials the company runs the risk of losing a significant segment of consumers and consequently hurting its sales and market share. Furthermore, when a company adopts a one-price-for-all policy, it denies itself the power of price discrimination, an established, effective economic instrument for rent appropriation and profit maximization. Second, it is a well-known fact that gray marketing is more than just a price game. Other influential factors such as excess inventory (Ahmadi, Iravani, & Mamani, 2015), unfulfilled demand (Zhao, Zhao, & Deng, 2016), and product unavailability or supply insufficiency (Yeung & Mok, 2013; Lim, Lee, & Tan, 2001) can naturally lead to the formation of gray markets even in the absence of price differentials. In this regard, Eagle, Kitchen, Rose, and Moyle (2003) report that 93% of the brand managers they interviewed disagreed that price discrimination or price differentials is a major factor in driving gray

imports. Therefore, “manufacturers may not be able to avoid diversion simply by ensuring that there are no price differentials between authorized markets” (Shulman, 2013). Given these two opposing theoretical views, we deduce that extant research presents a mostly *mixed* view toward this anti-gray market mechanism.

6. *Supply control/management.* This mechanism tackles one of the major, non-price drivers of gray market activity which is excess inventory. Manufacturers often impose strict “market quotas” (i.e. a mandate to order a minimum amount of products every month/quarter) and “order cancellation charges” on their authorized dealers to ensure production efficiency and scale economies and to recover the high costs of product development (Cespedes, Corey, & Rangan, 1988). Moreover, this can be sometimes a contractual obligation for maintaining the preferred partner’s status (e.g. platinum or gold distributor) or even the distribution franchise itself. As a result, authorized dealers are often left with excess inventory due to demand fluctuation and competitive actions. To deal with this tricky situation and avoid cancellation charges, authorized dealers often offload their excess inventory to the gray market (Altug, 2017; Hu, Pavlin, & Shi, 2013; Antia, Bergen, & Dutta, 2004). Indeed, a number of researchers (Yeung, Mok, 2013; Dasu, Ahmadi, & Carr, 2012; Eagle et al., 2003) have identified excess inventory as the primary cause for the formation of gray markets rather than price differentials. In a study by Eagle, Kitchen, Rose, and Moyle (2003), 93% of surveyed brand managers reported that excess inventory, due to manufacturers’ production policies, is the main driver of gray market activity and not price differentials. Accordingly, one of the common mechanisms for dealing with the gray market challenge is supply management/control to reduce excess inventory and the consequent product diversion. This

can be accomplished through a number of ways including but not limited to the following. First, *multiple replenishments* (Dasu, Ahmadi, & Carr, 2012), which is a flexible ordering system that allows dealers to place several order and replenish their stock based on market demand. Second, *buyback contracts* (Dasu, Ahmadi, & Carr, 2012), which enable authorized dealers to sell back any excess inventory to the manufacturer. Third, *supply rationing* (Ahmadi, Iravani, & Mamani, 2015; Chaudhry & Walsh, 1995), where manufacturers stipulate market quotas based on demand estimates to ensure product availability without creating excess inventory. For instance, in the early 2000s, a group of leading drug makers (GlaxoSmithKline, Sanofi, Wyeth, and Eli Lilly) imposed tough quotes on their European distributors to stop the flow of gray market products within Europe (Fuhrmans, 2002). More recently, in 2016, Sanofi, in an attempt to limit the parallel exportation of one of its top-selling drugs out of Poland, put a restriction on the quantity of this drug Polish pharmacies can order while allowing only one highly-trusted Polish pharmacy to order unrestricted quantities to ensure no product shortage within the country (Melck, 2016_b). Similar supply/purchase restrictions were applied by LVMH, Saks, and Apple in different parts of the world. Theoretically, whereas some researchers (Dasu, Ahmadi, & Carr, 2012; Chaudhry & Walsh, 1995) have praised this mechanism and highlighted its efficacy in addressing the excess inventory root of gray markets, others (Ahmadi, Iravani, & Mamani, 2015) have cautioned against its potential impact on product availability and suggested that price differentials reduction can be more effective. Overall, extant gray market theory reflects a rather *mixed* view about the efficacy of this anti-gray market mechanism.

7. *Lobbying for (against) anti-gray (pro-gray) laws.* One of the available artillery for brand owners in their battle with gray marketers is the policy option. Brand owners can shape, or at least influence, the regulatory landscape by lobbying for (against) anti-gray (pro-gray) laws that raise (maintain) the barriers in the face of gray marketers. A notable example on the use of this mechanism is when Deere used its lobbyists to convince the US president to reject government economists' pressure to overrule an ITC decision that bans the parallel importation of Deere's products into the US (Kaplan, 2004). Similarly, in 2003, pharmaceutical giant, Merck, enlisted powerful lobbyists (including an adviser to two ex-prime ministers) in its battle for regulations that will restrict parallel imports of its drugs from Canada into the US (Thompson, 2003). Similar lobbying actions were undertaken by tobacco manufacturers Reynolds American and Altria in the US and by software giants Macromedia, Microsoft, and Adobe in Australia, in the early 2000s. As to the efficacy of this mechanism in curtailing gray market imports and the underlying cost/benefit rationale, the gray market literature offers little insight. One of the few arguments in this regard is by Cavusgil and Sikora (1988) who argue that whereas this mechanism is very effective in limiting gray imports by addressing the problem at its source, it is very difficult to implement, costly, often requires joint action, and has a low success rate. Another argument is by Chaudhry and Walsh (1995) who recommended this mechanism as one of the effective approaches for addressing the massive pharmaceuticals gray market within the EU, in the late 1990s. Based on these two arguments, we can infer that prior research offer a generally *mixed* view toward this anti-gray mechanism.

8. *Raising consumers' awareness about the risks and disadvantages of gray market products.*

This mechanism targets the demand-side of the gray market channel mainly through advertising campaigns that (a) warn potential and existing consumers about the problems and risks associated with gray market products (Duhan & Sheffet, 1988), such as the lack of after-sales support and incompliance with local standards, and (b) illustrate product differences that help consumers differentiate between authorized and gray market products (Cavusgil & Sikora, 1988) in an attempt to “at least create doubt in the customers' minds that the lower priced parallel import is as good as the authorized import” (Weigand, 1989). For example, in 2015, Patterson Companies, the leading manufacturer of dental products, launched an awareness campaign to educate both patients and dentists about the risk associated with using gray market products (Dow Jones Institutional News, 2015). Similarly, in response to a severe gray market problem in Russia, five major cellphone makers (Motorola, Nokia, Siemens, Alcatel, and Panasonic) launched, in 2001, a joint large-scale campaign to alert mobile operators and the public about the problems of gray imports and to teach them how to differentiate between authorized and gray phones (Moskovskie Novosti, 2001). Similar awareness campaigns are common in the automotive industry as well, especially by renowned manufacturers such Mercedes Benz, Toyota, and BMW. Extant research provides a mixed view on the efficacy of this mechanism for combating gray markets. Duhan and Sheffet (1988) argue that this mechanism “may be expensive, but it may be the most effective way for manufacturers to keep their authorized distributors and their goodwill intact.” Likewise, Cavusgil and Sikora (1988) praise this mechanism and refer to it as an effective, low-risk mechanism for combating gray market activity. On the other hand, Eagle, Kitchen, Rose, and Moyle (2003) question the efficacy of this mechanism arguing that

“this is likely to be effective only where parallel importers offer no after-sales support ... [but] ... experience indicates that [they are] offering both support and a money back guarantee.” Furthermore, Huang, Lee, and Hsiao (2008) document evidence from an experimental study that this mechanism does not negatively influence consumers' attitude toward gray goods but instead negatively impacts consumers' loyalty toward the brand. As a result, we can deduce that exiting literature presents a *mixed* view toward this anti-gray market mechanism.

9. *Product differentiation/modification.* One of the innovative mechanisms for dealing with the gray market challenge is product differentiation. The main logic underlying this mechanism is as follows: the more dissimilar the authorized and gray products, the weaker the authenticity premise of the gray product and the less appealing to consumers it is. This mechanism can be implemented in a number of ways and may involve different levels of product modification. The simplest form of product differentiation entails merely the use of different packaging and labeling in different markets to differentiate gray imports from authorized products. Manufacturers can take this a step further by using different brand names, or at least different model names, in different territories to create suspicion in consumers' minds about the authenticity of gray products. Furthermore, manufacturers can alter the physical attributes (e.g., shape and color) or even the technical specifications of the product to make it not just distinguishable but also less appealing to local taste. Finally, the most drastic form of product differentiation is designing products so that they work only in the designated market which renders gray products technically incompatible or at least noncompliant with local safety and functional regulations. Ideally, the finest version of this

mechanism is one that simultaneously implements all these levels of product modification to maximize product differentiation and make gray products less attractive. This anti-gray market mechanism is particularly common in the information technology, pharmaceutical, and automotive industries. For instance, leading drug makers such as GlaxoSmithKline and Pfizer often use different commercial names, labeling, packaging, pill shape, and pill coating for different markets, while keeping the active medical ingredients unchanged, to curtail the parallel exportation of their blockbuster drugs from poor countries to more developed countries (Chaudhry & Walsh, 1995; Jack, 2005). Similar approaches are noticeable in the technology industry. For instance, many of Hewlett Packard's printers will not print if the ink cartridge is not originating from the same country as the printer and many Sony Play Station, Microsoft Xbox, and Nintendo consoles will not work with peripherals or power adapters bought from different countries (Pringle & Stecklow, 2005; Straits Times, 2003). Also, it is very common among prominent automakers such as Toyota, Audi, and Mercedes Benz to manufacture the same model with different/exclusive features and technical specifications (including power train and air-conditioning specifications) for different markets. A number of gray market theorists (Assmus & Wiese, 1995; Chaudhry & Walsh, 1995; Weigand, 1991) have praised this mechanism and recommended it as a "very effective method for stifling the gray market" (Cavusgil & Sikora, 1987). Overall, it is evident that extant research reflects a predominantly *positive* view toward this gray market combating mechanism.

10. *Anti-gray alliances/collaborations.* In their battle against gray marketers, manufacturers can join forces and form industry-level anti-gray alliances, or at least collaborate with each other from time to time, to create synergies, share expertise and market intelligence, leverage

individual capabilities, and thus optimize the outcome of their gray market combating efforts. Common examples on this include the Anti-Gray Market Alliance (AGMA) in the technology industry (comprises leading technology companies such as Apple, Hewlett Packard, 3Com, Cisco, Seagate, and Sun, and has operations in the US, EU, Middle East, Africa, and Asia) and SMI Group's Annual Parallel Trade Conference in the healthcare industry (involves prominent companies such as Pfizer, Novartis, Merck, Novo Nordisk, GSK, Roche, and Lilly Eli). Both alliances have been operating for more than a decade and produced whitepapers, industry reports, newsletters, joint lobbying efforts, and industry-level anti-gray initiatives that helped them in their fight against gray marketers. Similarly, in the early 2000s, and in response to a severe gray market situation in Russia, five large cellphone manufacturers (Motorola, Nokia, Siemens, Alcatel, and Panasonic) worked together and unified their efforts to tackle this problem which resulted in lobbying efforts that lead to new regulations, huge shipment confiscations by Russian customs, and joint large-scale awareness campaigns (Moskovskie Novosti, 2001). Extant gray market theory does not provide much insight about the efficacy of this mechanism, and in general the topic of strategic alliances and interfirm collaboration is a controversial topic that constitutes a research stream in its own right (see Prashant & Harbir, 2009). On one hand, interfirm alliances can enhance firm performance and innovation through knowledge transfer and capabilities acquisition (Mowery, Oxley, & Silverman, 1996; Prashant & Harbir, 2009; Dyer & Singh, 1998). On the other hand, alliances entail substantial resources (Prashant & Harbir, 2009) and their outcome is often uncertain (Simonin, 1999; Mani & Luo, 2015; Joshi & Nerkar, 2011) and subject to different contingencies and conditions (Das & Teng, 2000; Mowery, Oxley, & Silverman,

1996). Therefore, we can conclude that extant research provides *no insight* or at most a *mixed* view about this anti-gray market mechanism.

11. Vertical integration / shift to direct distribution. One of the mechanisms for combating gray market activity is to vertically integrate the leaking channel (the channel that is diverting products to the gray market) and shift completely to a direct distribution model in the implicated market. For instance, in the period between 2007 and 2010, a group of prominent drug makers (e.g., Novartis, Eli Lilly, AstraZeneca, Roche, Novo Nordisk) changed their distribution models in parts of Europe (e.g., UK, Poland) by removing wholesalers and shifting to a DTP (Direct-To-Pharmacy) business model to restrict parallel exports of their drugs out of these countries (Marinoni, 2009; Sesay, 2010). Whereas this strategy is widely considered as one of the most effective remedies to the gray market problem (Myers, 1999; Howell et al., 1986), it is “probably the most expensive strategy and seldom used” (Cavusgil & Sikora, 1988). Indeed, many scholars have cautioned against the use of this mechanism for dealing with the gray market challenge. For instance, Cavusgil and Sikora (1988) argue that vertical integration as an anti-gray mechanism should be used only as a final resort when all other mechanisms are exhausted cautioning that “its large initial cost must be weighed carefully against long-term benefits.” In the same spirit, Howell, Britney, Kuzdrall, and Wilcox (1986) emphasize that “this can be an expensive strategy which may be neither feasible or in line with the manufacturer’s overall strategy and seems to be an extreme step to take if the only goal is to combat the gray market.” From a broader perspective, channel theorists have long advised against the use of vertical integration as a remedy for channel issues emphasizing that “the control advantage associated with ownership is likely to be a

tradeoff with cost efficiency of contracting to external specialists” (Heide, 1994). Besides, existing research provides empirical evidence that vertical integration in general is fundamentally irresponsible from a financial point of view and often leads to shareholder wealth destruction (Moeller, Schlingemann, & Stulz, 2005). For a detailed discussion of the downsides of vertical integration see Coughlan, Anderson, Stern, and El-Ansary (2006) and Hitt, Harrison, & Ireland (2001). Accordingly, we can infer that the prevalent view in the literature toward this gray market combating mechanism is rather a *negative* one.

12. *Involved dealer/distributor termination.* One of the known mechanisms for combating gray market activity is the termination of authorized dealers/distributors implicated in diverting products to the gray market. For example, in 2017, Dell stripped two of its distributors of their partner status and terminated their agreements due to their involvement in supplying the gray market (Breeze, 2017). Similarly, in 2013, Unilever terminated its largest distributor in Australia when it discovered that it was diverting products to the UK through gray market channels (Mitchell, 2013). Likewise, in the early 2000s, Sun Microsystems sent termination notices to 70 of its UK distributors due to gray market violations (Yirrell, 2003). Also, in 2002, Ford terminated one of its Canadian dealers because it was parallel exporting cars to the US (Keenan, 2002_c). A number of scholars have praised this mechanism and argued that it sends a “loud signal” (Cespedes, Corey, & Rangan, 1988) that the manufacturer “is willing to take some expensive steps to keep the channel in line” (Howell et al., 1986). Such a drastic measure not only firmly closes a leakage point in the channel, but also is seen as a credible threat by other channel members and can deter them from engaging in similar opportunistic behavior (Wang, Gu, & Dong, 2013). Indeed, “Sometimes the mere threat of cancellation is

enough to limit gray market activity” (Cavusgil & Sikora, 1987). This is why Weigand (1991) refer to this mechanism as “the most powerful reactive strategy available to the manufacturer” for taming opportunistic dealers and addressing gray market issues at the source. In light of this, we conclude that existing gray market literature generally adopts a *positive* view toward this anti-gray market mechanism.

13. *Conversion of gray sellers into authorized dealers.* One of the cited mechanisms for combating gray market activity is the conversion of large gray sellers into authorized dealers (Cespedes, Corey, & Rangan, 1988; Cavusgil & Sikora, 1988; Weigand, 1991; Assmus & Wiese, 1995). This mechanism has mainly been implemented in the technology sector. For instance, in 2016, Hewlett Packard turned powerful gray seller DP Data Systems into an authorized dealer (Computer Reseller News, 2016a). Likewise, in 2008, Cisco Systems offered a group of large gray sellers, in the UK, the opportunity to become authorized dealers (Woodburn, 2008). Similar approaches were followed earlier by other technology companies such as Sony, Apple, and Nokia. Theoretically, this is one of the least researched anti-gray mechanisms and scholarly arguments about its efficacy are limited. Weigand (1989) questions the efficacy of this approach and argues that it is at most a “temporary solution.” On the other hand, Cespedes, Corey, and Rangan (1988) suggest that it can be a solution to the gray market problem because it enables the manufacturer to oversee how the price-sensitive segment of its market (which was previously served through gray sellers) is being served and hence gives him more control over his distribution network. However, they draw attention to some serious intra-channel problems that might eventuate from this approach such as “disputes among distributors over turf” and original dealers’ loss of incentive to

invest in/provide customer service. In the same spirit, Cavusgil and Sikora (1988) argue that this approach can be effective “in a high opportunity area where the authorized dealer has limited operations”. But, they emphasize that it is an uncommon approach and warn about its difficulty of implementation, impact on the manufacturer’s image, effect on incumbent authorized dealers, and the possibility of the acquired gray seller to reopen under a different trading name. Based on the aforementioned arguments, we infer that extant research offers a rather *mixed* view on this gray market combating mechanism.

14. *Channel monitoring/audit.* One of the main drivers for the formation of gray markets is the lack of channel monitoring that reduces channel partners’ temptation to divert products to the gray market (Autrey, Bova, & Soberman, 2015; Myers, 1999; Myers & Griffith, 1999; Shao, Krishnan, & McCormick, 2016). Indeed, two studies, one by KPMG (2008) and the other by Deloitte (2011), revealed that 42% and 33% respectively of surveyed manufacturers reported that they do not have channel monitoring processes in place to detect gray market activity. Thus, one of the mechanisms for combating gray market activity is the implementation of such processes and systems that enable the company to detect suspicious channel activity and identify gray market incidents. For instance, P&G “uses former FBI agents and regulatory, legal and fraud experts to track and halt product diversion” and “algorithms to assess order patterns [so that] if a buyer exceeds the amount expected, the company may flag the distributor for scrutiny and cut the order” (Wolf, 2009_b). Similar approaches were adopted in the technology industry by prominent brand names such as Sun Microsystems, which implemented a set of reporting measures that led to the investigation of 13 authorized dealers for gray market involvement (Microscope, 2004_a), as well as Seagate and its rival Western

Digital, which introduced strict anti-gray measures to their channels such as requiring channel partners to provide more stock transparency by electronically submitting purchase orders and end-user invoices and allowing warehouse spot checks (Microscope, 2004_b). Theoretically, whereas a number of researchers (Shao, Krishnan, & McCormick, 2016; Shulman, 2013) have underlined the necessity of this mechanism in the battle against gray marketers, gray market theory does not provide much insight about the efficacy of this mechanism. That said, it is established in the broader channel management literature that channel monitoring systems and activities are not only costly and unable to detect all violations (Bergen, Dutta, & Walker, 1992; Frazier, 1999), but also can backfire by increasing channel partners' opportunism and instigating negative behavior (Heide, Wathne, & Rokkan, 2007; Kashyap, Antia, & Frazier, 2012). A case in point is when Cisco Systems sent Hardware.com an audit notice in a gray market investigation. The authorized dealer was offended, refused to cooperate, and resigned from the distribution partnership (Walton, 2006_a). Therefore, we can conclude that extant research has in general a *negative* view of this anti-gray market mechanism.

15. *Supply sufficiency/product availability*. This mechanism addresses one of the non-price drivers of gray market activity which is unmet demand or supply insufficiency. Research has long established that gray markets can form in the absence of price differentials (Shulman, 2013; Yeung & Mok, 2013; Lim, Lee, & Tan, 2001) due to unmet demand or product unavailability (Antia et al., 2006; Cavusgil & Sikora, 1987; Duhan & Sheffet, 1988; Zhao, Zhao, & Deng, 2016). "By limiting circulation of a popular item to a few dealers, the supplier may inadvertently have created demand that can be satisfied only through transshipment to

gray outlets” (Cespedes, Corey, & Rangan, 1988). Hence, manufacturers can curtail gray market activity by ensuring product availability and supply sufficiency (Cavusgil & Sikora, 1987; Cespedes, Corey, & Rangan, 1988), especially of popular and new models. Notable examples on the use of this anti-gray market mechanism come from the automotive industry. For instance, when Mercedes Benz first launched its *Smart* model in the European market during the late 1990s, it did not make this model available to US consumers through authorized dealerships. A few years later and in response to the development of a large gray market for this model in the US, Mercedes launched this car in the American market and ensured product availability through authorized dealerships (Kurylko, 2004). Toyota had a similar situation with its *Wish* model in the Singaporean market, in the period between 2005 and 2008, and it responded in the same manner (Ee, 2006). The video games and smart phone industries present similar examples on the implementation of this anti-gray mechanism, especially by companies like Sony and Apple in a number of developing markets. Theoretically, whereas some researchers (Cavusgil & Sikora, 1987; Cespedes, Corey, & Rangan, 1988) point to this mechanism as one of the potential remedies for the gray market issue, others not only question its efficacy (Ahmadi, Iravani, & Mamani, 2015), but also argue that it might have a counter-effect (Howell et al., 1986; Zhao, Zhao, & Deng, 2016). Zhao, Zhao, and Deng (2016) study the gray market activity for a luxury handbag brand on a Chinese online platform and report that an increase of product availability through authorized channels has no effect on gray market demand, but quite the reverse it is associated with an increase in gray market supply. Based on these arguments, we infer that extant research presents a rather *mixed* view toward this anti-gray market mechanism.

16. *Pricing policy reform.* One of the main drivers of gray market activity is the manufacturer's pricing policy itself which leads to the creation of excess inventory and/or price differentials - two major causes for gray market formation. For example, many manufacturers apply *quantity discounts* in pursuit of market share or in response to competitors' pressure. This entices authorized distributors to order large quantities that exceed their market demand to utilize these discounts in reducing their per-unit cost (Cespedes, Corey, & Rangan, 1988; Howell et al., 1986; Cavusgil & Sikora, 1987). As a result, they end up with excess stock that is eventually diverted to the gray market (Altug, 2017; Duhan & Sheffet, 1988; Ahmadi, Iravani, & Mamani, 2017). Another example of a manufacturer's pricing policy that leads to the formation of gray markets is the decentralization of pricing decision-making. Some manufacturers grant their local/regional offices high levels of pricing decision-making autonomy to enhance their responsiveness to market conditions and competitive pressures. In doing so, the manufacturer unintentionally bring about price differentials, one of the major drivers of gray markets. Myers (1999) documents evidence that companies with higher levels of pricing decision decentralization experience higher levels of gray market activity. Therefore, one of the mechanism for tackling the gray market challenge is reforming the company's pricing policy itself rather than merely revising prices every now and then to reduce price differentials. Existing research identifies a number of ways by which a company can reform its pricing policy to reduce gray market activity including but not limited to the following: (a) stopping/ limiting quantity discounts (Cespedes, Corey, & Rangan, 1988; Duhan & Sheffet, 1988) which may be one of the "most effective means of controlling the gray-market problem" (Howell et al., 1986); (b) pricing decision-making centralization (Autrey, Bova, & Soberman, 2014; Myers, 1999; Assmus & Wiese, 1995) where the head

office makes all pricing decisions; (c) pricing process formalization (Assmus & Wiese, 1995; Autrey, Bova, & Soberman, 2014) where the head office stipulates a company-wide set of standards, decision rules, and guidelines that govern the pricing process in all branches and takes into consideration such factors as prices in neighboring countries, exchange rates, transportation costs, and tariffs to control price differentials; (d) transfer price management (Autrey & Bova, 2011; Assmus & Wiese, 1995) such as “setting higher transfer prices to subsidiaries in geographic regions that are sources for gray market goods” (Autrey, Bova, & Soberman, 2014); (e) informal price coordination (Assmus & Wiese, 1995) where the company nurtures a corporate culture that revolves around the general goals and welfare of the parent corporation rather than the subsidiaries, as well as promotes and rewards collaboration between territory managers, instead of formalizing the pricing process. “Thus a country manager would not set a low price for a product if it would cause the growth of gray market activities and subsequent price erosion on other countries. The decision is based on overall corporate goals, even though the low price might result in the best profits or be necessary for that country to remain competitive” (Assmus & Wiese, 1995); and (f) revenue-sharing contracts by which “a retailer pays the manufacturer a wholesale price for each unit purchased plus a percentage of the revenue the retailer generates” (Su & Mukhopadhyay, 2012). Common examples on pricing policy reform as a mechanism for combating gray markets include Hewlett Packard introducing new quoting/pricing systems in Canada and the UK, in 2005 and 2016 respectively (Nibletto, 2005; Computer Reseller News, 2016b), and Intel changing its pricing scheme in the US and other countries in 2006 (Kenedy, 2006). Theoretically, several scholars (Assmus & Wiese, 1995; Cespedes, Corey, & Rangan, 1988; Howell et al., 1986; Ahmadi, Iravani, & Mamani, 2017) have pointed to this anti-gray market

mechanism and emphasized its efficacy in curtailing product diversion. Besides, pricing policy reform as a gray market combating mechanism has two main advantages over the basic price differentials removal mechanism. First, it is more sustainable because it addresses the roots (manufacturer's pricing policy) of the problem rather than the symptoms (excess inventory and price differentials). Second, it does not necessarily deny the company the capacity to use price discrimination, as is the case with price differentials removal, since it "does not imply the same prices in all countries" (Assmus & Wiese, 1995). That said, under certain circumstances, this mechanism may be unviable or ineffective. For example, Autrey, Bova, and Soberman (2014) argue that pricing policy decentralization can be more profitable and effective for the firm under certain market dynamics, and also contend that the effectiveness of this mechanism can be severely undermined by external factors beyond the firm's control. A typical example on this situation is the pharmaceuticals industry where some countries allow free pricing by drug makers and others impose price control laws such as reference pricing and cost-plus pricing. This naturally generates and sustains price differentials and subsequently leads to the emergence of gray markets. In light of the above, we can deduce that the view in extant research about this mechanism is somehow *mixed*.

17. Encouraging and rewarding dealers' compliance. Manufacturers can tackle the gray market problem by taking actions that promote authorized dealers' compliance and encourage them to refrain from participating in product diversion. Such actions include but not limited to: (a) the use of rewards to recognize and compensate dealers who do not participate in product diversion or who help in reducing gray market activity in their territory (Antia, Bergen, & Dutta, 2004; Assmus & Wiese, 1995; Howell et al., 1986); (b) dealer education on gray

market drivers, dynamics, dangers, and deterrence mechanism (Assmus & Wiese, 1995; Cavusgil & Sikora, 1987; Howell et al., 1986); and (c) behavior-based incentive schemes for sales/country managers through which sales/regional managers' performance is appraised and rewarded based on both outcome and behavior measures (Iqbal & Feick, 2002; Assmus & Wiese, 1995). This anti-gray mechanism is particularly common in the technology industry. For instance, Cisco, Kodak, and Canon have dealer education programs through which they regularly conduct gray market trainings for their dealers' staff and management and provide them with supporting educational materials (Walton, 2006_b). Also, Hewlett Packard and Intel reward (mainly through preferential discounts) channel partners who help in reducing gray market activity in their territories or who refrain from participating in gray marketing (Moltzen, 2001). Theoretically, a number of scholars have pointed to this anti-gray market mechanism and discussed its efficacy. Assmus and Wiese (1995) argue that incorporating a behavioral component in the evaluation and compensation schemes of sales/regional managers encourages them to refrain from product diversion and subsequently reduces channel leakage. In the same vein, Iqbal and Feick (2002) document evidence, from an experimental study, that sales managers perceive gray marketing less favorably and are less likely to tolerate it when their incentive-schemes are behavior-based than when they are outcome-based. Conversely, whereas Cavusgil and Sikora (1987) emphasize the benefits of dealer education in alleviating the gray market problem, Howell, Britney, Kuzdrall, and Wilcox (1986) argue that it has "little promise." Generally speaking, channel management theory has long established that manufacturers' use of non-coercive influence strategies (e.g., incentives, education) toward their distributors is more effective in earning distributors' compliance and cooperation (Frazier & Summers, 1984; Gaski & Nevin, 1985; Scheer &

Stern, 1992; Payan & McFarland, 2005). Therefore, we infer that in general existing theory provides a rather *positive* view toward this anti-gray market mechanism.

18. *Joint use of multiple anti-gray market mechanisms.* A number of scholars have called for the joint-use of multiple anti-gray mechanisms in the battle against gray marketers. Cavusgil and Sikora (1987) argue that “simultaneous implementation” of several gray market combating mechanisms is often needed due to the “complementary nature” of those mechanisms. In the same spirit, Antia, Bergen, Dutta, and Fisher (2006) report evidence from two studies (survey-based and experiment) that enforcement-focused anti-gray mechanisms (e.g., involved dealer punishment, legal action, involved dealer termination) do not deter gray market activity in isolation; nevertheless, when they are used conjointly with detection-focused anti-gray mechanism (e.g., channel monitoring, product tracking) the anticipated deterrence is observed. Generally, extant research has a *positive* view toward the joint use of multiple anti-gray mechanisms.

Table 4.2 lists all the aforementioned gray market combating mechanisms, along with extant literature’s view about their efficacy.

4.3.2 Drivers of Firm’s Choice of Gray Market Combating Mechanism

A number of firm-level factors may drive the firm’s choice of a gray market combating mechanism. Factors such as resources availability, firm age, brand equity, innovation and technological capabilities, profitability, and growth (see Figure 4.1) can play an instrumental role in shaping the firm’s gray market combating behavior, as suggested by gray market theory and

Table 4.2 : Extant Literature’s View toward Different Gray Market Combating Mechanisms

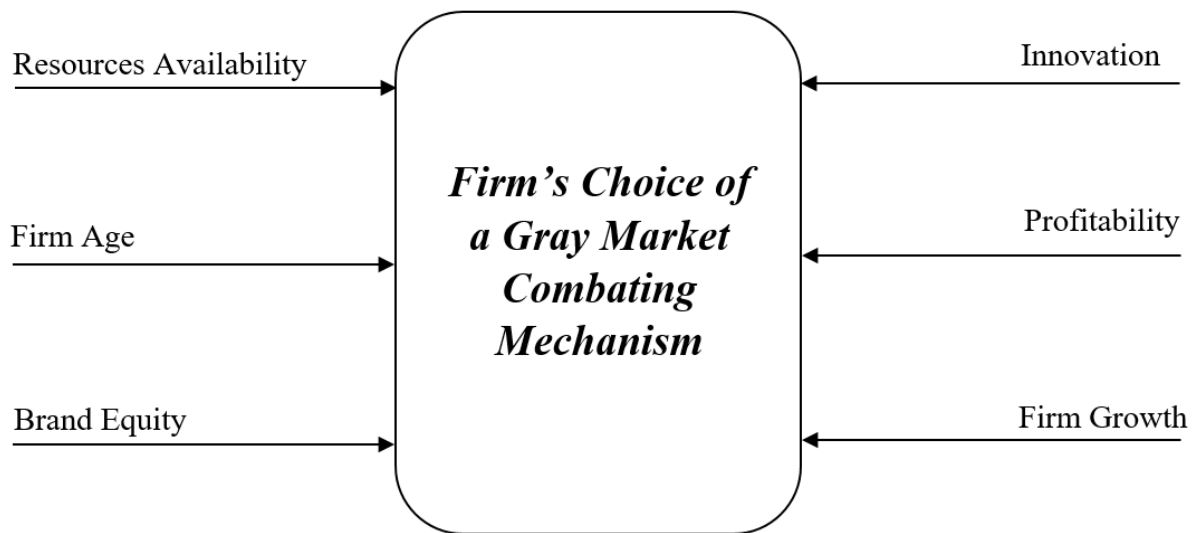
Gray Market Combating Mechanism	Extant Literature’s View toward its Efficacy
Raising consumers’ awareness about risks and disadvantages of gray market products	<i>Mixed</i>
Involved dealer/distributor termination	<i>Positive</i>
Supply sufficiency/product availability	<i>Mixed</i>
Conversion of gray seller into authorized seller	<i>Mixed</i>
Product Differentiation	<i>Positive</i>
Product tracking	<i>Positive</i>
Denial of or discrimination in post-sales services	<i>Negative</i>
Pricing policy reform	<i>Mixed</i>
Shift to direct distribution (vertical integration)	<i>Negative</i>
Legal action	<i>Negative</i>
Lobbying for (against) anti-gray (pro-gray) Laws	<i>Mixed</i>
Involved dealer punishment/warning	<i>Negative</i>
Anti-gray alliances/collaborations	<i>Mixed</i>
Supply management/control	<i>Mixed</i>
Price differentials reduction/removal	<i>Mixed</i>
Encouraging and rewarding dealers’ compliance	<i>Positive</i>
Channel monitoring/audit	<i>Negative</i>
Joint use of multiple mechanisms	<i>Positive</i>

relevant literature in marketing strategy and strategic management (mainly the resource-based view and capabilities literature). A detailed discussion of the potential influences of each factor, along with their theoretical underpinnings, are provided in the following sections.

- 1. Resources availability.* The influence of firm resources on its choice of a certain gray market combating mechanism is grounded in the resource-based view of the firm (Barney, 1991) and resource slack theory (Nohria & Gulati, 1996). Firms with larger resources at their disposal: (a) have a higher degree of flexibility and discretion when confronting external or internal challenges (Grewal & Tansuhaj, 2001; Nohria & Gulati, 1996; Moorman & Miner, 1998). For instance, a large firm with substantial resources can promptly utilize one of the notoriously expensive anti-gray mechanisms (e.g., vertical integration, consumer awareness advertising campaigns; lobbying for new regulations) that smaller firms find beyond reach; (b) are more likely to experiment with new ideas and technologies (Moses, 1992; Nelson & Winter, 1982; Nohria & Gulati, 1996) and pursue innovative solutions to their problems (Levinthal & March, 1981; Nohria & Gulati, 1996) such as cutting edge track-and-trace technologies and anti-diversion solutions; (c) are capable of handling multiple competitive and market threats simultaneously without jeopardizing performance (Rosenzweig & Easton, 2010; Schmenner & Swink, 1998) which emboldens them to aggressively confront gray market threats ; and (d) are more effective in distribution channels management at large (Ambulkar, Blackhurst, & Grawe, 2015; Modi & Mishra, 2011). Conversely, firms with limited resources are more susceptible to distribution disruptions (Chopra & Sodhi, 2004; Ambulkar, Blackhurst, & Grawe, 2015) and are less flexible and resilient in the face of competitive and environmental threats (Nohria & Gulati, 1996; Modi & Mishra, 2011).

This entails extra vigilance from such firms when implementing certain aggressive anti-gray mechanisms, such as authorized dealer termination or denial of after-sales services, to ensure that such effort does not lead to distribution interruption or loss of market share to competitors.

Figure 4.1 : Drivers of the Firm’s Choice of a Gray Market Combating Mechanism



2. *Firm age.* A firm’s age can drive its choice of a particular anti-gray market mechanism in two different ways. First, differences in firms’ ages imply differences in absorptive capacities, capabilities stocks, and cognitive abilities (Cyert & March, 1963; Nelson & Winter, 1982). Older firms have been dealing with gray markets, as well as other forms of channel conflict, for a longer period of time and thus have garnered more knowledge and expertise in that field, and consequently developed superior channel management capabilities. Such capabilities may manifest themselves in the form of advanced processes and systems that enable the firm to: (a) collect and assemble gray market

intelligence, (b) analyze intelligence data and assess gray market activity levels, (c) identify points of leakage in the channel, (d) trace diverted products' routes to the gray market, and (d) select the appropriate anti-gray mechanism to respond with. This view is grounded in the knowledge-based view of the firm (Grant, 1996), mainly in the organizational learning (Crossan, Lane, & White, 1999) and absorptive capacity (Cohen & Levinthal, 1990; Zahra & George, 2002) theory. Indeed, research has shown that firms who have previously dealt with a certain form of channel conflict (e.g., gray marketing) are not only more capable of handling new incidents of this conflict, but also more capable of learning from them to hone their channel management capabilities (Johnson, Sohi, & Grewal, 2004). On the other hand, firm age has often been linked to lower innovativeness, inertia, and resistance to change (Hulland, Wade, & Antia, 2007; Sorensen & Stuart, 2000) – a syndrome commonly referred to as the *incumbent's curse* (Chandy & Tellis, 2000; Roy & Sarkar, 2016). Therefore, as firms age, they become less receptive to the latest and most innovative approaches for tackling the gray market challenge such as product differentiation, which entails a significant level of innovativeness, and product tracking technologies, which entail openness to emerging and cutting-edge technological inventions.

3. *Brand equity*. As the prime victim of gray markets (Ahmadi, Iravani, & Mamani, 2017; Duhan & Sheffet, 1988; Huang, Lee, & Hsiao, 2008; Chen, 2007), brand equity plays an instrumental role in shaping the firm's gray market combating strategy. This significant influence may manifest itself in a number of ways such as the following. First, a firm's

brand equity is one of its most treasured and vital assets and a major pillar of its competitive advantage (Keller, 1993, 2003; Aaker, 2009; Srivastava, Shervani, & Fahey, 1998). Consequently, firms sometimes unsurprisingly go to great lengths, such as vertical integration, in protecting their brands from channel partners' opportunism (Nickerson & Silverman, 2003; Lafontaine & Shaw, 2005). Therefore, firms with higher brand equity are typically less hesitant in effecting the most radical anti-gray mechanisms, such as vertical integration, to shield their brands from any material threats. Second, brand equity is a major source of channel power and firms with higher brand equity often enjoy a significant power imbalance vis-a-vis their channel partners (El-Ansary & Stern, 1972; Davis & Mentzer, 2008; Scheer & Stern 1992). Since power imbalance has been associated with increased use of coercive power in dealing with channel conflict (Kumar, Scheer, & Steenkamp, 1998; Dwyer & Walker Jr, 1981; Frazier, Gill, & Kale, 1989), firms with higher brand equity may have more inclination toward the use of punitive anti-gray mechanisms such as involved dealer punishment or even termination. Third, firms with strong brand names are cognizant of the fact that consumers constitute the bedrock of their brands, and thus consumer antagonism can impose a serious threat to brand equity (Huber et al., 2010). Therefore, in their battle with gray marketers, firms with higher brand equity tend to have less inclination toward the use of demand-side, anti-gray mechanisms, especially ones that punish or offend consumers such as the denial of post sales services. Fourth, firms with higher brand equity are usually more innovative and receptive to new technological breakthroughs (Brexendorf, Bayus, & Keller, 2015; Sinapuelas, Wang, & Bohlmann, 2015) and hence they are less hesitant in embracing new advanced anti-gray market technologies such as track-and-trace and anti-diversion

solutions. Fifth, firms with stronger brands are typically more selective when hiring distribution partners because they put a lot of emphasis on brand representation, customer service, and dealer capabilities. This often translates into stricter partner selection criteria that discourage them from some anti-gray mechanisms such as the conversion of gray sellers into authorized dealers.

4. *Innovation and technological capabilities.* The firm's innovation and technological capabilities can inhibit or facilitate its use of certain anti-gray market mechanisms. For example, some gray market combating mechanisms demand a significant amount of innovation and technological capabilities such as product differentiation, which involves the alteration of technical specifications to render gray imports noncompliant with local regulations, technically incompatible with authorized products, peripherals, and/or infrastructure, or at least unappealing and dubious to consumers. This can drive less innovative firms away from such sophisticated anti-gray market mechanisms due to technical constraints. Furthermore, firm innovation has been linked to involvement in inter-organizational alliances and collaboration networks (Ahuja, 2000; Powell, Koput, & Smith-Doerr, 1996; Laursen & Salter, 2006), as well as to corporate political action (Lux, Crook, & Woehr, 2011; Taylor, 1997; Alt et al., 1999). Accordingly, more innovative firms are more likely to leverage their existing interorganizational ties in creating anti-gray alliances/collaborations, as well as utilize their political capital, reputational leverage, technological position, and alliances in lobbying for (against) anti-gray (pro-gray) regulations.

5. *Profitability.* One of the most cited risks of gray markets is their potential negative impact on the firm's bottom line (Cespedes, Corey, & Rangan, 1988; Ahmadi, Iravani, & Mamani, 2015; Huang, Lee, & Hsiao, 2008; Ahmadi, Iravani, & Mamani, 2017). Accordingly, firms with lower profitability may feel increased pressure to step up their gray market combating efforts to enhance their bottom line. On the other hand, firms with higher profitability do not feel such pressure and their motives to fight gray markets stem from other non-financial reasons such as authorized dealers' appeasement or brand protection. Therefore, as the firm's profitability increases, its perception of the financial threat of gray markets subsides, and subsequently its incentive to invest in expensive gray market combating mechanisms (e.g., lobbying, vertical integration, awareness advertising campaigns) decreases.

6. *Firm growth.* The most recognized benefit of gray markets is their benign effect on firm growth (Myers, 1999; Bucklin, 1993; Lowe & McCrohan, 1988; Iqbal & Feick, 2002). Gray markets boost sales by: (a) catering to a price-sensitive, service-insensitive market segment that otherwise would have been forsaken (Duhan & Sheffet, 1988; Lim, Lee, & Tan, 2001), (b) increasing product availability (Zhao, Zhao, & Deng, 2016; Lim, Lee, & Tan, 2001), (c) acting as an auxiliary distribution channel that serves untapped markets (Yeung & Mok, 2013), and (d) facilitating foreign markets penetration (Autrey, Bova, & Soberman, 2015; Lim, Lee, & Tan, 2001). Hence, firms going through a strong growth phase have a very delicate balance to strike when dealing with the gray market dilemma. On one hand, they need to undertake some serious combating actions against gray marketers to preserve brand equity and channel equity. On the other hand, the last thing they need to do during a solid growth phase is to disrupt product availability, disturb distribution, or sacrifice market share.

Therefore, when a firm is experiencing a strong growth period, it is quite sensible to avoid distribution-disrupting anti-gray mechanisms such as authorized dealer termination, or consumer-offending mechanisms such as denial of post sales services. Conversely, it makes sense to rely more on soft gray market combating mechanisms such as raising consumer awareness or product differentiation which perfectly achieve the aforementioned sought-after balance.

4.4. DATA AND RESEARCH METHODS

In this section, we describe our sample, data sources, measurements, and the econometric methods we used for studying the financial efficacy and drivers of choice of the different anti-gray market mechanisms discussed earlier. In our investigation, we rely mainly on three econometric methods: event study, multiple regression (for studying financial efficacy), and multinomial logistic regression (for exploring drivers of choice). Our data come from a number of common archival data sources such as Compustat, Statista, Center for Research in Security Prices (CRSP), LexisNexis, Factiva, Bloomberg and Wall Street Journal databases, and companies' annual reports and official websites.

4.4.1. Data Collection and Sample Development

To explore the financial efficacy and drivers of choice of the different anti-gray market mechanisms, we study the gray market combating behavior of a large sample of public companies for a time period of twenty years. The sample of companies under investigation is comprised of the constituents of the S&P 1500 and S&P ADR indices for the period from

January 2001 to June 2017 (e.g., Whitley, Krause, & Lehmann, 2018; Malhotra et al., 2018). A list of these companies can be retrieved from *Compustat*, where they are represented by the *S&P 1500 Super Composite* and *S&P ADR* indices. The *Compustat* query returned a list of 3,164 publicly-traded companies. This sample is quite comprehensive and reflects more than 90% of the U.S. market capitalization at any period of time (S&P Dow Jones Indices LLC, 2019).

Next, we searched *Factiva* and *LexisNexis* news databases for press reports or news releases regarding public announcements of gray market combating actions (hereinafter referred to as “events” as per the event study terminology) by firms in our sample. Our search is based on a company-by-company approach and covers the period from 01 January 1997 till 31 December 2017. The list of key words we used in our search is provided here below:

Grey market OR gray market OR parallel import OR parallel trade OR parallel importation OR gray imports OR parallel export OR anti-diversion OR unauthorized seller OR unauthorized distributor OR product diversion OR gray product OR grey product OR grey seller OR gray seller OR parallel trading.

For each company, we conducted a content analysis of all returned search results to confirm event validity and exclude duplicate announcements. Whenever there were multiple announcements of the same event, we always considered the first mention. If the announcement indicated that the purpose of action is to combat both counterfeit and gray products, we excluded that event to ensure that we are squarely studying gray market combating where product

authenticity is not in question. This process generated a sample of 358 events i.e. announcements of gray market combating actions by firms in the sample under study.

4.4.2 *Variables and Measures*

In what follows, we discuss the variables we use in our models and illustrate their measures and data sources.

Financial efficacy. The financial efficacy of a gray market combating action, i.e. its impact on the firm's financial performance, is measured as the cumulative abnormal stock returns (CAR) generated by the announcement of this action, as estimated by the event study method – more details on this measure and the event study method will be provided in the econometric modeling section later. Abnormal stock market returns is an established measure of financial performance that has been frequently used by scholars in different disciplines (Boyd & Kannan; 2018; Gielens et al., 2008; Fang, Palmatier, & Grewal, 2011; Vaaler & Schrage, 2009; Acemoglu et al., 2016). Stock price data for the event study were obtained from the University of Chicago's Center for Research in Security Prices (CRSP). This variable, financial efficacy, will serve as the dependent variable in the multiple regression model that analyzes the financial efficacy of different gray market combating mechanisms.

Gray market combating mechanism. As discussed earlier in the theory section, we have 18 different gray market combating mechanisms under examination. Hence, we represent these mechanisms by 17 dummy variables in the multiple regression model, in which they serve as explanatory variables, and by a categorical variable in the multinomial logistic regression, in which they serve as the outcome variable. In both cases, we use “legal action” as the reference category or the base outcome since it is the most frequent mechanism.

Drivers of choice of gray market combating mechanism. As discussed earlier in the theory section, there are six firm-level factors under investigation as potential drivers of the firm's choice of a certain gray market combating mechanism. We measure these factors as follows. First, we capture resources availability via two proxies, firm size (Rao, Chandy, & Prabhu, 2008; Groening, Mittal, & Anthea Zhang, 2016) and financial leverage (Malshe & Agarwal, 2015). Larger firms have more resources at their disposal to use in gray market combating. Conversely, more leveraged firms have lower access to capital, as well as increased pressure for efficient use of existing resources, which limits resources availability for non-core priorities such as gray market combating. Hence, these two proxies function in opposite ways. In line with previous research, we measure firm size as the number of employees (Fang, Palmatier, & Guo, 2016; Rao, Chandy, & Prabhu, 2008; Marano et al., 2017; Panagopoulos, Rapp, & Ogilvie, 2017) and financial leverage as the long-term debt to total assets ratio (Sadovnikova & Pujari, 2017; Homburg, Vollmayr, & Hahn, 2014; Raassens, Wuyts, & Geyskens, 2012; Dotzel, Shankar, & Berry, 2013). Second, we measure firm age as the difference between the year in which the event (announcement of gray market combating action) took place and the year of firm incorporation (e.g., Rao, Chandy, & Prabhu; 2008; Malhotra et al., 2018; Sadovnikova & Pujari, 2017). Third, we proxy brand equity by the firm's advertising intensity (Bernile, Bhagwat, & Yonker, 2018; Nath & Mahajan, 2008; Chang & Hong, 2000; Nickerson & Silverman, 2003; Chang & Rhee, 2011; Rose & Ito, 2008; Windsperger, 2004) measured as the advertising-to-sales ratio (e.g., Malshe & Agarwal, 2015; Sridhar et al., 2016) for the fiscal year preceding the event. Fourth, we use research and development (R&D) intensity, calculated as the R&D-to-sales ratio, as a proxy for the firm's innovation and technological capabilities (Nath & Mahajan, 2008; Chang & Hong, 2000; Xue, Ray, & Sambamurthy, 2012; Peterson & Jeong, 2010; Chang &

Rhee, 2011).¹¹ Fifth, we measure firm profitability as the net-income-to-sales ratio (Raassens, Wuyts, & Geyskens, 2012; Hope et al., 2011). Sixth, we measure firm growth as the firm's sales in year t divided by its sales in year t-1 (e.g., Homburg, Vollmayr, & Hahn, 2014; Tuli, Bharadwaj, & Kohli, 2010; Zheng et al., 2015). These variables serve as the explanatory variables in the multinomial logistic regression model (drivers of choice model) and as control variables in the multiple regression model (financial efficacy model). Data for these variables come from the following archival data sources: Compustat, Statista, Bloomberg and Wall Street Journal databases, companies' annual reports, and company's official websites.

Additional control variables. In addition to the main variables mentioned above, we include a few more control variables in the financial efficacy model (multiple regression model). First, we add a group of industry dummies to account for industry fixed effects. Second, we also add time dummies to control for time fixed effects following the same procedure described in chapter 3 of this dissertation – see page 105. Third, we control for competitive intensity, measured as the Herfindahl-Hirschman Index (HHI) estimated at the 4-digit SIC code level (e.g., Rubera & Kirca, 2017; Gao et al., 2018; Malinova & Park, 2015). Fourth, we also control for industry growth, measured as the total sales of the industry in year t divide by its total sales in t-1, at the 4-digit SIC code level (Mayer, Stadler, & Hautz, 2015; Whitler, Krause, & Lehmann, 2018). Finally, following previous research (e.g., Edmans, 2011; Sampath, Gardberg, & Rahman, 2018), we include a dummy to reflect whether the company trades in the US financial markets as a stock or as an ADR.

¹¹ For firms that expense advertising/R&D costs as they are incurred, or do not report them in their annual reports or the data sources we used, we followed previous research (e.g., Malshe & Agarwal, 2015) and imputed missing values by multiplying the corresponding industry's average advertising-to-SG&A ratio or R&D-to-SG&A ratio (at the 4-digit SIC code level) by the firm's SG&A expenses for that year.

4.4.3 *Econometric Modeling*

In this section, we describe the econometric models and techniques we use in our examination of the financial efficacy and drivers of choice of the different gray market combating mechanisms discussed earlier.

Cumulative Abnormal Stock Returns (CAR) Estimation Using Event Study. The first step in our analysis is to model the financial efficacy of a gray market combating action i.e. its impact on the firm's financial performance. To do so, we follow previous research (e.g., Fang, Lee, & Yang, 2015; Rao, Chandy, & Prabhu, 2008; Swaminathan, Murshed, & Hulland, 2008; Joshi & Hanssens, 2010) and use event study method to estimate the CAR for each announcement in the sample.

Event study analyzes stock market reaction to the announcement of a corporate event and models the financial efficacy of that event in terms of the abnormal stock returns generated around its announcement. For a detailed discussion of the event study method, see pages 107 to 108 in this dissertation or the recent review of the method by Sorescu, Warren, and Ertekin (2017). In this study, we use the 4-factor capital asset pricing model (Fama & French, 1993; Carhart, 1997), along with a CRSP value-weighted benchmark index and an estimation window of 365 days ending 15 days before the event date, for modeling expected (normal) stock returns. For capturing the cumulative abnormal stock returns, we use a 3-day event window centered on the event date i.e. event window (-1,1). In a departure from existing research, which either uses the full events sample in its analysis (e.g., Ertekin, Sorescu, & Houston, 2018) or a reduced sample that excludes confounding events (e.g., Homburg, Vollmayr, & Hahn, 2014), we use both the full events sample (N=341) and the reduced events sample (N=123) in our analyses to

enhance the robustness of our results. In this regard, we use a 5-day screening window (-2,2) centered on the event day (day 0) to identify confounding events i.e. other significant corporate events (e.g., earning reports, dividend announcements, mergers and acquisitions, product recalls, new product announcements, alliances/joint ventures, senior executives appointments/moves) that coincided with the event under study. Based on these specifications, event study estimates the cumulative abnormal stock returns (CAR) generated by the announcement of each gray market combating action in our sample. These estimates serve as a measure of the financial efficacy of the corresponding gray market combating actions and are denoted by CAR (-1,1), as per the common event study terminology.

Multiple regression (financial efficacy model). To study the financial efficacy of the gray market combating mechanisms under investigation, we regress the event-study-estimated cumulative abnormal returns CAR (-1,1) on a set of 17 dummies representing the different gray market combating mechanisms, along with an array of control variables, as indicated in the below equation:

$$CAR (-1,1) = \alpha_0 + \alpha_1.Mechanism_1 + \alpha_2.Mechanism_2 + \dots + \alpha_{17}.Mechanism_{17} + [array\ of\ control\ variables] + error\ term \quad (9)$$

where “legal action” is used as the reference mechanism being the most frequent.

Following previous research, we use Heckman’s procedure (Heckman, 1979) to correct for potential self-selection bias in the sample of announcements under examination. Certain factors, such as firm characteristics and managers’ access to privileged information, may have motivated some firms to self-select into combating gray markets leading to self-selection issues in the model. Hence, we estimate a probit model in which the dependent variable is a dummy

that is set to one if a firm announced a gray market combating action in a certain year and zero otherwise, and the explanatory variables are a set of relevant factors (e.g., brand equity, innovation, profitability, sales growth, firm size, firm age, financial leverage, competitive intensity). Then, we calculate the inverse mills ratio (IMR) and include it in the multiple regression model as an additional control variable. To account for potential multicollinearity, we mean-centered all continuous variables.

Multinomial logistic regression (drivers of choice model). To explore the firm-level factors that may drive a firm's choice of a particular gray market combating mechanism, we specify the following multinomial logistic regression model.

$$M_{i,t} = \alpha_0 + \alpha_1.Firm\ Size + \alpha_2.Financial\ Leverage + \alpha_3.Brand\ Equity + \alpha_4.Innovation + \alpha_5.Profitability + \alpha_6.Firm\ Growth + \alpha_7.Firm\ Age + error\ term \quad (10)$$

where $M_{i,t}$ is a categorical outcome variable denoting the gray market combating mechanisms under examination (i : firm index, t : time index). “Legal action” is chosen as the base outcome being the most frequent mechanism as discussed earlier.

4.5. RESULTS

In this section, we present our empirical results and illustrate how they address the two main research questions in this study: (a) how do different gray market combating mechanisms differ in their financial efficacy? And (b) what firm-level factors drive the firm's choice of each gray market combating mechanism?

4.5.1 *Financial Efficacy of the Different Gray Market Combating Mechanisms*

Model-free evidence. First, we start with some initial, model-free evidence based on the event study results. In Table 4.3, we show the effect of each gray market combating mechanism on the firm's financial performance, as reflected by the cumulative abnormal stock returns CAR (-1,1) generated by all relevant events, averaged at the mechanism-level. The second and third columns in this table describe the nature of the effect based on the full events sample and the reduced sample, respectively. The fourth column presents the exact size of that effect as reflected by the average CAR (-1,1), at mechanism-level, in the reduced sample (noise-free sample). The last column shows the frequency of use for each gray market combating mechanism, in the sample under study, as an indication of the mechanism's popularity in practice.

The results in Table 4.3 clearly demonstrate that the majority of available gray market combating mechanisms seem financially ineffective as underlined by several scholars and practitioners (e.g., Eagle et al., 2003; Howell et al., 1986). This finding is further substantiated by the aggregate effect size, the average CAR (-1,1) for the whole sample, which reveals a significant and negative effect (CAAR = -0.56%, $p < 0.01$) for gray market combating, in general, on financial performance. This underscores the importance of pinpointing the few financially effective gray market combating mechanisms to guide practitioners in what appears to be, to a great extent, a futile fight or a '*no potion*' situation. Interestingly, the most popular gray market combating mechanisms (e.g., legal action, supply control, lobbying) seem to be the least effective financially, and the most effective ones (e.g., raising consumers' awareness, product differentiation) tend to be the least popular; in other words, the majority of practitioners are indeed prescribing the '*wrong pill*'.

Table 4.3 : The Financial Efficacy and Popularity of Gray Market Combating Mechanisms

Gray Market Combating Mechanism	Impact on Financial Performance (Full Events Sample)	Impact on Financial Performance (Sample without Confounding Events)	Average Cumulative Abnormal Stock Returns ^a	Frequency (how often used in sample) ^b
Raising consumers' awareness about risks and disadvantages of gray market products	<i>positive</i>	<i>positive</i>	1.40%	2.2%
Involved dealer/distributor termination	<i>positive</i>	<i>positive</i>	0.92%	2.0%
Supply sufficiency/product availability	<i>positive</i>	<i>positive</i>	0.69%	0.6%
Conversion of gray sellers into authorized sellers	<i>positive</i>	<i>positive</i>	0.50%	1.4%
Product differentiation/modification	<i>positive</i>	<i>positive</i>	0.21%	1.4%
Product tracking	<i>negative</i>	<i>positive</i>	0.20%	2.8%
Denial of or discrimination in post-sales services	<i>positive</i>	<i>negative</i>	-0.89%	5.9%
Pricing policy reform	<i>negative</i>	<i>negative</i>	-0.38%	0.8%
Shift to direct distribution (vertical integration)	<i>negative</i>	<i>negative</i>	-1.13%	1.4%
Legal action	<i>negative</i>	<i>negative</i>	-0.60%	36.3%
Lobbying for (against) anti-gray (pro-gray) Laws	<i>negative</i>	<i>negative</i>	-0.13%	7.0%
Involved dealer punishment/warning	<i>negative</i>	<i>negative</i>	-0.61%	4.5%
Anti-gray alliances/collaborations	<i>negative</i>	<i>negative</i>	-1.58%	10.1%
Supply management/control	<i>negative</i>	<i>negative</i>	-0.95%	10.1%
Price differentials reduction/removal	<i>negative</i>	<i>negative</i>	-0.97%	5.6%
Encouraging and rewarding dealers' compliance	<i>negative</i>	<i>negative</i>	-0.56%	1.4%
Channel monitoring/audit	<i>negative</i>	<i>negative</i>	-0.94%	2.2%
Joint use of multiple mechanisms	<i>positive</i>	<i>negative</i>	-0.38	4.5%

^a Based on event window (-1,1) and the sub-sample excluding confounding events.

^b Based on full sample (N=358).

Model-based evidence. The descriptive statistics and correlations are available in Table 4.4 and the multiple regression analysis results are provided in Table 4.5. These results provide strong evidence on the financial efficacy of the following three gray market combating mechanisms: (1) raising consumers' awareness about risks and disadvantages of gray market products, (2) product differentiation, and (3) conversion of gray sellers into authorized sellers. This evidence is consistent across the two events samples, the full sample and the sample without confounding events (reduced sample). Out of the 17 anti-gray market mechanisms under examination, only three mechanisms were found financially effective from a shareholder point of view. The common characteristics among these mechanisms seem to be their non-coercive, non-confrontational nature and that they do not disrupt distribution or distract product availability. Speaking about the control variables, we detect a positive effect for brand equity on the financial efficacy of gray market combating which points to the leading role brand equity plays in the gray market story. Conversely, we document a negative effect for firm growth and firm size.

4.5.2 *Drivers of the Firm's Choice of Gray Market Combating Mechanism*

The full results of the multinomial regression analysis are provided in Table 4.6. For the ease of exposition and discussion, an excerpt of these results featuring the three effective anti-gray mechanisms (which were identified in the previous section) is presented in Table 4.7.

As suggested by the results in Table 4.7, the choice of the first effective anti-gray mechanism, raising consumers' awareness about risks and disadvantages of gray market products, is mainly driven by firm age, resources availability, and firm growth. As firms age, they learn more about gray markets and gain more experience in combating them, and thus they are more likely to

Table 4.4 : Descriptive Statistics and Correlations

Variable	N	M	SD	1	2	3	4	5	6	7	8	9	10
1. Financial Efficacy (CAR)	341	-0.56	3.50	1									
2. Brand Equity	348	0.03	0.03	0.08	1								
3. Innovation	354	0.10	0.07	-0.01	-0.04	1							
4. Profitability	355	0.10	0.14	0.08	0.08	0.11*	1						
5. Sales Growth	355	1.07	0.20	-0.11	-0.04	0.00	0.24**	1					
6. Firm Size	356	106.40	93.38	0.11	0.04	-0.30**	-0.11**	-0.14**	1				
7. Firm Age	355	83.25	63.57	0.07	0.08	0.03	0.18**	-0.02	0.12*	1			
8. Financial Leverage	355	0.14	0.12	0.10	0.04	-0.19**	-0.05	-0.17**	0.18**	0.24**	1		
9. Competitive Intensity (HHI)	355	0.25	0.19	-0.06	-0.13	-0.42**	-0.32**	-0.04	0.08	-0.26**	-0.03	1	
10. Industry Growth	355	3.15	5.70	-0.02	0.02	0.30**	0.14**	-0.01	-0.10*	0.10	-0.00	-0.27**	1

M: Mean; SD: Standard Deviation; n: sample size; *p<0.05 **p<0.01

Table 4.5 : Analysis of the Financial Efficacy of Gray Market Combating Mechanisms

Variable	Sample without Confounding Events	Full Sample
Gray Market Combating Mechanisms		
Raising consumers' awareness	0.809 (0.482)**	1.247 (0.422)***
Product Differentiation/modification	0.940 (0.581)*	1.110 (0.705)*
Conversion of gray sellers into authorized sellers	0.842 (0.322)**	0.447 (0.243)**
Denial of or discrimination in post-sales services	-0.228 (0.671)	0.442 (0.193)**
Supply management/control	-0.162 (0.220)	-0.141 (0.209)
Involved dealer punishment/warning	-0.191 (0.268)	-0.128 (0.211)
Anti-gray alliances/collaborations	-0.308 (0.329)	-0.318 (0.249)
Channel monitoring/audit	0.245 (0.287)	-0.806 (0.532)*
Product tracking	0.246 (0.283)	-0.051 (0.300)
Encouraging and rewarding dealers' compliance	0.110 (0.373)	-0.589 (0.649)
Involved dealer/distributor termination	0.572 (0.669)	0.306 (0.254)
Lobbying for (against) anti-gray (pro-gray) Laws	0.397 (0.480)	0.175 (0.295)
Price differential reduction/removal	-0.171 (0.224)	-0.212 (0.203)
Pricing policy reform	0.411 (0.472)	0.020 (0.155)
Shift to direct distribution (vertical integration)	-0.417 (0.359)	0.032 (0.250)
Supply sufficiency/product availability	0.527 (0.609)	0.410 (0.651)
Joint use of multiple mechanisms	0.165 (0.444)	0.409 (0.244)**
Controls		
Brand Equity	3.307 (2.397)*	1.614 (1.383)
Innovation and Technological capabilities	-2.432 (2.478)	-0.018 (1.507)
Firm Size	-0.003 (0.001)**	-0.000 (0.001)
Profitability	0.572 (0.470)	0.659 (0.416)*
Firm Growth	-0.967 (0.589)*	-0.735 (0.274)***
Firm Age	0.000 (0.001)	-0.001 (0.001)
Competitive Intensity	-0.470 (0.459)	-0.587 (0.505)
Industry Growth	0.003 (0.010)	-0.001 (0.011)
Financial Leverage	-0.151 (0.942)	0.103 (0.632)
Inverse Mills Ratio	-0.028 (0.122)	-0.116 (0.099)
R ²	24.37%	15.52%
N	121	339

*p<0.1 **p<0.05 ***p<0.01

Robust standard errors are in parentheses. One-tailed tests of significance.

Dependent Variable is standardized cumulative abnormal stock returns (SCAR) over event window (-1,1).

Reference category is legal action.

Time dummies, industry dummies, ADR dummy, and intercept are included but not presented for parsimony.

Table 4.6 : Multinomial Logit Results -- Antecedents of Firms' Choice of Gray Market Combating Mechanism

Gray Market Combating Mechanisms (Choice Variable)	Firm Size	Leverage	Brand Equity	Innovation	Profitability	Firm Growth	Firm Age
Raising consumers' awareness	0.009** (0.004)	-8.466* (5.285)	-95.397*** (42.888)	0.855 (9.050)	-5.156* (3.677)	3.483* (2.129)	0.013** (0.007)
Product differentiation/modification	0.027*** (0.006)	0.628 (4.089)	-3.706 (27.997)	29.314*** (10.301)	8.360* (5.530)	2.469 (3.378)	-0.0253* (0.016)
Conversion of gray sellers into authorized sellers	0.005 (0.006)	-2.870 (4.958)	-53.851* (34.342)	-1.812 (9.213)	-1.341 (3.450)	-0.738 (2.715)	-0.012 (0.014)
Denial of or discrimination in post-sales services	0.016*** (0.004)	-8.115** (3.536)	-29.657** (17.409)	-2.156 (6.198)	-2.856 (3.288)	5.330** (1.692)	-0.009 (0.008)
Supply management/control	0.000 (0.004)	0.843 (1.848)	5.496 (6.015)	10.755*** (3.062)	3.056* (2.073)	3.109* (1.218)	0.001 (0.003)
Involved dealer punishment/warning	0.013*** (0.004)	-0.511 (2.813)	9.111* (5.901)	11.646*** (4.537)	1.268 (3.079)	3.598** (1.596)	-0.001 (0.004)
Anti-gray alliances/collaborations	-0.010** (0.005)	-0.874 (1.748)	-47.551*** (13.566)	9.682*** (3.148)	-0.002 (-0.001)	0.266 (1.180)	-0.006* (0.004)
Channel monitoring/audit	0.007* (0.005)	-13.567** (6.066)	-267.797*** (95.332)	-3.993 (8.483)	-2.080 (2.675)	-1.682 (2.496)	-0.021* (0.014)
Product tracking	-0.009 (.008)	-6.036* (4.302)	10.825* (7.587)	4.812 (5.941)	2.929 (2.885)	-1.941 (2.112)	-0.013* (0.009)
Encouraging and rewarding dealers' compliance	0.018*** (0.007)	-45.336** (21.764)	-6.851 (20.226)	-19.139* (14.233)	6.921 (6.425)	-2.895 (3.380)	-0.020 (0.019)
Involved dealer/distributor termination	0.014** (0.007)	1.334 (3.324)	4.212 (10.026)	6.216 (8.182)	-0.442 (2.886)	-4.357* (2.463)	-0.050** (0.024)
Lobbying for (against) anti-gray (pro-gray) Laws	0.005* (0.003)	-4.312* (2.638)	-1.998 (7.889)	5.519* (3.727)	-2.552* (1.768)	0.488 (1.576)	-0.002 (0.004)
Price differential reduction/removal	0.005* (0.004)	-3.344 (2.905)	2.951 (7.005)	5.832* (4.301)	1.770 (2.779)	1.600 (1.628)	-3.344 (2.905)
Pricing policy reform	0.0171*** (0.007)	-9.777 (9.564)	-6.514 (18.196)	-8.644 (16.401)	6.006 (7.562)	-0.576 (4.518)	-0.0284 (0.028)
Shift to direct distribution (vertical integration)	0.003 (0.013)	-2.551 (5.207)	16.370* (11.622)	22.775*** (7.643)	2.694 (4.170)	-0.856 (3.916)	-0.013 (0.012)
Supply sufficiency/product availability	0.004 (0.008)	-7.922 (10.148)	-3.884 (22.374)	-17.030 (20.466)	-4.616 (6.11)	-3.699 (4.160)	0.007 (0.017)
Joint use of multiple mechanisms	0.005* (0.003)	0.341 (2.478)	-10.088 (12.150)	1.445 (4.847)	-4.535** (2.031)	-0.556 (1.883)	-0.001 (0.006)

*Pseudo R² = 18.44%; N = 348 ; *p<0.1 ; **p<0.05 ; ***p<0.01 ; Reference category (base outcome) is legal action. Intercepts not presented for parsimony. 1-tailed tests of significance.*

Table 4.7 : Multinomial Logit Results -- Antecedents of Firms' Choice of Effective Gray Market Combating Mechanism

Gray Market Combating Mechanisms (Choice Variable)	Firm Size	Leverage	Brand Equity	Innovation	Profitability	Firm Growth	Firm Age
Raising consumers' awareness about risks and disadvantages of gray market products	0.009** (0.004)	-8.466* (5.285)	-95.397*** (42.888)	0.855 (9.050)	-5.156* (3.677)	3.483* (2.129)	0.013** (0.007)
Product differentiation/modification	0.027*** (0.006)	0.628 (4.089)	-3.706 (27.997)	29.314*** (10.301)	8.360* (5.530)	2.469 (3.378)	-0.0253* (0.016)
Conversion of gray seller into authorized seller	0.005 (0.006)	-2.870 (4.958)	-53.851* (34.342)	-1.812 (9.213)	-1.341 (3.450)	-0.738 (2.715)	-0.012 (0.014)
Pseudo R ²				18.44%			
N				348			

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$;

Reference category (base outcome) is legal action.

Intercepts not presented for parsimony. 1-tailed tests of significance.

choose such an effective mechanism. Additionally, as theoretically predicted, the notoriously substantial costs demanded by this mechanism make resources availability a major predictor of the firm's choice of this mechanism. Also, as discussed earlier in the theory section, when a firm is going through a growth phase, its view toward gray markets is typically favorable due to their well-known, benign impact on sales growth. That said, the firm still needs to demonstrate some resolution in acting against the gray market to maintain channel equity and pacify authorized dealers. This mechanism perfectly achieves that delicate balance: on one hand, it speaks loudly to the firm's willingness to use the most expensive gray market combating mechanisms; on the other hand, it does not threaten demand or disrupt product availability. Conversely, brand equity and profitability were found to have a negative influence on the likelihood of using this anti-gray mechanism.

Turning to the second effective gray market combating mechanism, product differentiation/modification, as theoretically predicted, innovation and technological capabilities appear to be the major determinant of the firm's propensity to use this anti-gray mechanism. This is exactly why the vast majority of companies shy away from this anti-gray mechanism despite the well-known consensus on its efficacy. Obviously, the superior innovation and technological capabilities demanded by this mechanism strongly inhibit the ability of most firms to use it in their battle with the gray markets. In addition to that, two other firm-level factors, profitability and firm age, were found to influence the firm's tendency to use this gray market combating mechanism. Whereas profitability increases the odds of using this mechanism, firm age decreases the odds of doing so.

Regarding the third effective gray market combating mechanism, conversion of gray sellers into authorized sellers, the results indicate that firms with higher brand equity are less inclined to use this mechanism. This finding validates the theoretic prediction presented earlier which suggests that: as brand equity increases, the firm's emphasis on customer service, brand representation, after-sales support, and dealer capabilities and reputation increases, which translates into stringent dealer selection standards that discourage the firm from enlisting gray marketers. Table 4.8 presents a brief summary of the drivers of choice for each of the three effective gray market combating mechanisms discussed above. The robustness of these results was further validated using a multinomial probit model (see Table 4.9).

In addition to our discussion of the drivers of choice for the three effective gray market combating mechanism, we provide in Table 4.10 a summary of the drivers of choice for all combating mechanisms, based on the multinomial logit results presented earlier in Table 4.6. For example, we find that as brand equity increases, firms become less inclined to use “denial of or discrimination in post-sales services” as a gray market combating mechanism to avoid offending customers and denting brand image. Conversely, as brand equity increases, firms' propensity to impose punishments on noncompliant channel partners increases due to the increase in power asymmetry, which is often associated with increased reliance on coercive power, as discussed earlier in the theory section. Also, in line with the theoretic predictions presented earlier, we observe that resources availability and firm innovation are major predictors of the firm's propensity to employ political lobbying in its battle with the gray market.

Table 4.8 : Summary of Drivers of Firm Choice of Effective Gray Market Combating Mechanisms

Gray Market Combating Mechanism	Drivers of Choice of this Mechanism
Raising consumers' awareness about risks and disadvantages of gray market products	<ul style="list-style-type: none"> ▪ <i>Firm resources (+)</i>: as firm resources increase, the likelihood of relying on this mechanism increases. ▪ <i>Firm Age (+)</i>: as firm age increases, the likelihood of relying on this mechanism increases. ▪ <i>Firm Growth (+)</i>: as firm growth increases, the likelihood of relying on this mechanism increases. ▪ <i>Brand Equity (-)</i>: as brand equity increases, the likelihood of relying on this mechanism decreases. ▪ <i>Profitability (-)</i>: as profitability increases, the likelihood of relying on this mechanism decreases.
Product differentiation/modification	<ul style="list-style-type: none"> ▪ <i>Innovation (+)</i>: as innovation increase, the likelihood of relying on this mechanism increases. ▪ <i>Profitability (+)</i>: as profitability increases, the likelihood of relying on this mechanism increases. ▪ <i>Firm Age (-)</i>: as firm age increases, the likelihood of relying on this mechanism decreases.
Conversion of gray sellers into authorized sellers	<p><i>Brand Equity (-)</i>: as brand equity increases, the likelihood of relying on this mechanism decreases.</p>

Table 4.9 : Multinomial Probit Results -- Antecedents of Firms' Choice of Effective Gray Market Combating Mechanism

Gray Market Combating Mechanisms (Choice Variable)	Firm Size	Leverage	Brand Equity	Innovation	Profitability	Firm Growth	Firm Age
Raising consumers' awareness about risks and disadvantages of gray market products	0.005** (0.002)	-4.305* (2.718)	-44.666** (20.927)	1.690 (4.788)	-2.835* (2.035)	2.113** (1.235)	0.006* (0.004)
Product differentiation/modification	0.014*** (0.004)	-0.461 (2.423)	-2.324 (12.091)	14.601*** (5.197)	3.204 (2.835)	1.417 (1.908)	-0.015** (0.009)
Conversion of gray seller into authorized seller	0.003 (0.003)	-1.832 (2.436)	-26.002** (14.782)	0.120 (4.667)	-0.687 (1.858)	-0.325 (1.427)	-0.007 (0.006)

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$;

Reference category (base outcome) is legal action.

Intercepts not presented for parsimony. 1-tailed tests of significance.

Table 4.10 : Summary of Drivers of Firm Choice of Gray Market Combating Mechanism

Gray Market Combating Mechanisms (Choice Variable)	Resources Availability	Firm Age	Brand Equity	Innovation	Profitability	Firm Growth
Raising consumers' awareness	+	+	-		-	+
Product differentiation/modification		-		+	+	
Conversion of gray seller into authorized seller			-			
Denial of or discrimination in post-sales services	+		-			+
Supply management/control				+	+	+
Involved dealer punishment/warning			+	+		+
Anti-gray alliances/collaborations		-	-	+		
Channel monitoring/audit	+	-	-			
Product tracking	-	-	+			
Encouraging and rewarding dealers' compliance	+			-		
Involved dealer/distributor termination		-				-
Lobbying for (against) anti-gray (pro-gray) Laws	+			+	-	
Price differential reduction/removal				+		
Pricing policy reform						
Shift to direct distribution (vertical integration)			+	+		
Supply sufficiency/product availability						
Joint use of multiple mechanisms					-	

+ : factor increases likelihood of choosing mechanism - : factor increases likelihood of choosing mechanism blank : has no effect

4.6. *DISCUSSION*

In this section, we discuss the theoretical contributions, managerial and policymaking implications, and limitations of our research. Then, we conclude by suggesting some avenues for future research in this area.

4.6.1 *Contributions to Theory*

Gray market combating mechanisms have been established in the literature for more than three decades (Cavusgil & Sikora, 1987; Sheffett & Duhan, 1988; Howell et al., 1986). That said, our understanding of their efficacy, as well as the factors that drive the firm's choice of one mechanism or another, remains poor. Indeed, our knowledge in this domain is limited to a body of theoretical arguments that recommends, or cautions against, the use of certain combating mechanisms (see Table 4.1) with little empirical evidence about the efficacy of those mechanisms. In this study, we conduct a comprehensive review of the gray market combating mechanisms present in the literature, discuss existing theoretical views about them, and undertake the first scientific assessment of their financial efficacy using a unique data set and a novel methodological approach. Our results reveal that the majority of available gray market combating mechanisms are financially ineffective, with the exception of three mechanisms. Moreover, we observe that the most popular combating mechanisms among practitioners are the financially ineffective ones while the few effective ones seem to be largely under-utilized. In addition to that, we delve into a group of firm-level factors that underlie the firm's choice of a gray market combating mechanism and provide a detailed picture of how those factors influence

the choice of each individual combating mechanism. These original findings advance gray market theory by addressing some focal, long-standing research questions in that literature.

Whereas the primary focus of this research is to advance our understanding of the gray market phenomenon, our findings carry implications for the broader distribution channels literature, especially the channel management and channel conflict research streams. Basically, gray marketing is a form of channel conflict – unauthorized distribution that leads to intra-brand competition and territorial interference – which makes gray market combating a channel management affair in its purest form. Hence, the findings of this study may provide valuable insights to channel researchers when construed in the larger channel or interorganizational context.

First, our findings substantiate a well-known theoretic view in the channels literature (e.g., Frazier & Summers, 1984; Gaski & Nevin, 1985; Scheer & Stern, 1992; Payan & McFarland, 2005) that argues that soft (non-coercive, non-confrontational) conflict resolution mechanisms are more effective than harsh (coercive, confrontational) ones. This is clearly evident in our results where we find that soft gray market combating mechanisms (e.g., raising consumers' awareness about risks and disadvantages of gray market products, product differentiation, conversion of gray sellers into authorized sellers) are more effective than their harsh counterparts (e.g., legal action, involved dealer termination, shift to direct distribution, involved dealer punishment/warning, channel monitoring/audit). Furthermore, while the vast majority of available evidence on this theoretic view comes from survey-based studies, our research provides a different type of evidence that is based on archival data, stock returns, large sample of public companies, 20-year time frame, and a unique empirical setting.

Second, distribution channels theory provides valuable insights about the external dyadic, network, and environmental drivers of the firm's channel management strategy such as dependence asymmetry (Kumar, Scheer, & Steenkamp, 1998; Dwyer & Walker Jr, 1981; Frazier, Gill, & Kale, 1989), length of the distribution relationship (Heide, 2003), network density and centrality (Antia & Frazier, 2001), and regulatory environment (Antia, Zheng, & Frazier, 2013). That said, our knowledge about the internal, firm-level factors that influence the firm's channel management strategy remains relatively poor despite the crucial role such factors play in shaping the firm's overall business strategy, not only its channel or marketing strategy (Cyert & March, 1963; Barney, 1991). In this study, we depart from existing research and examine a group of firm-level factors (e.g., brand equity, innovation and technological capabilities, profitability, firm age, resources availability, firm growth) that were seldom studied in this line of research to explore their influence on the firm's channel management strategy, particularly its gray market strategy. In doing so, we unveil a number of interesting relationships that have strong roots in existing theory but were never empirically explored before.

In addition to its contributions to gray market theory and the broader channels theory, this study also advances brand theory and adds to the marketing interactions research stream by unveiling an interesting facet of the dynamic interaction between brand and channel. As discussed earlier, brand equity is one of the most influential drivers of the firm's choice of certain gray market combating mechanisms and also enhances the financial efficacy of gray market combating in general regardless to the mechanism in use.

4.6.2 *Implications for Managers*

In their battle with the gray market, managers need to be mindful of the gray market combating mechanisms they employ. As evidenced in this study, and as argued by several scholars and practitioners, the majority of available anti-gray mechanisms are ineffective and detrimental to the firm's financial performance, with the exception of a few. Besides, as documented in this study, the most popular anti-gray mechanisms among practitioners are indeed the least effective financially, and the most effective mechanisms appear to be widely overlooked. Therefore, managers must be cognizant of the financial implications of gray market combating, and only pick a fight with the gray market after a careful cost-benefit assessment and using the right ammunition. Shareholders seem more receptive to soft anti-gray mechanisms that do not disrupt distribution, threaten product availability, offend consumers, or involve long legal and regulatory battles. The mechanism-of-choice for firms with strong innovation and technological capabilities should be product differentiation/modification. This is one of the most effective gray market combating mechanisms, as evidenced in this study and as argued by most theorists. On the other hand, firms with massive resources can rely on advertising and awareness campaigns that educate consumers about the risks and disadvantages of gray market products. Another effective gray market combating mechanism, which does not entail strong innovation capabilities or substantial resources, is enlisting major gray sellers by converting them into authorized dealers.

4.6.3 *Implications for Policymakers*

The legality of gray marketing has received a considerable amount of attention from scholars and legislators (Bucklin, 1993; Duhan & Sheffett, 1988; Cavusgil & Sikora, 1987; Cross, Stephans, & Benjamin, 1990; Kelly, 2018) all around the world, during the past three decades. Yet, to date, it remains a developing, highly controversial topic because it “confronts a variety of pragmatic issues concerning financial, legal, and marketing matters... [and] also involves more ethereal philosophical and ethical questions such as property rights and the right to free ride on assets owned by others” (Weigand, 1991). Policymakers in different parts of the world have adopted different regulatory positions that ranged from legalizing (Autrey, Bova, & Soberman, 2014; Lim, Lee, & Tan, 2001; Eagle et al., 2003; Chaudhry & Walsh, 1995; Kelly, 2018) to delegating (Duhan & Sheffett, 1988; Cross, Stephans, & Benjamin, 1990; Chaudhry & Walsh, 1995; Melck, 2016a) to mixed policy (Duhan & Sheffett, 1988; Cavusgil & Sikora, 1987; Cross, Stephans, & Benjamin, 1990), and various jurisdictions have swung back and forth between legality and illegality. As mentioned earlier in the theory section, there were even incidents where the US president himself needed to intervene to settle some gray market-related tug-of-war between different legislative bodies. The findings of this study contribute to this regulatory debate by providing solid empirical evidence that the most effective gray market combating mechanisms, from a financial standpoint, are indeed in the hands of managers (product differentiation, raising consumer awareness, converting powerful gray sellers) rather than legislators or judges. Above and beyond, we document evidence that shareholders themselves do not seem to appreciate costly legal battles or lobbying campaigns in dealing with the gray market challenge.

4.6.4 *Limitations and Directions for Future Research*

This study is not without limitations as is the case with any research endeavor. However, those limitations may serve as avenues and opportunities for future research work in this area. First, the sample of companies under examination, though large, representative, and diverse, is limited to public companies. Future research may put the generalizability of our findings to the test by investigating whether the same relationships hold in private ownership settings. Second, our measure of financial performance, abnormal stock returns, although widely-accepted, forward-looking, and objective, is not the only measure of firm performance. Future research work may use different perceptual or accounting-based operationalizations of firm performance to validate the consistency of our results. Third, despite the quasi-experimental nature of event study (Srinivasan & Hanssens, 2009), it is by no means a definite test of causality. Future research may investigate the causal nature of observed relationships using proper experimental designs such as field experiments. Fourth, as the first empirical investigation into the financial efficacy and drivers of choice of the different gray market combating mechanisms present in the literature, we do not distinguish whether the targeted gray marketer is an online (digital) or an offline (brick-and-mortar) seller. This is because the announcements in our sample do not often indicate whether the targeted gray seller is an offline, online, or both offline and online seller. Future research could examine whether the efficacy, as well as the choice, of each mechanism depends on whether the targeted gray marketer operates as an offline, online, or both offline and online seller¹².

¹² Whereas the efficacy of some combating mechanisms (e.g., raising consumers' awareness, product differentiation) may logically be unaffected by whether the gray seller is online, offline, or both, the efficacy of other mechanisms (e.g., denial of after-sales services, legal action) may vary from one type of seller to another. In terms of differences between sellers, offline gray sellers are expected to be more sophisticated in terms of pre- and post-sales services, and also to have invested more in facilities

5. Conclusion

How brand equity influences channel strategy remains one of the least researched topics in marketing despite its significance to both theory and practice. In this dissertation, I endeavored to advance our understanding of this important relationship by unveiling two facets of the dynamic interaction between brand equity and distribution channel. The first reflects a significant role for brand equity in shaping the firm's *channel governance* strategy and the second relates to a major influence for brand equity on the firm's *channel management* strategy. In doing so, I departed from extant research in this domain which is almost completely focused on understanding the influence of brand equity on *channel coordination*. Using a wide assortment of secondary data sources (Bond's Franchise Guide, Entrepreneur's Franchise 500, Factiva, LexisNexis, University of Chicago's Center for Research in Security Prices, Compustat, Statista, firms' annual reports, Bloomberg and Wall Street Journal databases, and companies' official websites), two large longitudinal data sets, and a variety of econometric techniques (Bayesian Panel Vector Autoregression, Event Study, Multiple Regression, Probit, Multi-level Mixed-Effects Linear Models, Multinomial Logistic Regression, Generalized Linear Models, Multinomial Probit, Maximum Likelihood), I documented some interesting strategic interactions taking place at the *brand-channel interface*. These interactions underscore the crucial role brand equity plays in shaping the firm's distribution strategy and pose significant implications for theory, practice, and policymaking.

and people (not always the case, though, given that some online sellers are more sophisticated today than their offline peers). On the other hand, online sellers are expected to have a lower cost structure and thus to be more nimble.

In chapter 2, using a large panel data set that spans 44 industries and a Bayesian Panel Vector Autoregression, I undertook the first empirical inquiry in marketing on the influence of brand equity on channel governance structure. In this regard, I detected a direct, powerful, but lagging effect for brand equity on channel governance such that higher brand equity leads to less hierarchical channel governance structure (i.e. lower levels of downstream vertical integration). This effect demonstrated high resilience when confronted by a series of robustness checks and model specifications. Despite being theoretically established (Ghosh and John, 1999; Coughlan, Anderson, Stern, & El-Ansary, 2006), the link between brand equity and channel governance has never been empirically assessed in marketing. In this study, I provided solid empirical evidence on the presence and nature of that link. In doing so, I contributed to brand theory by identifying a new strategic role for brand equity, one that goes beyond customers, competitors, employees, and shareholders to reach channel partners. Substantively, anecdotal evidence (from Fortune 500 companies such as Coke, Pepsi, and Starbucks) suggests that practitioners are divided on whether higher brand equity calls for more hierarchical channel governance or diffuses pressures for doing so. In this respect, I offered practitioners some valuable, scientific insights about the nature of this relationship. Furthermore, I put in the hands of senior marketing managers (e.g., CMO) empirical evidence that aids them in selling brand building initiatives to the board of directors by arguing that investments in brand equity are *dual investments* directly in the brand and indirectly in the channel which makes their risk/reward ratio superior to many other investment alternatives. This makes the challenging task of gaining organizational support for brand building activities easier.

In chapter 3, I explored the effect of gray market combating on firm performance and the contingencies that govern that effect. Using a unique large data set, I documented empirical

evidence that gray market combating, on average, has a negative bearing on the firm's financial performance, as reflected by abnormal stock returns. However, that effect exhibits significant variations depending on a number of contingencies such as brand equity, innovation, profitability, and sales growth. In addition to that, I highlighted the crucial role brand equity plays in this relationship. Brand equity is not only a major driver of the firm's decision to combat gray markets, but also a key determinant of the financial efficacy of this decision. Firms with higher brand equity are not only more likely to engage in gray market combating, but also less susceptible to the negative financial consequences of doing so. On the theoretical front, I addressed some of the central, long-standing research questions in the gray market literature. In that respect, I presented a conceptual framework, along with solid empirical evidence, that illustrates how gray market combating affects firm performance and the factors that govern this effect. I challenged my results via a battery of robustness checks and alternative model specifications, but they remained consistent. Substantively, I offered practitioners some valuable, actionable insights to aid them in dealing with the gray market conundrum. Firms should not engage in gray market combating haphazardly, or just because the competition is doing so, but rather should be mindful and choose the right course of action that best fits their strategic assets, financial situation, and market dynamics. Specifically, more profitable firms and firms with higher brand equity seem to be less susceptible to the negative financial implications of gray market combating. Conversely, more innovative firms or firms that are in a growth phase tend to be more vulnerable to the negative financial implications of gray market combating. Lastly, I put before policymakers some revealing insights that may assist them in dealing with the gray market controversy. In that respect, I provide the first comprehensive scientific evidence that demonstrates that gray market combating is often not in the best financial interest of the firm.

In chapter 4, I conducted a comprehensive review of the different gray market combating mechanisms present in the literature and discussed available theoretic arguments about their efficacy. As illustrated, whereas gray market theory reflects some sort of consensus about what combating mechanisms brand owners can utilize in their battle with the gray market, it is equivocal on the absolute or relative efficacy of those different mechanisms. To attend to this research imperative, I performed the first comprehensive, empirical assessment of the financial efficacy of gray market combating mechanisms. Results revealed that the majority of available gray market combating mechanisms are financially ineffective, as previously argued by several scholars and practitioners. Out of the 17 gray market combating mechanisms under investigation, I was able to isolate only three financially-effective mechanisms. Interestingly, I found that the most popular gray market combating mechanisms among practitioners are the least effective, from a financial standpoint, while the financially-effective mechanisms are indeed under-utilized; in other words, the majority of practitioners are indeed prescribing the ‘*wrong pill*’. Then, I identified a number of firm-level factors that may underlie the firm’s choice of a particular combating mechanism. Evidence from a multinomial logistic regression presents a detailed picture on how such firm-level factors as resources availability, firm age, brand equity, innovation and technological capabilities, firm growth, and profitability play an instrumental role in shaping the firm’s choice of a gray market combating mechanism. These findings present significant contributions to gray market theory, as well as the broader channel theory, and offer managers several valuable *plug-and-play* recommendations to assist them in their battle with the gray market. Finally, this research puts in the hands of policymakers comprehensive, scientific evidence (based on studying the gray market combating behavior of more than 3,000 public companies, company-by-company, for a period of twenty years) that demonstrates that the most

effective responses (raising consumers' awareness, product differentiation, conversion of gray sellers into authorized sellers) to the gray market challenge are indeed in the hands of managers themselves, not legislators, lawyers, or judges.

I hope that this dissertation provides useful guidance to practitioners in their strategic decision-making and spurs further scientific research on this interesting, underresearched phenomenon: the *brand-channel interface*.

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6. Appendices

6.1. APPENDIX A FOR CHAPTER 2

Figure A.1. Illustrative Diagram for How Higher Brand Equity Leads to Less Hierarchical Channel Governance

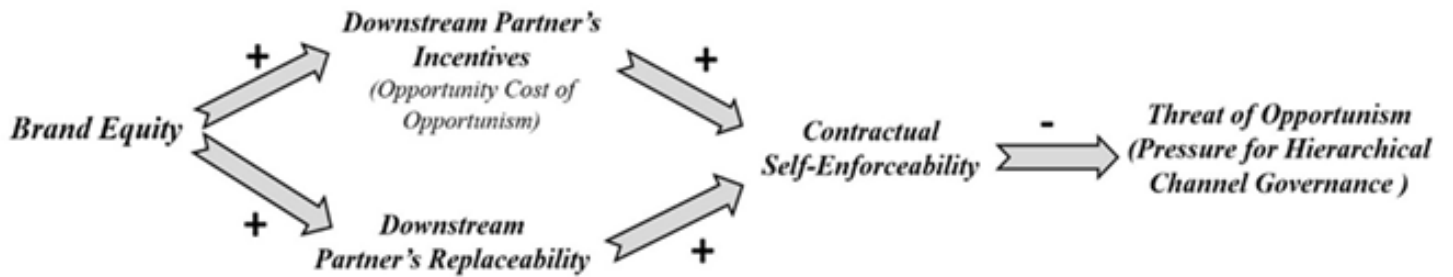


Table A.1: Sample Breakdown by Industry (Bond's Classification)

Industry	Percentage
Auto Products and Services	6.76
Auto/ Truck Rental	1.40
Building and Remodeling	4.68
Business: Accounting/ Credit/ Collection	1.60
Business: Advertising and Promotion	0.86
Business: Telecommunications/Miscellaneous	2.23
Child Development	3.49
Education/Personal Development/ Training	2.37
Employment and Personnel	3.07
Donuts/ Cookies/ Bagels	3.02
Coffee	1.35
Ice-cream/ Yogurt/Smoothies	2.19
Quick Service/ Take out	14.36
Restaurant/ Family Style	6.26
Specialty Foods	3.87
Hairstyling Salons	1.22
Health/ Fitness/ Beauty	3.06
Laundry and Dry Cleaning	0.97
Lawn and Garden	1.18
Lodging	2.33
Maid Services and Home Cleaning	1.28
Maintenance/ Commercial Cleaning/ Sanitation	6.54
Medical/ Dental/ Optical Products and Services	0.52
Packaging and Mailing	1.37
Printing and Graphics	1.28
Publications	0.61
Home/Building Inspection Services	1.18
Real Estate Services	2.13
Recreation and Entertainment	1.08
Formal Wear and Tools Lease	0.60
Art, Art Supplies and Framing	0.70
Athletic Wear/ Sporting Goods	1.29
Clothing / Shoes / Accessories	0.31
Convenience Stores	0.84
Home Furnishing	1.87
Home Improvement and Hardware	0.51
Pet Product and Services	0.87
Photography Products and Services	0.65
Specialty Retail	4.02
Video/ Audio/ Electronics	0.48
Miscellaneous Retail	0.72
Security and Safety Systems	0.44
Signs	0.74
Travel	0.69
Miscellaneous	2.99
Total	100

Table A.2: Data Examples

CompanyName	year	VI	Industry	Age	BDT	Ad	Insize	Media	International	Financing
DENNY'S	2001	41.62996	17	38	10	5.000	7.504392	474	1	1
DENNY'S	2002	55.52764	17	39	10	5.000	7.372746	455	1	1
DENNY'S	2003	55.52764	17	40	10	5.000	7.372746	449	1	1
DENNY'S	2004	34.10055	17	41	10	3.000	7.409136	447	1	0
DENNY'S	2005	34.5	17	42	10	3.000	7.377759	440	1	0
DENNY'S	2006	34.44302	17	43	10	4.000	7.353722	456	1	0
DENNY'S	2007	31.83007	17	44	10	4.000	7.333023	454	1	0
DENNY'S	2008	25.323	17	45	10	4.000	7.344719	476	0	0
DENNY'S	2009	17.03368	17	46	10	4.000	7.342132	484	1	0
HAMPTON INN/HAMPTON INN & SUITES	2001	1.974448	23	18	0	4.000	6.758094	459	0	0
HAMPTON INN/HAMPTON INN & SUITES	2002	2.319588	23	19	0	4.000	7.059618	461	1	0
HAMPTON INN/HAMPTON INN & SUITES	2003	0.082919	23	20	0	4.000	7.095064	462	1	0
HAMPTON INN/HAMPTON INN & SUITES	2004	0.082919	23	21	0	4.000	7.095064	465	1	0
HAMPTON INN/HAMPTON INN & SUITES	2005	2.799378	23	22	0	4.000	7.159292	453	1	1
HAMPTON INN/HAMPTON INN & SUITES	2006	2.621723	23	23	0	5.000	7.196687	475	1	1
HAMPTON INN/HAMPTON INN & SUITES	2007	1.770538	23	24	0	5.000	7.252762	469	1	1
HAMPTON INN/HAMPTON INN & SUITES	2008	1.770538	23	25	0	4.000	7.252762	480	0	1
HAMPTON INN/HAMPTON INN & SUITES	2009	1.841949	23	26	0	4.000	7.428333	497	1	1
NOVUS AUTO GLASS	2001	0.079618	4	16	13	3.000	7.828835	427	1	1
NOVUS AUTO GLASS	2002	0.079618	4	17	13	3.000	7.828835	426	1	1
NOVUS AUTO GLASS	2003	0.289855	4	18	13	2.500	7.635304	261	1	0
NOVUS AUTO GLASS	2004	0.271985	4	19	13	0.000	7.698936	347	1	0
NOVUS AUTO GLASS	2005	0.271985	4	20	13	0.000	7.698936	379	1	0
NOVUS AUTO GLASS	2006	0.271985	4	21	13	0.000	7.698936	436	1	0
NOVUS AUTO GLASS	2007	0.271985	4	22	13	0.000	7.698936	378	1	0
NOVUS AUTO GLASS	2008	0.271985	4	23	13	0.000	7.698936	418	1	0
NOVUS AUTO GLASS	2009	0.271985	4	24	13	2.000	7.698936	412	1	1
THE MAIDS HOME SERVICES	2001	11.68224	24	21	1	1.000	6.059123	408	0	1
THE MAIDS HOME SERVICES	2002	2.017937	24	22	1	1.000	6.100319	138	0	1
THE MAIDS HOME SERVICES	2003	2.017937	24	23	1	1.000	6.100319	308	0	1
THE MAIDS HOME SERVICES	2004	1.711027	24	24	1	1.000	6.265301	421	0	1
THE MAIDS HOME SERVICES	2005	0.552486	24	25	1	1.000	6.297109	442	0	1
THE MAIDS HOME SERVICES	2006	0.461894	24	26	1	2.000	6.763885	463	0	1
THE MAIDS HOME SERVICES	2007	0.334448	24	27	1	2.000	6.799056	459	0	1
THE MAIDS HOME SERVICES	2008	0.461894	24	28	1	1.000	6.763885	453	0	1
THE MAIDS HOME SERVICES	2009	2.469136	24	29	1	2.000	6.959399	460	0	1

Table A.3: Schwartz Bayesian Information Criterion for identifying the optimal lag Length

Lag Length	SIC
0	20.9787
1	18.9807
2	19.6226
3	19.6797
4	19.2802
5	18.6057*
6	18.6508
7	19.0520

* *Optimal lag length*

Figure A.2: Bayesian PVARX Estimates

Prior type: Normal-Wishart Hyper-parameters: Mu: 0, L1: 0.1 Standard errors in () & t-statistics in []			
	D(AD)	D(RRANK)	VI
D(AD(-1))	-0.108717 (0.07937) [-1.36972]	35.44613 (15.6809) [2.26046]	-0.889088 (1.18982) [-0.74724]
D(AD(-2))	-0.216550 (0.00038) [-577.377]	-19.54243 (0.07410) [-263.737]	-1.606702 (0.00562) [-285.771]
D(AD(-3))	-0.022235 (0.00571) [-3.89092]	2.026683 (1.12900) [1.79511]	-0.483890 (0.08567) [-5.64862]
D(AD(-4))	-0.011394 (0.07731) [-0.14738]	1.006681 (15.2743) [0.06591]	-0.515625 (1.15897) [-0.44490]
D(AD(-5))	-0.372106 (0.00036) [-1038.33]	-5.972238 (0.07080) [-84.3527]	0.967064 (0.00537) [180.014]
D(RRANK(-1))	0.000131 (0.00717) [0.01825]	-0.659262 (1.41639) [-0.46545]	0.003910 (0.10747) [0.03638]
D(RRANK(-2))	0.000168 (0.03828) [0.00438]	-0.240293 (7.56311) [-0.03177]	0.003778 (0.57387) [0.00658]
D(RRANK(-3))	0.000296 (0.00034) [0.87471]	-0.165657 (0.06688) [-2.47689]	-0.001756 (0.00507) [-0.34601]
D(RRANK(-4))	0.000118 (0.00529) [0.02224]	0.038411 (1.04531) [0.03675]	-0.003184 (0.07932) [-0.04014]
D(RRANK(-5))	0.000214 (0.03951) [0.00542]	0.007631 (7.80485) [0.00098]	-0.005856 (0.59221) [-0.00989]
VI(-1)	-0.001747 (0.00030) [-5.80363]	-0.769346 (0.05946) [-12.9380]	0.766643 (0.00451) [169.914]
VI(-2)	0.001121 (0.00424) [0.26476]	1.805734 (0.83684) [2.15781]	0.016450 (0.06350) [0.25907]
VI(-3)	0.001132 (0.06680) [0.01695]	-1.492348 (13.1967) [-0.11308]	0.213528 (1.00133) [0.21324]
VI(-4)	-0.003517 (0.00030) [-11.6860]	0.596823 (0.05946) [10.0379]	-0.043939 (0.00451) [-9.73944]
VI(-5)	0.002326 (0.00352) [0.66051]	-0.448000 (0.69566) [-0.64400]	0.025415 (0.05278) [0.48148]

C	0.021415 (0.10647) [0.20114]	18.91092 (21.0345) [0.89904]	-1.599616 (1.59604) [-1.00224]
AGE	-0.002273 (0.00257) [-0.88429]	0.674656 (0.50777) [1.32865]	-0.098168 (0.03853) [-2.54794]
BDT	0.000147 (0.00146) [0.10076]	-0.041162 (0.28881) [-0.14253]	-0.004785 (0.02191) [-0.21837]
FINANCING	0.061601 (0.04943) [1.24631]	13.03927 (9.76501) [1.33530]	0.796898 (0.74094) [1.07552]
INDUSTRY	-0.002164 (0.00272) [-0.79649]	-1.099146 (0.53667) [-2.04808]	0.012151 (0.04072) [0.29839]
INTERNATIONAL	0.008473 (0.04448) [0.19048]	-0.029959 (8.78812) [-0.00341]	-0.442137 (0.66682) [-0.66306]
LNSIZE	0.007620 (0.01844) [0.41317]	-2.634403 (3.64351) [-0.72304]	0.502213 (0.27646) [1.81659]
R-squared	0.290079	0.384276	0.956552
Adj. R-squared	0.180459	0.289201	0.949844
Sum sq. resids	6.538684	333844.4	1920.432
S.E. equation	0.219268	49.54532	3.757769
F-statistic	2.646224	4.041822	142.5814
Mean dependent	0.015823	-0.829114	11.53677
S.D. dependent	0.242209	58.76643	16.77903

Figure A.3: Impulse Response Functions for the Effect of an Orthogonalized Shock in Brand Equity on Vertical Integration

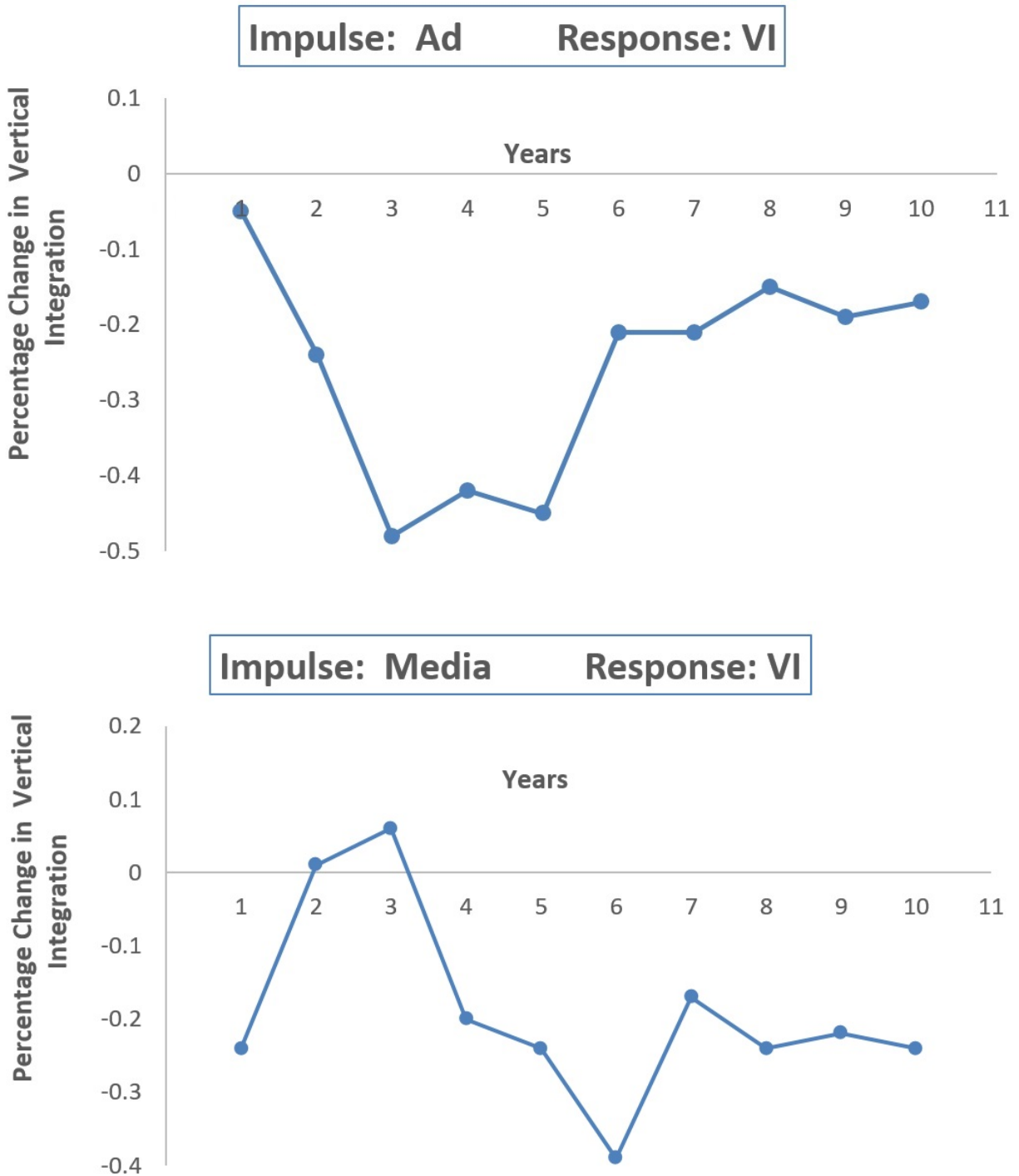


Figure A.4: Accumulated GIRFs for the Effect of a Shock in Brand Equity on Vertical Integration

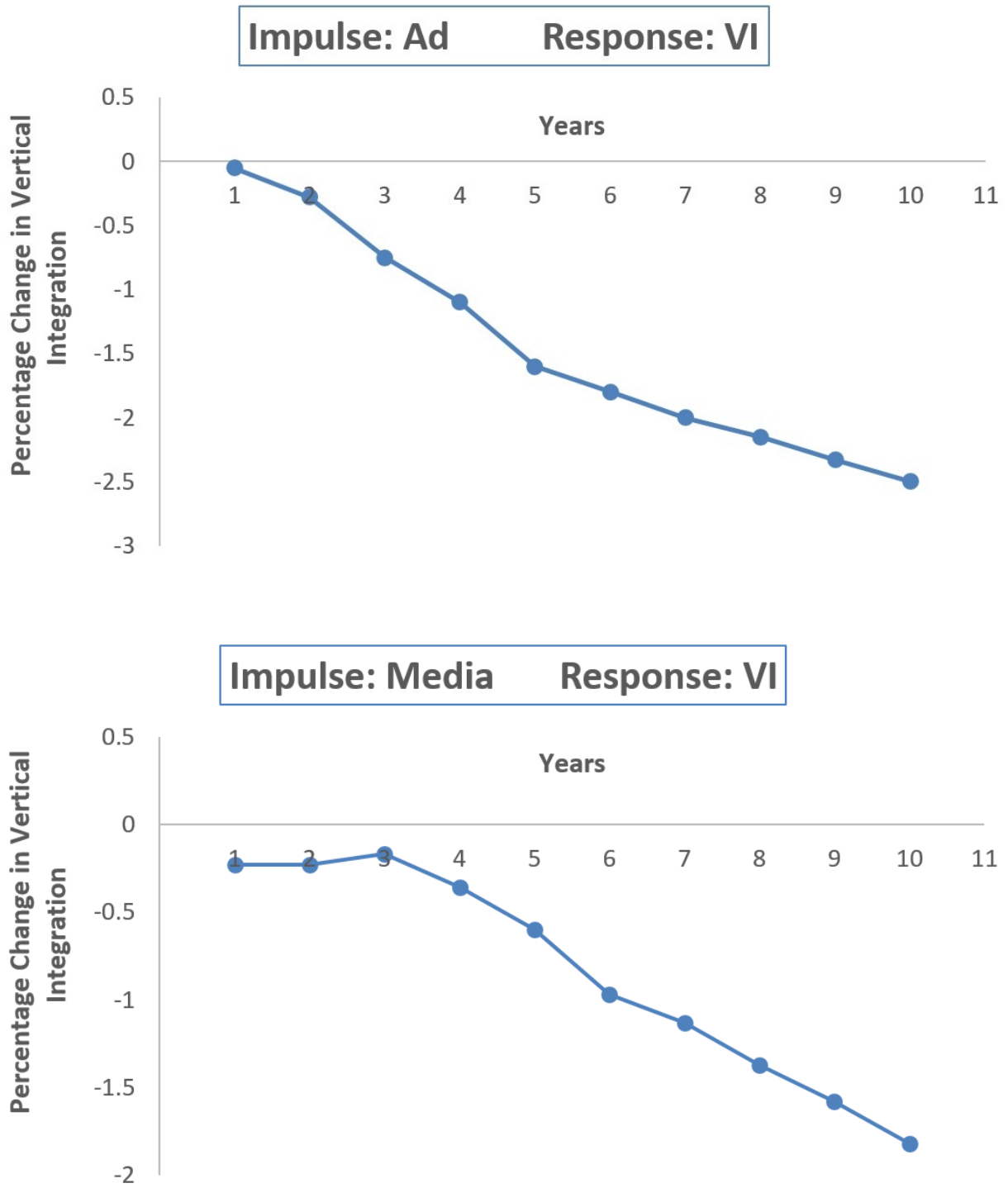


Figure A.5: Variance Decomposition Analysis of VI

Period	S.E.	D(AD)	D(RRANK)	VI
1	0.203431	0.020042	0.416612	99.56335
2	0.204819	0.265674	0.262418	99.47191
3	0.208789	1.060835	0.223225	98.71594
4	0.209047	1.364397	0.288493	98.34711
5	0.209547	1.647019	0.385652	97.96733
6	0.223538	1.532790	0.656343	97.81087
7	0.224441	1.443770	0.635976	97.92025
8	0.226123	1.346835	0.676445	97.97672
9	0.226272	1.285751	0.696441	98.01781
10	0.226519	1.229491	0.728200	98.04231

Figure A.6: Accumulated GIRFs for the Effect of a Shock in Vertical Integration on Brand Equity

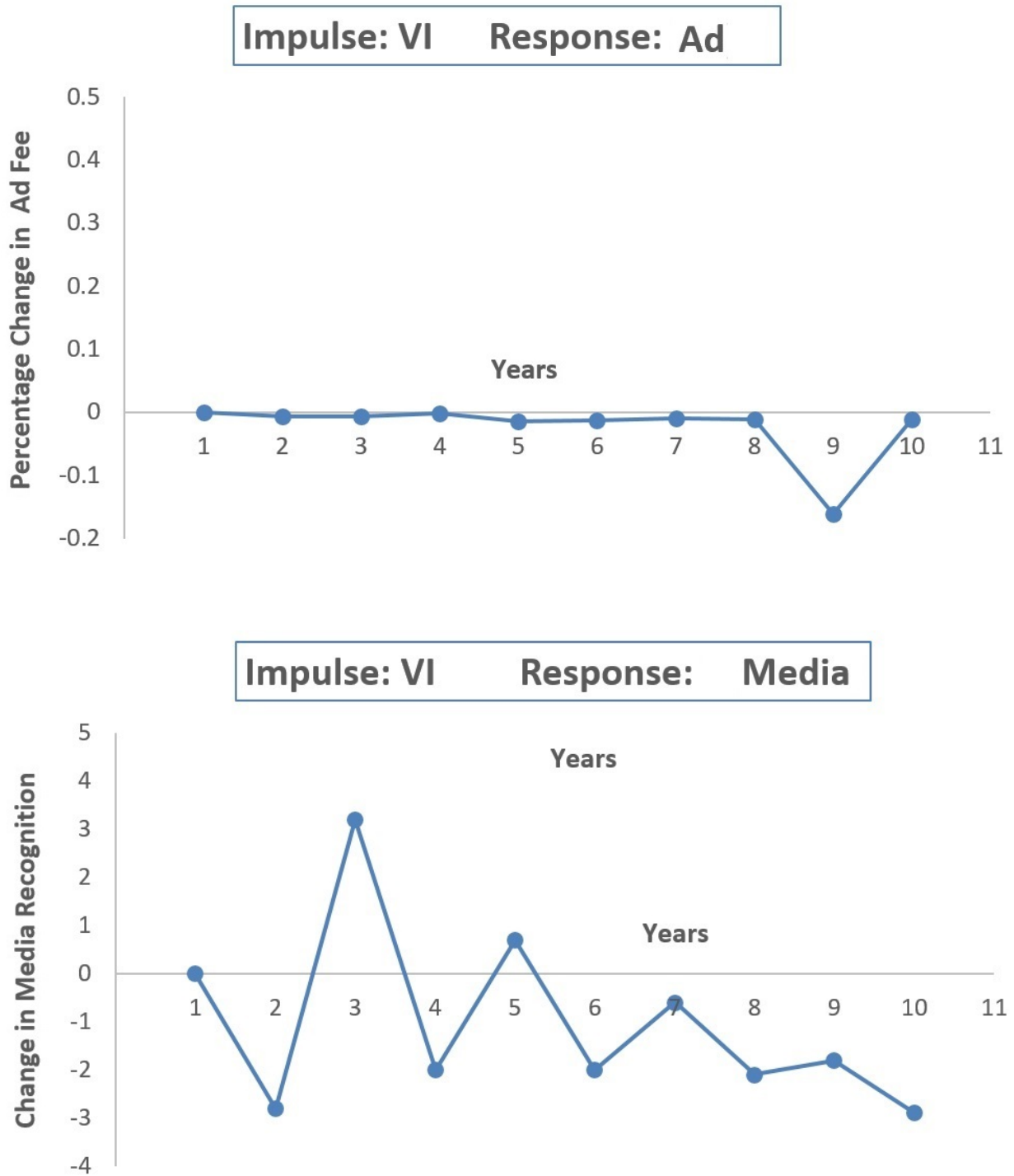


Figure A.7: Generalized IRFs for the Unrestricted PVAR

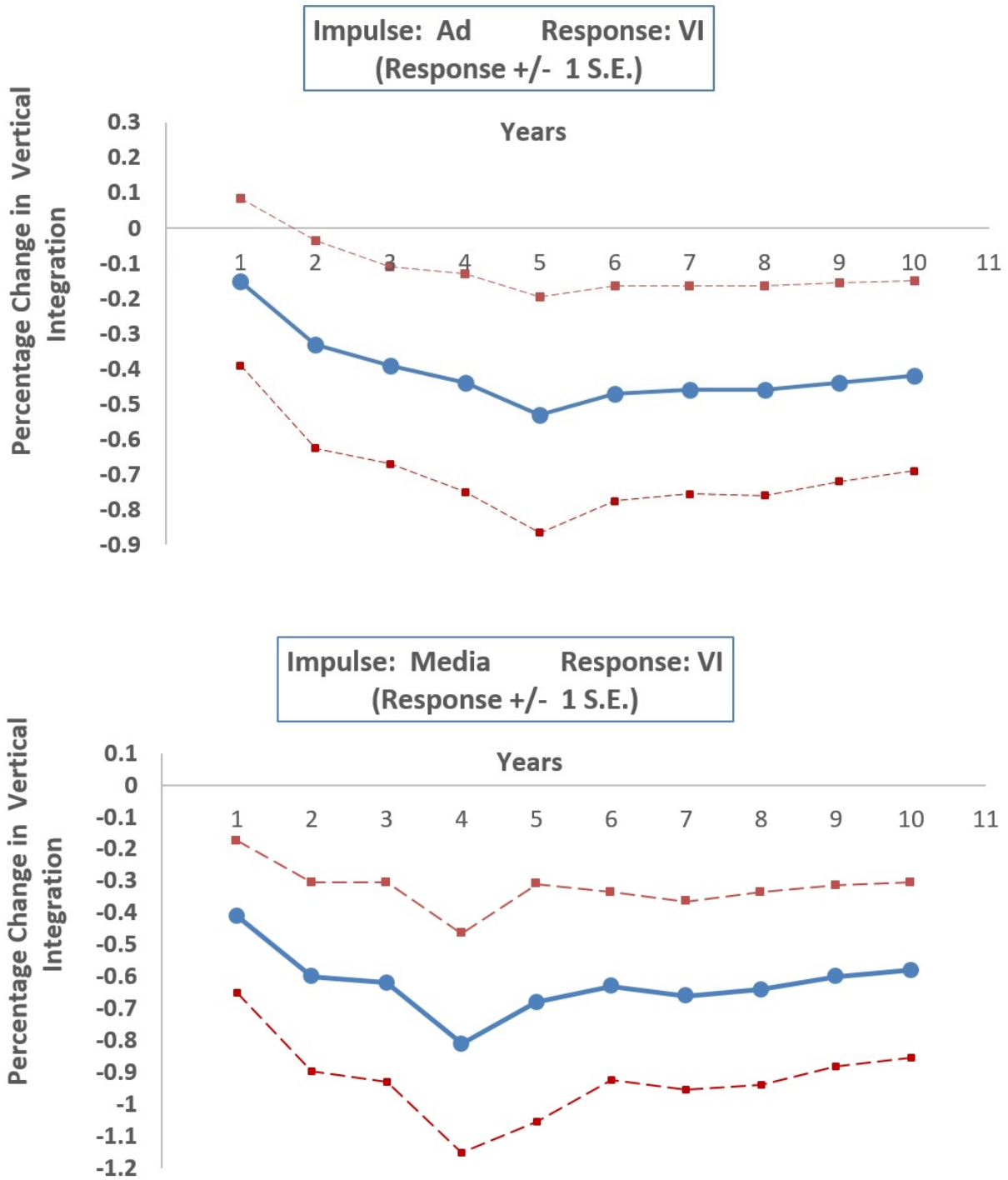


Figure A.8: Accumulated GIRFs for the Unrestricted PVAR

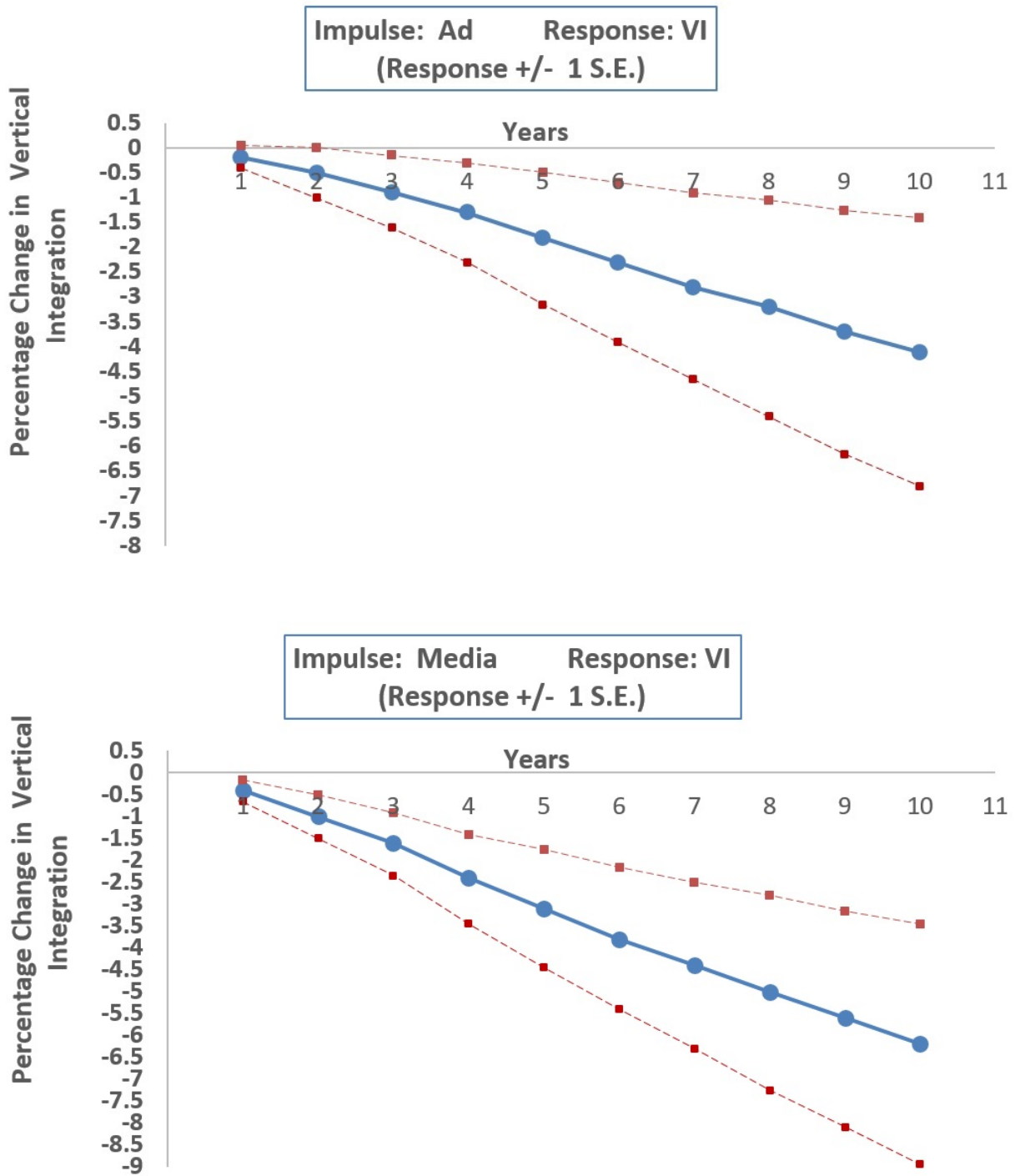


Figure A.9: Generalized Impulse Response Functions for BPVARX (Minnesota prior)

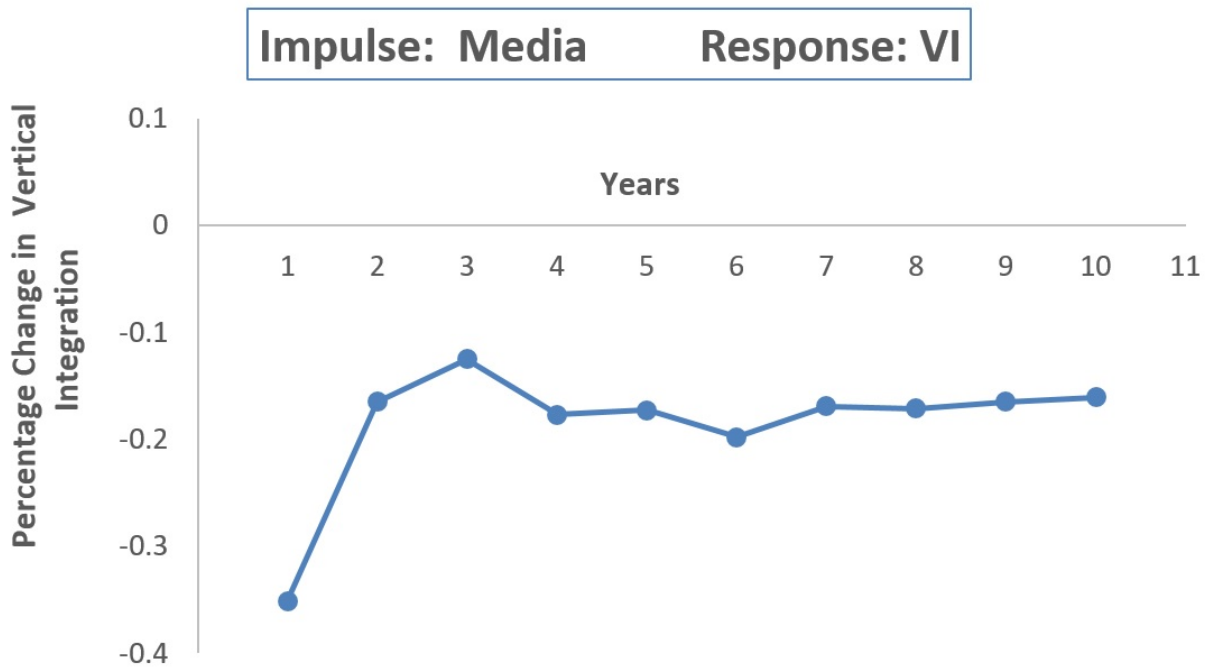
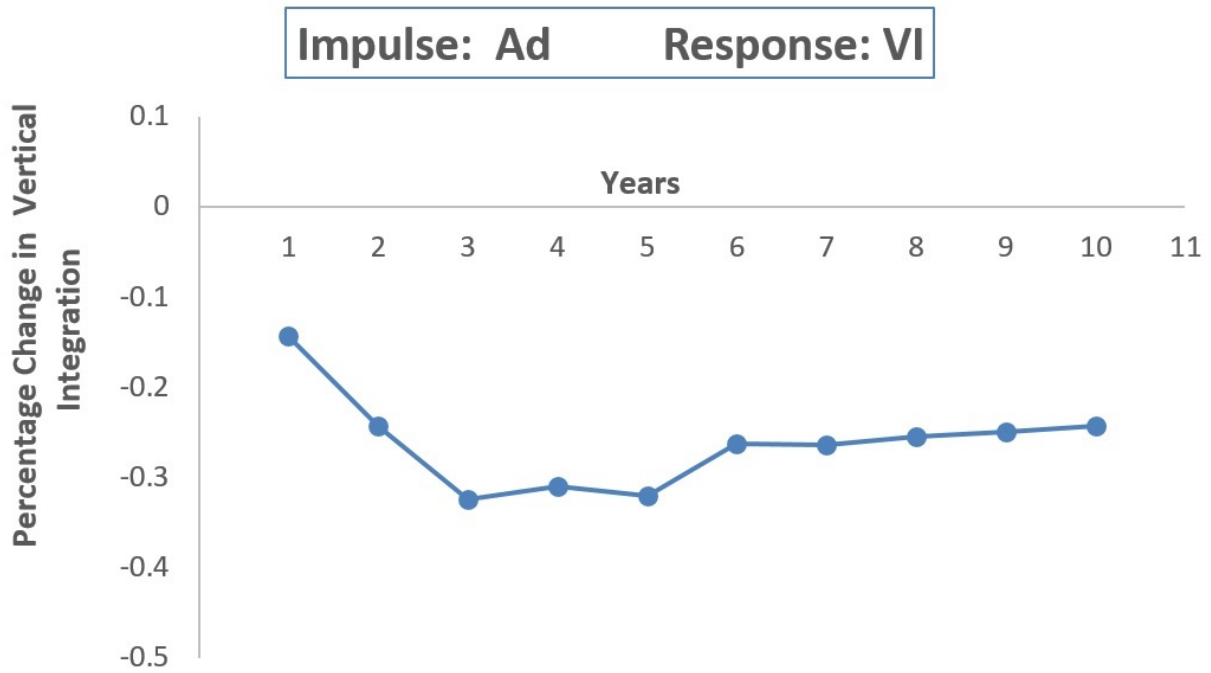


Figure A.10: Generalized IRFs for the BPVARX with Lag Length L=3

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

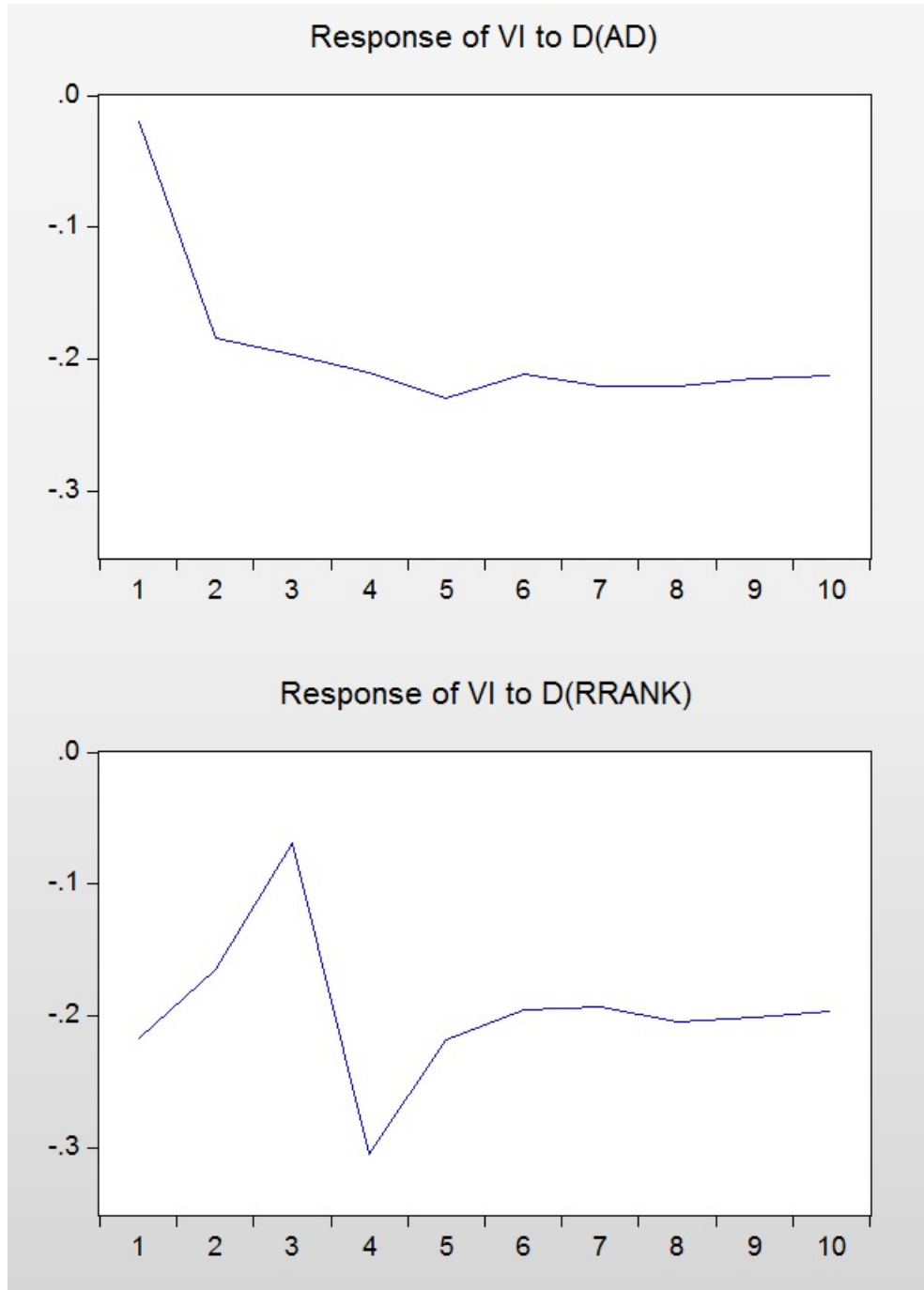


Figure A.11: Generalized IRFs for the BPVARX with Lag Length L=4

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

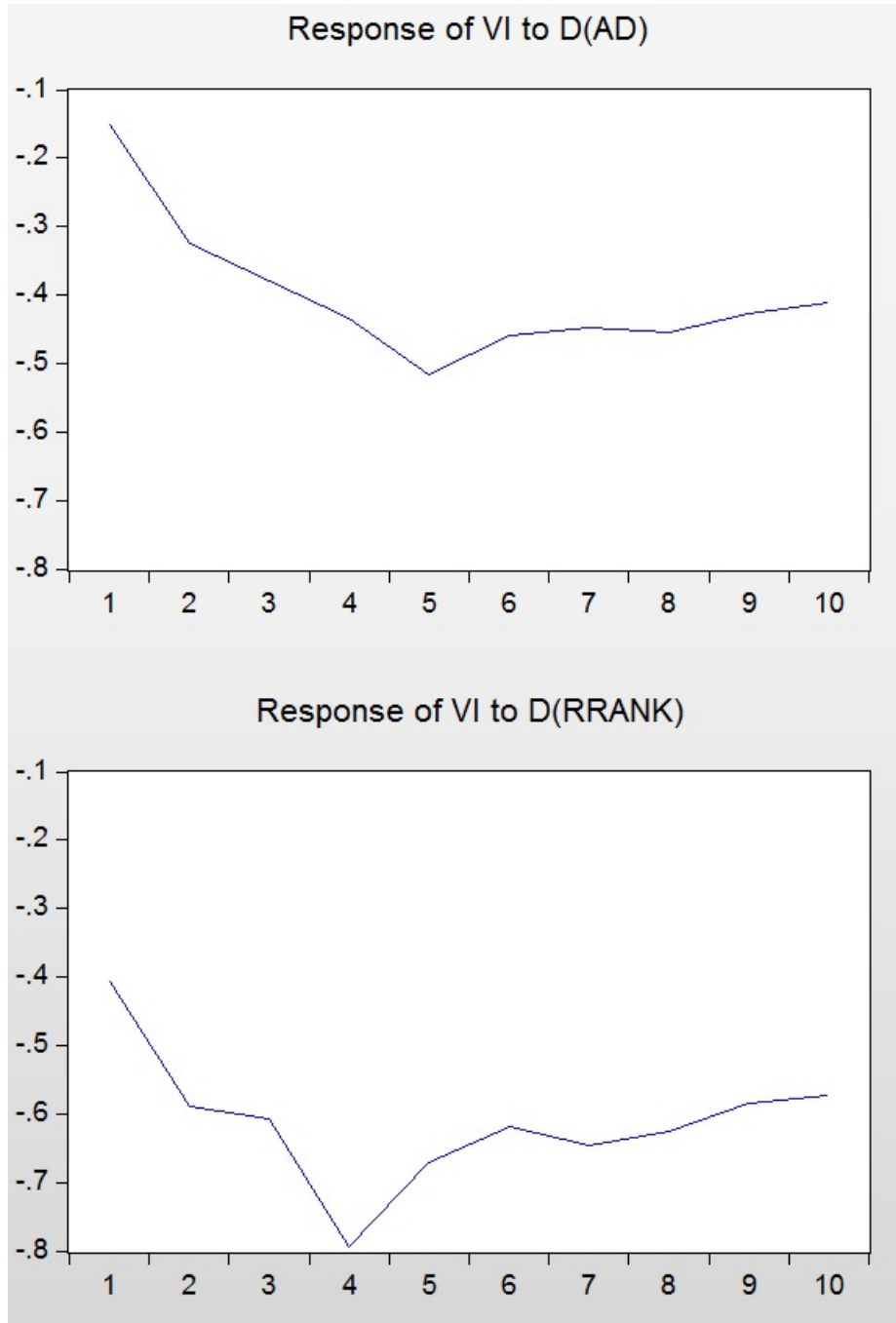


Figure A.12: Generalized IRFs for the BPVARX with Lag Length L=6

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

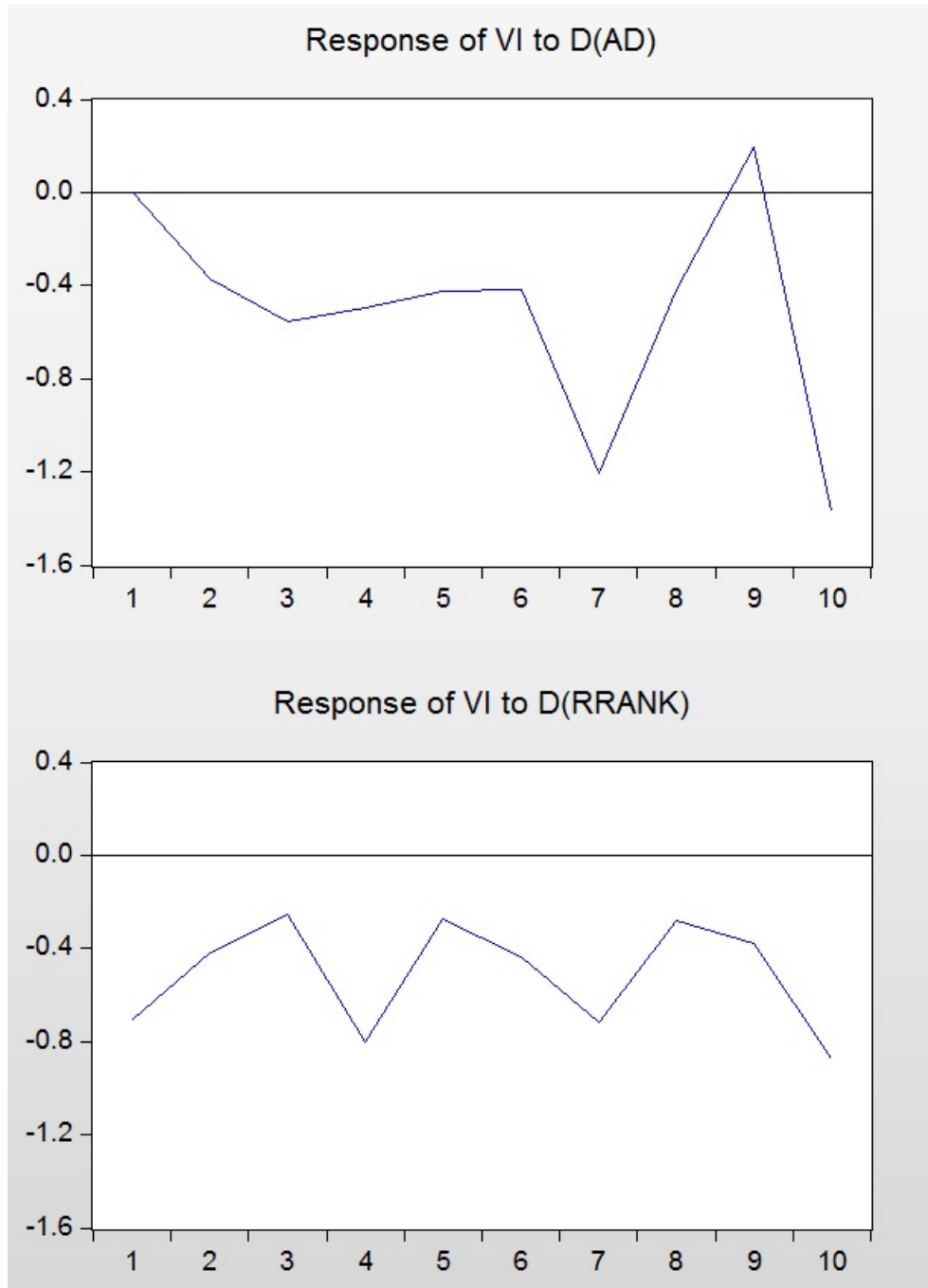


Figure A.13: Generalized IRFs for the BPVAR (no control variables) –Wishart Prior
(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

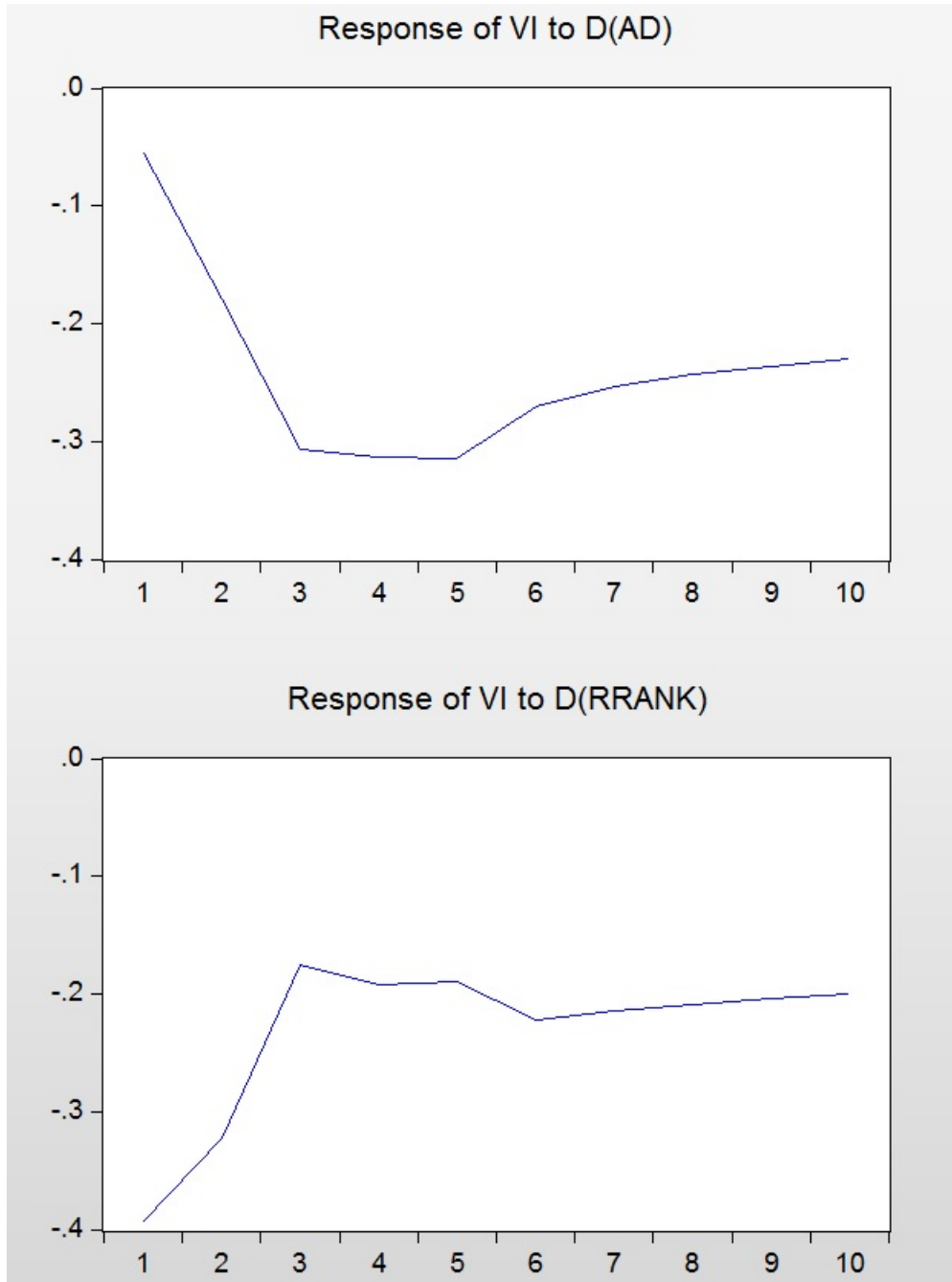


Figure A.14: Generalized IRFs for the BPVAR (no control variables) – Minnesota Prior
(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

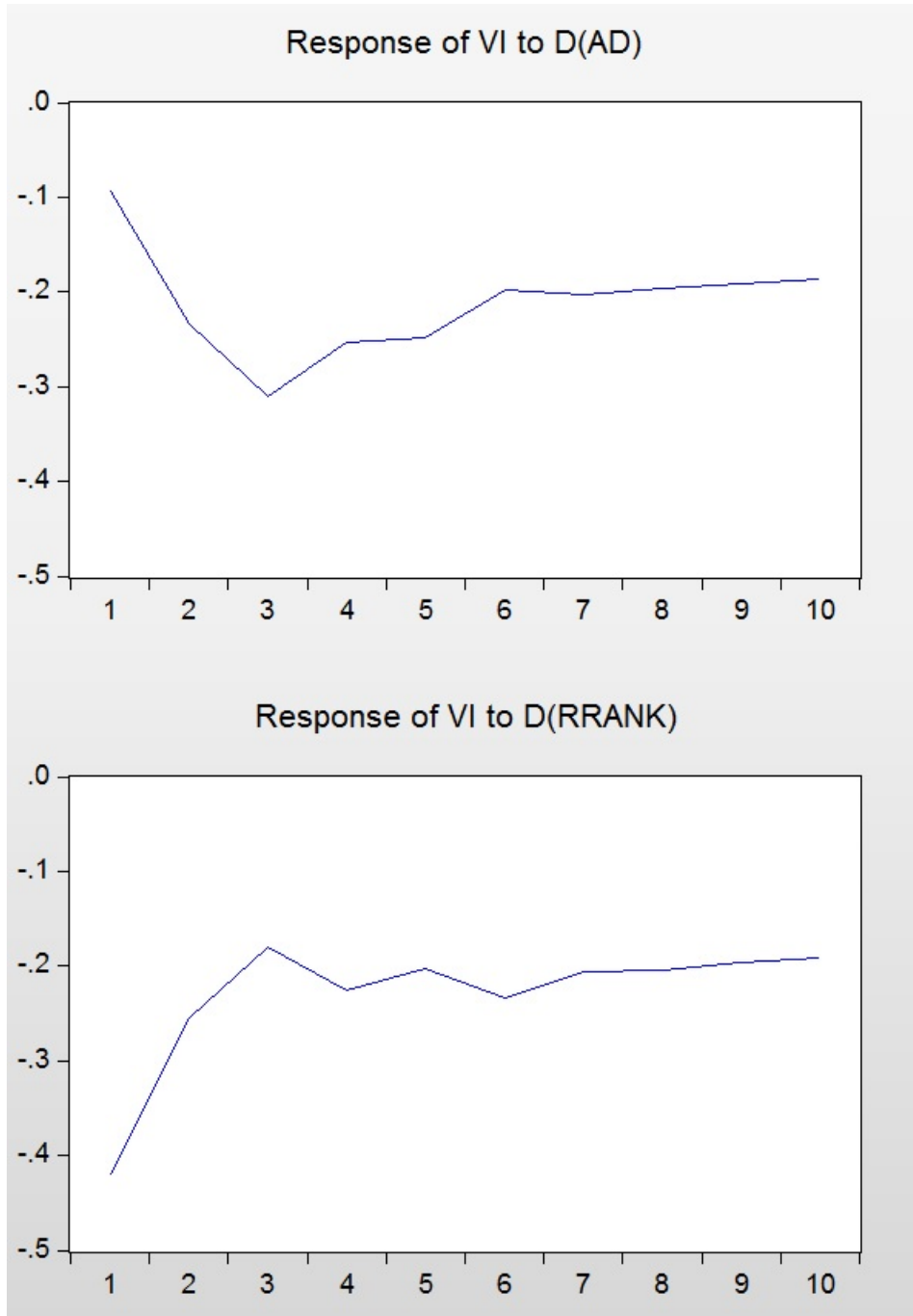


Figure A.15: Accumulated GIRFs for an All-In-First-Difference BPVARX model – Wishart Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

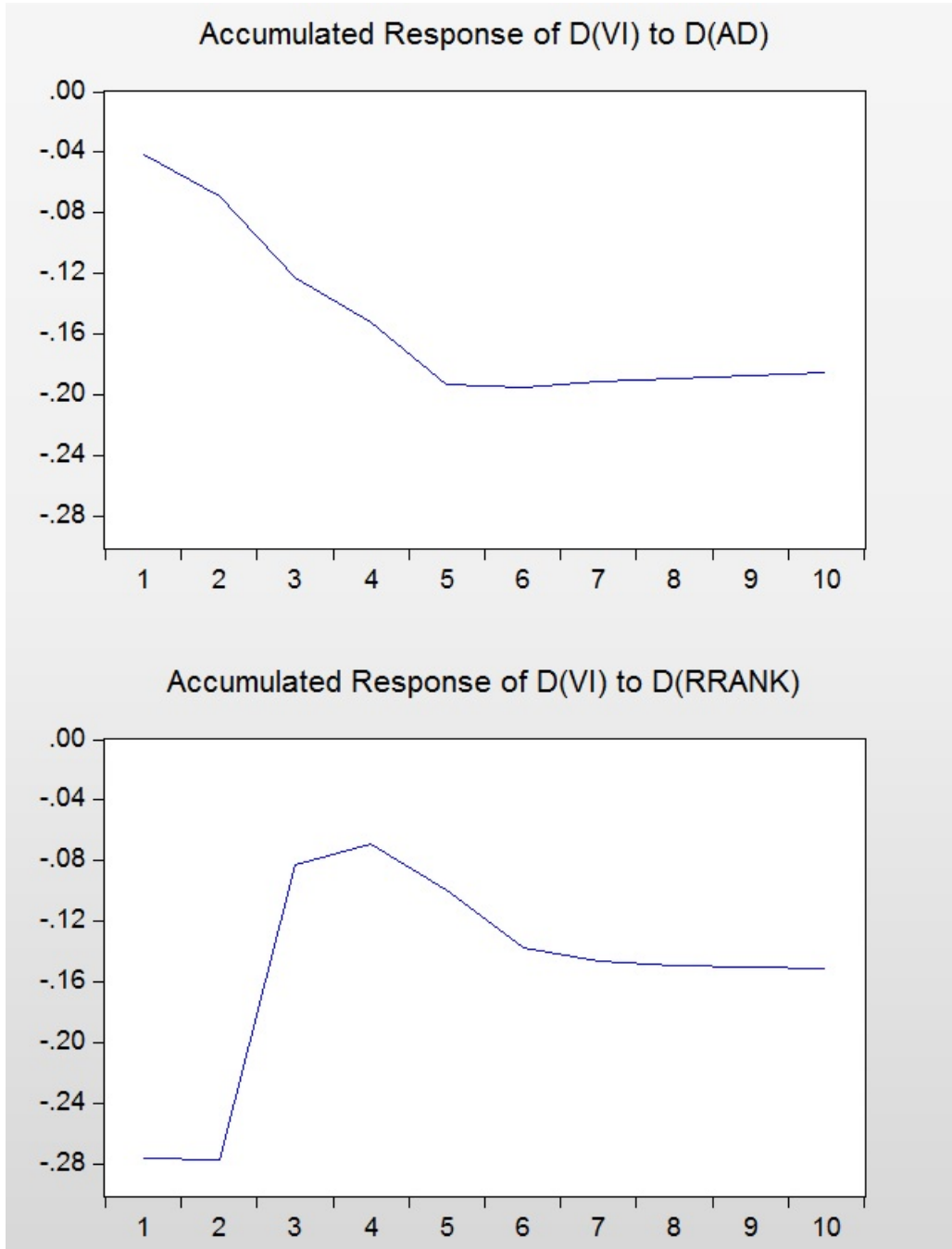


Figure A.16: Accumulated IRFs for an All-In-First-Difference BPVARX model – Minnesota
Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

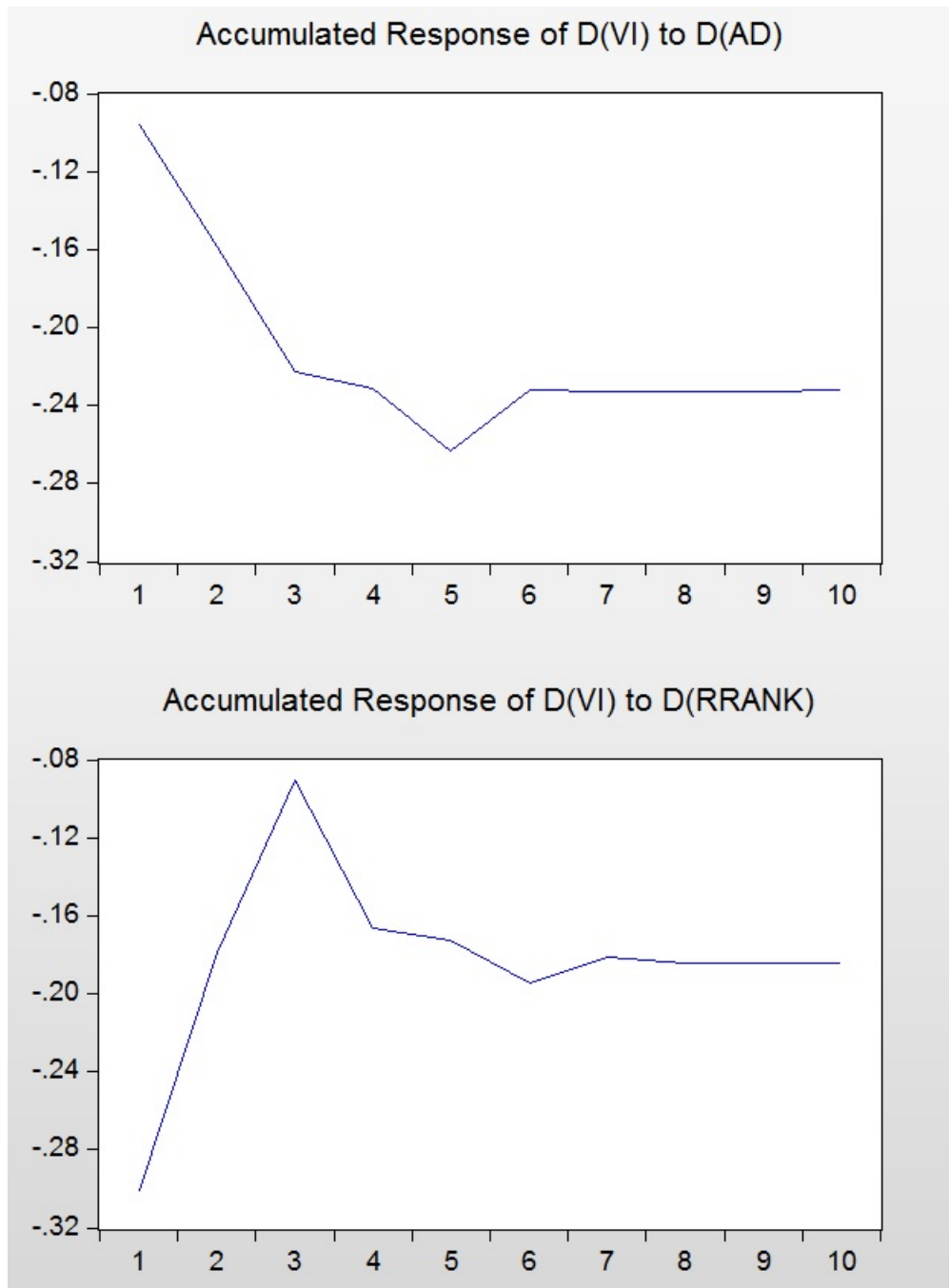


Figure A.17: Generalized IRFs for a BPVARX over the balanced sub-panel only – Wishart Prior
(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

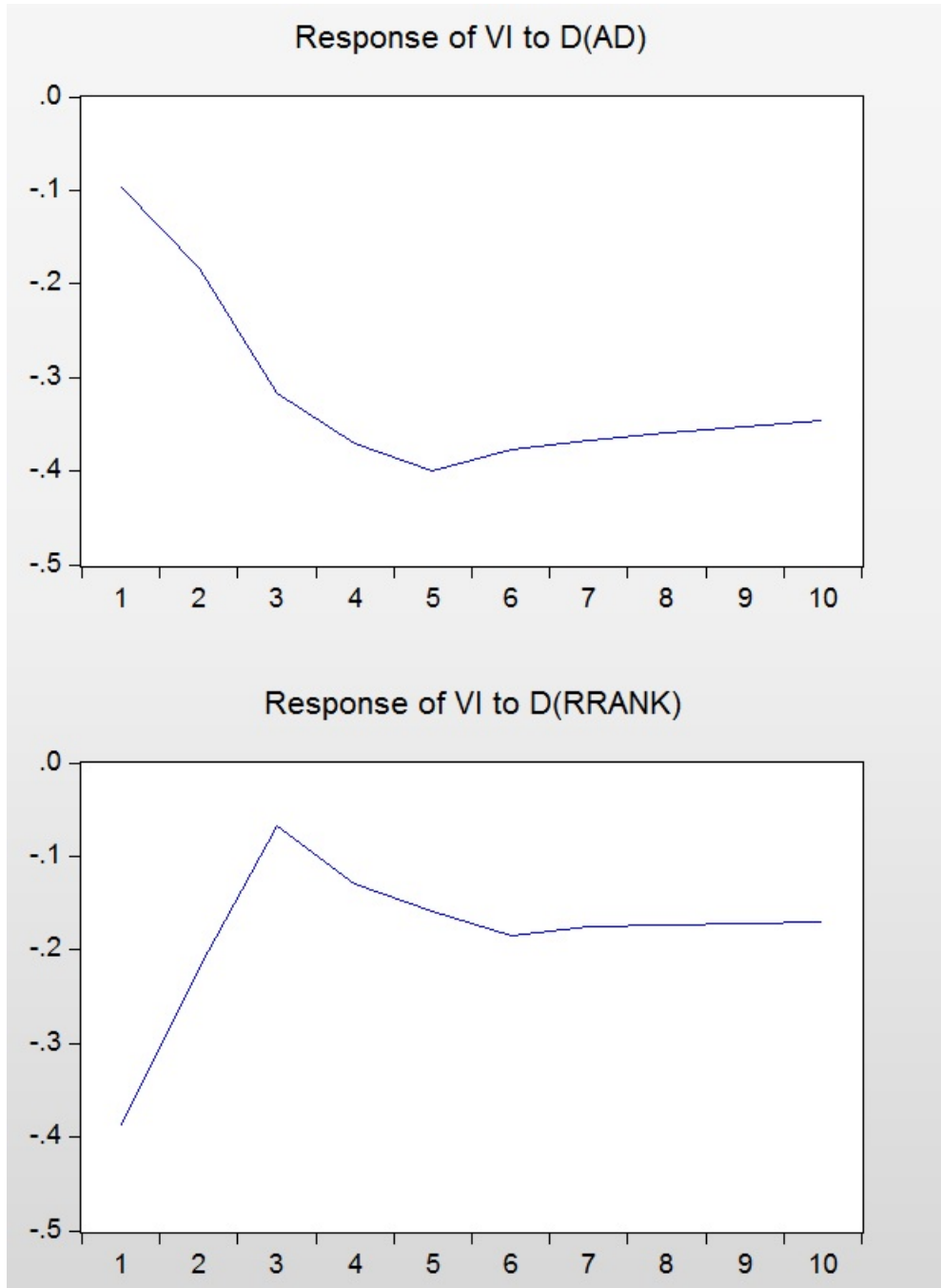


Figure A.18: Generalized IRFs for a BPVARX over the balanced sub-panel only – Minnesota

Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

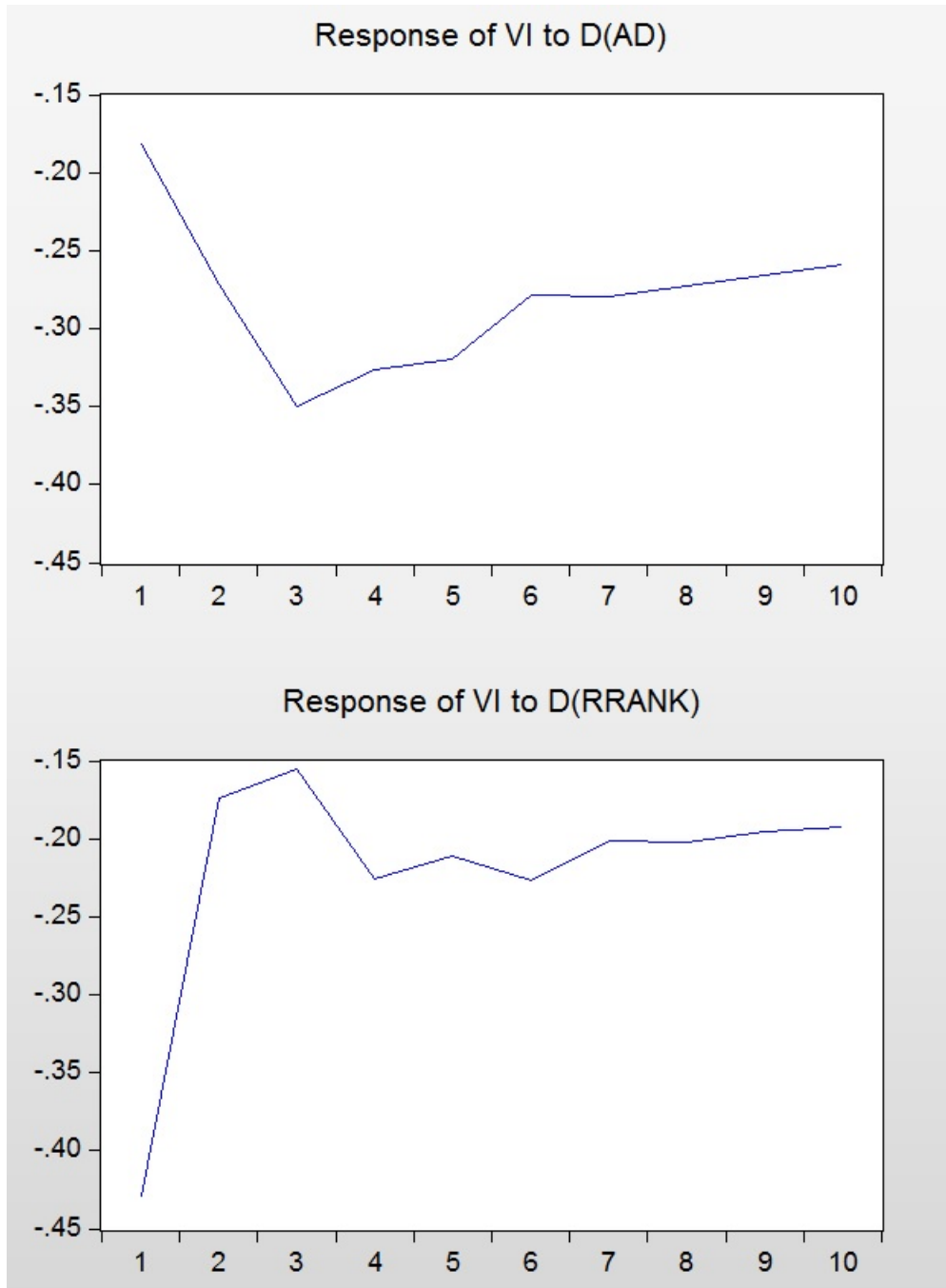


Figure A.19: Generalized IRFs for a BPVARX over the Full Sample (including observations with missing/censored-at-zero dependent variable) - Wishart Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

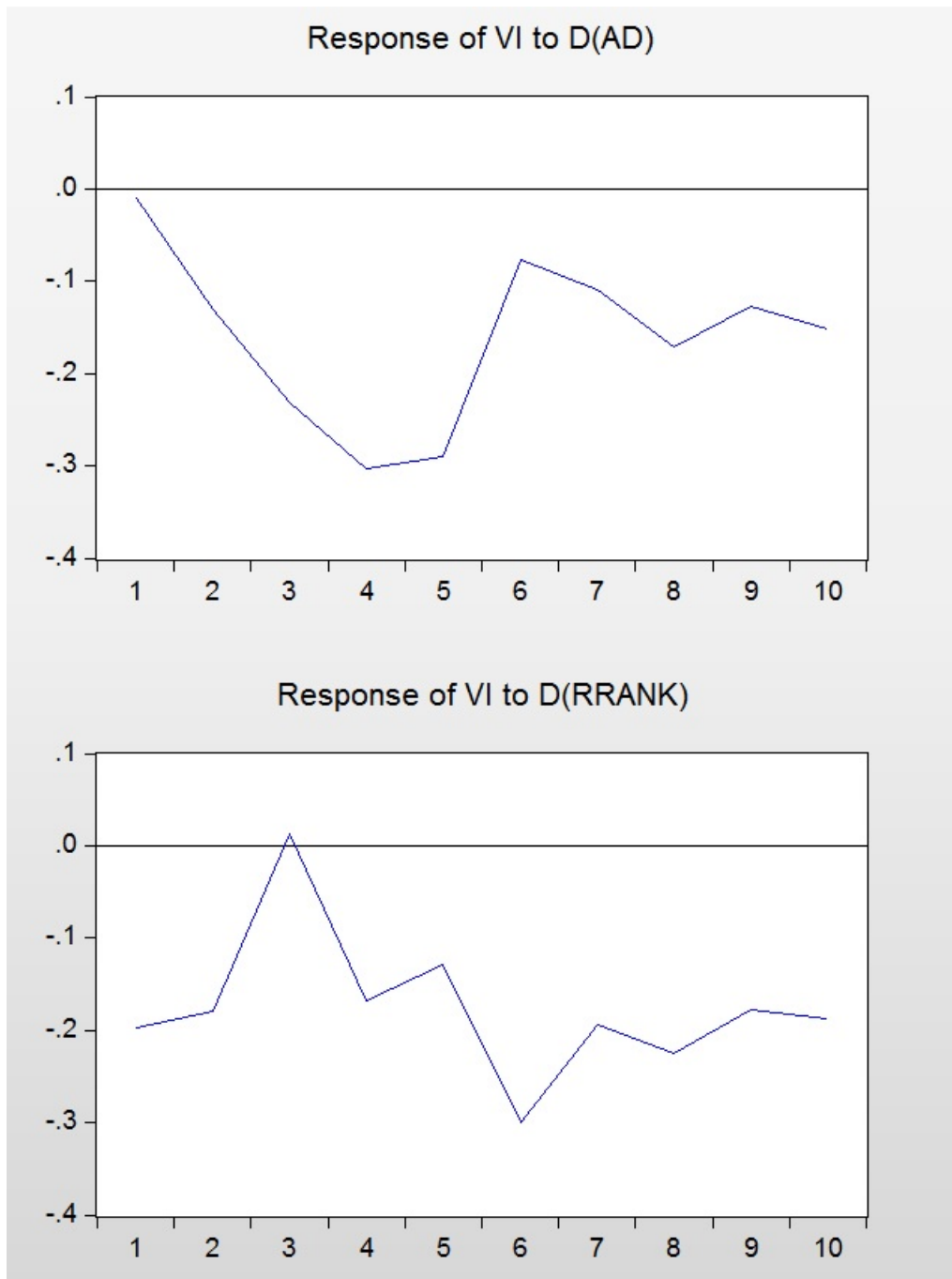


Figure A.20: Generalized IRFs for a BPVARX over the Full Sample (including observations with missing/censored-at-zero dependent variable) - Minnesota Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

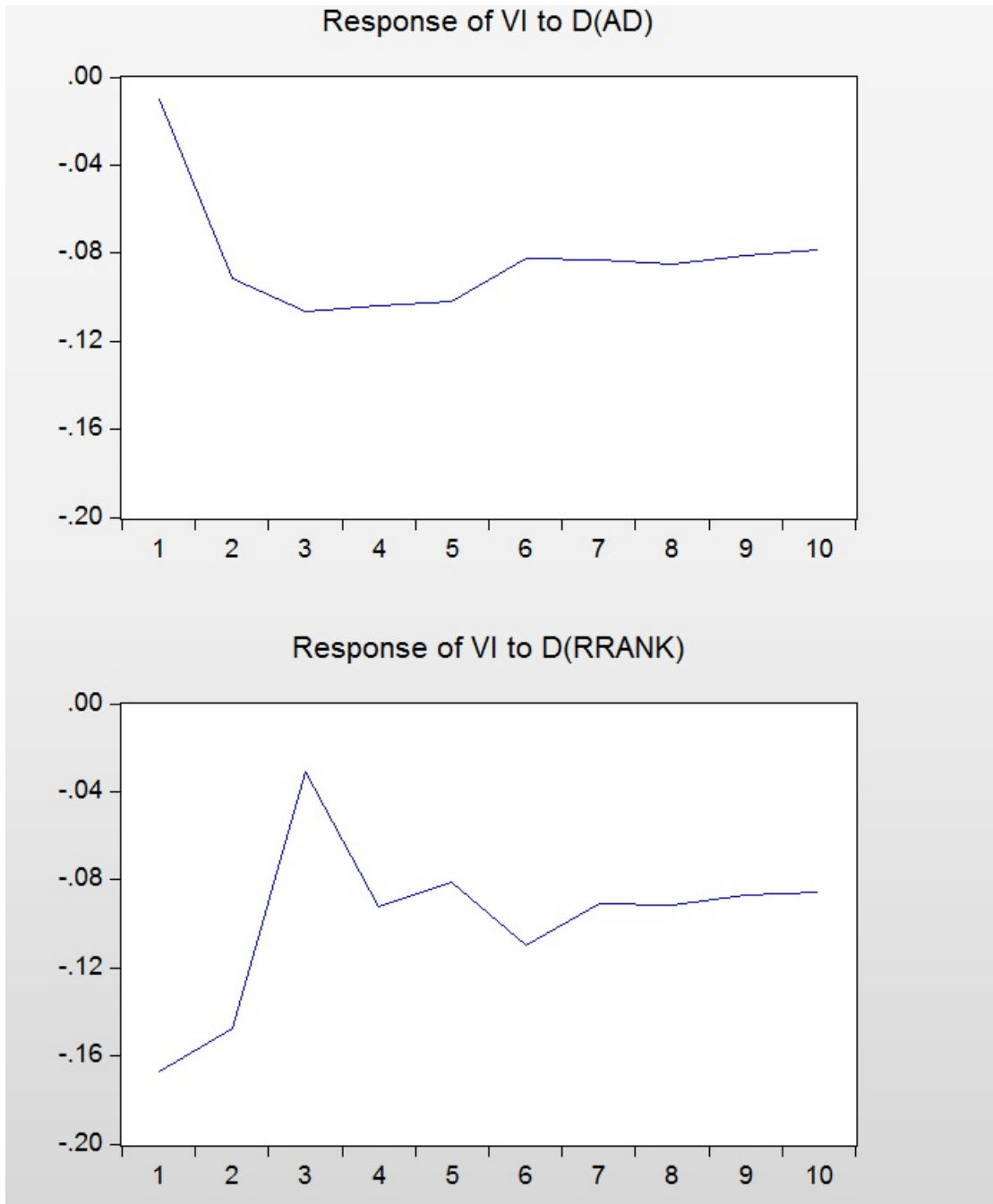


Figure A.21: Generalized IRFs for the BPVARX model on Trimmed Subsample (excluding +/- 5 Percentile) – Wishart Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

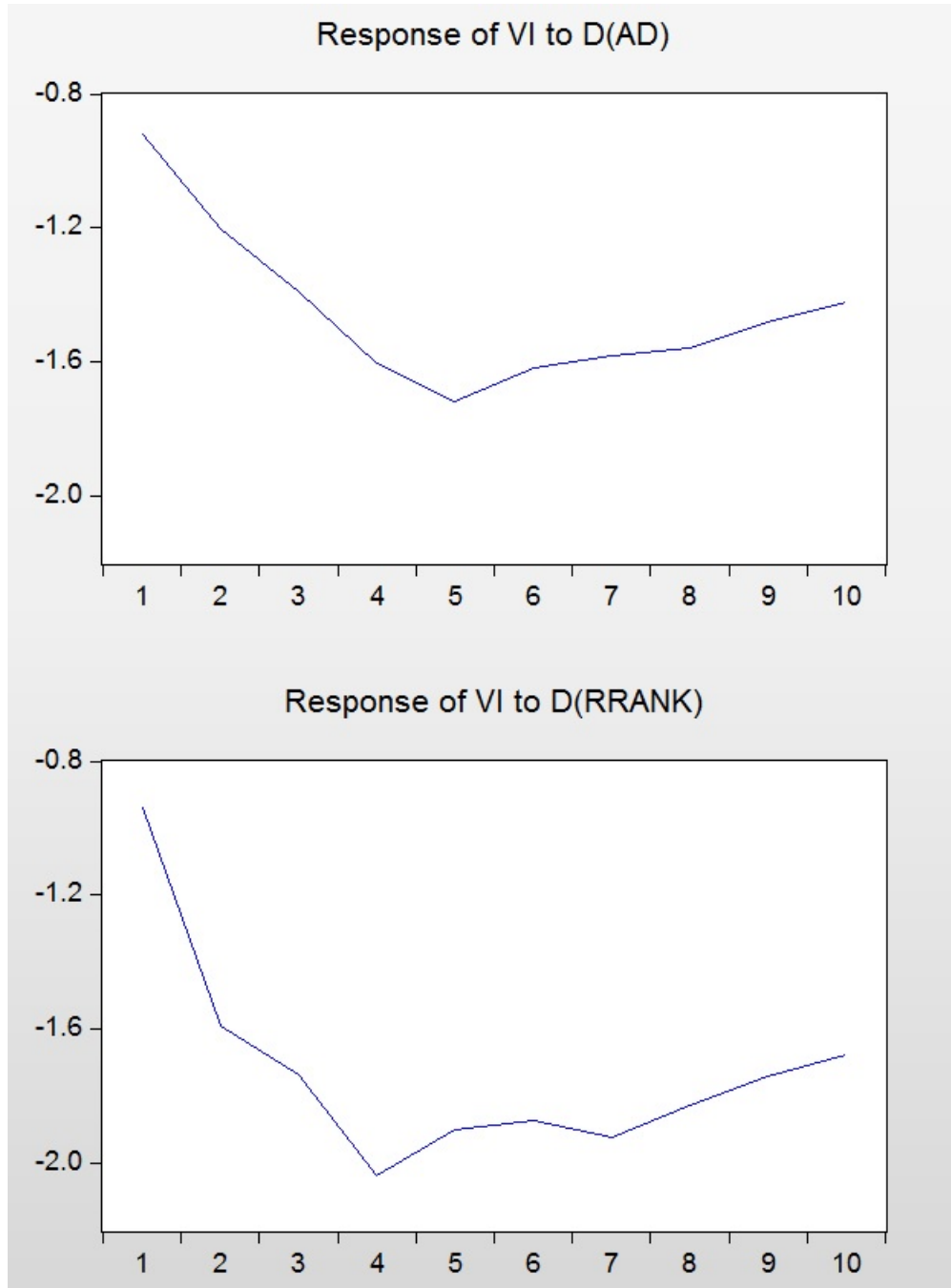


Figure A.22: Generalized IRFs for the BPVARX model on Trimmed Subsample (excluding +/- 5 Percentile) – Minnesota Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

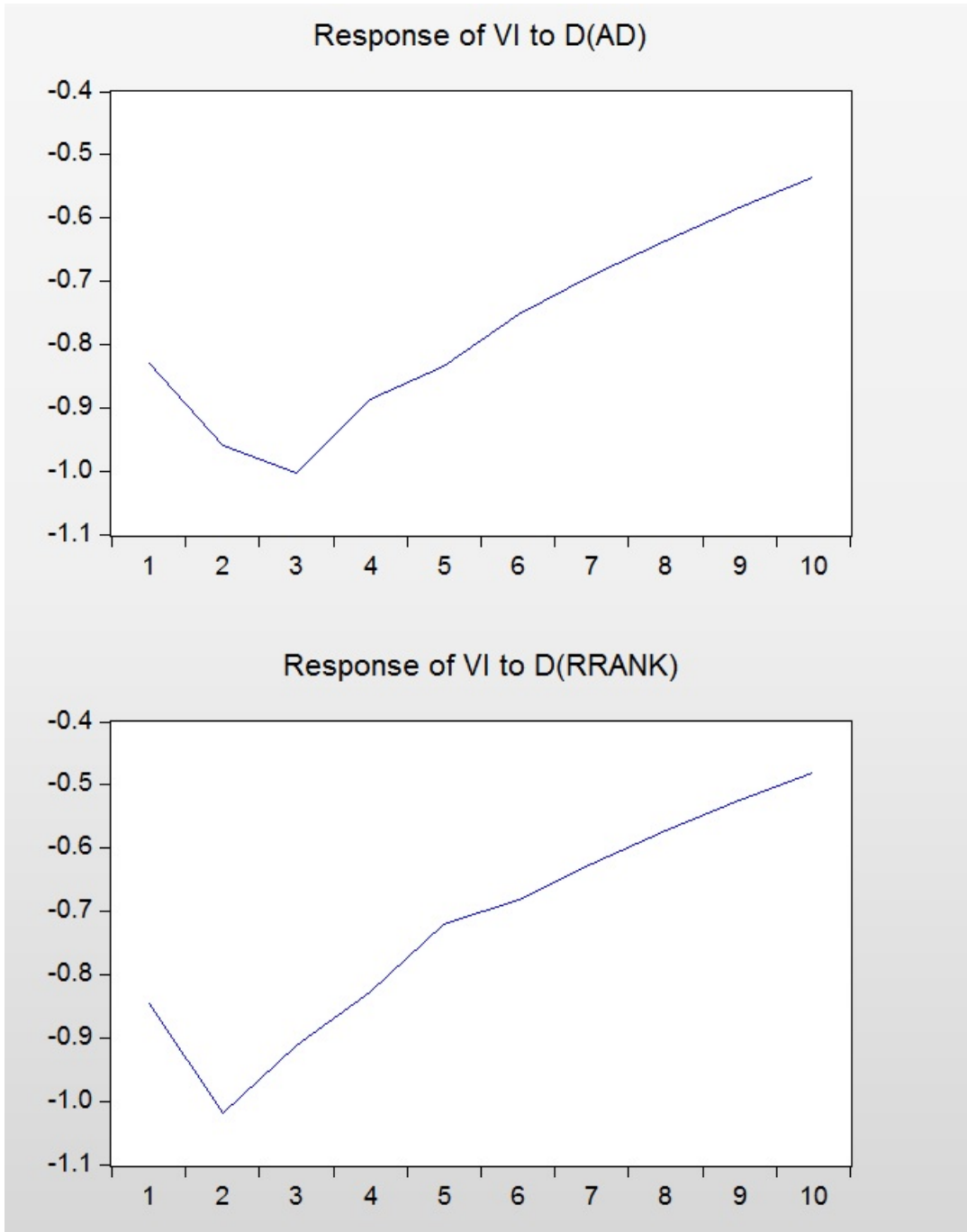


Figure A.23: Generalized IRFs for the BPVARX model on Trimmed Subsample (excluding +/- 10 Percentile) – Wishart Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

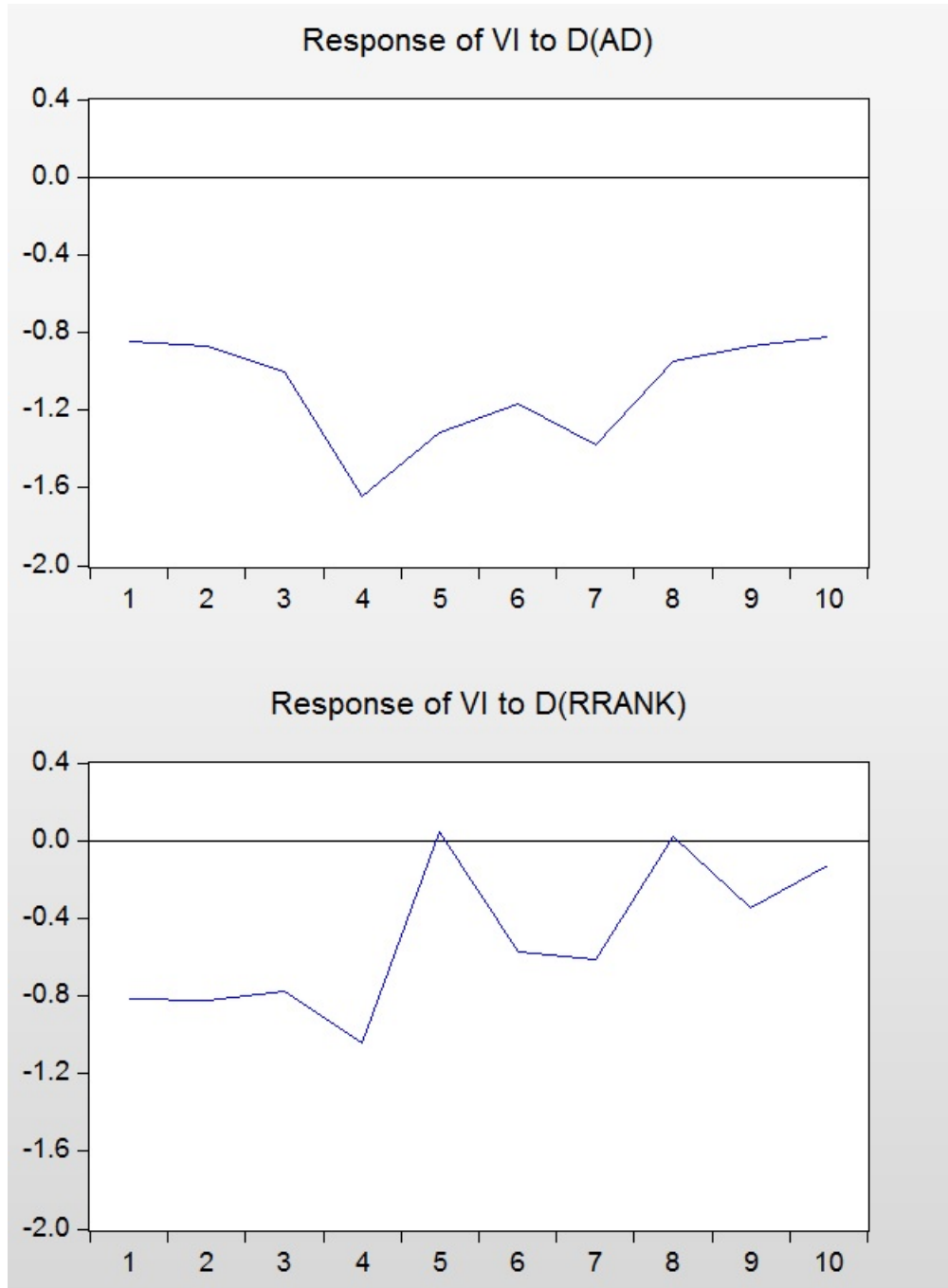


Figure A.24: Generalized IRFs for the BPVARX model on Trimmed Subsample (excluding +/- 10 Percentile) – Minnesota Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

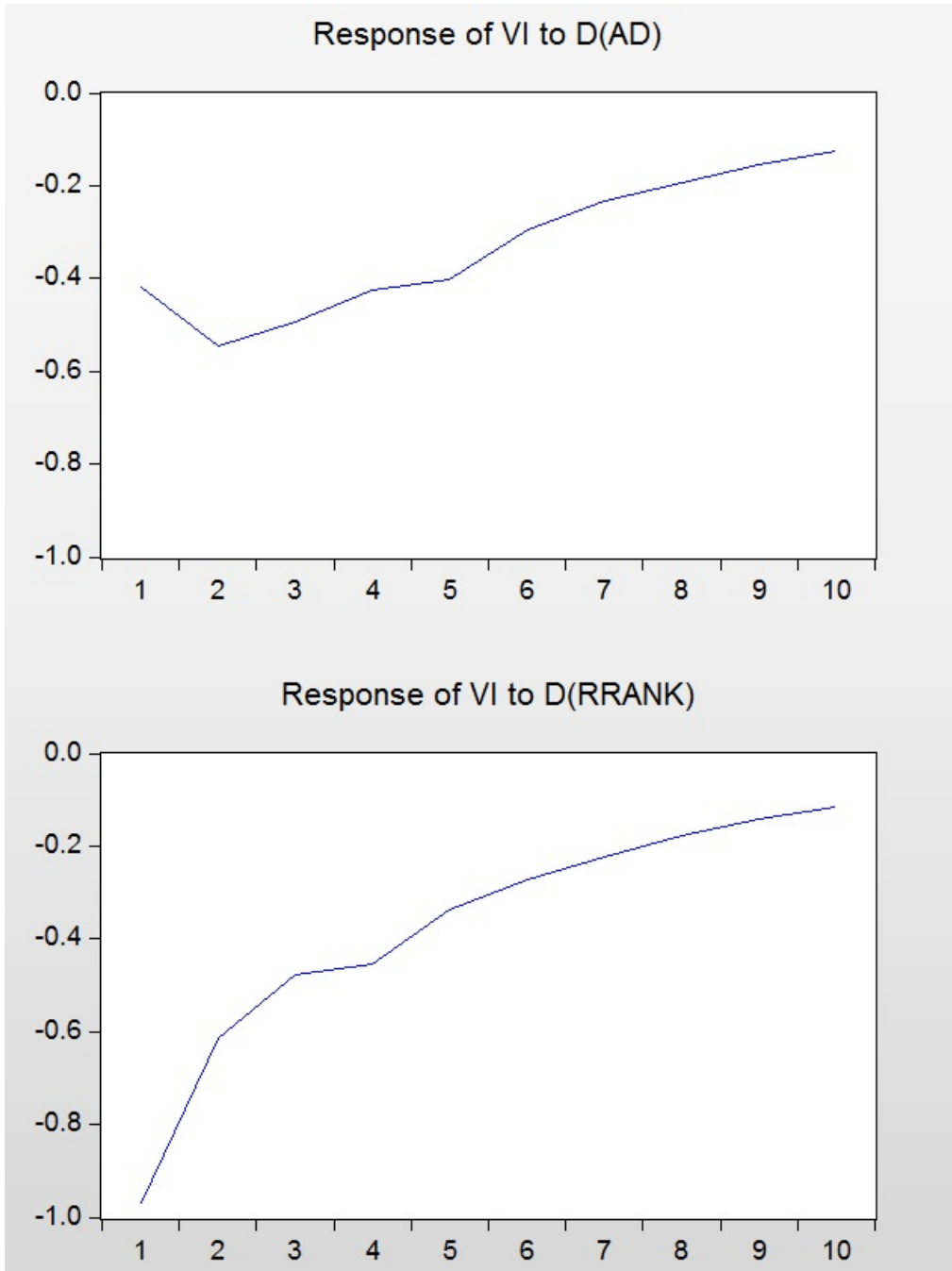


Figure A.25: Generalized IRFs for the BPVARX model on Trimmed Subsample (excluding +/- 15 Percentile) – Wishart Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

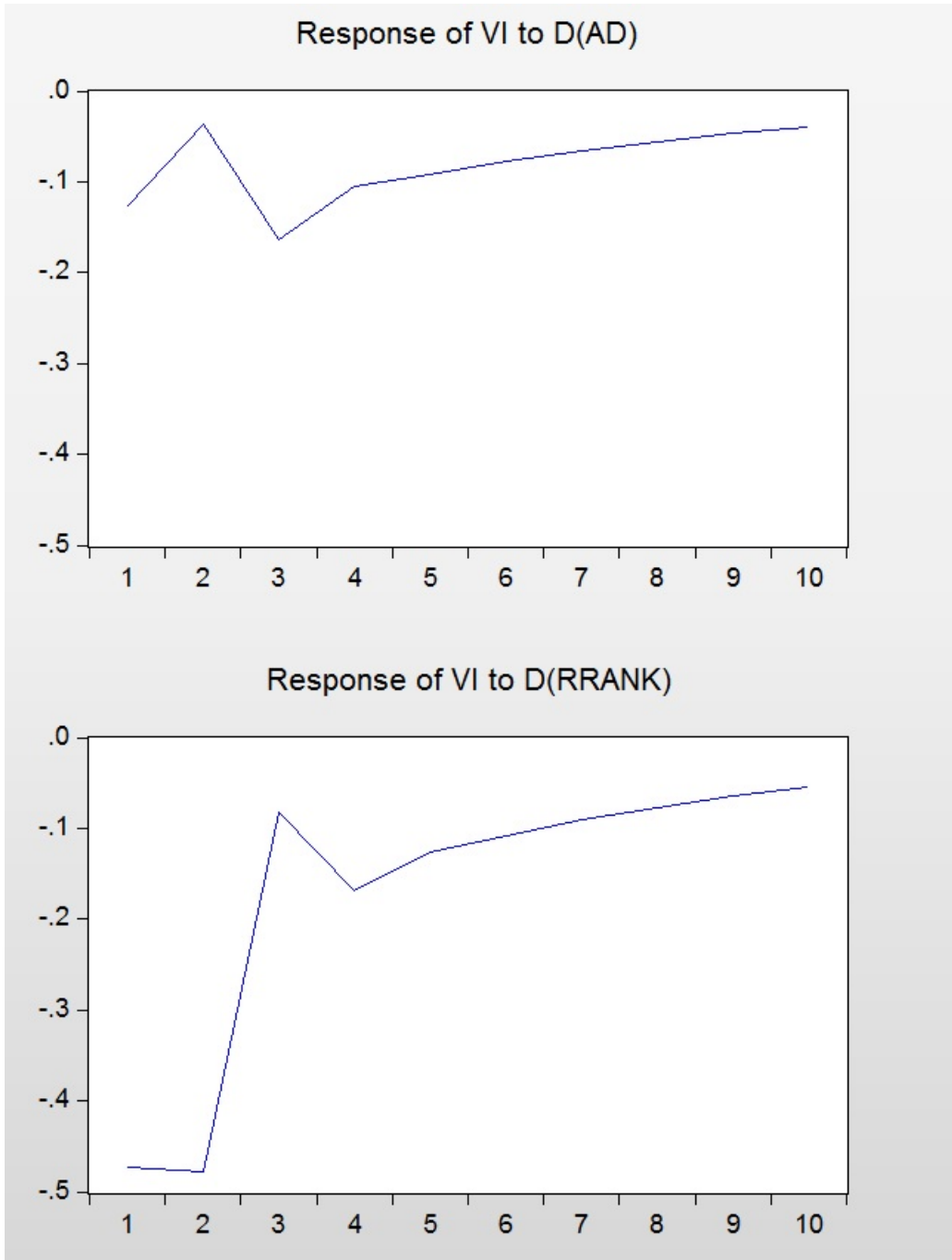


Figure A.26: Generalized IRFs for the BPVARX model on Trimmed Subsample (excluding +/- 15 Percentile) – Minnesota Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

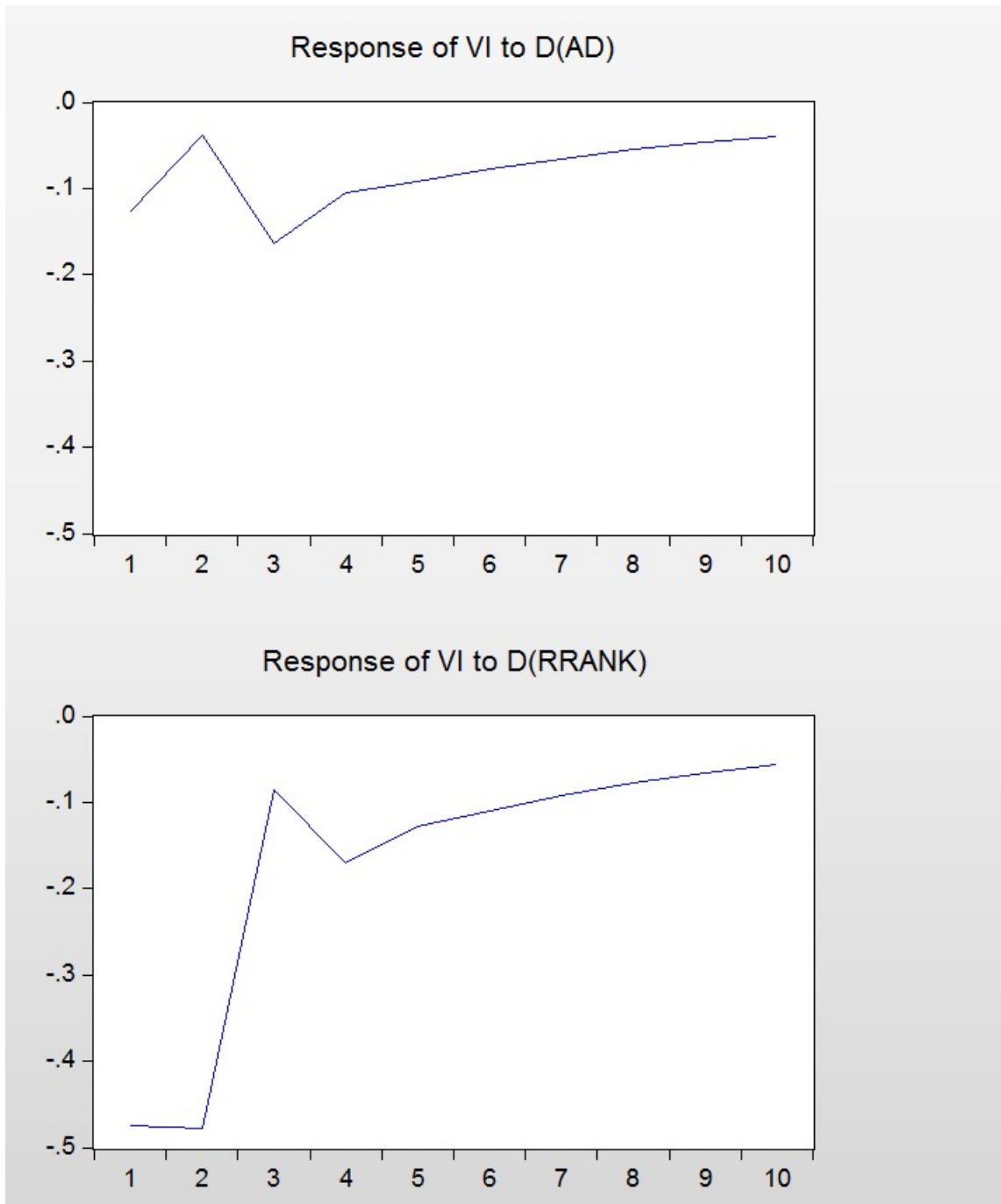


Figure A.27: Generalized IRFs for the BPVARX model on Trimmed Subsample (excluding +/- 20 Percentile) – Wishart Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

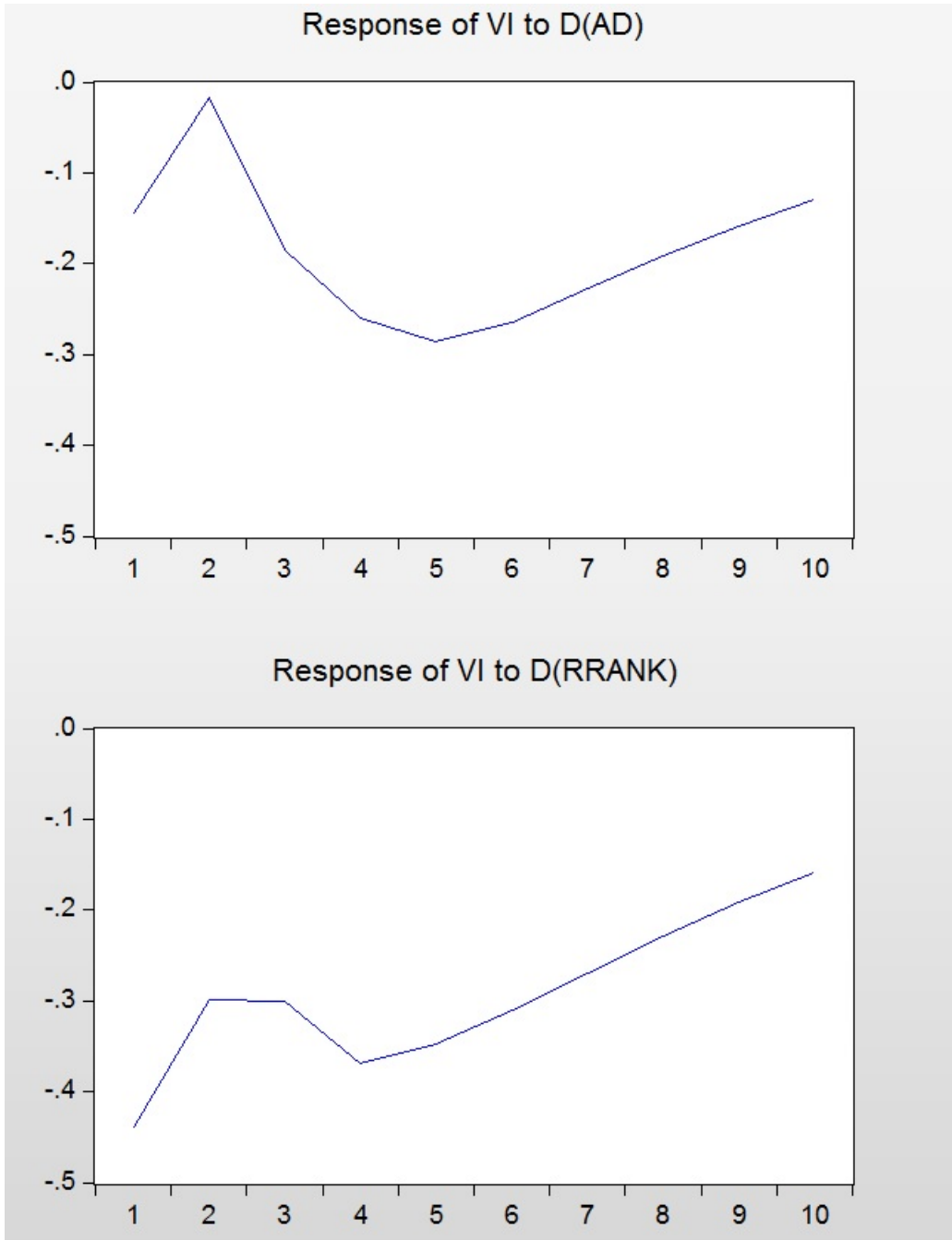


Figure A.28: Generalized IRFs for the BPVARX model on Trimmed Subsample (excluding +/- 20 Percentile) – Minnesota Prior

(Horizontal Axis: Time in Years; Vertical Axis: Percentage Change in Vertical Integration)

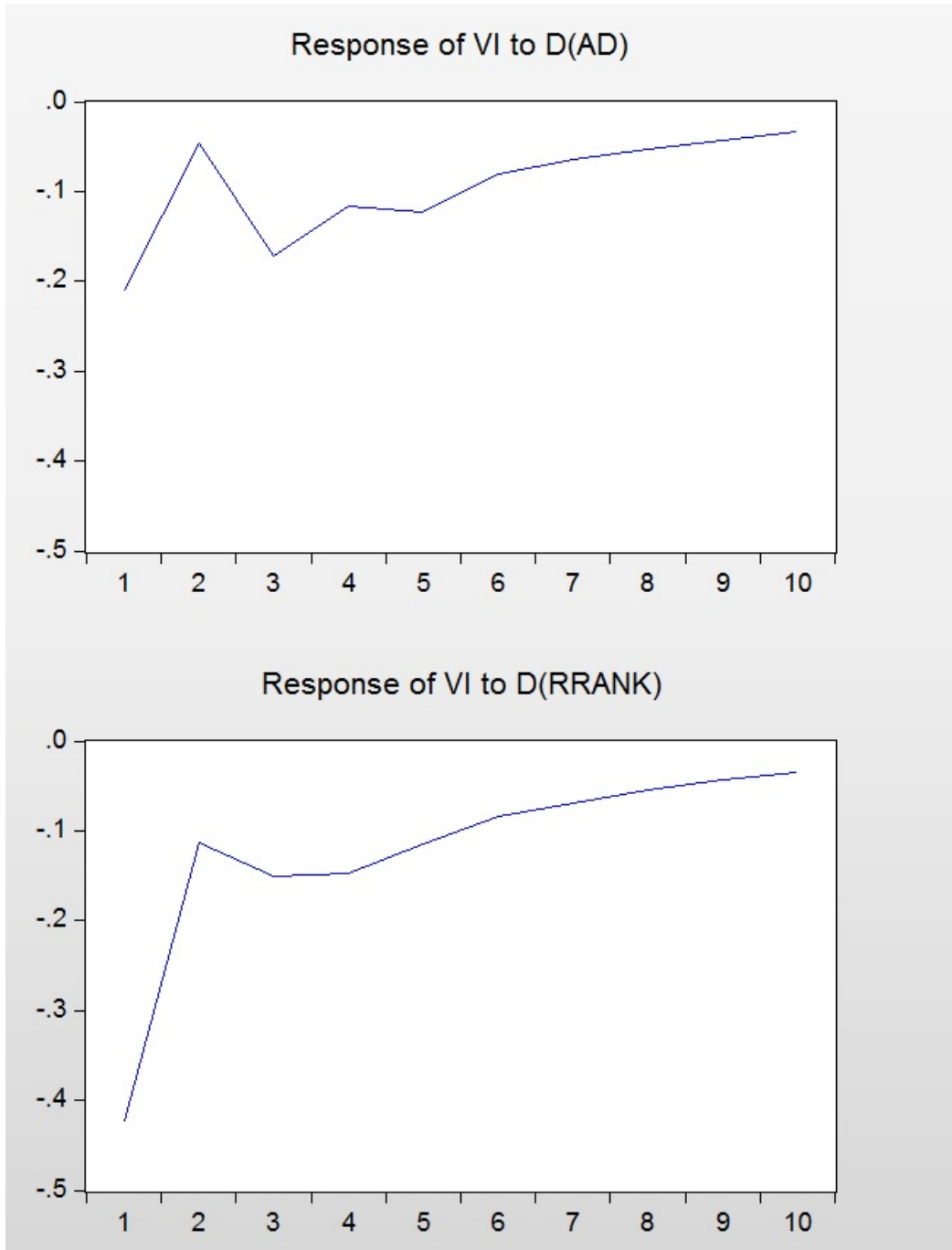


Table A.4: Managerial Takeaways

Managerial Question	Scholarly Advice	Underlying Logic
<p>Selling brand building initiatives to senior management is challenging due to the intangibility and long-term nature of the beneficial outcomes of such investments, how can marketing managers better sell brand building initiatives?</p>	<p>This study helps marketing managers in selling brand building initiatives by drawing attention an under-recognized, strategic benefit for brand equity: By strengthening its brand equity, the firm increases its influence on its distribution partners which, in turn, improves channel coordination and consequently boosts financial performance.</p>	<p>Brand equity alleviates the channel coordination problem by functioning as an alternative channel governance mechanism that effectively curbs downstream members’ opportunism through contractual self-enforcement.</p>
<p>Vertical integration is witnessing a renewed interest from practitioners and it is fashionable once again, should firms pursue vertical integration?</p>	<p>We advise against unnecessary forward vertical integration, especially in situations where the firm enjoys a moderate to high level of brand equity.</p>	<p>Firms with strong brand names can lean on their brands to safeguard themselves against downstream members’ opportunism and to govern their distribution channels effectively without the need for extensive involvement in direct distribution.</p>
<p>When it comes to marketing investments decision making, how do brand investments compare with other marketing investment alternatives, especially investments in acquiring downstream channel members?</p>	<p>Investments in brand equity may offer a lower risk/reward ratio and a better hedge against uncertainty because of their nature as dual investments directly in the brand and indirectly in the channel.</p>	<p>When investing in its brand, the firm may enhance its channel performance and reduce the need for investing in forward vertical integration. This is because brand equity functions as an alternative governance mechanism that solves many channel issues through contractual self-enforcement.</p>

6.2. APPENDIX B FOR CHAPTER 3

Table B.1: Cumulative Average Abnormal Stock Returns Using Alternative Asset Pricing Models and Benchmark Indices

A.) Full Sample (N=341)

Benchmark Model	CAAR	StdCsect Z	CDA	CsectErr t	Rank Test Z	Generalized Sign Z
4-Factor, CRSP Value-weighted index	-0.56%	p<0.01	p<0.01	p<0.01	p<0.05	p<0.05
4-Factor, CRSP Equally-weighted index	-0.57%	p<0.01	p<0.01	p<0.01	p<0.05	p<0.05
3-Factor, CRSP Value-weighted Index	-0.60%	p<0.01	p<0.01	p<0.01	p<0.01	p<0.1
3-Factor, CRSP Equally-weighted Index	-0.59%	p<0.01	p<0.01	p<0.01	p<0.05	p<0.05
Market Model, CRSP Value-weighted Index	-0.64%	p<0.01	p<0.01	p<0.001	p<0.01	p<0.05
Market Model, CRSP Equally-weighted Index	-0.52%	p<0.05	p<0.05	p<0.01	p<0.05	p<0.05
Market Adjusted Returns, CRSP Value-weighted Index	-0.65%	p<0.001	p<0.01	p<0.001	p<0.01	p<0.05
Market Adjusted Returns, CRSP Equally-weighted Index	-0.74%	p<0.001	p<0.01	p<0.001	p<0.05	p<0.001

2-tailed tests of significance

StdCsect Z : Standardized Cross-sectional z-test

CDA t : Time-Series Standard Deviation t-test (Crude Dependence t-stat)

CsectErr t : Cross-sectional t-stat

B.) Sample without Confounding Events (N=123)

Benchmark Model	CAAR	StdCsect Z	CDA	CsectErr t	Rank Test Z	Generalized Sign Z
4-Factor, CRSP Value-weighted index	-0.62%	p<0.01	p<0.05	p<0.01	p<0.01	p<0.05
4-Factor, CRSP Equally-weighted index	-0.62%	p<0.05	p<0.05	p<0.01	p<0.1	p<0.01
3-Factor, CRSP Value-weighted Index	-0.60%	p<0.05	p<0.05	p<0.01	p<0.05	p<0.05
3-Factor, CRSP Equally-weighted Index	-0.58%	p<0.05	p<0.1	p<0.05	p<0.1	p<0.01
Market Model, CRSP Value-weighted Index	-0.74%	p<0.001	p<0.05	p<0.001	p<0.05	p<0.01
Market Model, CRSP Equally-weighted Index	-0.63%	p<0.01	p<0.05	p<0.01	p<0.1	p<0.01
Market Adjusted Returns, CRSP Value-weighted Index	-0.68%	p<0.01	p<0.05	p<0.01	p<0.05	p<0.01
Market Adjusted Returns, CRSP Equally-weighted Index	-0.80%	p<0.001	p<0.05	p<0.001	p<0.05	p<0.001

2-tailed tests of significance

StdCsect Z : Standardized Cross-sectional z-test

CDA t : Time-Series Standard Deviation t-test (Crude Dependence t-stat)

CsectErr t : Cross-sectional t-stat

Table B.2: Cumulative Average Abnormal Returns for the Stock-only & ADR-only Subsamples

Subsample	CAAR	N	Statistical Significance
ADR-only subsample of the full sample	-0.28%	124	p<0.1
Stock-only subsample of the full sample	-0.72%	217	p<0.01
ADR-only subsample of the reduced sample (sample without confounding events)	-0.44%	35	p<0.1
Stock-only subsample of the reduced sample (sample without confounding events)	-0.69%	88	p<0.05

1-tailed tests of significance

Table B.3: Cumulative Average Abnormal Returns after Trimming the Events Sample at Different Levels to Control for Outliers

Trimming Levels	CAAR	N	Statistical Significance
Sample Excluding the 95% and 5% Percentiles	-0.44%	307	p<0.001
Sample Excluding the 90% and 10% Percentiles	-0.43%	273	p<0.001
Sample Excluding the 85% and 15% Percentiles	-0.44%	239	p<0.001
Sample Excluding the 80% and 20% Percentiles	-0.43%	205	p<0.001

2-tailed tests of significance

Table B.4: Results of Long-term Event Studies***A.) Using the Buy-and-Hold Abnormal Returns (BHAR) Method:***

Event Window & Sample	Compounded Total CAAR	Average Monthly CAAR	Statistical Significance
BHAR (12 months) - full sample	-10.97%	-0.91%	p<0.001
BHAR (18 months) - full sample	-20.86%	-1.74%	p<0.001
BHAR (24 months) - full sample	-38.22%	-3.19%	p<0.001
BHAR (12 months) - sample excluding confounding events	-14.13%	-1.18%	p<0.001
BHAR (18 months) - sample excluding confounding events	-20.34%	-1.70%	p<0.001
BHAR (24 months) - sample excluding confounding events	-25.02%	-2.09%	p<0.001

*2-tailed tests of significance****B.) Using the Calendar-Time Portfolio Abnormal Returns (CTPAR) Method:***

Event Window & Sample	Compounded Total CAAR	Average Monthly CAAR	Statistical Significance
CTPAR (12 months) - full sample	-8.57%	-0.71%	p<0.01
CTPAR (18 months) - full sample	-13.97%	-1.16%	p<0.001
CTPAR (24 months) - full sample	-26.47%	-2.21%	p<0.001
CTPAR (12 months) - sample excluding confounding events	-13.09%	-1.09%	p<0.001
CTPAR (18 months) - sample excluding confounding events	-21.52%	-1.79%	p<0.001
CTPAR (24 months) - sample excluding confounding events	-29.57%	-2.46%	p<0.001

2-tailed tests of significance

Table B.5: Results of Generalized Linear Model and Mixed Linear Models Estimation

Model	Generalized Linear Model		Two-Level Mixed Linear Model		Three-Level Mixed Linear Model		
	Full Sample	Reduced Sample	Full Sample	Reduced Sample	Full Sample	Reduced Sample	
Dependent Variable: CAR (-1,1)							
Target of Action ^a							
Consumer	H ₇	0.343 (0.139)***	0.000 (0.229)	0.349 (0.136)***	0.057 (0.228)	0.336 (0.127)***	0.057 (0.227)
Nature of Action							
Punitive Action ^b	H ₁₁	0.100 (0.129)	-0.048 (0.163)	0.115 (.071)*	-0.040 (0.132)	0.122 (0.068)**	-0.041 (0.132)
Proactive Action ^c	H ₉	0.084 (0.207)	0.066 (0.201)	0.113 (0.176)	0.088 (0.171)	0.097 (0.172)	0.088 (0.171)
Brand Equity	H₃	10.592 (3.465)***	9.636 (3.801)***	12.269 (3.974)***	7.908 (4.271)**	11.847 (3.918)***	7.917 (4.263)**
Innovation	H ₆	-0.084 (1.293)	-2.782 (1.740)*	-0.756 (1.353)	-1.529 (1.157)*	-0.937 (1.306)	-1.540 (1.153)*
Profitability	H ₅	0.509 (0.365)*	0.732 (0.414)**	0.494 (0.485)	0.679 (0.366)**	0.414 (0.477)	0.674 (0.366)**
Sales Growth	H ₄	-0.777 (0.282)***	-1.115 (0.465)***	-0.826 (0.264)***	-1.154 (0.489)***	-0.796 (0.271)***	-1.153 (0.489)***
Target of Action x Brand Equity	H ₈	-10.406 (7.264)*	-3.729 (10.934)	-9.249 (4.644)**	-4.219 (8.027)	-9.005 (4.813)**	-4.214 (8.026)
Punitive Action x Brand Equity	H ₁₂	-10.840 (3.764)***	-6.631 (4.140)*	-11.332 (4.255)***	-6.140 (4.396)*	-11.142 (4.106)***	-6.152 (4.389)*
Proactive Action x Brand Equity	H ₁₀	-11.403 (4.295)***	-8.564 (3.860)**	-12.686 (2.812)***	-7.019 (3.863)**	-12.313 (2.688)***	-7.029 (3.856)**
Control Variables							
Firm Size		-0.000 (0.001)	-0.002 (0.001)**	-0.000 (0.000)	-0.001 (0.001)	-0.000 (0.000)	-0.001 (0.001)
Firm Age		-0.000 (.001)	0.001 (0.001)	-0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Financial Leverage		0.488 (0.516)	0.119 (0.697)	0.319 (0.544)	0.001 (0.799)	0.195 (0.530)	-0.003 (0.799)
Industry Growth		0.002 (0.011)	-0.001 (0.009)	0.001 (0.011)	-0.000 (0.004)	0.001 (0.011)	-0.000 (0.004)
Competitive Intensity		-0.821 (0.414)**	-0.558 (0.407)*	-0.568 (0.360)*	-0.658 (0.224)***	-0.562 (0.375)*	-0.662 (0.224)***
Inverse Mills Ratio (IMR)		-0.070 (0.105)	0.064 (0.100)	-0.010 (0.054)	0.068 (0.043)*	-0.032 (0.056)	0.068 (0.043)*
N		339	121	339	121	339	121

* p<0.1 ** p<0.05 *** p<0.01

Robust standard errors are in parentheses. One-tailed tests of significance.

CAR: Cumulative Abnormal Returns.

^a A dummy set to one if the target of action is the consumer and zero otherwise

^b A dummy set to one if the action is of punitive nature and zero otherwise.

^c A dummy set to one if the nature of action is proactive (as per Cavusgil & Sikora (1987) classification) and zero otherwise

Time dummies, industry dummies, ADR dummy, and intercept are included but not presented for parsimony.

Table B.6: Hypothesized Effects and Results

Variable (Hypothesis)	Hypothesized Effect	Result
Brand Equity (H3)	-	<i>Supported</i>
Sales growth (H4)	+	<i>Supported</i>
Profitability (H5)	?	<i>Negative Effect</i>
Innovation (H6)	+	<i>Supported</i>
Target of Action – Consumer (H7)	-	<i>Not Supported</i>
Target of Action – Consumer x Brand Equity (H8)	-	<i>Not Supported</i>
Nature of Action – Proactive (H9)	+	<i>Not Supported</i>
Nature of Action – Proactive x Brand Equity (H10)	+	<i>Supported</i>
Nature of Action – Punitive (H11)	+	<i>Not Supported</i>
Nature of Action – Punitive x Brand Equity (H12)	+	<i>Supported</i>

Based on results of the model where the outcome variable is SCAR and the sample is the one without confounding events.