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by
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Abstract

Examining Outcomes of Marketing Actions from Customer, Investor, and Operational Perspectives

Lim Leon Gim

This dissertation examines the impact of three distinct marketing actions from three different perspectives, i.e., customer, investor, and operational. Specifically, the first essay examines investors' evaluation of firms' price-increase preannouncements, thereby responding to recent calls for exploring investors' evaluation of a firm's pricing actions which have been predominantly examined from consumers' perspective. The second essay adopts an operations lens to present the first empirical examination about the impact of customer satisfaction on the future costs of selling and producing for a firm. The essay, therefore, is of direct importance to CEOs as they consider costs as their top priority. In addition, it is responsive to recent calls for more research on the cost implications of marketing actions. Finally, the third essay integrates the customer, investor and operational perspectives, to explore the consequences of mergers and acquisitions using a stakeholder-specific approach. Specifically, using a longitudinal dataset, this essay examines how mergers and acquisitions in the airline industry have an impact on key stakeholders – consumers, employees, senior managers, and investors. Taken together, this dissertation seeks to contribute to existing literature by exploring, for different stakeholders, the outcomes of marketing actions that have high managerial relevance, but have received little attention in current literature.

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Acknowledgements

This dissertation marks the end of my 10 years at Singapore Management University. Looking back, when I first started my undergraduate studies in SMU back in 2009, I would never have associated myself with a Ph.D and let alone an academic career. Doing a Ph.D is not a common career path for a typical Singaporean. Case in point, when I was about to graduate with my Bachelor's degree in 2013, I was all set to dive into the professional world. Now that I am close to completing my Ph.D and am also looking forward to embarking on my new journey as an assistant professor in Marketing with Tilburg University, I am really happy with my decision to take the "route less travelled". At the same time, I am also very grateful to be offered these opportunities. All these will not be possible without the help and the tremendous support from many very important people. As such, I would like to take this opportunity to thank them in, hopefully, the most read section of this dissertation.

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Chapter 1

General Introduction

Marketing actions can potentially have differential or even conflicting consequences for different stakeholders, e.g., consumers, investors, employees, and senior managers. For example, while price wars are welcomed by consumers, investors are wary of them as they are likely to erode a firm's profit margins (van Heerde, Gijsbrechts, and Pauwels 2015). Similarly, whereas investors have favourable evaluations of new product announcements (Warren and Sorescu 2017), the launch of new products is likely to increase the costs of selling for the firm (Kim and McAlister 2011). Accordingly, this dissertation comprises of three essays that examine the consequences of three distinct marketing actions from three different perspectives, i.e., customer, investor, and operational.

1.1 Outline of the Dissertation

Chapter 2 features the first essay of this dissertation, "*Investors' Evaluation of Price-Increase Preannouncements*". This essay examines the impact of firms' price-increase preannouncements from an investor perspective. Several firms preannounce their price increases with the expectation that such announcements will be evaluated favorably by investors. However, little is known about the actual effect they have on shareholder value. Accordingly, the authors present the first systematic empirical examination of investors' evaluations of 265 price-increase preannouncements (PIP). Results show that whereas the average increase in abnormal returns following a PIP is 0.41%, almost 42% of the PIPs result in negative abnormal returns. To explore this heterogeneity, the authors propose a conceptual framework that focuses on three key pieces of information that investors can use when evaluating a PIP: information on the nature (size and timing) of the upcoming price increase, information on the underlying motivation for the price increase (cost and/or demand based), and information on prior PIP occurrences by the firm and its competitors. Consistent with the proposed hypotheses, results indicate that PIPs with greater timing, higher own precedence and greater competitive precedence result in lower abnormal returns, while PIPs with higher magnitude and PIPs with an explicit demand attribution result in greater abnormal returns.

Chapter 3 features the second essay of this dissertation, "*Customer Satisfaction and its Impact on the Cost of Selling and Producing*". This essay adopts an operations lens to present the first empirical examination about the impact of customer satisfaction on the future costs of selling and producing for a firm. Whereas most empirical research on customer satisfaction explores its impact on either investor sentiment or operational performance, few studies directly examine its impact on the costs incurred by the firm. Accordingly, this essay draws on the Motivation-Opportunity-Ability framework to outline hypotheses about the effects of customer satisfaction on the cost of selling (COS) and the cost of producing (COP). Using almost two decades of data comprising 1022 observations from 115 firms, the results suggest that on average higher customer satisfaction significantly lowers COS. This effect is stronger for firms that have lower stock returns or stock returns volatility, or higher inventory slack. In addition, the impact of customer satisfaction on COS is stronger if the firm is in an industry with higher growth or lower turbulence. Interestingly, customer satisfaction significantly lowers COP only for firms that have lower stock returns or stock returns volatility, or higher inventory slack. This essay concludes by calculating the cost elasticities of customer satisfaction and discussing the dollar impact of increases in customer satisfaction on COS and COP.

Chapter 4 features the third essay of this dissertation, "*A Stakeholder-Specific Approach to Examining the Impact of Mergers and Acquisitions: Policy Implications from an Empirical Examination*". This essay integrates the consumer, employee, senior manager, and investor perspectives, to explore the consequences of mergers and acquisitions in the airlines industry by adopting a stakeholder-specific approach. Using a unique longitudinal dataset assembled from multiple secondary data sources, results from the stacked generalized difference-in-difference analysis show that following a M&A, acquiring airlines offer higher prices, lower service quality and fewer choices for consumers. In addition, whereas the employees of these airlines face reduction in headcounts, lower salaries and lower benefits after the M&A, senior managers of these airlines enjoy higher salaries post-merger. Finally, from an investor perspective, M&As result in higher operating margins and lower operating costs. However, the revenue passenger miles (RPM), an indicator of an airline's growth potential, decreases after a M&A. Interestingly, further analyses show that higher prior service emphasis of an acquiring airline softens the negative impact of M&As for consumers and employees. In addition, acquiring airlines with higher prior service emphasis also provide smaller increases in senior managers' salaries after a M&A. From an investor perspective, these airlines also accrue smaller gains in operating margins, and smaller reduction in operating costs following a M&A. Importantly, acquiring airlines with higher prior service emphasis experience a smaller reduction in RPM following a M&A. Taken together, results of this essay provide policy makers with empirical evidence to reconsider the future approvals of M&As in the airline industry.

1.2 Contribution of Dissertation

This dissertation contributes to the academic literature by examining, for different stakeholders, the outcomes of marketing actions that have high managerial relevance, but have received little attention in current literature. Specifically, the first essay responds to recent calls for exploring the shareholder-value effect of firms' pricing actions (Edeling and Fischer 2016, p. 533), a key concern for investors (e.g., Subhedar and Rees 2017). By presenting a systematic examination of how investors evaluate price-increase preannouncements, this essay also augments existing research on price increases that predominantly focuses on consumer reactions (e.g., Homburg, Hoyer, and Koschate 2005; Homburg, Koschate, and Totzek 2010).

The second essay is responsive to recent calls for more research on the impact of marketing actions on firms' costs (Katsikeas et al. 2016, p. 16), a top priority for CEOs (e.g., PwC 2017). Even though firms often engage in initiatives to improve customer satisfaction (e.g., Keiningham et al. 2014), the views of the cost implications of such marketing efforts are often inconclusive (e.g., Krasnikov, Jayachandran, and Kumar 2009; Mizik and Nissim 2011). As such, recognizing the importance of customer satisfaction and costs, this essay seeks to contribute to the paucity of research examining the relationship between the two.

Finally, the third essay is responsive to recent calls for more research in marketing that accounts for the key stakeholders of the firm (Mishra and Modi 2016, p. 43) and assesses the societal outcomes of marketing actions (Moorman and Day 2016, p.29). Through the examination of multiple performance outcomes, this essay provides a holistic investigation of the costs and benefits of M&As for key stakeholders and complements extant research that predominantly examines the impact of M&As on prices (e.g., Borenstein 1990; Peters 2006).

Chapter 2

Investors' Evaluation of Price-Increase Preannouncements

2.1 Introduction

Price increases are widely viewed as one of the most effective marketing instruments to increase profits (Meehan, Davenport, and Kahlon 2012). Consulting reports, the popular press, and industry experts frequently underscore the importance of price increases. For example, Deloitte Consulting reports that the effect of a price increase on profits is 4 times that of other initiatives (Hayes and Singh 2013). McKinsey & Company reports that a 1% increase in product price can boost the operating profits of a typical Global 1200 firm by 8.70% (Baker, Marn, and Zawada 2010). The investment community also endorses the importance of price increases. Warren Buffet, for example, suggests that the ability to raise prices is investors' "single most important decision in evaluating a business" (see Frye and Campbell 2011, p. 1 for the full statement). Similarly, Reuters identifies a firm's ability to raise prices as the key concern for investors in 2017 (Subhedar and Rees 2017).

Against this background, it is not surprising that several firms publicly announce their price increases ahead of their actual implementation to signal to investors their ability and willingness to do so (Calantone and Schatzel 2000). For example, during 2010 – 2014, Starbucks made 10 price-increase preannouncements (PIPs), J.M. Smucker made 7 PIPs, while Peet's Coffee made just one such pre-announcement. Analysts tend to view a PIP as a valuable signal as it communicates potential future earnings to investors, and allows customers to make budgetary adjustments (Marn, Roegner, and Zawada 2004; Smith 2011). A PIP can also be a valuable competitive market signal, as it indicates a firm's pricing intent to its competitors (Heil and Robertson 1991; Prabhu and Stewart 2001).

Anecdotal evidence, however, shows that investors do not always share a unanimous positive view about PIPs. For example, when J.M. Smucker preannounced a price increase 9 days before its implementation in February 2011 (J.M. Smucker Company 2011), it resulted in an abnormal increase of 0.76% in its stock price.[1] However, when it preannounced another price increase almost 2 months before its implementation in September 2011 (Ziobro 2011), its stock price had an abnormal decrease of 0.40%. Similarly, when Starbucks made a preannouncement of a 1% increase in its prices in June 2013 (Kavilanz 2013), it resulted in an abnormal decrease of 0.72% in its stock price. However, when in June 2014 it made a preannouncement of a 4.5% increase in its prices (Ausick 2014), its stock price had an abnormal increase of 1.85%.

Given the oft-mentioned importance, combined with the contradictory anecdotal evidence, it is surprising that there has not yet been a systematic examination of investors' evaluations of a PIP. Accordingly, we draw on multiple secondary data sources to present the first large-scale empirical study of investors' evaluations of PIPs. Using an event-study approach, we measure investors' evaluations by calculating the abnormal returns following 265 PIPs between 2010 and 2014. Thus, we respond to recent calls for research to examine investors' evaluations of a firm's pricing decisions (Edeling and Fischer 2016, p. 533), and complement existing studies on price increases that almost exclusively examined customer reactions (Homburg, Hoyer, and Koschate 2005; Homburg, Koschate, and Totzek 2010).

We find that, on average, a PIP results in abnormal returns of 0.41%. There is, however, significant underlying heterogeneity, as almost 42% of the PIPs result in negative abnormal returns. Therefore, we develop a conceptual framework to identify conditions under which investors will react more or less positively (negatively) to a PIP. Integrating prior

[1] An abnormal increase in stock price is an increase in the stock price that is not predicted by taking into consideration fundamental financial factors.

literature from a customer, economic, and competitive perspectives, we postulate that investors are likely to take three essential pieces of information into account when evaluating a PIP. First, we posit that investors will take information on the implementation of the upcoming price change into account, i.e. the extent of the increase (i.e., magnitude) and when it will become effective (i.e., timing). Second, investors may consider whether an explicit reason for the increase is offered in the announcement (i.e., attribution), and if so, whether the price change is attributed to an increase in demand and/or to an increase in the underlying costs. Finally, investors' evaluations of a PIP are likely to also be affected by prior PIP occurrences by the firm and/or its competitors (i.e., precedence).

Results provide strong support for the conceptual framework, as we find that timing has a significant negative impact on abnormal returns. In contrast, magnitude has a significant positive impact on abnormal returns. Therefore, results underscore the importance of both implementation features of the upcoming price increase. Underscoring the moderating role of attribution, we find that a PIP is likely to result in a significant positive effect on abnormal returns if a firm provides a demand attribution in the PIP. In addition, results support arguments for the moderating effects of precedence. Specifically, we find a significant negative effect on abnormal returns following the PIP if the firm's own precedence of prior PIPs is higher. We also find a significant negative effect on abnormal returns following the PIP if competitive precedence is higher. Taken together, the results present a nuanced picture that enables senior managers to identify conditions under which PIPs are more likely to be evaluated (un)favourably by investors.

2.2 Conceptual Framework

A PIP takes place when a firm makes a public announcement of a future price increase. The fundamental concern for investors is the expected effect of a PIP on the future cash flows of the firm (Srinivasan and Bharadwaj 2004). If investors consider a PIP to result in an increase (decrease) in future cash flows, they are likely to adjust the stock price of the firm upwards (downwards), resulting in positive (negative) abnormal returns.

Drawing on prior literature on preannouncements, we propose that investors' evaluations of a PIP are likely to be a function of three sets of drivers: (1) the information contained in the PIP that characterizes the planned price increase (*Implementation Information*), (2) the underlying rationale for the preannounced price increase (*Attribution),* and (3) the prior PIP behaviour of the firm and its competitors (*Precedence*). Figure 2.1 outlines the proposed conceptual framework.

[Insert Figure 2.1 about here]

While a PIP can serve as a "necessary means" for a firm to communicate its future price level to customers (Smith 2011, p. 283), it can also signal to investors the potential future earnings of the firm (Marn, Roegner, and Zawada 2004). In addition, like other forms of preannouncements, a PIP can also be conceived as a competitive market signal (Heil and Langvardt 1994), where the firm makes a PIP with the purpose of influencing the behaviours of its competitors (Prabhu and Stewart 2001). Thus, when developing our hypotheses, we assess the impact of each of the proposed drivers on abnormal returns by considering three perspectives: a customer, an economic and a competitive perspective. In doing so, we draw upon the shareholder value framework of Srivastava, Shervani, and Fahey (1998), and consider how future cash flows could be affected in terms of their level, their stability, and their timing.[2] Then, following prior research (e.g., Geyskens, Gielens, and Dekimpe 2002), we derive the expected net effect on shareholder value by combining the arguments across the three perspectives.

[2] Srivastava, Shervani, and Fahey (1998) also identify the residual value as a fourth dimension of shareholder value. However, given that investors evaluate the net impact of a PIP on all expected future cash flows, the residual value of the firm's business is automatically incorporated into the valuation as an outcome of the level, stability and timing of expected future cash flows (see Srivastava, Shervani, and Fahey 1999, p. 173). Therefore, consistent with existing research in marketing (e.g., Luo and Homburg 2008), we do not explicitly consider the effect of a PIP on the residual value of the firm's business in our conceptual framework.

From a customer's point of view, a PIP's impact on shareholder value is likely to depend on their perceptions of fairness. If customers view the announced price increase as unfair, they may well reduce (or even terminate) their relationships with the firm (Xia, Monroe, and Cox 2004). This, in turn, will result in lower future sales. Customers may even vent their negative emotions by spreading unfavourable word-of-mouth about the firm or brand, which is likely to have an adverse effect on the purchase decisions of both current and potential customers (Luo 2007). If customers view a PIP as unfair, it can lower the levels and stability of expected future cash flows. It can also have an adverse effect on the timing of expected future cash flows, as negative word-of-mouth can make it more difficult (and time consuming) to convince prospective new customers (Luo and Homburg 2007). In contrast, if customers perceive the price increase as fair, both current and potential new customers are likely to proceed with their usual (planned) transactions, but now at a higher price.

From an economic perspective, investors take into account the PIP's implications in terms of revenues and costs (Geyskens, Gielens, and Dekimpe 2002), given that both affect the levels of the expected future cash flows of the firm (Srinivasan et al. 2009). Also, the time at which the firm experiences the changes in revenues and costs, i.e., sooner or later, will accelerate or delay the firm's receipt of these expected future cash flows (Srivastava, Shervani, and Fahey 1998).

Finally, a PIP's impact on shareholder value is also likely to be a function of the degree to which a firm is vulnerable to competition. Following a PIP, competitors can try to attract the firm's customers by keeping their own prices unchanged, by cutting their prices, or by increasing their prices to a lesser extent (Thomadsen 2012). The higher the expected loss of current and potential customers to competitors, the lower investors' expectations will be about the level and stability of future cash flows, while the expected speed of reaction will affect the timing of these cash flows.

It is important to note that our objective is to develop hypotheses about investors' expectations about the impact of a PIP on shareholder value *at the time when the PIP is made*. Therefore, we develop arguments for the effect of a PIP on the three aforementioned dimensions of expected future cash flows to arrive at a testable expectation about the combined (or net) effect on shareholder value. Consistent with prior event studies (see, for example, Geyskens, Gielens, and Dekimpe 2002 or Kalaignanam et al. 2013), we do *not* empirically test the effects of the independent variables on each separate underlying dimension. This is because the data for these are typically not available to investors at the time when a PIP is made (see also Steenkamp and Fang 2011, p. 631 for a similar reasoning). Table 2.1 outlines the three perspectives, along with the net expected effects of implementation information, attribution and precedence on the resulting abnormal returns.

[Insert Table 2.1 about here]

2.2.1 Implementation Information

In assessing the impact of a PIP, investors are likely to focus on two fundamental attributes of the upcoming price increase, its Magnitude and Timing. Timing is a fundamental attribute because it provides concrete information about the time at which investors can expect the changes in future cash flows to accrue to the firm (for a similar logic in case of product recalls, see Eilert et al. 2017). It also signals the firm's commitment to really implement the price increase (cf. Sorescu, Shankar, and Kushwaha 2007), as well as the concreteness of its intentions. A second fundamental attribute is the magnitude of the preannounced price increase, which communicates the per-unit impact of the upcoming price increase, and thereby helps investors to form expectations about its likely cash-flow impact (Marn, Roegner, and Zawada 2004).

Timing. The duration between the date of the announcement and the date the preannounced price increase will become effective refers to the timing of a preannounced price increase. Greater timing implies that customers have more time to prepare for the preannounced price increase by changing their consumption patterns or by reallocating their budgets. Since such a situation is in customers' favour, it is less likely to trigger perceptions of price unfairness (Xia, Monroe, and Cox 2004). Therefore, from a customer perspective, a PIP with greater timing is likely to result in more favourable expected future cash flows.

However, from an economic perspective, the timing of the preannounced price increase is likely to have a negative impact on the level and timing of expected future cash flows. This is because if the preannounced price increase corresponds to a better (more profitable) price for the firm, then purchases made between the day of the PIP and the effective date of the preannounced price increase are less profitable for the firm. Similarly, when a firm preannounces a price increase far ahead in time, it provides competitors with more time to fine tune their strategies to attract the firm's customers (Kohli 1999). Thus, from a competitive perspective, greater timing increases a firm's vulnerability to competitors' actions. This is likely to result in lower expectations about the level and stability of expected future cash flows.

Taken together, we expect that concerns from an economic and competitive perspective will outweigh the more positive customer considerations, and result in investors having an overall negative evaluation of PIPs with greater (as compared to lower) timing of the preannounced price increase. As such, we propose:

H1: The greater the timing, the lower the associated abnormal returns following a PIP.

Magnitude. Magnitude refers to the level of the price increase that is preannounced. A PIP with higher magnitude is more likely to trigger customers' perceptions of price unfairness as larger price increases have a greater likelihood of exceeding customers' price threshold (Kalyanaram and Little 1994). A PIP with higher magnitude is more likely to trigger customers' perceptions of price unfairness, and results in a higher likelihood that customers' price threshold will be exceeded (Pauwels, Srinivasan, and Franses 2007). As such, from a customer perspective, we expect a negative impact on the level, timing and stability of expected future cash flows for the firm.

From an economic perspective, PIPs of higher magnitude can have a positive effect on the level and timing of expected future cash flows. This is because such PIPs not only correspond to higher revenues per unit sold, they also provide customers with a greater incentive to move their purchases forward to take advantage of the current (lower) price (Bijmolt, van Heerde, and Pieters 2005). Still, higher magnitude of a PIP suggests that unless competitors follow this increase, a firm's relative price position will deteriorate more. This, in turn, increases the firm's vulnerability to competition, and hence is likely to reduce investors' expectations on the level and stability of its future cash flows. However, prior research shows that price increases of higher magnitude also signal the presence of a "core loyal customer base with a strong need or desire" for the firm's offerings such that they will continue to purchase from the firm "even at very high prices" (Pauwels, Srinivasan, and Franses 2007, p. 85). Such loyal customers, in turn, suggest that PIPs with higher magnitude are likely to result in a higher level and stability of expected future cash flows. Therefore, from a competitive perspective, it is not clear whether magnitude of a PIP will have a positive or a negative impact.

Given that the customer (negative), economic (positive), and competitive (positive or negative) perspectives provide good arguments for both a positive and a negative effect of PIPs with higher magnitude, we offer alternative hypotheses for the relationship between magnitude and abnormal returns (we refer to Geyskens, Gielens, and Dekimpe 2002 for a similar approach).

H2a: The greater the magnitude, the higher the associated abnormal returns following a PIP.

H2b: The greater the magnitude, the lower the associated abnormal returns following a PIP.

2.2.2 Attribution

The reason(s) provided by a firm for making an increase in the price charged to customers is referred to as the PIP's attribution. Since a price increase can only result in an overall increase in future cash flows if it is not offset by a proportionate decrease in the quantity sold, the cash flows implications of a preannounced price increase due to rising demand are likely to be different from those of rising costs (Prabhu and Stewart 2001). As such, investors are likely to evaluate a preannounced price increase differently depending on whether the firm attributes the price increase to rising demand, i.e., a Demand Attribution, or to rising costs, i.e., a Cost Attribution.

Demand Attribution. A firm provides a demand attribution in its PIP if it states that the reason for its preannounced price increase is an increase in the demand for its offerings. Existing studies on price fairness suggest that a preannounced price increase is likely to be perceived as unfair if it is attributed to a rising demand (Kwak, Puzakova, and Rocereto 2015). This is because customers are likely to infer that the firm will enjoy additional profits while making them bear the burden of higher prices (Campbell 1999). Therefore, from a customer's perspective, a PIP citing demand attribution is likely to result in investors expecting a reduction in the level, stability and timing of future cash flows.

However, from an economic perspective, demand attribution in a PIP is likely to have a positive impact on the level and timing of expected future cash flows. This is because higher demand indicates that the per-unit impact of the preannounced price increase will be applied to a high(er) number of units sold. A demand attribution is also likely to signal an acceleration in the receipt of the expected future cash flows, as the growing demand indicates that more customers are likely to buy a firm's offerings sooner rather than later.

A demand attribution also suggests to investors that the firm is offering high-quality products that provide unique benefits to customers (Hellofs and Jacobson 1999). In this way, investors are likely to be more confident about the firm's value proposition, and hence less likely to be concerned about competitors' ability to attract the firm's customers (e.g., Prabhu and Stewart 2001). Importantly, customers of firms with rising demand are also likely to be more loyal as they tend to have more positive attitudes towards the firm's offerings (Koschate-Fischer, Cramer, and Hoyer 2014). As such, from a competitive perspective, PIPs with a demand attribution are likely to have a positive impact on the level and stability of the expected future cash flows of the firm.

In summary, a joint consideration of the customer, economic, and competitive perspectives suggests that investors have more reasons to expect a PIP with a demand attribution to result in an enhancement of shareholder value. Therefore, we propose:

H3: Providing a demand attribution in a PIP results in higher associated abnormal returns following the PIP.

Cost Attribution. A firm provides a cost attribution in a PIP if it states that the reason for the preannounced price increase is an increase in its cost of doing business. Customers are less likely to perceive a preannounced price increase as unfair if it is due to an increase in firm costs (Bolton, Warlop, and Alba 2003). This is because customers view such price increases as an attempt by the firm to maintain (rather than increase) its existing level of profit (Campbell 1999). As such, from a customer perspective, a cost attribution in a PIP is likely to have a positive impact on the expected future cash flows.

From an economic perspective, however, a cost attribution in a PIP indicates that rising costs are likely to (partially or fully) offset any benefits of higher revenues due to the price increase. In fact, a firm is likely to enjoy an increase in cash flows, if any, only some time later, i.e., after overcoming the higher costs. Therefore, from an economic perspective, the presence of a cost attribution in a PIP is likely to reduce investors' expectations about the level and timing of the firm's future cash flows. Rising costs also indicate that the firm is likely to be more resource constrained, and thus more vulnerable to competition (Lee and Grewal 2004). This is because a firm facing rising costs is likely to be handicapped by the resulting budget constraints when facing competitors. Thus, from a competitive perspective, PIPs citing cost attribution are likely to result in a negative impact on the level and stability of expected future cash flows.

In summary, even though it is less probable for customers to perceive a PIP with a cost attribution to be unfair, economic and competitive considerations strongly suggest that a PIP with a cost attribution is likely to lower investors' expectations about the levels and stability of future cash flows. Therefore, we expect:

H4: Providing a cost attribution in a PIP results in lower associated abnormal returns following the PIP.

2.2.3 Precedence

Precedence refers to the prior preannouncement behaviours of the firm and its competitors. Since investors cannot directly observe the pricing strategies of a firm, they rely on the historical preannouncement behaviour of the firm and its competitors to form an understanding of the firm's unobservable pricing strategies (Warren and Sorescu 2017). We examine two dimensions of precedence: the firm's Own Precedence, which reflects the firm's past price preannouncement behaviour, and the prior occurrence of PIPs by its competitors, i.e., Competitive Precedence.

Own Precedence. A firm's own precedence of prior PIPs refers to the number of PIPs made by the firm before the current PIP. Frequent PIPs increase the probability that customers perceive the preannounced price increase as unfair. This is because customers' perception of price unfairness is based on their comparisons between the price they currently pay and a range of past prices that they have paid (Bolton, Warlop, and Alba 2003;

Kalyanaram and Winer 1995). The more frequent the PIPs by a firm, the more salient the price attribute becomes (Nijs et al. 2001), and the more likely customers will note that the preannounced new price exceeds previously-paid prices (Rajendran and Tellis 1994). The increased salience is also likely to influence the future price expectations for the firm's current and future customers, resulting in a higher price sensitivity and lower willingness to pay (DelVecchio, Krishnan, and Smith 2007). Thus, from a customer's perspective, higher own precedence is likely to result in a negative impact on the level, stability and timing of expected future cash flows.

A firm also incurs a menu cost, i.e., the cost of revising prices, when it implements a change in its prices (Anderson, Jaimovich, and Simester 2015). Frequent PIPs are likely to result in higher menu costs and therefore lower per-unit profits for the firm. Therefore, from an economic perspective, higher own precedence is likely to have a negative impact on the expected future cash flows of the firm.

Frequent PIPs also provide competitors with more opportunities to learn about the firm, as each additional PIP offers some information about the firm's underlying pricing strategy (Eliashberg and Robertson 1988). This, in turn, is likely to increase competitors' likelihood of identifying the best response to a firm's PIP (Montgomery, Moore, and Urbany 2005), hence increasing the firm's vulnerability to competition. As such, from a competitive perspective, making frequent PIPs is likely to reduce investors' expectations on the level and stability of the firm's future cash flows.

In summary, higher own precedence of prior PIPs is likely to lower investors' expectations about the level, stability and timing of future cash flows. More formally:

H5: The higher the firm's own precedence of prior PIPs, the lower the associated abnormal returns following a PIP.

Competitive Precedence. We refer to the number of PIPs made by a firm's competitors before its current PIP as the PIP's competitive precedence. Customers evaluate the fairness of a firm's preannounced price increase by comparing it with competitors' prices and pricing practices (Bolton, Warlop, and Alba 2003). If a firm makes a PIP after a number of its competitors have already done so, it is less likely for customers to perceive the preannounced price increase as unfair. This is because the new price is comparable to the other prices being offered in the market (Xia, Monroe, and Cox 2004). Thus, from a customer perspective, competitive precedence is likely to result in a positive impact on the expected future cash flows.

Higher competitive precedence, however, is likely to result in a negative effect on the timing of the firm's expected future cash flows from an economic perspective. This is because when a firm makes a PIP after a number of its competitors have already done so, investors may perceive its delay in raising prices as "leaving money on the table" (Prushan 1997). That is, by waiting for its competitors to make PIPs, the firm foregoes an opportunity to accrue higher cash flows (Marn, Roegner, and Zawada 2004).

Furthermore, higher competitive precedence also signals to investors that the firm is not confident about its ability to increase prices without losing customers (Keil, Reibstein, and Wittink 2001). That is, the firm appears to lack a loyal customer base since it can only make a PIP after the industry has become accustomed to the notion of price increases. In this way, the lack of confidence is likely to signal the firm's vulnerability to competitors' actions (Prabhu and Stewart 2001). As such, from a competitive perspective, competitive precedence is likely to have a negative impact on the level and stability of expected future cash flows.

Taken together, even though customers are unlikely to view PIP with higher competitive precedence as unfair, both economic and competitive considerations suggest that higher competitive precedence in a PIP is likely to have an adverse effect on shareholder value. Therefore, we expect:

> *H6:* The higher the competitive precedence of prior PIPs, the lower the associated abnormal returns following a PIP.

2.3 Method

To identify PIPs, we use the electronic search engine FACTIVA that allows us to search all major US-based newspapers and trade publications.[3] We consider all PIPs that were made between 2010 and 2014 by publicly-listed firms in the United States.[4] Following precedence, we do not consider observations from utility, finance and insurance industries, as prices in these industries are typically heavily regulated (Morgan and Rego 2009; Rego, Billett, and Morgan 2009). We also exclude observations from firms operating in industries with less than 2 unique firms in each year, as we are not interested in studying the effects of a PIP in monopolistic markets. This resulted in 684 observations from 120 firms.

To avoid potential confounds, we do not consider announcements that are in close proximity (+/- 2 days) to other major events, such as earnings announcements (e.g., Robinson, Tuli, and Kohli 2015; for details, see Appendix 2.A). In addition, we eliminate PIPs if we cannot determine their release date, and if their accounting and stock-returns data are not available in COMPUSTAT and the University of Chicago Centre for Research in Security Prices (CRSP). In case of multiple release dates, we use the earliest date as the release date of the PIP. These criteria produced a preliminary sample of 608 PIPs from 111 firms. Since we focus on the timing and magnitude of a PIP, we use the PIPs that provided information about these variables. Our final sample consists of 265 PIPs between 2010 and

[3] We only consider non-commodity PIPs because commodities such as oil and natural gas are heavily traded in commodity exchanges. We identify a product as a commodity if it is listed on the Chicago Mercantile Exchange (CME) (see Bruno, Che, and Dutta 2012 for a similar practice). Using FACTIVA's "Intelligent Indexing", we restrict our search to only US publications by selecting a source grouping (i.e., Publications – By Region) and a regional indexing term (i.e., United States) in FACTIVA (see DeKinder and Kohli 2008 for an example of the use of FACTIVA's "Intelligent Indexing"). The keywords used in the search are combinations of "price" and "increase", "jump", hike", "raise", "rise", "increment", etc.
[4] We do not consider PIPs from foreign companies listed in the US, as prior research in finance suggests that investors may possess different preferences for domestic versus foreign equities (Coval and Moskowitz 1999).

2014 from 78 firms (for details, see Appendix 2.B).[5] The reduction in the final sample size (i.e., 265) from the total number of public preannouncements of price increases (i.e., 684) is consistent with prior event studies in marketing. For example, Wang, Saboo, and Grewal (2015) begin with an initial sample of 926 public announcements of CMO succession and analyze a final sample of 303 announcements. More recently, Hsu and Lawrence (2016) start with 2,124 announcements of public recalls and use a final sample of 185 announcements.

We estimate abnormal returns following a PIP as a function of the information available to investors on the day when the PIP is made. As such, all variables are measured as of the day of the PIP. For the variables that reflect periodically released firm financial information, we use the annual report released in the closest financial year preceding the PIP. Following prior work (e.g., Rust and Huang 2012), we identify the firm's industry using its six-digit North American Industry Classification System (NAICS) code.

2.3.1 Dependent Variable

We adopt the event-study method to estimate the abnormal returns following a PIP. According to the efficient-market hypothesis, stock prices reflect the impact of all publicly-available information about a firm on its future cash flows (MacKinlay 1997). When a firm makes a PIP, investors update their expectations of the firm's future cash flows and adjust the price of the firm's stock accordingly. If investors expect the PIP to result in an increase (decrease) in future cash flows, the stock price will increase (decrease). The benefit of an event-study is that it allows an inference of cause (PIPs) and effect (abnormal returns) in a quasi-experimental setting, thus identifying factors that explain changes in abnormal returns (Srinivasan and Hanssens 2009). The approach is widely used to assess investors' evaluations

[5] For all subsequent mentions of PIPs, we are referring to PIPs that provide information on timing and magnitude. However, we will also consider the larger sample of 608 PIPs (i.e., thereby also taking into account the PIPs that do not disclose information on timing and/or magnitude of a PIP) in our sensitivity analyses.

of marketing actions, such as CMO successions (e.g., Wang, Saboo, and Grewal 2015) and product recalls (e.g., Hsu and Lawrence 2016).

We assess the effect of a PIP (the "event") on the stock price of a firm by estimating the change in its stock price after accounting for firm and market factors (i.e., the *risk-adjusted abnormal stock return* of the firm) during a specified time window around the event date. The risk-adjusted abnormal stock return of the focal firm is measured as the difference between the firm's expected and actual stock returns (Equation 1):

$$\mathrm{AR_{ijt}} = \mathrm{R_{ijt}} - (\mathrm{a_{ij}} + \beta_{\mathrm{ij}}\mathrm{R_{mt}} + \mathrm{s_{ij}SMB_t} + \mathrm{h_{ij}HML_t} + \mathrm{u_{ij}UMD_t}), \qquad (1),$$

where $\mathrm{AR_{ijt}}$ is the abnormal return of firm *i* of industry *j* on day *t* (i.e., the day of the PIP), $\mathrm{R_{ijt}}$ is the firms' actual stock return, $\mathrm{R_{mt}}$ the return on a value-weighted portfolio of the total stock market, $\mathrm{SMB_t}$ the Fama and French (1993) size portfolio return, $\mathrm{HML_t}$ the Fama and French (1993) book-to-market-ratio portfolio return, and $\mathrm{UMD_t}$ the Carhart (1997) momentum portfolio return, all on day t. a_{ij}, β_{ij}, s_{ij}, h_{ij} and u_{ij} are parameters estimated over a 250 day period ending 30 days before the event date (see Geyskens, Gielens, and Dekimpe 2002 for a similar practice). We use the CRSP database to obtain daily stock returns from a value-weighted market index comprising all stocks on NASDAQ and NYSE.

2.3.2 Independent Variables

Timing. Timing is measured as the number of days between the date of the PIP and the date the preannounced price increase becomes effective (for examples, see Appendix 2.C, Table 2.C1). PIPs in our sample were made as early as 131 days (W.R. Grace and Company in August 2010) or as late as one day (Carpenter Technology in April 2011) before implementation.

Magnitude. We measure the magnitude of the preannounced price increase as the percentage change in the price of the firm's product and/or service before and after the PIP (for examples, see Appendix 2.C, Table 2.C1). In our sample, firms make PIPs with magnitudes ranging from as low as 1% (Starbucks in June 2013) to as high as 63% (DISH Network Corporation in December 2013).

Demand and Cost Attribution. We measure attribution through the reasons given in the PIP to justify the increase in price. To identify the reasons for the preannounced price increase, the PIPs were first content-analyzed to identify phrases and combinations of words that are commonly used to justify the need for a price increase.

To identify PIPs with a *demand attribution,* the keywords include combinations of words such as, “demand”, “profit(s)”, “revenue(s)”, “growth”, and “increase”, “change”, “strong”. In addition, we used specific phrases such as “facilitate organic growth”, “rebalance the marketplace”, “support continued growth and investment”. In coding PIPs with a *cost attribution*, the set of keywords includes combinations of words such as “cost” or “costs” and “increase”, “input”, “operating”, “transportation”, “logistic”, “raw materials” (for examples, see Appendix 2.C, Table 2.C2).

Second, two judges independently examined the PIPs to identify the attributions, and then compared notes to arrive at an agreement. This approach is consistent with prior studies (e.g., Lee and Grewal 2004; Robinson, Tuli, and Kohli 2015). We find that 73 out of 265 (i.e., 28%) of the PIPs in our sample cite demand attributions while 127 out of 265 (i.e., 48%) of the PIPs in our sample cite cost attributions.[6]

Own and Competitive Precedence. Following Warren and Sorescu (2017), we measure own (competitive) precedence as the natural logarithm of the number of PIPs by the firm (competitors) in the year preceding the focal PIP, where we define competitors as firms

[6] This frequency of disclosure is in line with previous event studies. For example, Sorescu, Shankar, and Kushwaha (2007) find that less than half of the new product preannouncements provide information on the price and introduction date of the new product.

within the same six-digit NAICS code as the focal firm.[7] We compute these variables using PIPs from the most recent year because prior research suggests that investors weight recent information more heavily (Sorescu, Shankar, and Kushwaha 2007). Using a one-year time window not only allows sufficient variation to examine the PIP history of the firm and its competitors, it also more accurately captures the investors' state of mind when they are evaluating the firm's PIP (e.g., Warren and Sorescu 2017). We find that some firms made as many as 29 PIPs in the preceding year, while others did not make any PIPs during that period. For competitive precedence, we find that while some PIPs are preceded by 48 competitive PIPs, others are the first PIP to be made in the industry within a year.

To account for potential diminishing returns to scale effects of our continuous drivers, we take the natural logarithm of Timing, Magnitude, Own and Competitive Precedence (cf. Hanssens, Parsons, and Schultz 2001).[8]

2.3.3 Control Variables

We control for several factors that are likely to have an impact on abnormal returns. First, we control for firm-related non-financial variables that may result in systematic differences in investors' evaluations of a PIP. Research in consumer behavior and psychology suggests that the source of price information "can influence evaluations and perceptions of outcomes" (Campbell 2007, p. 262). Since PIP made by the top management team or the chief executive officer can be perceived differently from PIPs made by other members of the firm (Sorescu, Shankar, and Kushwaha 2007), we account for the Spokesperson of the PIP as a control variable in our model.

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[7] The computation of Own Precedence and Competitive Precedence also includes price-increase announcements that 1) were post-announcements, 2) were made on the day the announced price increase becomes effective, 3) do not provide sufficient information about the magnitude of the change in prices and the effective date of the announced price increase, and 4) were in close proximity (i.e., +/- 2 days) to other events such as earnings announcements. In addition, the computation of Competitive Precedence also includes PIPs that were from foreign companies listed in the US. We collected price-increase announcements that were made in the year of 2009 using the same data-collection procedure in order to compute Own Precedence and Competitive Precedence for PIPs made in 2010.

[8] Since Timing, Magnitude, Own Precedence and Competitive Precedence can have very small values, we use the transformation of, for example, ln (Timing + 1) to compute the log-transformation of Timing. A similar transformation was performed for Magnitude, Own Precedence and Competitive Precedence (see ter Braak et al. 2013 for a similar practice).

Prior research suggests that the firm's overall reputation is likely to influence investors' evaluations of its announcements, where investors might discount the reliability of PIPs from low-reputation firms (Sorescu, Shankar, and Kushwaha 2007). Consistent with existing research, we use a firm's presence on Fortune magazine's Most Admired Company list to account for the firm's overall Reputation (e.g., Mishra and Modi 2016).

In addition, due to the potential spill-over effects of a PIP from one brand to other brands in the firm's portfolio (e.g., Larkin 2013), the impact of a PIP from a mono-brand firm may differ significantly from that of a multi-brand firm. Hence, we control for whether a firm adopts a Corporate Branding strategy. Following Rao, Agarwal, and Dahlhoff 2004), we determine the branding strategy of firms for a particular financial year by examining their 10-K statements obtained from the SEC (U.S. Securities and Exchange Commission) and their corporate webpages to uncover information regarding the product and/or service brands marketed by these firms. A firm is coded as having a corporate branding strategy if it predominantly uses its corporate name on its products and/or services.

Following prior research, we also control for several firm financial characteristics. Specifically, a firm's profitability encompasses financial information that influences investors' evaluations of a firm's stock (Luo 2007). Following Srivastava, Shervani, and Fahey (1998), we use a firms' net operating Cash Flows to account for its profitability (also see Gruca and Rego 2005). To take into account the capital structure of the firm, we include Leverage and Liquidity, as investors are likely to prefer firms with lower leverage (Malshe and Agarwal 2015) and higher liquidity (Luo, Homburg, and Wieseke 2010). Since investors tend to have a preference for the stocks of larger firms (Rubera and Kirca 2012), we also control for Firm Size. Finally, the expected profits following a PIP are likely to be different for firms facing different operating costs (Rust, Moorman, and Dickson 2002). As such, we include a firm's cost of goods sold, i.e., its COGS, as a control variable.

We include several industry covariates to account for the differences in investor responses to PIP across different industries. Following Fang, Palmatier, and Steenkamp (2008), we include Industry Concentration, Industry Growth and Industry Turbulence as they are likely to have an impact on firm value. We also account for whether or not a PIP is made by a firm operating in a Service Industry, as investors may evaluate the stock of a product- (vs. service-) focused firm differently (Morgan and Rego 2009). Finally, we control for whether a firm is operating in a Business-to-Consumer industry as the price dynamics in such industries are typically different from industries that sell mainly to businesses.

Table 2.2 outlines the control variables, their measures, data sources and examples of studies that support the use of these measures.

[Insert Table 2.2 about here]

2.3.4 Model Specification

We test our hypotheses using Equation 2, where the abnormal returns ($\mathrm{AR_{ijt}}$) are a function of the information that investors have at the time of the preannouncement:

$$\begin{aligned}\mathrm{AR_{ijt}} = \gamma_0 + \gamma_1\mathrm{TIME_{ijt}} + \gamma_2\mathrm{MAG_{ijt}} + \gamma_3\mathrm{DB_{ijt}} + \gamma_4\mathrm{CB_{ijt}} + \gamma_5\mathrm{OWN_{ijt}} \\ +\gamma_6\mathrm{COMP_{ijt}} + \gamma_7\mathrm{CNTRLS_{ijt}} + \epsilon_{ijt}\,, \qquad (2)\end{aligned}$$

where $\mathrm{TIME_{ijt}}$ and $\mathrm{MAG_{ijt}}$ are the (log-transformed) timing and magnitude of the preannounced increase featured in the PIP from firm *i* of industry *j* on day *t*, $\mathrm{DB_{ijt}}$ and $\mathrm{CB_{ijt}}$ are dummy variables indicating whether or not there are demand and cost attributions, $\mathrm{OWN_{ijt}}$ and $\mathrm{COMP_{ijt}}$ represent the (log-transformed) own and competitive precedence, and the coefficient vector γ_7 denotes the effect of the set of control variables $\mathrm{CNTRLS_{ijt}}$ (i.e., Spokesperson, Reputation, Corporate Branding, Cash Flows, Leverage, Liquidity, Firm Size, COGS, Industry Concentration, Industry Growth, Industry Turbulence, Service Industry and Business-to-Consumer). To account for the potential correlation among PIPs from firms within the same industry, we allow the error terms of observations of firms within an industry to be correlated with each other (Robinson, Tuli, and Kohli 2015).

Using OLS to estimate the proposed model (i.e., Equation 2) can lead to biased estimates as there are two potential sources of endogeneity (Gielens et al. 2017). First, because some of the factors that influence the abnormal returns might also affect the firm's probability of making a PIP, the model specified in Equation 2 is likely to yield biased estimates due to a selection bias (Hamilton and Nickerson 2003). For example, whereas investors are likely to view price increases more favorably for firms with higher costs, such firms are also more likely to make a PIP. Thus, we specify a selection model to estimate a firm's likelihood of making a PIP to address this concern.

Second, our hypothesized main effects can also potentially suffer from omitted variable bias, as these variables could be correlated with unobservable factors that affect the abnormal returns following a PIP. To address this concern, we follow Gielens et al. (2017) and draw upon Park and Gupta (2012)'s Gaussian copulas approach to account for the potential endogeneity of the continous PIP characteristics (Timing, Magnitude, Own and Competitive Precedence). In addition, we use the Hausman-Wu test to assess the potential endogeneity of the dummy variables that reflect, respectively, Demand and Cost Attribution (e.g., Clement, Wu, and Fischer 2014; Gielens and Dekimpe 2001).

Addressing Selection Bias. We jointly estimate Equation 2, i.e., the outcome model, and the selection model (Equation 3) using Maximum Likelihood (ML) estimation as it produces estimates that are more efficient than the Heckman (1979) two-stage estimations (Breen 1996; see also ter Braak et al. 2013):

$$\begin{aligned}\mathrm{LIC}_{\mathrm{ijT}} = {} & \delta_0 + \delta_1\mathrm{CORP}_{\mathrm{ijT}} + \delta_2\mathrm{REP}_{\mathrm{ijT}} + \delta_3\mathrm{CFTA}_{\mathrm{ijT}} + \delta_4\mathrm{LEV}_{\mathrm{ijT}} + \delta_5\mathrm{LIQ}_{\mathrm{ijT}} + \delta_6\mathrm{SIZE}_{\mathrm{ijT}} \\ & +\delta_7\mathrm{COGS}_{\mathrm{ijT}} + \delta_8\mathrm{IC}_{\mathrm{jT}} + \delta_9\mathrm{IGRTH}_{\mathrm{jT}} + \delta_{10}\mathrm{ITURB}_{\mathrm{jT}} + \delta_{11}\mathrm{SVC}_{\mathrm{j}} \\ & +\delta_{12}\mathrm{B2C}_{\mathrm{j}} + [\delta_{13}\mathrm{INST}_{\mathrm{ijT}} + \delta_{14}\mathrm{EGRTH}_{\mathrm{ijT}} + \textstyle\sum_{k=15}^{18}\delta_k\mathrm{YEAR}_{\mathrm{T}}] + \mu_{\mathrm{ijT}}\,, \qquad (3)\end{aligned}$$

where $\mathrm{LIC}_{\mathrm{ijT}}$ is 1 if firm i in industry *j* made a PIP in year *T*, else 0, ϵ_{ijt} is the error term for the outcome model $\sim N(0,1)$, μ_{ijT} is the error term for the selection model $\sim N(0,1)$, and ρ denotes the correlation between ϵ_{ijt} and μ_{ijT}.

The selection model includes several of the firm and industry control variables that are also included in the outcome model as these variables arguably affect not just the abnormal returns following a PIP, but are likely to also influence whether or not a firm makes a PIP.[9] Specifically, we include Reputation ($\mathrm{REP}_{\mathrm{ijT}}$) and Corporate Branding ($\mathrm{CORP}_{\mathrm{ijT}}$) because the firm's overall reputation and/or branding strategy is likely to influence customers' price sensitivity towards its products and services (Bharadwaj, Tuli, and Bonfrer 2011), and hence can affect its likelihood to make a PIP.

Firms with lower Cash Flows ($\mathrm{CFTA}_{\mathrm{ijT}}$) but higher COGS ($\mathrm{COGS}_{\mathrm{ijT}}$) are more likely to preannounce a price increase. This is because such firms generally have lower profits, and hence need the additional revenues expected from the PIP more than firms that already have higher earnings or lower costs (Homburg, Hoyer, and Koschate 2005). Thus, we include these variables in the selection model. We also include Leverage ($\mathrm{LEV}_{\mathrm{ijT}}$) and Liquidity ($\mathrm{LIQ}_{\mathrm{ijT}}$), as a firm with higher leverage and lower liquidity is more likely to preannounce a price increase to realize an increase in cash flows (Robinson, Tuli, and Kohli 2015). Finally, we also include Firm Size ($\mathrm{SIZE}_{\mathrm{ijT}}$), as larger firms are more likely to make a PIP as they have more power to exert control and influence consumption patterns within the industry (Rubera and Kirca 2012).

The selection model also accounts for factors that reflect a firm's operating environment. Firms in industries with greater Industry Concentration ($\mathrm{IC}_{\mathrm{ijT}}$) are more likely

[9] Some firm and industry factors included in the outcome model cannot be conceptualized/measured in the absence of a PIP (i.e., Magnitude, Timing, Demand Attribution, Cost Attribution, Own Precedence, Competitive Precedence and Spokesperson). Therefore, these variables are not included in the selection model.

to make a PIP, as economic theory suggests that higher concentration will result in higher prices (Ramaswamy, Gatignon, and Reibstein 1994). Similarly, firms in industries with greater Industry Growth (IGRTH_{jT}) and Industry Turbulence (ITURB_{jT}) are more likely to preannounce a price increase, because customers are less sensitive to prices in growing markets (Ramaswamy et al. 1993), and are less likely to switch to unfamiliar brands in turbulent markets (Erdem and Keane 1996). Finally, given that our sample also includes PIPs from service-focused firms and/or firms that sell mainly to end-consumers, we also include Service Industry (SVC_j) and Business-to-Consumer ($\mathrm{B2C}_j$) in the selection model to control for potential systematic differences in firms' likelihood to make a PIP in these industries.

The selection model includes some additional variables – exclusion restrictions – that are not incorporated in the outcome model (i.e., the variables in the square brackets in Equation 3). A firm with a higher percentage of institutional holdings is under greater scrutiny to reduce information asymmetry through the disclosure of information that may affect its future cash flows (Bushee and Noe 2000). Since a price increase is likely to affect the future cash flows of a firm, we expect that firms with a higher percentage of institutional holdings are more likely to preannounce a price increase. That said, according to the efficient-market hypothesis, there is no reason to expect investors' evaluations of a PIP to be influenced by the level of institutional holdings of a firm's outstanding shares (Fama 1991). As such, we include Percentage of Institutional Holdings (INST_{ijT}) as an exclusion restriction.

Firms are less likely to make PIPs during periods of low economic growth as customers tend to be more price conscious in their purchase decisions (Estelami, Lehmann, and Holden 2001) and are likely to slow down their spending (Deleersnyder et al. 2004). As such, we also include Economic Growth (EGRTH_{ijT}) as an exclusion restriction. Finally, to account for the argument that unobserved time-related events may have influenced the firms' likelihood of making a PIP, we include Year Dummy variables (YEAR_T) that correspond to the year in which the PIP was made. However, economic growth and the year dummy variables do not influence the abnormal returns. This is because the calculation of abnormal returns includes the return on a value-weighted portfolio of the total stock market (i.e., R_{mt} in Equation 1), which takes into account the macro-economic factors and the year-specific effects by using overall stock-market returns (Flannery and Protopapadakis 2002).[10]

We outline the exclusion restrictions, their measures, data sources and examples of prior literature supporting the use of these measures in Table 2.2. In addition, we also describe how we arrive at the sample for the selection model in Appendix 2.D.

Addressing Potential Endogeneity. Following recent event studies in marketing (e.g., Gielens et al. 2017), we adopt Park and Gupta (2012)'s Gaussian copulas approach to account for the potential endogeneity of our hypothesized continous variables. Specifically, we first assess the distribution of Timing, Magnitude, Own Precedence and Competitive Precedence to confirm the suitability of this method. Results from the Shapiro-Wilk test suggest that these variables are not normally distributed ($W_{\mathrm{TIME_{ijt}}} = 0.95, p < 0.001; W_{\mathrm{MAG_{ijt}}} = 0.98, p < 0.001; W_{\mathrm{OWN_{ijt}}} = 0.97, p < 0.001; W_{\mathrm{COMP_{ijt}}} = 0.92, p < 0.001$). In this way, the inclusion of the copula correction terms for these variables through a control function approach allows us to separate the variation due to these variables from that of the error term so that the effects of these variables can be estimated consistently (Papies, Ebbes, and Heerde 2017). Following Park and Gupta (2012), we obtain the copula correction terms as follows:

$$cop(\mathrm{TIME_{ijt}}) = \phi^{-1}\left(H(\mathrm{TIME_{ijt}})\right), cop(\mathrm{MAG_{ijt}}) = \phi^{-1}\left(H(\mathrm{MAG_{ijt}})\right),$$
$$cop(\mathrm{OWN_{ijt}}) = \phi^{-1}(H(\mathrm{OWN_{ijt}})), cop(\mathrm{COMP_{ijt}}) = \phi^{-1}(H(\mathrm{COMP_{ijt}})), \qquad (4-7)$$

[10] To verify our exclusion restrictions, we estimated a model where the exclusion restrictions were included as additional control variables in the outcome equation. Consistent with our expectations, we find that their effect on abnormal returns is not significant ($\chi^2(6) = 3.76, p > 0.10$).

where ϕ^{-1} is the inverse of the cummulative normal distribution function, and $H(\mathrm{TIME_{ijt}})$, $H(\mathrm{MAG_{ijt}})$, $H(\mathrm{OWN_{ijt}})$ and $H(\mathrm{COMP_{ijt}})$ are the empirical distribution functions. These copula correction terms are first added one at a time to our model to test for their statistical significance. Consistent with existing studies (Gielens et al. 2017; Mathys, Burmester, and Clement 2016), we then keep the statistically significant copula correction terms in our final model as the terms that are not statistically significant suggest that their corresponding variables are not endogeneous (Park and Gupta 2012).

As the distribution of dummy variables is not suitable for the Gaussian copulas approach, we draw on an alternative procedure to address the potential endogeneity of Demand Attribution and Cost Attribution. Following recent studies in marketing (e.g., Clement, Wu, and Fischer 2014; Lamey et al. 2012), we assess the endogeneity of these variables using the Hausman-Wu test (Greene 2006). In particular, we first estimate two auxiliary regressions using Demand Attribution and Cost Attribution as the dependent variables, along with the excluded variable and all other control variables that we include in our focal model.

Drawing on existing marketing studies that use lagged variables as exclusion restrictions (e.g., Albers 2012; Gielens, Gijsbrechts, and Dekimpe 2014), we use the attribution that the firm cites in its previous PIP as the excluded variable in both of the auxiliary regressions.[11] We argue that the attribution that the firm cites in its previous PIP is a valid exclusion restriction because firms tend to adopt similar decision choices over a short time period such that if the firm cites a demand attribution in its previous PIP, it is likely to also cite a demand attribution in its current PIP. However, this excluded variable is unlikely to influence abnormal returns following the current PIP as the efficient-market hypothesis

[11] The excluded variable for Demand (Cost) Attribution is measured as follows: = 1 if the firm cites a demand (cost) attribution in its closest preceding PIP, = 0 if the firm did not cite a demand (cost) attribution in its closest preceding PIP or did not make any previous PIPs from the start of our data year, i.e., before 2010.

suggests that the stock price of the firm can only be influenced by the information provided in the firm's current PIP (MacKinlay 1997).[12]

Upon obtaining the predicted values from the auxiliary regressions, we then included these values as instruments for Demand Attribution and Cost Attribution in our focal model using a stepwise approach. Each estimation is accompanied by a χ^2-test to assess the statistical significance of the instruments (see Gielens and Dekimpe 2001 for a similar approach). Results suggest that the potential endogeneity of Demand Attribution and Cost Attribution is not an issue, as we find that neither test is significant ($p = 0.22$ for Demand Attribution and $p = 0.41$ for Cost Attribution).

2.4 Results

Table 2.3 reports the abnormal returns on the day of the PIP, as well as up to 5 days before and after the PIP. We use both a parametric test, the Cross-Sectional Error t-test (Brown and Warner 1985), and two nonparametric tests, the Rank test (Corrado 1989) and the Jackknife test (Giaccotto and Sfiridis 1996), to test the significance of the abnormal returns.

[Insert Table 2.3 about here]

Across the three tests, we find that the abnormal returns are most significant on day $t + 1$, with a positive abnormal return of 0.25% ($p < 0.02$). In addition, the cumulative average abnormal returns (CAAR) is most significant for the event window [0, 1]. Accordingly, we use the CAAR for the event window [0, 1] as the dependent variable to test the proposed hypotheses (for similar practice, see Cao and Sorescu 2013; Kalaignanam et al. 2013). We find that the CAAR for the event window [0, 1] is .41%. However, there is wide variation in the CAARs. Almost 42% of the PIPs experience a negative CAAR. In terms of

[12] The excluded variables were highly significant in the auxiliary regressions ($\chi^2(1) = 12.18, p < 0.001$ for the excluded variable for demand attribution; $\chi^2(1) = 30.19, p < 0.001$ for the excluded variable for cost attribution), which testifies to the strength of the excluded variables.

the range, while some PIPs yield returns as low as -11.41%, other PIPs result in positive returns as high as 15.59%. Clearly, investors' evaluations differ considerably across PIPs.

Table 2.4 reports the estimation results (we refer to Appendix 2.E, Table 2.E1 for the descriptive statistics). The maximum VIF statistic of the model is 4.56, well below the threshold of 10, suggesting that multicollinearity is not an issue for our model. We report one-sided significance levels for the parameter estimates of the directional hypotheses, and two-sided significance levels for all other parameter estimates.

[Insert Table 2.4 about here]

We first discuss the results of our selection equation. The error correlation is negative and significant ($\rho = -0.33, p < 0.10$), indicating the importance of accounting for a selection bias. We find support for the exclusion restrictions as we find that a higher percentage of institutional holdings results in a higher likelihood of making a PIP ($\delta_{13} = 0.76, p < 0.01$). In addition, relative to 2010, there is a lower likelihood of making a PIP in all subsequent years, except in 2011 ($\delta_{15} = -0.13, p > 0.10$; $\delta_{16} = -0.72, p < .01$; $\delta_{17} = -0.85, p < .01$; $\delta_{18} = -0.47, p < .01$). However, contrary to our expectations, we find that firms' likelihood of making PIPs does not differ across different periods of economic growth ($\delta_{14} = 0.05, p > 0.10$).

Results show that timing has a significant negative effect on abnormal returns ($\gamma_1 = -0.34, p < 0.01$). Therefore, H1 is supported. The impact of magnitude on abnormal returns is significantly positive ($\gamma_2 = 3.16, p < 0.05$), thereby supporting H2a (and rejecting H2b). We also find strong support for H3, as the effect of a PIP citing demand attribution on abnormal returns is significantly positive ($\gamma_3 = 0.50, p < 0.05$).

We do not find support for H4, as a PIP with a cost attribution does not have a significant effect on abnormal returns ($\gamma_4 = -0.02, p > 0.10$). H5, however, is supported as the impact of own precedence on abnormal returns is negative and significant ($\gamma_5 =$

$-0.34, p < 0.05$). Consistent with H6, we find that PIPs with higher competitive precedence have a significant negative impact on abnormal returns ($\gamma_6 = 0.43, p < 0.05$).

2.4.1 Sensitivity Analyses

We conduct several sensitivity analyses to assess the robustness of our conclusions (see Table 2.5; for complete estimation results, see Appendix 2.F, Table 2.F1). Results across 15 different sensitivity tests underscore the robustness of our conclusions, as we find that in more than 96% of the cases, our substantive conclusions remain unchanged.

Alternative Dependent Variables. We examine the sensitivity of our results by using alternative methods to compute the dependent variable. First, we use the abnormal returns obtained from the estimation of two alternative models – the Fama and French (1993) three factor model and the market model (Brown and Warner 1985). Second, we also estimate the abnormal returns using an equally-weighted market-index. Finally, following Skiera, Bayer, and Schöler (2017, p.6), we examine the robustness of our results to the abnormal returns that account for only the value of the operating business. Our conclusions remain unchanged.

Sensitivity to Outliers. Consistent with existing event studies in marketing (e.g., Robinson, Tuli, and Kohli 2015), we assess the impact of outliers by removing observations with residuals at the one percentile of each tail. We find the same results as in our focal analysis.

Alternative Standard Errors. We explore the sensitivity of our results to alternative computations of the standard errors in the following ways. First, to account for the possible correlation among multiple PIPs made by the same firm, we re-estimate the models by clustering the errors at the firm level. Second, we re-estimate a model with errors clustered at both the industry and year level to allow for possible correlation among PIPs made by different firms within the same industry in the same year.[13] Third, we also re-estimate the models without the use of clustered standard errors, but using heteroscedasticity-robust standard errors (Wooldridge 2009). Across the analyses, our conclusions remain, as shown in Table 2.5, largely unchanged.

Alternative Industry Classification. Given that the number of firms included in the selection sample might vary depending on the granularity of the NAICS codes utilized, we also consider an alternative industry classification, and repeat the estimation process using five-digit NAICS codes. Again, our substantive conclusions remain unchanged.

Heckman Two-Step Estimation. We re-estimate our models using the more traditional Heckman (1979) two-step estimation technique. Our conclusions remain unchanged.

Reputation of Following through on PIPs. Whether a firm followed through on its previous PIP could affect investors' evaluations of its subsequent PIPs. To that extent, we consider whether PIPs in our sample were preceded by announcements of a price increase retraction in the one year preceding its preannouncement date. Specifically, we checked whether there were news articles reporting that the firm was cancelling, delaying, or cutting back on a previously announced price increase, regardless of whether the announced price increase had eventually been implemented. We find that only 10 of the PIPs within our sample are preceded by such announcements. We re-estimated our model by first dropping these 10 PIPs. In addition, we estimated the model with an indicator variable for such an occurrence. In both instances, our conclusions remain unchanged, while the parameter of the indicator variable is not statistically significant ($p > 0.10$).

Alternative Measures. We assess the robustness of our model to alternative measures. First, to account for the possibility that the PIP history of the firm and its competitors extend

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[13] To cluster the standard errors at both the industry- and year-level, we use a variable that contains a unique value for each industry-year pair, i.e., we create this variable by multiplying the firms' six-digit NAICS codes with the data year, and use this variable as the cluster variable (see Petersen 2009 for a similar practice).

beyond a one-year period, we re-estimate our model using Own and Competitive Precedence measured over a two-year time window. Second, we also estimate our model using an alternative measure of Reputation. In particular, we use the corporate social performance data from the Kinder, Lydenberg, and Domini (KLD) Social Ratings Database as an alternative proxy for the firm's overall Reputation. The KLD database contains social ratings on how well a firm caters to issues like climate change, waste management, employee involvement, product safety, corruption and political instability, and financial-system instability (MSCI ESG Research 2015). Our conclusions remain unchanged.

Alternative Specification of the Selection Model. The selection model specified in our focal analysis reflects a firm's decision to make a PIP on the condition that the PIPs provide information on timing and magnitude. To account for a possible sample selection bias due to the lack of information on the timing and/or the magnitude of the preannounced price increase, we specify a multinomial selection model to demonstrate an alternative decision structure. Specifically, the first-stage is a multinomial logit model that accounts for a firm's decision to make a PIP that provides information on timing and magnitude (n = 265), make a PIP with incomplete information (i.e., PIPs that do not provide information on either the timing or the magnitude of the preannounced price increase or both; n = 343), or not make a PIP at all (n = 3,349).

Using the "conditional expectations correction method" as proposed by Dubin and McFadden (1984)[14], we use the parameter estimates from the first-stage model to obtain the predicted conditional probabilities for each of the decision outcomes given the conditional probabilities of all other decision outcomes. These predicted conditional probabilities are then used to compute a set of correction terms to be included in the second-stage model to control for the possible sample selection bias. Following Bourguignon, Fournier, and Gurgand

[14] We refer to Fang et al. (2016) and Gijsbrechts, Campo, and Vroegrijk (2018) for recent marketing applications of this method.

(2007), we include three correction terms to account for each of the three decision outcomes and bootstrap the second-stage regression (500 bootstrap replications) to account for the standard errors from the first-stage model.

Results show that our substantive conclusions remain largely unchanged if we use this approach. Importantly, none of the coefficients of the correction terms are statistically significant in the model (using a significance level of $p < 0.10$), thus suggesting that there is no evidence of a sample selection bias in this decision structure. These results, therefore, support the use of the simpler Heckman approach that we use in our focal analysis.

In addition, we also computed the abnormal returns following the PIPs with incomplete information using the event-study method. We find that the abnormal returns are not statistically significant on the day of the PIP, as well as up to 5 days before and after the PIP (for details, see Appendix 2.F, Table 2.F2). The CAAR for the event window [0, 1] is also not statistically significant ($-0.09\%, p > 0.10$). This analysis suggests that investors respond to PIPs only when the firm provides investors with implementation information, i.e., the Timing and Magnitude, as they need this information to make an educated estimate of the impact of a PIP on the change in future cash flows for the firm. PIPs with incomplete information do not significantly influence abnormal returns.

[Insert Table 2.5 about here]

2.5 Discussion

Firms regularly preannounce their price increases because it signals their ability to raise prices (Krishna, Feinberg, and Zhang 2007), provides timely information to customers and investors (Smith 2011) and can also be a valuable competitive market signal (Prabhu and Stewart 2001). Existing research, however, offers neither a theoretical nor an empirical examination of how investors evaluate public announcements of future price increases. This study seeks to fill this void, and has both theoretical and managerial implications.

2.5.1 Theoretical Implications

By presenting a systematic examination of how investors evaluate PIPs, we respond to recent calls for a better understanding of investors' evaluations of firms' pricing actions (Edeling and Fischer 2016, p. 533). Results indicate that, on average, a PIP leads to positive abnormal returns of 0.41%, i.e., an increase of $30.39 million in a firm's market capitalization. This impact of a PIP is comparable to other marketing actions, such as the announcements of internet channel additions (0.71%, £16.38 million, per Geyskens, Gielens, and Dekimpe 2002) and brand licensing (0.33%, $37.52 million, per Robinson, Tuli, and Kohli 2015).

Interestingly, there is significant variation in investors' evaluations of a PIP with 42% of the PIPs resulting in negative abnormal returns. In fact, in our sample, investors' responses to PIPs range from a gain of $4.42 billion to a loss of $3.21 billion in market capitalization.[15] Accordingly, we build a conceptual framework to examine investors' evaluations of PIPs. As such, the current study complements extant literature on customers' perceptions of price increases (e.g., Homburg, Hoyer, and Koschate 2005; Homburg, Koschate, and Totzek 2010).

A key contribution of the proposed framework is that it underscores the moderating effects of the three key factors of a PIP, i.e., implementation information, attribution, and precedence. These moderating effects identify boundary conditions for the impact of a PIP on abnormal returns. In this way, the current study advances theory development in this nascent domain. To further illustrate these boundary conditions, we calculate the marginal effects on abnormal returns, and plot them across the actual values of the corresponding hypothesized variables (Figure 2.2a and 2.2b).

[Insert Figure 2.2a and 2.2b about here]

As shown in Figure 2.2a, Panel A, a PIP has a negative effect on abnormal returns as timing increases and this effect increases at a slower rate at larger values of timing. These

[15] We compute the change in market capitalization by multiplying the abnormal returns by the market capitalization of the firm at the close of the day prior to the PIP (for similar practice, see Robinson, Tuli, and Kohli 2015).

results complement recent research that suggests that investors are likely to punish firms that delay the implementation of preannounced marketing actions (e.g., Eilert et al. 2017). Consistent with the widely accepted view that price increases are an effective marketing instrument to increase profits (e.g., Hayes and Singh 2013; Subhedar and Rees 2017), we find that a PIP has a positive effect on abnormal returns as magnitude increases (see Panel B). However, we also find that this effect increases at a slower rate at larger values of magnitude. Taken together, the results suggest that although the positive impact of a PIP on abnormal returns can be strengthened with higher magnitude, there is a limit to raising prices as customers want to pay less not more, and the customer perspective becomes more important in investors' evaluations of PIPs featuring larger price increases.[16]

We also find that a PIP results in greater abnormal returns if it features a demand attribution (see Panel C). In contrast to our hypothesis, we find that citing a cost attribution does not significantly influence the impact of a PIP on abnormal returns.[17] One probable explanation for this result might be that with respect to a firm's costs, investors value the actual financial information more than the information provided in the preannouncement. This explanation coincides with the results for the control variables in Table 2.4, as we observe that the impact of a firm's cost of goods sold, i.e., COGS, on abnormal returns is statistically significant ($p < 0.01$). Taken together, the findings on demand and cost attributions add to the literature on strategic preannouncements (e.g., Calantone and Schatzel 2000; Sorescu, Shankar, and Kushwaha 2007), as they identify when the provision of certain information (in this case, the reasons for the upcoming price increase) is useful or inconsequential.

Figure 2.2b identifies boundary conditions for the observed negative effects of precedence on abnormal returns. Specifically, we find that a PIP results in negative abnormal

[16] We thank an anonymous reviewer for providing this insight.
[17] We do not generate the plot for cost attribution because the hypothesized effect is not significant.

returns as the firm's own precedence of prior PIPs increases, even though this negative effect increases at a slower rate at higher values of own precedence (see Panel A). Similarly, we also find that the negative impact of a PIP on abnormal returns increases as competitive precedence increases; again, the rate of the increase slows down at greater values of competitive precedence (see Panel B). While precedence-related variables have received some attention in the preannouncement literature (e.g., Gao et al. 2015), prior studies on prices increases (e.g., Homburg, Koschate, and Totzek 2010) rarely examine their impacts. By synthesizing both literatures, our findings show how operational decisions can considerably influence the financial consequences of the marketing actions featured in a preannouncement.

2.5.2 Managerial Implications

Results of the current study also provide guidance to managers engaged in making PIPs. To articulate the managerial implications, we follow Fang et al. (2016), and conduct counterfactual analyses to illustrate to managers the economic consequences of preannouncing price increases (we refer to Appendix 2.G for technical details).

[Insert Table 2.6 about here]

Based on the results of our counterfactual analyses, we suggest that managers should be cautious making PIPs with implementation dates too far into the future. Preannouncing a price increase 33 days before its implementation date is likely to result in significantly lower abnormal returns than one with 19 days $(-0.18\%, p < .01)$. That is, a difference of two weeks can result in an average loss of nearly $39 million in market capitalization.

Our counterfactual analyses also illustrate the economic impact of magnitude, as preannouncing a 7.5% price increase results in significantly higher abnormal returns than a 5.5% price increase $(0.85\%, p < .05)$. In light of the concerns related to estranging or losing customers following large price increases (Homburg, Hoyer, and Koschate 2005), a direct implication for managers is that they should not, from an investor's perspective, de facto shy away from implementing bigger price increases as a mere two percentage points increase in magnitude can mean a difference of as much as $183.06 million in market capitalization.

Managers face a choice in providing investors with the underlying reasons for the PIP. Our results suggest that managers should not hesitate from revealing an underlying demand attribution as it can mean a difference of 0.50% in abnormal returns ($p < .05$) or more than $107 million in market capitalization. While customers may be less appreciative of a demand-inspired price increase, our results show that investors value this information.

Finally, we also caution managers about the perils of making too frequent PIPs and/or falling too far behind competition before making a PIP. Specifically, the results of the counterfactual analyses indicate that the abnormal returns following a PIP are likely to be smaller if the given PIP is the second, as opposed to the first PIP for a firm in the last year ($-0.76\%, p < .05$). In other words, even one additional prior PIP can result in a loss amounting to more than $164 million. The counterfactual analyses also outline the benefits of not waiting for competitors to make PIPs, as we find the abnormal returns following PIPs are significantly lower when the given PIP is the second, as opposed to the first, within an industry in the last year ($-0.59\%, p < .01$). Thus, managers should preannounce price increases as early as possible, as being pre-empted by even one competitor's PIP can amount to a loss of almost $130 million in market capitalization.

2.5.3 Limitations and Future Research

Results of the current study should be interpreted in light of its limitations, some of which provide opportunities for future research. First, while the current study examines investors' evaluations of a PIP, future research can complement this study by examining the effect of PIPs on various operational metrics, such as changes in sales revenues following the PIP or changes in the penetration and/or purchase frequency of the products involved in the PIP.

Second, since the focus of this study is on the abnormal returns in the event window surrounding the PIP, the realized long-run value of the preannounced price increase is not perceptible in our findings. Following the PIP, investors' might dynamically alter their evaluations after observing the subsequent reactions of competitors and customers. These reactions might even cause the firm to retract the preannounced price increase. Although we do take into account prior announcements of price retraction in our sensitivity analyses, these announcements may act more like reputation builders for investors. Thus, more research is required to examine the long-run effects of a PIP.

Third, even though event studies are quasi-experiments (Srinivasan and Hanssens 2009), it is important to keep in mind that we use cross-sectional data. As such, readers should be cautious in drawing too strong causal implications from this study. Fourth, as this study focuses on understanding, both theoretically and empirically, investors' evaluations of PIPs, we do not explore investors' evaluations of preannouncements of price decreases or elaborate on firms' motivations for making PIPs. Given that the topic of preannouncements of price changes is not heavily explored in the marketing literature, more research is required to also examine the preannouncements of price decreases and the reasons why some firms preannounce price changes and/or provide information on the specific timing and size of the price increase in the preannouncement while others don't.

Finally, while we examine investors' evaluations of the future cash flows of the firm making the PIP, we did not consider the impact of such PIPs on investors' evaluations of the firm's competitors. In the context of new-product introductions, existing research finds that a firm's preannouncements can have a significant effect on the abnormal returns of its competitors (Fosfuri and Giarratana 2009). Thus, an interesting extension of this study would be to examine whether this also holds in the context of PIPs.

Table 2.1
Conceptual Framework for Developing Hypotheses

		Customer	Economic	Competitive	Net Effect on Investors' Evaluations of the PIP
Implementation Information					
H1	Timing	+	–	–	–
H2	Magnitude	–	+	+/–	?
Attribution					
H2	Demand Attribution	–	+	+	+
H4	Cost Attribution	+	–	–	–
Precedence					
H5	Own Precedence	–	–	–	–
H6	Competitive Precedence	+	–	–	–

Notes. PIP = Price-Increase Preannouncement. Consistent with Geyskens, Gielens, and Dekimpe (2002), a "+" signifies that we expect the hypothesized variable in question to have a favourable effect on the firm's expected future cash flows (and hence investors' evaluations of the PIP) , a "–" signifies a negative effect, a "+/ –" signifies that there are good arguments for both a positive and a negative effect, and a "?" signifies that we do not advance any a priori hypothesis on the net effect.

Table 2.2
Control Variables, Measures, and Data Sources

Variable	Measure	Source	Prior Support
Spokesperson	Equals 1 if the PIP is made by members of the top management team or the chief executive officer; 0 otherwise.	FACTIVA	Sorescu, Shankar, and Kushwaha (2007)
Reputation	Equals 1 for firms that were on the list of Fortune magazine's Most Admired Company; 0 otherwise.	Fortune Magazine Most Admired Company	Mishra and Modi (2016)
Corporate Branding	Equals 1 if the firm predominantly uses its corporate name on its products and/or services; 0 otherwise.	SEC; Company Webpage	Rao, Agarwal, and Dahlhoff (2004)
Cash Flows	Net cash flows from operating activities of the firm (DT: OANCF) scaled by its total assets (DT: AT).	COMPUSTAT	Vomberg, Homburg, and Bornemann (2015)
Leverage	Ratio of the firm's total long-term debt (DT: DLTT) to its market capitalization, where market capitalization is the product of the stock price (DT: PRCC) and the total number of outstanding shares (DT: CSHO).	COMPUSTAT	Grewal, Chandrashekaran, and Citrin (2010)
Liquidity	Ratio of the current assets (DT: ACT) to the current liabilities (DT: LCT).	COMPUSTAT	Luo, Homburg, and Wieseke (2010)
Firm Size	The natural logarithm of a firm's total revenues (DT: REVT).	COMPUSTAT	Robinson, Tuli, and Kohli (2015)
COGS	Ratio of the firm's cost of goods sold expenses (DT: COGS) to the firm's total revenues (DT: REVT).	COMPUSTAT	Mittal et al. (2005)
Industry Concentration	Hirschman–Herfindahl index (HHI) within the firm's six-digit NAICS (DT: REVT).	COMPUSTAT	Fang, Palmatier, and Grewal (2011)
Industry Growth	Average of the three year-over-year revenue growth in an industry, where the year-over-year revenue growth is the percentage change in the sum of the revenues of the firms within the same six-digit NAICS code at the end of the current fiscal year from the end of the preceding fiscal year (DT: REVT).	COMPUSTAT	Bahadir, Bharadwaj, and Srivastava (2008)
Industry Turbulence	Standard deviation of the sum of the revenues of the firms in the same six-digit NAICS code across the prior four years divided by the mean value of the sum of the total revenues of the firms within the same six-digit NAICS code for those four years (DT: REVT).	COMPUSTAT	Fang, Palmatier, and Steenkamp (2008)
Service Industry	Firms with a six-digit NAICS code beginning with 42-92 are coded as firms in the service industry.	COMPUSTAT	Rust and Huang (2012)
Business-to-Consumer	Equals to 1 if the firm's six-digit NAICS code sells mostly to end-consumers; 0 otherwise.	COMPUSTAT	Kalaignanam and Bahadir (2013)
Exclusion Restrictions for Selection Equation			
Percentage of Institutional Holdings	Percentage of shares outstanding with all reporting institutions for each firm (DT: INSTOWN_PERC).	Thomson Financial Institutional Holdings (13F)	Nagel (2005)
Economic Growth	Percentage change in gross domestic product (based on current dollars) reported in the preceding fiscal quarter.	BEA of the US Department of Commerce	Lee and Grewal (2004)
Year Dummy Variables	Year dummy variables corresponding to the five data years in our sample (i.e., 2010 – 2014)	FACTIVA	Homburg, Vollmayr, and Hahn (2014)

Notes. PIP = Price-Increase Preannouncement; DT = Data Item; SEC = U.S. Securities and Exchange Commission; BEA = Bureau of Economic Analysis; COGS = Cost of Goods Sold; NAICS = North American Industry Classification System. All variables in this table are measured using the financial information from the annual report released in the closest financial year preceding the PIP. In line with prior research, we replace the missing values of the following variables with zero: long-term debt (e.g., Robinson, Tuli, and Kohli 2015) and percentage of institutional holdings (e .g., Nagel 2005).

Table 2.3
Abnormal Returns, N = 265

Day	Average AR (in %)	Number of PIPs with Positive (Negative) AR		% of PIPs with Positive (Negative) AR		CSectErr (t)	*p*-value	Rank Test (Z)	*p*-value	Jackknife (Z)	*p*-value
-5	-0.01	126	(139)	48	(52)	-0.08	0.47	-0.24	0.40	-0.78	0.22
-4	0.07	132	(133)	50	(50)	0.68	0.25	0.17	0.43	-0.43	0.33
-3	0.04	129	(136)	49	(51)	0.47	0.32	0.10	0.46	-0.36	0.36
-2	-0.16	111	(154)	42	(58)	-1.40	0.08	-2.09	0.02	-1.98	0.02
-1	-0.03	136	(129)	51	(49)	-0.27	0.39	0.85	0.20	0.58	0.28
0	0.16	148	(117)	56	(44)	1.49	0.07	2.28	0.01	2.12	0.02
1	0.25	148	(117)	56	(44)	2.67	0.00	2.04	0.02	1.87	0.03
2	0.00	129	(136)	49	(51)	-0.01	0.50	0.24	0.40	0.30	0.38
3	0.03	131	(134)	49	(51)	0.30	0.38	0.42	0.34	-0.04	0.48
4	-0.02	128	(137)	48	(52)	-0.26	0.40	0.19	0.42	0.01	0.50
5	-0.02	130	(135)	49	(51)	-0.26	0.40	-0.34	0.37	-1.38	0.08

Notes. PIP = Price-Increase Preannouncement; N = Number of observations pertaining to the outcome equation; AR = Abnormal returns; CSectErr (t) = Cross-Sectional Error t-statistic. The *p*-values are two-sided. Consistent with existing studies (e.g., Robinson, Tuli, and Kohli 2015), in determining the significance of the abnormal returns, we use a parametric test – the Cross-Sectional Error t-test (Brown and Warner 1985) – and two nonparametric tests – the Rank test (Corrado 1989) and the Jackknife test (Giaccotto and Sfiridis 1996).

Table 2.4
Factors Predicting Abnormal Returns

HP	*Outcome Model*	Coeff	SE
– H1	Timing	-0.34	0.12†††
? H2	Magnitude	3.16	1.30**
+ H3	Demand Attribution	0.50	0.25††
– H4	Cost Attribution	-0.02	0.24
– H5	Own Precedence	-0.34	0.17††
– H6	Competitive Precedence	-0.43	0.19††
	Firm-Level Controls		
	Spokesperson	-0.30	0.22
	Reputation	0.01	0.42
	Corporate Branding	-0.38	0.34
	Cash Flows	7.31	3.52**
	Leverage	0.67	0.43
	Liquidity	-0.13	0.14
	Firm Size	-0.24	0.18
	COGS	4.16	1.38***
	Industry-Level Controls		
	Industry Concentration	-0.82	1.17
	Industry Growth	1.63	1.92
	Industry Turbulence	0.84	1.99
	Service Industry	-0.58	0.49
	Business-to-Consumer	-0.15	0.46
	Copula Correction Terms[a]		
	Copula Correction Term for Magnitude	-1.67	0.77**
	Copula Correction Term for Competitive Precedence	0.53	0.20***
	Constant	-5.07	2.74*
	Selection Model	**Coeff**	**SE**
	Firm-Level Controls		
	Reputation	0.20	0.26
	Corporate Branding	0.15	0.23
	Cash Flows	0.28	1.04
	Leverage	0.06	0.09
	Liquidity	-0.01	0.08
	Firm Size	0.41	0.09***
	COGS	0.03	0.01**
	Industry-Level Controls		
	Industry Concentration	0.25	0.59
	Industry Growth	0.48	1.04
	Industry Turbulence	1.95	1.24
	Service Industry	-0.45	0.36
	Business-to-Consumer	-0.69	0.30**
	Exclusion Restrictions		
	Percentage of Institutional Holdings	0.76	0.27***
	Economic Growth	0.05	0.03
	Year Dummy 1: 2011	-0.13	0.12
	Year Dummy 2: 2012	-0.72	0.17***
	Year Dummy 3: 2013	-0.85	0.21***
	Year Dummy 4: 2014	-0.47	0.17***
	Constant	-4.50	0.71***
	ρ	-0.33	0.18*
	Wald Chi-Square (df)	134.74 (21)	
	Maximum VIF		4.56
	R^2		0.13

Notes. † p < .10; †† p < .05; ††† p < .01 (one-sided); * p < 0.10; ** p <0 .05; *** p < 0.01 (two-sided); [a] We do not include the copula correction terms for Timing and Own Precedence in the final model as they were not statistically significant when we included them in our preliminary (one variable at a time) endogeneity testing (i.e., p = 0.25 and p = 0.89 respectively); COGS = Cost of Goods Sold; HP = Hypothesis and its expected sign; Coeff = Coefficient; SE = Standard Error; df = Degrees of Freedom; Maximum VIF = Highest variance inflation factor of the outcome equation; R^2 = R-squared value of the outcome equation. There are 265 (2,463) observations pertaining to the outcome (selection) equation. We Winsorize all continuous variables at the 1st and 99th percentile levels. We allow the error terms within a given six-digit North American Industry Classification System to be correlated with each other.

Table 2.5
Sensitivity Analyses

		Alternative Dependent Variables				Dropping Outlying Residuals ± 1 percentile	Alternative Standard Errors			Alternative Industry Classification: Using 5-Digit NAICS	Heckman Two-Step Estimation	Reputation Concerning Past PIPs		Alternative Measures		Alternative Specification of the Selection Model
							Clustering									
HP	Focal Model Results	Fama and French (1993)	Market Model	Equally-Weighted Model	CAR^{OB}		Firm-Level	Industry- and Year-Level	Robust Standard Errors			Dropping PIPs	Indicator Variable[1]	2-Year Time Window[2]	CSR	
– **H1** Timing	–	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
? **H2** Magnitude	+	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
+ **H3** Demand Attribution	+	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
– **H4** Cost Attribution	–															
– **H5** Own Precedence	–	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
– **H6** Competitive Precedence	–	√	√	√	√	√	(√)[a]	√	(√)[a]	√	√	√	√	√	√	(√)[a]

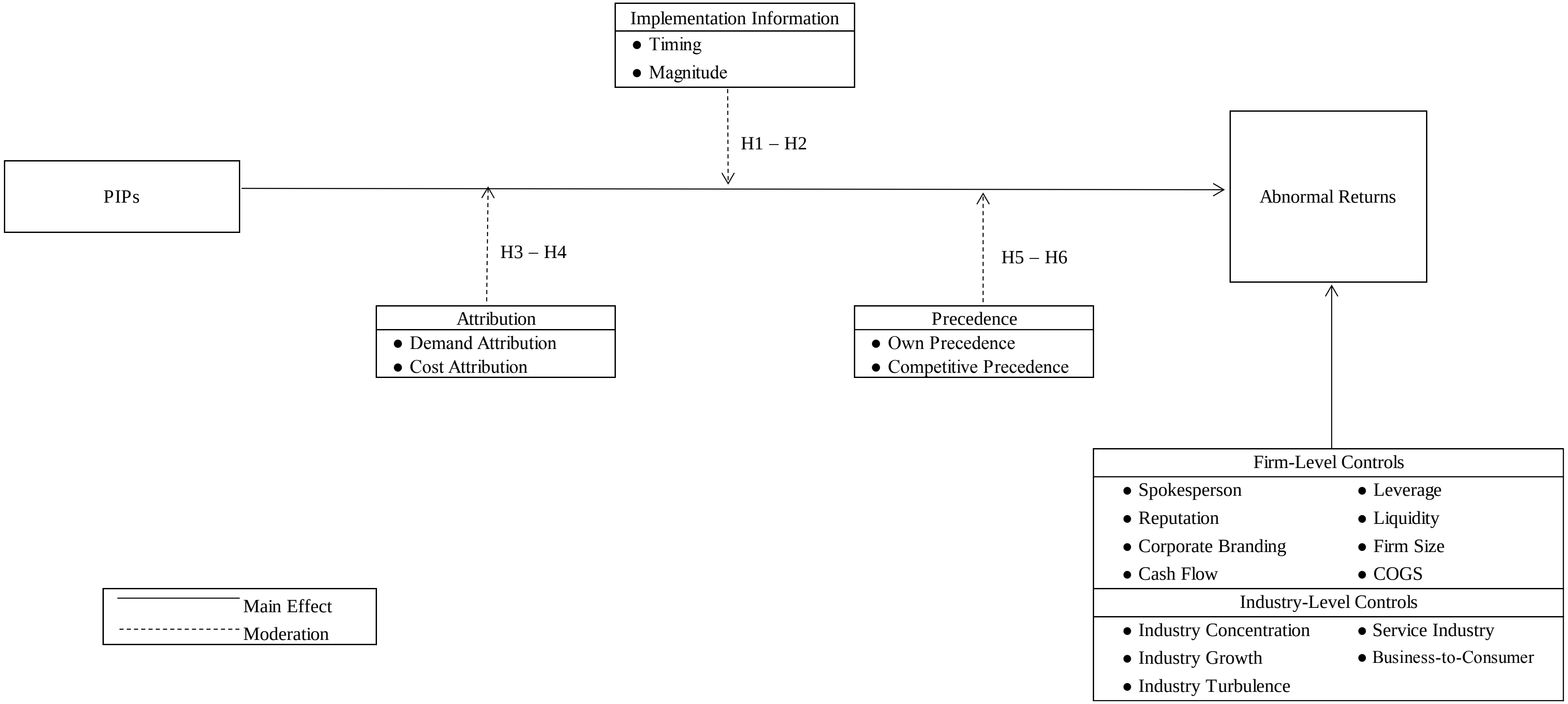
Notes. [1] = The indicator variable is not statistically significant in the model; [2] = Using a 2-year time window to measure Own Precedence and Competitive Precedence; HP = Hypothesis and its expected sign; CAR^{OB} = Cumulative abnormal returns on the value of the operating business; NAICS = North American Industry Classification System; PIP = Price-Increase Preannouncement; CSR = Using Corporate Social Responsibility to proxy for firm Reputation; √ = The findings from the focal estimation are replicated; (√)[a] = Although the estimated coefficient for this effect is in the expected direction, its *p*-value failed to reach significance ($p > 0.10$, one-tailed).

Table 2.6
Results of the Counterfactual Analyses

	Counterfactual Conditions	Difference in Predicted Abnormal Returns (in %)	Dollar Value of the Difference in Predicted Abnormal Returns (in Millions of Dollars)
Implementation Information			
Timing	Preannouncing a price increase 33 days (versus 19 days) ahead of its implementation	-0.18***	-$38.68
Magnitude	Preannouncing a 7.5% (versus 5.5%) price increase	0.85**	$183.06
Attribution			
Demand Attribution	Preannouncing a price increase with (versus without) a demand attribution	0.50**	$107.33
Precedence			
Own Precedence	Preannouncing a price increase when the PIP is the second (versus first) for the firm in the last one year	-0.76**	-$164.28
Competitive Precedence	Preannouncing a price increase when the PIP is the second (versus first) within an industry in the last one year	-0.59***	-$128.38

Notes. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-sided). Note that we do not compute the counterfactuals for cost attribution because the hypothesized effect is not significant. The technical details of the counterfactual analyses are presented in Appendix 2.G.

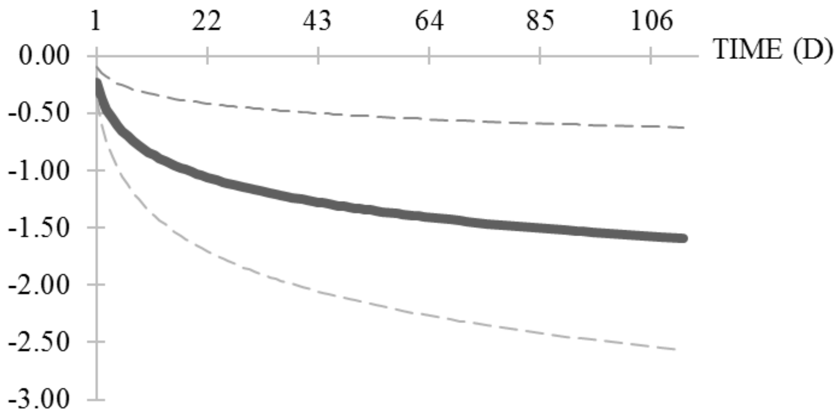
Figure 2.1
Conceptual Model



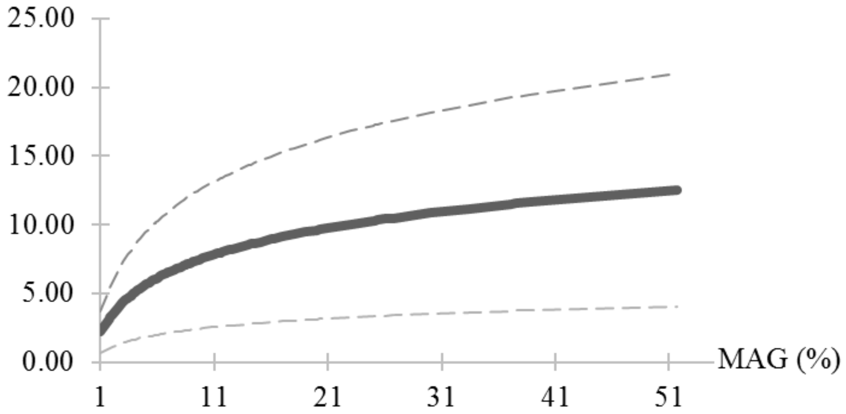
Notes. PIP = Price-Increase Preannouncement; COGS = Cost of Goods Sold.

Figure 2.2a
Marginal Effect of Implementation Information and Attribution on Abnormal Returns Across Actual Values of the Corresponding Hypothesized Variables

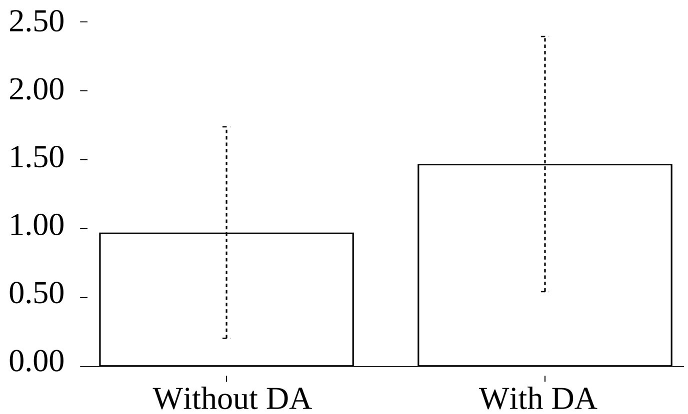
A: Timing



B: Magnitude



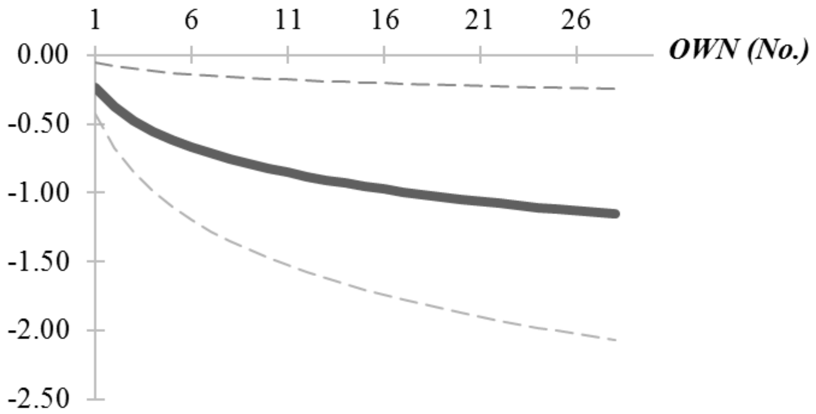
C: Demand Attribution



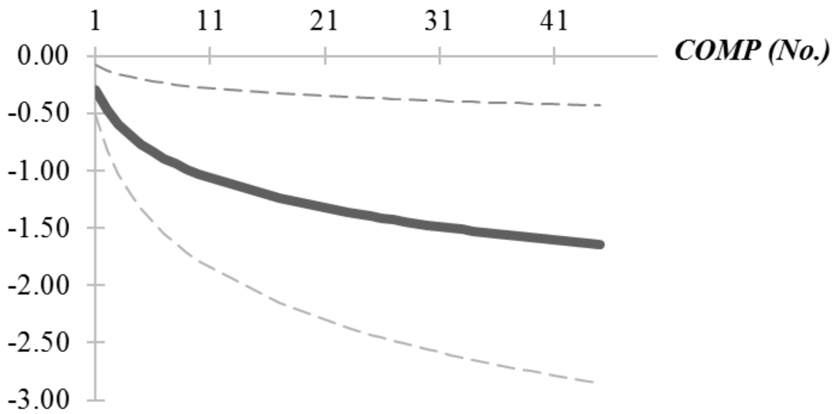
Notes. TIME (D) = Actual values of Timing in number of days; MAG (%) = Actual values of Magnitude in percentages; DA = Demand Attribution. The horizontal axis of every graph represents the different values of the corresponding hypothesized variable across the data range in our sample. The dashed lines indicate the 90% confidence interval bands. The vertical axis of every graph represents the marginal effects of the hypothesized variable on abnormal returns across changes in its corresponding values. Note that we do not generate the plot for cost attribution because the hypothesized effect is not significant.

Figure 2.2b
Marginal Effect of Precedence on Abnormal Returns Across Actual Values of the Corresponding Hypothesized Variables

A: Own Precedence



B: Competitive Precedence



Notes. OWN (No.) = Actual values of Own Precedence in number of previous price-increase preannouncements + 1; COMP (No.) = Actual values of Competitive Precedence in number of price-increase preannouncements from competitors + 1. The horizontal axis of every graph represents the different values of the corresponding hypothesized variable across the data range in our sample. The dashed lines indicate the 90% confidence interval bands. The vertical axis of every graph represents the marginal effects of the hypothesized variable on abnormal returns across changes in its corresponding values.

Appendix 2

Appendix 2.A: PIPs that were Excluded Due to Confounding Events

Table 2.A1: PIPs that were Excluded Due to Confounding Events

Company	Date of PIP	PIP Headline	News Source	Reason for Exclusion
Albemarle Corp.	March 01, 2010	Albemarle to Increase Price of Elemental Bromine and Hydrobromic Acid	PR Newswire	Proximity to Other PIPs
Albemarle Corp.	March 02, 2010	Albemarle to Increase Price of SAYTEX(R) CP-2000 Brominated Flame Retardant	PR Newswire	Proximity to Other PIPs
Albemarle Corp.	March 25, 2010	Albemarle to Increase Price of ETHANOX(R) Antioxidants for Fuel and Lubricant Market Segments	PR Newswire	Proximity to Other PIPs
Albemarle Corp.	March 26, 2010	Albemarle to Increase Price of MARTINAL Flame Retardant	PR Newswire	Proximity to Other PIPs
Celanese Corp.	March 29, 2010	Celanese Announces Price Increases for Ticona POM and PBT Products in North and South America	Business Wire	Proximity to Other PIPs
Celanese Corp.	March 30, 2010	Celanese Announces Emulsions Price Increases in Asia	Business Wire	Proximity to Other PIPs
Celanese Corp.	March 31, 2010	Celanese Announces Emulsions Price Increases in Europe, North Africa and the Middle East	Business Wire	Proximity to Other PIPs
Carpenter Technology Corp.	October 12, 2010	Carpenter Technology Raises Prices on Stainless and Specialty Alloys in All Product Forms	Business Wire	Proximity to Other PIPs
Carpenter Technology Corp.	October 13, 2010	Talley Metals Raises Prices on All Stainless Products	Business Wire	Proximity to Other PIPs
Albemarle Corp.	November 15, 2010	Albemarle to Increase Prices of Saytex® Brominated Flame Retardants	PR Newswire	Proximity to Other PIPs
Albemarle Corp.	November 16, 2010	Albemarle to Increase Price of MARTINAL® Fine Precipitated Aluminium Trihydrate Flame Retardants	PR Newswire	Proximity to Other PIPs
Albemarle Corp.	November 17, 2010	Albemarle to Increase Prices of SAYTEX® BT-93W and BT-93 Brominated Flame Retardants	PR Newswire	Proximity to Other PIPs
Costco Wholesale Corp.	October 06, 2011	Costco to Raise Membership Fees To Offset Tighter Operating Margin	The Wall Street Journal	Proximity to Earnings Announcement
Sonoco Products Co.	February 14, 2014	Sonoco Protective Solutions Announces Price Increase	PR Newswire	Proximity to Earnings Announcement
Allegheny Technologies Inc.	April 10, 2014	ATI increasing stainless, alloy base prices	American Metal Market	Proximity to Other PIPs
Allegheny Technologies Inc.	April 11, 2014	ATI increasing stainless, alloy base prices	American Metal Market	Proximity to Other PIPs

Notes. PIP = Price-Increase Preannouncement.

Appendix 2.B: Distribution of PIPs by Year and Industry

Table 2.B1: Distribution of PIPs by Year

Year	Number of PIPs	%	Average Abnormal Returns (in %)
2010	77	29.06	0.92
2011	67	25.28	0.13
2012	38	14.34	0.09
2013	32	12.08	0.55
2014	51	19.25	0.14
Total	265	100.00	0.41

Notes. PIP = Price-Increase Preannouncement.

Table 2.B2: Distribution of PIPs and Abnormal Returns by Industry

Industry (Six-Digit NAICS)	Number of PIPs	%	Average Abnormal Returns (in %)
Andalusite mining and/or beneficiating (212325)	1	0.38	0.27
Breakfast cereals manufacturing (311230)	2	0.75	-0.48
Fruit and vegetable canning, pickling, and drying (31142)	1	0.38	0.26
Cheese curls and puffs manufacturing (311919)	1	0.38	0.29
Coffee concentrates (i.e., instant coffee) manufacturing (311920)	4	1.51	1.54
Artichokes, canned, manufacturing (311421)	3	1.13	0.43
Artificially carbonated waters manufacturing (312111)	4	1.51	0.68
Chewing tobacco manufacturing (312230)	1	0.38	-1.38
Bobbins, fiber, made from purchased paperboard (322219)	13	4.91	-0.12
Bar soaps manufacturing (325611)	1	0.38	-0.57
Adrenal medicinal preparations manufacturing (325412)	1	0.38	-1.80
Architectural coatings (i.e., paint) manufacturing (325510)	4	1.51	-1.06
Alkalies manufacturing (325180)	1	0.38	4.73
Basic chemical manufacturing (3251)	6	2.26	0.30
Accelerators (i.e., basic synthetic chemical) manufacturing (325199)	12	4.53	1.28
Activated carbon or charcoal manufacturing (325998)	19	7.17	-0.18
Acetal resins manufacturing (325211)	2	0.75	0.82
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing (3252)	1	0.38	0.59
Adhesives (except asphalt, dental, gypsum base) manufacturing (325520)	1	0.38	2.38
Ant poisons manufacturing (325320)	3	1.13	1.27
Acetylene manufacturing (325120)	26	9.81	0.32
Aircraft tire manufacturing (326211)	4	1.51	3.87
Plastics product manufacturing (3261)	1	0.38	4.42
Film, plastics, packaging, manufacturing (326112)	3	1.13	0.70
Acrylic film and unlaminated sheet (except packaging) manufacturing (326113)	1	0.38	0.78
Antimony refining, primary (331410)	6	2.26	2.46
Armor plate made in iron and steel mills (331110)	38	14.34	0.55
Annular ball bearings manufacturing (332991)	1	0.38	-0.43
Aftercoolers (i.e., heat exchangers) manufacturing (332410)	1	0.38	0.52

Table 2.B2: (Continued)

Industry (Six-Digit NAICS)	**Number of PIPs**	**%**	**Average Abnormal Returns (in %)**
Adding machines manufacturing (333318)	1	0.38	10.83
Bale throwers manufacturing (333111)	6	2.26	0.17
Aggregate spreaders manufacturing (333120)	3	1.13	-1.65
Diesel and semidiesel engines manufacturing (333618)	3	1.13	-1.08
Air-conditioners, unit (e.g., motor home, travel trailer, window), manufacturing (333415)	8	3.02	-0.41
Electrical equipment, appliance, and component manufacturing (335)	2	0.75	0.08
Brush blocks, carbon or molded graphite, manufacturing (335991)	1	0.38	-11.41
Aircraft engine and engine parts (except carburetors, pistons, piston rings, valves) manufacturing (336412)	2	0.75	0.45
Air bag assemblies manufacturing (336390)	4	1.51	2.49
Aircraft seats manufacturing (336360)	13	4.91	0.31
Beds, sleep-system ensembles (i.e., flotation, adjustable), manufacturing (337910)	1	0.38	3.17
Bakery machinery and equipment merchant wholesalers (423830)	7	2.64	-0.18
Audio and video content downloading retail sales sites (454111)	1	0.38	2.59
Air commuter carriers, scheduled (481111)	4	1.51	2.48
Barge transportation, coastal or Great Lakes (including St. Lawrence Seaway) (483113)	1	0.38	0.08
General freight trucking, long-distance, less-than-truckload (LTL) (484122)	1	0.38	1.71
Air courier services (except establishments operating under a universal service obligation) (492110)	12	4.53	-0.02
Applications software, computer, packaged (511210)	2	0.75	-0.93
Cable broadcasting networks (515210)	20	7.55	0.44
Broadcasting networks, television (515120)	1	0.38	0.53
Cable program distribution operators (517110)	1	0.38	-2.23
Beeper (i.e., radio pager) communication carriers (517210)	2	0.75	0.10
Advertising periodical publishers, exclusively on Internet (519130)	1	0.38	-2.18
Ash collection services (562111)	1	0.38	0.07
Carryout restaurants (722513)	5	1.89	-1.90
Total	265	100.00	0.41

Notes. PIP = Price-Increase Preannouncement; NAICS = North American Industry Classification System.

Appendix 2.C: Examples of the Measurements of Timing, Magnitude, Demand and Cost Attribution

Table 2.C1: Examples of the Measurements of Timing and Magnitude

Company	Date of PIP	PIP Headline	News Source	Timing and Magnitude (of the preannounced price increase) Cited from Excerpts of PIPs	Timing (Days)	Magnitude (%)
Starbucks Corp.	May 25, 2011	Starbucks to Raise Packaged Coffee Price by 17 Percent	Reuters	*"The world's biggest coffee shop chain Starbucks Corp will boost the cost of its packaged coffee for the second time since March, but this time it will take place in its own U.S. stores and by a steep* ***17 percent****…The price increase, effective* ***July 12****…"*	48	17.00
Airgas Inc.	October 1, 2014	Airgas to Increase Argon Prices	Business Wire	*" Airgas, Inc. (NYSE: ARG), one of the nation's leading suppliers of industrial, medical, and specialty gases, and related products, today announced that its operating units will increase prices on argon by up to* ***15%****, effective* ***November 1*** *or as contracts permit. Price adjustments may vary based on specific market conditions or contractual provisions."*	31	15.00

Notes. PIP = Price-Increase Preannouncement.

Table 2.C2: Examples of the Measurements of Demand and Cost Attribution

Company	Date of PIP	PIP Headline	News Source	Reasons Cited (of the preannounced price increase) Cited from Excerpts of PIPs that Reflects a ***Demand Attribution***
Tempur-Sealy International, Inc.	February 3, 2010	Tempur-Pedic Raises Prices On New Cloud Mattress Line	Dow Jones News Service	*"Tempur-Pedic International Inc. (TPX) is raising prices on its new Cloud line of mattresses* ***amid strong sales****. "****Customer response at retail has been so positive*** *that retailers were urging the company to raise the list price,"…"*
AT&T Inc.	January 19, 2012	AT&T Hikes Rates on Smartphone Plans	CNN Money	*"AT&T said it raised rates as customers' data usage continues to grow by an astounding 40% per year. "Our new plans are driven by this* ***increasing demand*** *in a highly competitive environment," David Christopher, AT&T Mobility's chief marketing officer, said in a prepared statement."*
Company	**Date of PIP**	**PIP Headline**	**News Source**	**Reasons Cited (of the preannounced price increase) Cited from Excerpts of PIPs that Reflects a *Cost Attribution***
Smucker J M Co.	February 8, 2011	The J. M. Smucker Company Announces Coffee Price Increases	The J.M. Smucker Company Corporate & Financial News Release	*"The increase in price is driven by* ***sustained increases in green coffee costs****."*
Lydall Inc.	October 3, 2014	Lydall Performance Materials Announces a Price Increase	Globe Newswire	*"…announced a general price increase...This adjustment is necessary as a result of* ***industry-wide increases in the costs*** *of fibers, resins, energy, and freight.."*

Notes. PIP = Price-Increase Preannouncement.

Appendix 2.D: Data for Selection Model

Data for Selection Model

The sample to estimate the likelihood of a firm doing a price-increase preannouncement (PIP) involves both the 78 firms appearing in the outcome analysis along with their competitors that did not preannounce a price increase in the same year. We identify competing firms as all publicly-listed firms in the primary six-digit North American Industry Classification System (NAICS) code of the 78 focal firms for each year *T* in which a PIP took place in our sample. This yielded a total of 1,320 firms (including the 78 focal firms in the dataset for the outcome model) across 54 six-digit NAICS codes. Restricting firms to the same NAICS code enables us to control for the effects of industry factors likely to influence the decision to preannounce a price increase. However, data for several variables in the selection model were only available for 2,463 observations from 619 unique firms. These 2,463 observations were used to estimate the selection model.

Appendix 2.E: Descriptive Statistics and Correlation Matrix

Table 2.E1: Descriptive Statistics and Correlation Matrix

		Correlation Matrix																		
	Outcome Equation	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*
1	Timing (D)	1.00																		
2	Magnitude (%)	-0.02	1.00																	
3	Demand Attribution	**-0.14**	**0.14**	1.00																
4	Cost Attribution	0.03	**0.15**	0.08	1.00															
5	Own Precedence (No.)	0.04	**0.14**	0.00	**-0.16**	1.00														
6	Competitive Precedence (No.)	**-0.15**	-0.06	**0.29**	**-0.19**	**0.11**	1.00													
7	Spokesperson	-0.07	-0.01	**0.30**	**0.20**	-0.08	0.03	1.00												
8	Reputation	0.00	**-0.16**	**-0.17**	-0.01	**-0.22**	**-0.38**	0.02	1.00											
9	Corporate Branding	**-0.19**	0.02	**0.17**	-0.09	-0.06	**0.31**	**0.18**	0.04	1.00										
10	Cash Flows	0.09	0.06	-0.03	0.09	**-0.29**	**-0.21**	-0.04	**0.21**	0.08	1.00									
11	Leverage	-0.03	-0.03	-0.06	0.03	0.03	**0.14**	-0.09	-0.08	-0.05	**-0.30**	1.00								
12	Liquidity	0.00	-0.05	**0.13**	**-0.11**	0.10	**0.32**	**0.14**	**-0.39**	0.10	**-0.11**	-0.08	1.00							
13	Firm Size (No.)	0.04	-0.03	**-0.15**	-0.10	0.02	**-0.19**	**-0.28**	**0.63**	-0.05	**0.22**	-0.01	**-0.65**	1.00						
14	COGS	0.05	**-0.24**	**-0.15**	**-0.23**	**0.30**	**0.20**	-0.04	**-0.13**	**0.25**	**-0.44**	0.04	**0.37**	**-0.22**	1.00					
15	Industry Concentration	0.00	**-0.11**	-0.05	**0.21**	**-0.15**	**-0.42**	0.08	**0.21**	**-0.16**	-0.06	**-0.18**	**-0.14**	**0.13**	0.10	1.00				
16	Industry Growth	-0.07	-0.04	0.03	**0.13**	**-0.12**	0.07	**0.22**	-0.01	0.07	**-0.10**	0.10	0.01	0.01	-0.04	-0.02	1.00			
17	Industry Turbulence	-0.02	-0.10	0.02	-0.03	-0.09	**0.19**	**0.14**	**-0.29**	-0.02	**-0.23**	-0.05	**0.34**	**-0.45**	**0.17**	**-0.10**	**0.44**	1.00		
18	Service Industry	-0.08	0.08	0.04	-0.01	**-0.32**	-0.08	-0.03	**0.40**	**0.17**	**0.35**	**0.18**	**-0.29**	**0.38**	**-0.29**	**-0.35**	0.09	**-0.16**	1.00	
19	Business-to-Consumer	0.02	-0.02	**-0.11**	**0.21**	**-0.41**	**-0.36**	**0.23**	**0.48**	0.05	**0.36**	0.07	**-0.27**	**0.22**	**-0.37**	-0.08	**0.15**	**-0.10**	**0.57**	1.00
Mean		3.08	2.13	0.28	0.48	1.07	1.07	0.28	0.37	0.31	0.10	0.40	2.03	8.66	0.70	0.32	0.04	0.15	0.22	0.46
Standard Deviation		0.85	0.60	0.45	0.50	0.90	1.29	0.45	0.48	0.46	0.06	0.57	1.32	1.43	0.15	0.19	0.08	0.08	0.42	0.50

Table 2.E1: (Continued)

		Correlation Matrix																	
	Selection Equation	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*
1	Reputation	1.00																	
2	Corporate Branding	**-0.12**	1.00																
3	Cash Flows	**0.11**	-0.01	1															
4	Leverage	**0.04**	0.02	0.01	1.00														
5	Liquidity	**-0.18**	-0.02	**-0.10**	**-0.20**	1.00													
6	Firm Size (No.)	**0.52**	**-0.15**	**0.55**	**0.18**	**-0.38**	1.00												
7	COGS	**-0.04**	**-0.04**	**-0.36**	-0.02	**0.12**	**-0.36**	1.00											
8	Industry Concentration	**0.19**	**-0.14**	**0.14**	-0.01	**-0.14**	**0.31**	**-0.08**	1.00										
9	Industry Growth	**-0.06**	**0.04**	**0.05**	**-0.14**	0.02	**-0.05**	-0.03	**0.07**	1.00									
10	Industry Turbulence	**-0.11**	0.01	**0.06**	**-0.14**	0.02	-0.01	**-0.06**	**0.19**	**0.56**	1.00								
11	Service Industry	0.00	**0.23**	**0.19**	**0.13**	**-0.19**	-0.02	**-0.11**	**-0.27**	**0.24**	0.02	1.00							
12	Business-to-Consumer	**0.07**	**0.05**	**-0.04**	0.00	-0.03	**-0.20**	**0.04**	**-0.35**	**0.16**	**-0.21**	**0.49**	1.00						
13	Institutional Holdings (%)	**0.09**	-0.03	**0.30**	-0.03	**-0.05**	**0.34**	**-0.12**	**0.10**	-0.03	-0.03	**-0.05**	**-0.14**	1.00					
14	Economic Growth	**0.03**	-0.02	-0.01	0.02	-0.02	0.02	0.00	**0.07**	0.00	**-0.05**	-0.03	**-0.05**	0.03	1.00				
15	Year Dummy 1: 2011	-0.01	-0.02	0.02	**-0.04**	0.00	-0.02	0.01	0.01	**-0.17**	**-0.06**	-0.02	-0.01	-0.01	**-0.36**	1.00			
16	Year Dummy 2: 2012	0.01	0.00	-0.01	0.02	0.00	0.00	0.01	0.01	-0.03	**-0.08**	-0.01	0.01	0.01	**0.47**	**-0.25**	1.00		
17	Year Dummy 3: 2013	0.01	0.01	0.01	0.02	0.01	0.01	-0.01	0.00	**0.27**	0.02	0.01	0.01	**0.03**	**0.26**	**-0.25**	**-0.24**	1.00	
18	Year Dummy 4: 2014	-0.01	0.00	-0.01	**-0.05**	0.00	**0.05**	-0.03	0.02	**0.13**	**0.08**	0.02	0.00	-0.01	**-0.39**	**-0.26**	**-0.25**	**-0.25**	1.00
Mean		0.12	0.42	0.05	0.36	2.66	6.50	1.50	0.21	0.06	0.14	0.51	0.80	0.60	2.76	0.21	0.19	0.19	0.20
Standard Deviation		0.33	0.49	0.22	0.79	2.35	2.25	9.17	0.17	0.08	0.08	0.50	0.40	0.31	1.94	0.40	0.39	0.40	0.40

Notes. D = Days; No. = Number; PIP = Price-Increase Preannouncement; COGS = Cost of Goods Sold. There are 265 (2,463) observations pertaining to the outcome (selection) equation. All correlations that are significant at $p < 0.10$ (two-sided) are put in bold. We Winsorize all continuous variables at the 1st and 99th percentile levels. The reported mean, standard deviation and correlations of all continuous variables in this table are before taking the logarithm (if applicable). We report the mean and standard deviation of dummy variables as the proportion of observations where the dummy variable takes the value of 1.

Appendix 2.F: Detailed Results of Sensitivity Analyses and Event Study Results of PIPs with Incomplete Information

Table 2.F1: Detailed Results of Sensitivity Analyses

	Alternative Dependent Variables				Dropping Outlying Residuals ± 1 percentile	Alternative Standard Errors: Clustering		Alternative Standard Errors: Robust Standard Errors	Alternative Industry Classification: Using 5-Digit NAICS	Heckman Two-Step Estimation	Reputation Concerning Past PIPs		Alternative Measures		Alternative Specification of the Selection Model
HP	Fama and French (1993)	Market Model	Equally-Weighted Model	CAR^{OB}		Firm-Level	Industry- and Year-Level				Dropping PIPs	Indicator Variable[1]	2-Year Time Window[2]	CSR	
– **H1** Timing	-0.30†††	-0.34†††	-0.33†††	-0.23††	-0.25††	-0.34†††	-0.34†††	-0.34†††	-0.32†††	-0.34†††	-0.39†††	-0.35†††	-0.31†††	-0.35†††	-0.33††
? **H2** Magnitude	3.27**	3.53***	3.10**	2.25**	2.69**	3.16**	3.16**	3.16***	3.39**	3.09**	3.24**	3.07**	3.18**	3.23**	3.01**
+ **H3** Demand Attribution	0.48††	0.42†	0.57††	0.51†††	0.57†††	0.50††	0.50††	0.50††	0.40†	0.51††	0.57††	0.51††	0.48††	0.47††	0.51††
– **H4** Cost Attribution	0.00	-0.07	-0.11	0.09	0.05	-0.02	-0.02	-0.02	-0.09	-0.03	0.00	-0.02	-0.03	-0.01	0.00
– **H5** Own Precedence	-0.31††	-0.29††	-0.34††	-0.26††	-0.41†††	-0.34††	-0.34††	-0.34††	-0.23†	-0.35††	-0.33††	-0.35††	-0.18†	-0.31††	-0.36††
– **H6** Competitive Precedence	-0.32††	-0.26†	-0.37††	-0.39†††	-0.30††	-0.43	-0.43††	-0.43	-0.35††	-0.44†	-0.28†	-0.42††	-0.31††	-0.46†††	-0.48

Notes. [1] = The indicator variable is not statistically significant in the model; [2] = Using a 2-year time window to measure Own Precedence and Competitive Precedence; HP = Hypothesis and its expected sign; CAR^{OB} = Cumulative abnormal returns on the value of the operating business; NAICS = North American Industry Classification System; PIP = Price-Increase Preannouncement; CSR = Using Corporate Social Responsibility to proxy for firm Reputation; † $p < .10$; †† $p < .05$; ††† $p < .01$ (one-sided); * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-sided); Coeff = Coefficient. In conducting the sensitivity analyses, we apply the same variable transformations and include the same set of control variables and exclusion restrictions as in our focal analysis.

Table 2.F2: Abnormal Returns for PIPs with Incomplete Information, N = 343

Day	Average AR (in %)	Number of PIPs with Positive (Negative) AR	% of PIPs with Positive (Negative) AR	CSectErr (t)	*p*-value	Rank Test (Z)	*p*-value	Jackknife (Z)	*p*-value
-5	-0.19	157 (186)	46 (54)	-2.07	0.02	-0.35	0.36	-0.58	0.28
-4	0.08	158 (185)	46 (54)	0.86	0.20	-0.21	0.42	-0.40	0.35
-3	-0.11	161 (182)	47 (53)	-1.11	0.13	-0.82	0.21	-1.01	0.16
-2	0.13	174 (169)	51 (49)	1.61	0.05	1.16	0.12	1.42	0.08
-1	-0.11	158 (185)	46 (54)	-1.23	0.11	-0.81	0.21	-1.34	0.09
0	-0.11	166 (177)	48 (52)	-1.17	0.12	0.23	0.41	0.44	0.33
1	0.02	171 (172)	50 (50)	0.21	0.42	0.16	0.44	-0.07	0.47
2	-0.04	161 (182)	47 (53)	-0.45	0.32	0.02	0.49	-0.12	0.45
3	0.03	168 (175)	49 (51)	0.32	0.38	0.67	0.25	0.23	0.41
4	-0.03	163 (180)	48 (52)	-0.30	0.38	-0.56	0.29	-1.10	0.14
5	0.17	186 (157)	54 (46)	1.58	0.06	1.19	0.12	-0.08	0.47

Notes. PIP = Price-Increase Preannouncement; N = Number of observations; AR = Abnormal returns; CSectErr (t) = Cross-Sectional Error t-statistic. The *p*-values are two-sided. Consistent with existing studies (e.g., Robinson, Tuli, and Kohli 2015), in determining the significance of the abnormal returns, we use a parametric test – the Cross-Sectional Error t-test (Brown and Warner 1985) – and two nonparametric tests – the Rank test (Corrado 1989) and the Jackknife test (Giaccotto and Sfiridis 1996).

Appendix 2.G: Counterfactual Analyses

Counterfactual Analyses

The specified conditions for the counterfactual analyses are as follows. The conditions specified for Timing compare the predicted abnormal returns following PIPs with greater timing values, i.e., that are 1 week above its median (i.e., 33 days), and those with lower timing values, i.e., that are 1 week below its median (i.e., 19 days). Similarly, the conditions specified for Magnitude compare the predicted abnormal returns following PIPs with higher magnitude values, i.e., that are one percentage point above its median (i.e., 7.5%) and those with lower magnitude values, i.e., that are one percentage point below its median (i.e., 5.5%). On a similar valence, the conditions specified for Own (Competitive) Precedence compare the predicted abnormal returns following PIPs that are the second and the first PIPs made by the firm (within an industry) in a one-year time period, where Own (Competitive) Precedence takes the value of 1 and 0 respectively. Finally, the conditions specified for Demand Attribution compare the predicted abnormal returns following PIPs with and without a demand attribution. We do not compute the counterfactual conditions for Cost Attribution as its hypothesized effect in the focal model is not statistically significant (see Table 2.4).

We conduct the counterfactual analyses by using the estimates of the coefficients from the focal model (Table 2.4) and applying the specified conditions on our outcome sample to derive the predicted abnormal returns. Consistent with our measurement approach, we derive the values for all of the counterfactual conditions by matching the values of interest to the corresponding transformed values that were used to estimate our focal model, i.e., after taking the natural logarithm (if applicable) and Winsorizing to the focal outcome sample. For example, for the counterfactual condition for which a price increase is preannounced 33 days prior to its implementation, we impute the value of the post-transformed timing variable when the pre-transformed timing variable takes the value of 33. Following Fang et al. (2016), we hold all other independent variables at their sample means when conducting these analyses (see also Ghosh and John 2009; Mayer and Nickerson 2005).

We illustrate the steps to derive the counterfactual results using the hypothesized effect of Magnitude. *First*, to compute the predicted abnormal returns following PIPs with 7.5% magnitude, we set magnitude to 7.5% and hold all other variables at their sample means. We repeat the preceding step with the value of magnitude set at 5.5%. *Second*, to compute the dollar values of the predicted abnormal returns, we take the product of the predicted abnormal returns and the average market capitalization in our 265 outcome sample.

All other counterfactual analyses are conducted using the preceding steps. The variables with set values (i.e., in step one) vary according to the specified conditions.

Chapter 3

Customer Satisfaction and Costs of Selling and Producing

3.1 Introduction

At the nucleus of current marketing thinking is the customer (Hanssens et al. 2014); as such, customer satisfaction has become one of the most widely used and extensively studied marketing metric (Fornell, Rust, and Dekimpe 2010; Mittal and Frennea 2010). Whereas an impressive body of work examines the impact of customer satisfaction on firm performance (e.g., Kumar et al. 2011), we know little about its impact on the costs incurred by a firm.[18] This lack of emphases is surprising as costs are a critical concern for the top management. Indeed, over the last three years, reducing costs has been the top most concern for CEOs according to the Annual Global CEO Survey conducted by PricewaterhouseCoopers (see PwC 2014a; 2015; 2016; 2017). Not surprisingly, investors and analysts also keep a close watch on the costs incurred by a firm (see Gupta, Pevzner, and Seethamraju 2010). As such, firms are constantly looking for marketing initiatives that produce the same product-market outcomes at lower costs (e.g., Hanssens, Wang, and Zhang 2016; Katsikeas et al. 2016).

Marketing scholars do recognize that while marketing actions can drive sales, they can also increase costs that might not be reflected in the aggregated profit metrics (see Boulding and Christen 2008; Hanssens et al. 2014). Indeed, the conventional wisdom in accounting even considers marketing efforts as a cost/expense (see Mizik and Nissim 2011). However, recent research suggests that certain marketing initiatives such as customer relationship management could actually lower firm costs (e.g., Krasnikov, Jayachandran, and Kumar 2009). Given the opposing views on the cost implications of marketing efforts, and

[18] Scholars have studied the effect of customer satisfaction on both stock market-based measures (e.g., Fornell, Morgeson, and Hult 2016; Lee et al. 2015) and operational measures of firm performance (e.g., Malshe and Agarwal 2015; Rego, Morgan, and Fornell 2013).

recognizing the importance of customer satisfaction and costs along with the paucity of research examining the relationship between the two, we study the effects of customer satisfaction on the costs incurred by a firm.

Specifically, we draw on the Motivation-Ability-Opportunity (MOA) framework to suggest that while customer satisfaction indicates organizational *ability* to understand customers' requirements, the extent to which this ability is utilized should depend on organizational *motivation* and/or the *opportunity* provided (e.g., Wu, Balasubramanian, and Mahajan 2004; Wuyts, Rindfleisch, and Citrin 2015). We propose that by driving customer retention, customer satisfaction offers both downstream (related to customers) and upstream (related to suppliers) learning benefits that influence *costs of selling* (COS; related to customers) and *costs of producing* (COP; related to suppliers).

COS denote the marketing and sales expenditures associated with products and services offered, while COP assess the manufacturing expenditures for the products and services (Boulding and Christen 2008). COS and COP form the "core expenses" of a firm (see McVay 2006) and together, COS and COP account for almost 85% of the total costs incurred by a firm (see Donelson, Jennings, and McInnis 2011).[19] Given that cost reduction is a top priority for CEOs (e.g., PwC 2017) and that firms often engage in initiatives to improve customer satisfaction (e.g., Keiningham et al. 2014), it becomes important to examine the influence of customer satisfaction on both COS and COP.

Our primary contribution is to develop an understanding of the COS and COP associated with customer satisfaction, which we believe has not received empirical scrutiny. In the process, we respond to recent calls by Katsikeas and colleagues (2016) for marketing scholars to examine the effect of marketing actions on the costs incurred by a firm. To deepen our understanding of the effect of customer satisfaction on COS and COP, we use the MOA

[19] Both COS and COP are viewed as variable costs incurred by a firm (e.g., Kinney and Raiborn 2011). As such, we do not focus on the fixed costs incurred by a firm in this study.

framework to develop a contingency approach. The proposed contingency approach integrates recent research on myopic marketing decisions (e.g., Chakravarty and Grewal 2016), operations research (e.g., Modi and Mishra 2011), and research on industry level factors (e.g., Fang, Palmatier, and Steenkamp 2008).

Consistent with the proposed hypotheses, we find that an increase in customer satisfaction reduces COS and this effect is stronger for firms with lower stock returns or stock returns volatility, or for firms facing lower industry turbulence. We also find that an increase in customer satisfaction increases COS when inventory slack or industry growth increases. Finally, an increase in customer satisfaction decreases COP when stock returns or stock returns volatility decreases, or when inventory slack increases.

3.2 Motivation-Ability-Opportunity Framework

A large body of literature examines the impact of customer satisfaction on both investor sentiment and operational performance. Studies that focus on the investor sentiment examine the effects of customer satisfaction on metrics such as stock returns (e.g., Fornell, Morgeson, and Hult 2016), Tobin's Q (e.g., Grewal, Chandrashekaran, and Citrin 2010), portfolio returns (e.g., Aksoy et al. 2008), and stock returns risk (e.g., Tuli and Bharadwaj 2009). Studies that focus on the operational performance, investigate the effects of customer satisfaction on return on investment (e.g., Anderson, Fornell, and Lehmann 1994), growth and volatility in cash flows (e.g., Gruca and Rego 2005), sales (e.g., Morgan and Rego 2006), financial leverage (e.g., Malshe and Agarwal 2015), and market share (e.g., Rego, Morgan, and Fornell 2013). Missing from this impressive body of research on customer satisfaction is the cost angle and thereby the relationship between customer satisfaction and COS and COP. This lack of emphasis on costs is surprising because existing studies in the service-profit chain literature suggest that disregarding the cost of customer satisfaction may reduce a firm's profitability (e.g., Kamakura et al. 2002; Mittal et al. 2005). Furthermore, both COS and COP are closely watched by the top management of a firm, investors, and financial analysts (e.g., Banker, Huang, and Natarajan 2011).

Against this background, we study the effects of customer satisfaction on COS and COP. We draw on the MOA framework that has been used to study multiple organizational actions (e.g., Wu, Balasubramanian, and Mahajan 2004; Wuyts, Rindfleisch, and Citrin 2015). Briefly, in this framework, *motivation* refers to the willingness of a firm to act, *opportunity* refers to the contextual factors that surround an action, while *ability* refers to organizational skills and knowledge bases that are required to conduct an action (see Wuyts, Rindfleisch, and Citrin 2015). We propose that as customer satisfaction increases, organizational ability to learn about customers and markets increases as well; utilization of this knowledge should reduce COS and COP. Figure 3.1 outlines our conceptual framework.

[Insert Figure 3.1 about here]

3.2.1 Customer Satisfaction and Downstream and Upstream Advantages

Downstream effects. Higher customer satisfaction is likely to result in reductions in a firm's COS through two mechanisms – customer retention and customer acquisition. First, higher customer satisfaction leads to greater customer retention (see Gustafsson, Johnson, and Roos 2005). Greater customer retention, in turn, implies a more stable customer base for the firm. This stability enables a firm to better understand its customers' requirements and hence form long-term relationships with their customers (e.g., Kaufman, Jayachandran, and Rose 2006). Stability of customer relationships and long-term relationships, in turn, are likely to lower the costs of customer retention, thereby lowering the firm's COS (e.g., Kalwani and Narayandas 1995; Patatoukas 2012). Second, having higher customer satisfaction also signals that the firm's products and/or services are of higher quality relative to its competitors (e.g., Daughety and Reinganum 2008a; 2008b). Indeed, increase in customer satisfaction generates positive word-of-mouth (e.g., Luo and Homburg 2007), which reduces the spending required to acquire new customers (e.g., Villanueva, Yoo, and Hanssens 2008) and hence lower the firm's COS. Therefore, we expect:

H1a: The higher the customer satisfaction, the lower the COS.

Upstream effects. Higher customer retention and greater understanding of customer requirements, which emanates from higher customer satisfaction, also translate into lower *demand uncertainty* about the type and quantity of products/services that customers want. Lower demand uncertainty is likely to lower COP for four reasons. First, lower demand uncertainty shortens lead times in production, which, in turn, lower the input costs pertaining to raw materials (see Fisher, Maltz, and Jaworski 1997; Yan, Liu, and Hsu 2003). Second, lower demand uncertainty also translates into lower instances of supply and demand mismatches between a firm and its suppliers. Such mismatches are known to increase costs by almost 11% (see Hendricks and Singhal 2005).

Third, suppliers covet stable relationships with firms that have lower demand uncertainty because such firms can lower the supplier's demand risk (see for example, Irvine, Park, and Yıldızhan 2016). In return for lowering uncertainty, suppliers are likely to offer more favorable input prices thus lowering the COP (e.g., Boulding and Christen 2008; Cachon 2003). Fourth, stable relationships between the firm and supplier lower the coordination costs of managing production for the firm as both parties have more knowledge about each other's operations (see Anderson and Dekker 2009; Cannon and Homburg 2001). Taken together, we suggest:

H1b: The higher the customer satisfaction, the lower the COP.

Higher customer satisfaction indicates organizational ability to understand customers and therefore reduce COS and COP. However, these effects are more likely to be realized if the firm is motivated and has the opportunity to utilize this ability (see Morgan, Anderson, and Mittal 2005; Wuyts, Rindfleisch, and Citrin 2015). Drawing on recent research in marketing, finance, and operations (see Bond, Edmans, and Goldstein 2012; Hendricks and Singhal 2009; Mizik 2010), we propose that the stock price movements motivate the firm to capitalize on higher customer satisfaction to lower COS and COP. Further, the organizational resources that the firm possesses and its operating environment determine whether the firm has an *opportunity* to capitalize on higher customer satisfaction to lower COS and COP.

Firms are more likely to be *motivated* to utilize their ability to reduce COS and COP if they have the incentives to do so. Since the compensation of senior managers is usually tied to the firm's stock price, a firm's motivation to utilize its ability to lower COS and COP will depend on the behavior of the firms' stock price (Bond, Edmans, and Goldstein 2012). For example, Kau, Linck, and Rubin (2008) propose that when faced with negative stock returns, firms are likely to terminate their investment plans. Previous research also finds that an increase in volatility is likely to lead to firms avoiding new initiatives or making risky decisions (see Devers et al. 2008; Matta and McGuire 2008). Therefore, we use both a firm's stock returns and stock returns volatility to assess the stock market behavior of a firm.

The impact of customer satisfaction on COS and COP is also likely to be contingent on the degree to which organizational resources and operating environment provide an *opportunity* for firms to utilize their ability to reduce COS and COP. We propose that larger organizational resources provide higher opportunity for the firm to utilize its ability to reduce its COS and COP. Consistent with prior research (e.g., Lee and Grewal 2004; Modi and Mishra 2011), we conceptualize organizational resources as the amount of inventory and operating slack a firm possesses. In addition, we propose that the opportunity for a firm to utilize its ability to lower COS and COP is likely to be a function of its operating environment as reflected in industry concentration, growth, and turbulence (e.g., Fang, Palmatier, and Steenkamp 2008).

3.2.2 Moderating Effect of Stock Price Behavior

Stock returns. We argue that lower stock returns represent a negative evaluation of firm's actions and therefore increase managers' motivation to explore avenues for improving the financial performance of the firm. Investors expect the future earnings of firms with lower stock returns to be lower than prior expectations. In this way, lower stock returns increase the pressure on managers to show improvements in future profits (e.g., Mizik 2010). As such, managers faced with lower stock returns are more likely to be motivated to capitalize on the upstream and downstream benefits of higher customer satisfaction to lower their COS and COP. Thus, the effects of customer satisfaction on COS and COP are likely to be stronger for firms with lower stock returns. Formally:

H2: The negative effect of customer satisfaction on (a) COS and (b) COP is likely to be stronger (weaker) for firms with lower (higher) stock returns.

Stock returns volatility. Stock returns volatility reflects the level of uncertainty about the future prospects of the firm. We argue that managers facing greater stock returns volatility should be less motivated to utilize customer satisfaction information to lower their COS and COP. This lower motivation results because in order to incorporate the tacit knowledge of customers and hence reap the cost benefits of having higher customer satisfaction, firms must continuously undergo substantial transitions in their corporate routines (see Kim, Kumar, and Kumar 2012). For firms that do not already have these routines in place, they are unlikely to invest in them when there is higher stock returns volatility as the higher uncertainty is likely to make senior managers risk averse such that they are less likely to explore new initiatives (e.g., Devers et al. 2008; Matta and McGuire 2008). Similarly, since firms with higher stock returns volatility are also more likely to cut back on their future investments (e.g., Panousi and Papanikolaou 2012), the greater uncertainty is likely to deter firms that already have these routines in place from making additional improvements to boost their existing customer satisfaction levels. Therefore, this response to higher uncertainty suggests that when faced with greater stock returns volatility, firms are likely to be less motivated to utilize the learning benefits of customer satisfaction to lower their COS and COP. As such, we expect:

H3: The negative effect of customer satisfaction on (a) COS and (b) COP is likely to be weaker (stronger) for firms with higher (lower) stock returns volatility.

3.2.3 Moderating Effect of Organizational Resource

Inventory slack. Inventory slack refers to the spare physical inventory that a firm possesses (e.g., Azadegan, Patel, and Parida 2013; Hendricks and Singhal 2009). Even though inventory slack may make a firm less efficient, it allows a firm to better respond to supply and demand variations (Kovach et al. 2015). More importantly, a firm with greater inventory slack possesses the flexibility of providing a wider range of products, hence enabling it to "*better adapt to changing customer needs*" (Modi and Mishra 2011 p. 256). As such, inventory slack facilitates the execution of strategic behaviors (Tan and Peng 2003; Thompson 1967), thereby creating an opportunity for firms to realize the benefits of higher customer satisfaction. Thus, we propose that greater inventory slack provides a better opportunity for the firm to utilize the learning benefits of customer satisfaction to lower its COS and COP. Hence, the effects of customer satisfaction on COS and COP are likely to be stronger for firms with higher inventory slack. Formally:

H4: The negative effect of customer satisfaction on (a) COS and (b) COP is likely to be stronger (weaker) for firms with higher (lower) inventory slack.

Operating slack. Operating slack reflects excess capacity of the firm's production process (Azadegan, Patel, and Parida 2013). Unlike inventory slack, prior research suggests that operating slack cannot be readily deployed (Voss, Sirdeshmukh, and Voss 2008). Since operating slack is bound by the existing operations of the firm, it corresponds to additional costs, rather than uncommitted resources to the firm (Tan and Peng 2003). As such, firms with higher operating slack are likely to focus more on cutting losses as opposed to investing in future gains (Voss, Sirdeshmukh, and Voss 2008). In this way, operating slack impedes current and future investments, thereby reducing the opportunities for firms to realize the benefits of higher customer satisfaction to lower their COS and COP. Thus, the effects of customer satisfaction on COS and COP are likely to be stronger for firms with lower operating slack. Formally:

H5: The negative effect of customer satisfaction on (a) COS and (b) COP is likely to be stronger (weaker) for firms with lower (higher) operating slack.

3.2.4 Moderating Effect of Operating Environment

Industry concentration. Industry concentration reveals the degree of competition a firm faces within an industry (Bharadwaj, Tuli, and Bonfrer 2011). A more concentrated industry entails lower competitive intensity, where customers have fewer options to choose from (Fang, Palmatier, and Grewal 2011). The lack of options in such industries makes it difficult for dissatisfied customers to discontinue their relationships with the firm (see Luo, Homburg, and Wieseke 2010). Therefore, there is lower incentive for firms to use customer satisfaction information in more concentrated industries (see Morgan, Anderson, and Mittal 2005). Thus, industries with higher concentration ratio provide firms with fewer opportunities to utilize the benefits of higher customer satisfaction to lower their COS. As such, we expect the effect of customer satisfaction on COS to be weaker for firms in more concentrated industries. Formally:

H6a: The negative effect of customer satisfaction on COS is likely to be weaker (stronger) for firms operating in industries with higher (lower) industry concentration.

In contrast, firms in industries with higher concentration ratio are likely to have greater opportunities to utilize the learning benefits of higher customer satisfaction to lower their COP. Having higher customer satisfaction allows a firm to accumulate knowledge about the preferences of its customers. Since firms operating in highly concentrated industries tend to have more consistent sales, these learning benefits of higher customer satisfaction are likely to be more effective in translating to lower COP in such industries (e.g., Besanko et al. 2010). Thus, we expect the effect of customer satisfaction on COP to be stronger for firms in more concentrated industries. Formally:

H6b: The negative effect of customer satisfaction on COP is likely to be stronger (weaker) for firms operating in industries with higher (lower) industry concentration.

Industry growth. Industry growth indicates the rate of demand growth in the firm's industry (Homburg, Vollmayr, and Hahn 2014). The downstream benefit of the positive word-of-mouth generated by more satisfied customers, and the subsequent lowering of a firm's COS is likely to be stronger as industry growth increases. This benefit emanates because customers tend to rely more on word-of-mouth in industries with higher growth (see You, Vadakkepatt, and Joshi 2015).

In addition, firms operating in industries with higher growth also typically have to manage a growing number of new customers, thus increasing their COP (Robinson and Min 2002). As industry growth increases, the upstream benefits of better understanding customer demand patterns become more beneficial as each mistake in demand prediction can be costlier, i.e., in terms of production delays having a stronger effect on COP. In this way, an increase in industry growth provides better opportunity for firms to leverage the benefits of customer satisfaction to lower their COS and COP. As such, the effects of customer satisfaction on COS and COP are likely to be stronger in such industries. Formally:

H7: The negative effect of customer satisfaction on (a) COS and (b) COP is likely to be stronger (weaker) for firms operating in industries with higher (lower) industry growth.

Industry turbulence. Industry turbulence reflects the extent to which industry demand changes rapidly and unpredictably (see Fang, Palmatier, and Grewal 2011); the higher the industry turbulence, the greater the unpredictability in the nature and quantity of customers' requirements (Homburg, Vollmayr, and Hahn 2014). As such, the knowledge gained from understanding customer requirements is likely to be less valuable in more turbulent industries because the constant changes in customers' preferences and requirements in such industries make it difficult to rely on prior knowledge of customers (Kumar et al. 2011). In this way, as industry turbulence increases, firms should have fewer opportunities to capitalize on the benefits of higher customer satisfaction to lower their COS. Therefore, we expect:

H8a: The negative effect of customer satisfaction on COS is likely to be weaker (stronger) for firms operating in industries with higher (lower) industry turbulence.

Higher industry turbulence also implies that products and services have to be modified frequently to meet the changing customer preferences (see Zhou, Yim, and Tse 2005). These frequent changes, in turn, mean that there is a higher probability of production costs increasing for firms operating in more turbulent industries (see Grover and Malhotra 2003). These increasing costs, in turn, suggest that turbulent industries present a valuable opportunity for firms to utilize the benefits of higher customer satisfaction to lower their COP. Consequently, we expect the effect of customer satisfaction on COP to be stronger for firms in more turbulent industries. Formally:

H8b: The negative effect of customer satisfaction on COP is likely to be stronger (weaker) for firms operating in industries with higher (lower) industry turbulence.

3.3 Model Specification

3.3.1 Model Specification and Identification Strategy

We can use a linear regression model specification to test our hypotheses, where we treat COS and COP as a function of customer satisfaction, moderators, and control variables including sales. We also need to temporally separate costs and the explanatory variables as current costs are likely to depend on past levels of customer satisfaction and other explanatory variables. Specifically:

(1a) $COS_{ij(t+1)} = \beta_0 + \beta_1 CS_{ijt} + \beta_2(CS_{ijt} \times SR_{ijt}) + \beta_3(CS_{ijt} \times Vol_{ijt}) + \beta_4(CS_{ijt} \times ISL_{ijt}) + \beta_5(CS_{ijt} \times OSL_{ijt}) + \beta_6(CS_{ijt} \times HERF_{jt}) + \beta_7(CS_{ijt} \times GRTH_{jt}) + \beta_8(CS_{ijt} \times TURB_{jt}) + \beta_9 Cntrls_{ijt} + \epsilon_{ij(t+1)}$

(1b) $COP_{ij(t+1)} = \gamma_0 + \gamma_1 CS_{ijt} + \gamma_2(CS_{ijt} \times SR_{ijt}) + \gamma_3(CS_{ijt} \times Vol_{ijt}) + \gamma_4(CS_{ijt} \times ISL_{ijt}) + \gamma_5(CS_{ijt} \times OSL_{ijt}) + \gamma_6(CS_{ijt} \times HERF_{jt}) + \gamma_7(CS_{ijt} \times GRTH_{jt}) + \gamma_8(CS_{ijt} \times TURB_{jt}) + \gamma_9 Cntrls_{ijt} + \omega_{ij(t+1)}$

where $COS(COP)_{ij(t+1)}$ is the future cost of selling (producing) of firm i in industry j at time $t+1$, CS_{ijt} is Customer Satisfaction of firm i in industry j at time t, SR_{ijt} is Stock Returns, Vol_{ijt} is Stock Returns Volatility, ISL_{ijt} is Inventory Slack, OSL_{ijt} is Operating Slack, $HERF_{jt}$ is Industry Concentration, $GRTH_{jt}$ is Industry Growth, $TURB_{jt}$ is Industry Turbulence, $Cntrls_{ijt}$ is vector of firm- and industry-specific control variables, and $\epsilon_{ij(t+1)}$ and $\omega_{ij(t+1)}$ are the random error terms.

Despite temporal separation, our key explanatory variable, customer satisfaction, could be endogenous due to three types of omitted variables that could potentially influence both costs in period $t+1$ and customer satisfaction in period t. First, we need to account for certain exogenous shocks that change both customer satisfaction level and costs. These shocks could be boom and bust business cycles, where it is well documented that marketing budgets are curtailed during bust periods (e.g., Srinivasan, Rangaswamy, and Lilien 2005). Second are variables like organizational culture that are largely stable over time but influence both how much a firm spends on customer satisfaction (i.e., costs) and the level of customer satisfaction it achieves. For example, firms that lay more emphasis on customer engagement should spend more on attaining customer satisfaction (i.e., higher costs) and should have higher levels of customer satisfaction. Third are firm specific variables that change over time and can potentially influence costs in period $t+1$ and customer satisfaction in period t. For example, the mindset of the chief executive officer (CEO) and/or chief marketing officer (CMO) could determine the emphasis on customer satisfaction over 2-5 year periods (i.e., average tenures of CEOs and CMOs; e.g., Germann, Ebbes, and Grewal 2015).

We use a three-pronged approach to identify the effects of these endogenous variables of interest (total sales and customer satisfaction). First, we use a rich set of covariates; specifically, we include the lagged dependent variable, lagged sales, and other control variables. As there is likely to be some persistence in spending, lagged dependent variable is needed as a control variable. Lagged dependent variable can also be seen as serving as a proxy for many difficult to measure variables such as organizational ethos with respect to various costs. Lagged sales is also an important control variable as costs are often determined based on sales (such as spending on advertising and perhaps customer satisfaction). As such, lagged sales can be seen as an important decision variable on costs.

To account for the capital market factors, we control for the firms' stock returns and the volatility of stock returns as they are likely to have an effect on firm spending behavior (see Chakravarty and Grewal 2011). We also control for inventory slack and operating slack because the amount of organizational resources a firm possesses may affect its strategic behavior (e.g., Lee and Grewal 2004). In addition, to account for the firm's financial performance, we also control for cash flows and firm leverage (see Grewal, Chandrashekaran, and Citrin 2010).

We account for the number of business segments a firm has as it captures the extent of diversification of the firm which, in turn, is likely to have an effect on the costs incurred by the firm (see Morgan and Rego 2006). We also control for asset intensity of the firm because it is likely to have an impact on the firm's ability to respond to changing demands of customers (Homburg, Krohmer, and Workman 2004). Finally, to account for industry-specific factors, we follow Fang, Palmatier, and Steenkamp (2008) and control for industry concentration, growth and turbulence.

With all these control variables, the identifying assumption here is that these variables account for or proxy any omitted variables. As our control variables include the lagged dependent and sales variables, which proxy many other variables, in the language of Germann, Ebbes, and Grewal (2015), we believe we have a strong argument to claim that we have a rich data model. As a result, a potential identification strategy would be to claim that our parameters of interest are identified in the model presented in equations 1a and 1b.

Second, to explicitly capture firm specific variables that do not vary over time, we use firm-specific fixed effects. On average, our unbalanced panel data has nine years of data per firm; variables such as organizational culture that are stable and slow to change can be accounted for by these firm-specific fixed effects. We also include time-specific fixed effects to control for exogenous shifters, such as boom and bust business cycles that might jointly affect both costs and customer satisfaction. Since prior research suggests that industry idiosyncrasies can be teased out using both the firm- and time-specific fixed effects (Kang, Germann, and Grewal 2016), the inclusion of these fixed effects also account for industry variables that do not change over time. The identifying assumption with this fixed effects specification is that beyond the control variables, the omitted variables do not vary over time (Germann, Ebbes, and Grewal 2015). Thus, we can augment equations 1a and 1b as:

(2a) $$COS_{ij(t+1)} = \beta_0 + \beta_1 CS_{ijt} + \beta_2(CS_{ijt} \times SR_{ijt}) + \beta_3(CS_{ijt} \times Vol_{ijt}) + \beta_4(CS_{ijt} \times ISL_{ijt}) + \beta_5(CS_{ijt} \times OSL_{ijt}) + \beta_6(CS_{ijt} \times HERF_{jt}) + \beta_7(CS_{ijt} \times GRTH_{jt}) + \beta_8(CS_{ijt} \times TURB_{jt}) + \beta_9 Cntrls_{ijt} + \mu_i + \alpha_t + \epsilon_{ij(t+1)}$$

(2b) $COP_{ij(t+1)} = \gamma_0 + \gamma_1 CS_{ijt} + \gamma_2 (CS_{ijt} \times SR_{ijt}) + \gamma_3 (CS_{ijt} \times Vol_{ijt}) + \gamma_4 (CS_{ijt} \times ISL_{ijt}) + \gamma_5 (CS_{ijt} \times OSL_{ijt}) + \gamma_6 (CS_{ijt} \times HERF_{jt}) + \gamma_7 (CS_{ijt} \times GRTH_{jt}) + \gamma_8 (CS_{ijt} \times TURB_{jt}) + \gamma_9 Cntrls_{ijt} + \phi_i + \delta_t + \omega_{ij(t+1)}$

where μ_i and ϕ_i denote the firm-specific fixed effects, α_t and δ_t represent the time-specific fixed effects.

Third, to account for time varying omitted variables that impact both costs and customer satisfaction, we use an instrumental variable approach. We first difference equations 2a and 2b to remove the firm-specific fixed effects:

(3a) $\Delta\, COS_{ij(t+1)} = \beta_0 + \beta_1 \Delta CS_{ijt} + \beta_2 \Delta (CS_{ijt} \times SR_{ijt}) + \beta_3\, \Delta(\, CS_{ijt} \times Vol_{ijt}) + \beta_4\, \Delta(\, CS_{ijt} \times ISL_{ijt}) + \beta_5\, \Delta(\, CS_{ijt} \times OSL_{ijt}) + \beta_6\, \Delta(\, CS_{ijt} \times HERF_{jt}) + \beta_7\, \Delta(\, CS_{ijt} \times GRTH_{jt}) + \beta_8\, \Delta(\, CS_{ijt} \times TURB_{jt}) + \beta_9 \Delta Cntrls_{ijt} + \Delta\alpha_t + \Delta\epsilon_{ij(t+1)}$

(3b) $\Delta\, COP_{ij(t+1)} = \gamma_0 + \gamma_1\, \Delta\, CS_{ijt} + \gamma_2\, \Delta(\, CS_{ijt} \times SR_{ijt}) + \gamma_3\, \Delta(\, CS_{ijt} \times Vol_{ijt}) + \gamma_4\, \Delta(\, CS_{ijt} \times ISL_{ijt}) + \gamma_5\, \Delta(\, CS_{ijt} \times OSL_{ijt}) + \gamma_6\, \Delta(\, CS_{ijt} \times HERF_{jt}) + \gamma_7\, \Delta(\, CS_{ijt} \times GRTH_{jt}) + \gamma_8\, \Delta(\, CS_{ijt} \times TURB_{jt}) + \gamma_9 \Delta Cntrls_{ijt} + \Delta\delta_t + \Delta\omega_{ij(t+1)}$

We follow Blundell and Bond (1998) and use the lagged differences of the endogenous variables as instruments for the equation in levels (i.e., equations 2a and 2b) and the lagged levels as instruments for the equation in the first differences (i.e., equations 3a and 3b). The Blundell and Bond (1998) method has been widely used in marketing (e.g., Banerjee, Prabhu, and Chandy 2015; Saboo, Kumar, and Ramani 2016), economics (e.g., Bloom, Bond, and Van Reenen 2007; Dearden, Reed, and Van Reenen 2006) and finance (e.g., Antoniou, Guney, and Paudyal 2008; Lemmon, Roberts, and Zender 2008).

Following recent recommendations, we now delve into the conceptual quality of our instruments by discussing *instrument relevance* and *exclusion restrictions* (see Germann, Ebbes, and Grewal 2015; Rossi 2014). Instrument relevance implies that the proposed instruments are conceptually correlated with the endogenous variables. Firms that experience an increase (decrease) in customer satisfaction are more likely to have higher (lower) customer satisfaction in the subsequent period. Thus, lagged change in customer satisfaction is a *relevant* instrument for current level of customer satisfaction. Similarly, prior levels of customer satisfaction are likely to be correlated with the current changes in customer satisfaction as firms with high customer satisfaction are likely to find it more difficult to increase customer satisfaction (e.g., Homburg, Wieseke, and Hoyer 2009). Thus, lagged level of customer satisfaction is a *relevant* instrument for current changes in customer satisfaction.

Exclusion restriction implies that the proposed instruments are not correlated with the omitted variables that are expected to be correlated with the endogenous variables, i.e., customer satisfaction. Variables that are typically excluded include the time varying organizational variables which are unobserved in secondary panel data settings and are likely to be correlated with customer satisfaction and costs. An example will be the level of TMT integration, which reflects the extent of collaboration, shared information, joint decision making, and shared vision within the TMT (Hambrick 1994). These attributes, in turn, are critical for coordinating actions among TMT members and for improving the quality of strategic decisions (Carmeli and Schaubroeck 2006). As such, TMT integration is likely to be correlated with customer satisfaction, sales, and costs (see Simsek et al. 2005). Importantly, TMT integration is likely to change with the concurrent changes in the size of the team, diversity of the team members, and factors such as CEO mindset (see Ou et al. 2014; Simsek et al. 2005). Thus, TMT integration is influenced more by the current attributes of the TMT and the CEO, rather than changes or levels of prior factors. This logic suggests that it is unlikely that TMT integration is influenced by either the level or change in customer satisfaction two to three years ago. As such, lagged levels and lagged changes in customer satisfaction are likely to be *valid* instruments in our context.

We estimate equations 2a, 2b, 3a, and 3b using the system GMM procedure outlined in Blundell and Bond (1998). To avoid the problems associated with instrument proliferation, we use only the first two lags of the levels as instruments for the first differences and the first two lags of the differences as instruments for the levels (see Tuli, Bharadwaj, and Kohli 2010 for a similar approach). We follow Blundell and Bond (1998) and examine the relevance and validity of the proposed instruments using three tests, AR(I) and AR(II) tests and the Hansen test of over-identifying restrictions. Consistent with Dutt and Padmanabhan (2011), we estimate the equations for each variable using robust standard errors.

3.3.2 Measures and Data

Customer satisfaction. We use the American Customer Satisfaction Index (ACSI) to obtain the customer satisfaction data. The ACSI collects customer satisfaction data from over 50,000 customers every year by using telephone interviews. The customer satisfaction scores for each firm are scaled from 0-100 (for details see Fornell et al. 1996). The ACSI releases customer satisfaction score of firms on an annual basis, but does so in different quarters for firms in different industries. We, therefore, collect quarterly accounting data from COMPUSTAT and align it to the four quarters between the releases of the ACSI scores.

Dependent variables. Consistent with prior research (see Coombs, Jenkins, and Hobbs 2005), we measure COS as the firm's selling, general and administrative expenditures (COMPUSTAT DATA ITEM: '*XSGAQ*'). Since the ACSI data and firm fiscal years are unlikely to match, we use the sum of the total sales, general, and administrative expenses reported by the firms between the ACSI surveys. From this figure we exclude the R&D expenses of the firm (*XRDQ*) as they are unlikely to be associated with the selling expenses of the firm. To measure a firms' COP, we use the sum of total cost of goods sold (*COGSQ*) during the four quarters between the ACSI surveys (see Jack and Raturi 2003). We log transform the dependent variables and customer satisfaction scores to lower the impact of influential outliers (see Anderson, Fornell, and Rust 1997).

Control variables. In Table 3.1 we present all the control variables, their measures, data sources, and examples of prior literature supporting the use of these measures. We mean center all continuous variables to facilitate the interpretation of the interaction effect parameter estimates.

[Insert Table 3.1 about here]

3.3.3 Data Collection

The data for the current study are from the ACSI database that provides the customer satisfaction score of each firm and the Standard & Poor's COMPUSTAT database that provides the accounting data for publicly listed firms. Following precedent in finance and accounting literature, we do not include firms from the utilities sector and the financial services industry (e.g., Dichev and Tang 2009). Firms in the utilities sector operate in a monopoly environment and have different financial reporting requirements that make it difficult to compare their financial performance metrics with firms from other industries. Similarly, the financial reporting requirements and the regulatory restrictions of firms in the financial services industries (banks, insurance firms, and brokerage firms) differ significantly from firms in other industries.

We obtained the ACSI scores from the fourth quarter of 1994 to the third quarter of 2013. Since our models require both current and lagged values of customer satisfaction and the dependent variables, we only include firms for which at least 3 consecutive years of customer satisfaction data are available. Our sampling criteria yield 1022 pooled time series and cross-sectional observations from 115 firms. In Table 3.2 we outline the descriptive statistics and bivariate correlations between the variables.

[Insert Table 3.2 about here]

3.4 Results

In Table 3.3 we provide the results of the estimation of equations 2a, 2b, 3a, and 3b using the system GMM procedure. We report the estimated results of the model with COS as a dependent variable in Panel A and the model with COP as a dependent variable in Panel B. Further, the condition indices for both models are well below the more rigorous cutoff criterion of 20 (Greene 2012). Thus, multicollinearity is not an issue for either models (see Table 3.3). We also find evidence for the relevance of the moderating effects as their inclusion in both models results in a significant increase in model fit ($\chi^2(7) = 33.55, p < .01$; $\chi^2(7) = 21.50, p < .01$). Results of the AR(I) and the AR(II) tests indicate that autocorrelation exists only in first differences and the instruments are hence not endogenous. Failure to reject the null hypothesis of the Hansen test also provides evidence for the exogeneity of the set of instruments utilized in both models. Taken together, the results of the three tests suggest that the instruments used in the models are valid (see Table 3.3). We now discuss the results of our hypotheses.

[Insert Table 3.3 about here]

Parameter estimates provide support for H1a but not for H1b as we find that customer satisfaction has a significantly negative effect on COS ($\beta_1 = -.338, p < .01$) but does not have a significant impact on COP ($\gamma_1 = -.020, n.s.$). Results indicate that the interaction of customer satisfaction and stock returns increases both COS ($\beta_2 = .381, p < .01$) and COP ($\gamma_2 = .445, p < .01$), hence providing strong support for H2a and H2b. Consistent with H3a and H3b, we also find that the interaction of customer satisfaction and stock returns volatility has a positive effect on both COS ($\beta_3 = .226, p < .10$) and COP ($\gamma_3 = .302, p < .01$).

As observed in Table 3.3, the interaction of customer satisfaction and inventory slack lowers both COS ($\beta_4 = -3.465, p < .05$) and COP ($\gamma_4 = -3.952, p < .05$). As such, H4a and H4b are supported. In contrast, we do not find support for H5a and H5b as the interaction of customer satisfaction and operating slack does not have a significant effect on COS ($\beta_5 = .250, n.s.$) and COP ($\gamma_5 = -.192, n.s.$). H6a and H6b are also not supported as the interaction of customer satisfaction and industry concentration does not significantly impact COS ($\beta_6 = .940, n.s.$) and COP ($\gamma_6 = .537, n.s.$).

Results support H7a but not H7b as we find that the interaction of customer satisfaction and industry growth has a negative effect on COS ($\beta_7 = -1.249, p < .05$) but not on COP ($\gamma_7 = -.879, n.s.$). We also find that the interaction of customer satisfaction and industry turbulence has a positive effect on COS ($\beta_8 = 3.592, p < .01$), thus supporting H8a. We do not, however, find support for H8b as the interaction of customer satisfaction and industry turbulence does not significantly impact COP ($\gamma_8 = .395, n.s.$).

In order to assess the robustness of our results, we conduct several sensitivity analyses. First, consistent with prior research (e.g., Fornell, Rust, and Dekimpe 2010), we examine if our findings are subjected to the idiosyncrasies of the selected sample period. Particularly, we estimated a model using data prior to 2010 to control for the change in reporting standards in that year (ACSI 2016). In addition, we also estimated a model using data from a more recent time period, i.e., from 2000, so as to incorporate recent changes in the macroeconomic conditions. Second, we also examine the sensitivity of our results using different sets of instruments as the number of instruments utilized may significantly influence the model estimates (Tuli, Bharadwaj, and Kohli 2010). Specifically, we estimated two models – a model using all available instruments and a model using only the first lags as instruments. As shown in Table 3.4, our substantive conclusions remain largely unchanged.

[Insert Table 3.4 about here]

3.5 Discussion

Academic research (e.g., Fornell et al. 2006; Rego, Morgan, and Fornell 2013) and the business press (e.g., Hobbib 2016; McClafferty 2015) frequently articulate the benefits of enhancing customer satisfaction in terms of sales, profits, and stock market performance. Little is known, however, about the impact of customer satisfaction on the costs incurred by the firm. This lack of emphasis on costs is surprising as costs have been the upmost concern for CEOs (see PwC 2014a; 2015; 2016; 2017). With this research, we present the first empirical examination of the impact of customer satisfaction on the costs incurred by a firm. We now discuss the theoretical and managerial implications of our research.

3.5.1 Theoretical Implications

Synthesizing literature in marketing (e.g., Fang, Palmatier, and Steenkamp 2008), finance (e.g., Bond, Edmans, and Goldstein 2012), and operations (e.g., Hendricks and Singhal 2009), we articulate the arguments for the impact of customer satisfaction on COS and COP. Importantly, we propose and test a contingency perspective that builds on the MOA framework. Results provide strong support for the contingency approach as shown by the variation in the marginal impact of customer satisfaction on the COS and COP and across changes in the moderating variables (see Figures 3.2 and 3.3). The proposed contingency framework complements extant literature in several ways.

[Insert Figure 3.2 and Figure 3.3 about here]

First, it contributes to the nascent literature that explores the impact of stock market performance of the firm on managerial actions such as advertising and R&D spending (e.g., Chakravarty and Grewal 2011). Consistent with the proposed arguments, we find that customer satisfaction has a negative effect on COS and COP if the firm is faced with lower stock returns and lower stock returns volatility (see Panels A and B of Figures 3.2 and 3.3). In contrast, customer satisfaction has a positive effect on COP if the firm has higher stock returns and stock returns volatility (see Panels A and B Figure 3.3). These results, suggest that stock returns and stock return volatility, not only drive the spending behavior of firms (as shown in Chakravarty and Grewal 2011), but also influence the extent to which they are likely to utilize marketing assets, such as customer satisfaction.

Second, the results also underscore the moderating impact of the operating resources. Consistent with the argument that inventory slack provides a firm with greater flexibility, we find that while customer satisfaction has a negative impact on COS only when the firm has higher inventory slack (see Panel C, Figure 3.2). Interestingly, the impact of customer satisfaction on COP is negative if the firm has high inventory slack, but it is positive if the firm has low inventory slack (see Panel C, Figure 3.3). Taken together, results bring to fore the importance of considering the role of operating resources in examining the impact of marketing assets such as customer satisfaction (e.g., Heikkilä 2002).

Third, current findings highlight the influence of industry conditions on the impact of customer satisfaction on COS. Consistent with the proposed hypotheses, we find that customer satisfaction has a negative impact on COS only if the firm is in an industry with high growth and low turbulence (see Panels D and E of Figure 3.2). Conversely, customer satisfaction has a positive effect on COS if the firm is in a more turbulent industry (see Panel E of Figure 3.2). Complementing existing studies that examine the heterogeneity of customer satisfaction across different operating environments (e.g., Larivière et al. 2016), the proposed framework contributes to theory development by identifying the boundary conditions for the effect of customer satisfaction on a firm's COS.

3.5.2 Managerial Implications

Firms are often looking for new ways to attain the same product-market outcomes with lower marketing costs (e.g., Hanssens, Wang, and Zhang 2016; Katsikeas et al. 2016). Accordingly, our findings identify improvements in customer satisfaction as an initiative that can reduce both the COS and COP of the firm. Importantly, our contingency framework identifies specific conditions under which senior managers can expect improvements in customer satisfaction to have negative effects, positive effects, or no effects on COS and COP.

In order to better articulate the managerial implications of our findings, we draw upon the marginal effects in Figures 3.2 and 3.3 and derive their dollar values.[20] These values can serve as benchmarks for marketing managers to assess the dollar impact of improving customer satisfaction on COS and COP (see Figures 3.4 and 3.5).

[Insert Figure 3.4 and Figure 3.5 about here]

Considering COS, we find that a 1% increase in customer satisfaction can lower COS by .847% for firms with lower stock returns (see Panel A of Figure 3.4). That is, the *COS elasticity* of customer satisfaction is -.847 for firms with lower stock returns.[21] Importantly, for the average firm in the ACSI sample, this translates into reduction of COS by almost $50.458 million. In contrast, if the firm has higher stock returns, COS elasticity of customer satisfaction is neither statistically nor economically significant (see Panel A of Figure 3.4). Similarly, COS elasticity of customer satisfaction is -.726 when a firm has lower stock returns volatility. In dollar terms, this means an average reduction $43.240 million in COS (see Panel B of Figure 3.4). COS elasticity, however, is not significant if stock returns volatility is high. Underscoring the impact of operating conditions, we find that COS elasticity of customer satisfaction is -1.085 with a dollar value of $64.649 million for firms with greater inventory slack (see Panel C of Figure 3.4).

We also see the impact of industry conditions on COS elasticity. As shown in Panel D of Figure 3.4, for firms in high growth industries, COS elasticity of customer satisfaction is

[20] Specifically, we multiply the marginal effects at three standard deviations above and below the means of each moderating variables by the average COS (COP) (i.e., before the taking the natural logarithm and mean centering) within our observation sample (see Gruca and Rego 2005 for a similar approach). Given our computation, the dollar values of the marginal effects represent the approximate monetary sizes of the effect for an average firm within our observation sample.
[21] Given that Customer Satisfaction, COS, and COP are log transformed, we can interpret our coefficients as elasticities.

– .782 with a dollar value of $46.573 million. In low growth industries, however, COS elasticity is not significant. In addition, while the COS elasticity of customer satisfaction is -1.128 with a dollar value of $67.199 million for firms in industries with low turbulence, it is equivalent to .405 with a dollar value of $24.113 million for firms in high turbulence industries (see Panel E of Figure 3.4).

In Figure 3.5 we identify conditions under which *COP elasticity* of customer satisfaction can be positive or negative. As shown in Panel A of Figure 3.5, COP elasticity of customer satisfaction is -.603 for firms with low stock returns. In sharp contrast, the COP elasticity of customer satisfaction is .533 if the firm has positive stock returns. Similarly, COP elasticity is -.523 for firms facing low stock returns volatility, but .442 for firms facing high stock returns volatility (see Panel B of Figure 3.5). We also find that the COP elasticity of customer satisfaction is .790 if firms have low inventory slack, but -.861 if firms have high inventory slack (see Panel C of Figure 3.5).

In summary, results of the current study have direct implications to senior managers as they identify conditions under which customer satisfaction can increase or decrease a firm’s future COS and COP. Identification of these conditions is especially important as a number of firms have struggled with the lack of financial results even though they have improved their customer satisfaction (see Keiningham et al. 2014).

3.5.3 Limitations and Future Research

Although the current study contributes to the limited knowledge of how customer satisfaction relates to the future costs of the firm, it also offers several avenues for further research. First, customer satisfaction data from the ACSI comprises mainly of large business-to-consumer firms (Larivière et al. 2016). Given the importance of customer relationships for business-to-business firms (see Tuli, Bharadwaj, and Kohli 2010), future research should explore the cost implications of customer satisfaction for such firms.

Second, our observation sample only comprises of ACSI firms that are publicly listed in the U.S. (e.g., Malshe and Agarwal 2015). There might exist differences in customer satisfaction across countries and cultures (e.g., Morgeson et al. 2011; Raithel et al. 2012) such that the cost advantages are greater for some but lower for others. Further research is required to examine the generalizability of the findings in this study across a larger sample of firms. Third, prior research in economics suggests that a firm's COP may be broken down to several components, for example, marginal (see Besanko et al. 2010), fixed (see Jeon and Menicucci 2012), physical (see Sappington 2005). However, given that we measure a firm's COP as its cost of goods sold, we are unable to distinguish the impact of customer satisfaction on different components of COP. Future research can hence explore the influence of customer satisfaction on each of these components using alternative data sources.

Fourth, it would be important to understand how the revenue benefits of customer satisfaction interact with its cost benefits, i.e., in terms of whether the interaction is complementary or competitive in nature. We urge marketing researchers to develop models that simultaneously incorporate both revenue- and cost- related performance measures to examine possible countervailing forces of revenue and cost advantages of having higher customer satisfaction. Such research is likely to provide strong implications for marketing managers interested in optimizing their customer satisfaction spending based on both the revenue and the cost advantages. Finally, drawing on the heterogeneity in the cost implications of customer satisfaction, future studies can examine the generalizability of such effects to other marketing assets such as customer lifetime value (e.g., Venkatesan and Kumar 2004) and brand licensing (e.g., Jayachandran et al. 2013).

TABLE 3.1: CONTROL VARIABLES, MEASURES AND DATA SOURCES

Variable	Measure	Data Source	Reference
Sales	The natural logarithm of the sum of the sales (DT: REVTQ) reported by the firm.	COMPUSTAT	Morgan and Rego (2006)
Stock Returns	The difference in the natural logarithm of the market capitalization of the firm at the current year from the end of the preceding year, where market capitalization is the product of the stock price (DT: PRCCQ) and the total number of outstanding shares (DT: CSHOQ).	COMPUSTAT	Mizik and Jacobson (2008)
Stock Returns Volatility	The natural logarithm of the standard deviation of the firm's monthly stock returns (DT: RET).	CRSP	Sorescu and Spanjol (2008)
Inventory Slack	Ratio of the firm's total inventory (DT: INVTQ) to its sales (DT: REVTQ).	COMPUSTAT	Chen, Frank, and Wu (2005)
Operating Slack	Ratio of the firm's gross property, plant, and equipment (DT: PPENTQ) to its sales (DT: REVTQ).	COMPUSTAT	Kovach et al. (2015)
Cash Flows	Net operating cash flows of the firm (DT: OANCF) scaled by its total assets (DT: ATQ).	COMPUSTAT	Gruca and Rego (2005)
Leverage	Ratio of the firm's total long-term debt (DT: DLTTQ) to its market capitalization, where market capitalization is the product of the stock price (DT: PRCCQ) and the total number of outstanding shares (DT: CSHOQ).	COMPUSTAT	Grewal, Chandrashekaran, and Citrin (2010)
Number of Business Segments	Number of operating business segments as reported by the firm in its annual (10-K) and/or quarterly reports (10-Q).	SEC Filings	Morgan and Rego (2009)
Asset Intensity	Ratio of the firm's net plant, property, and equipment (DT: PPENTQ) to its total assets (DT: ATQ).	COMPUSTAT	Tuli, Bharadwaj, and Kohli (2010)
Industry Concentration	The four-digit SIC Herfindahl index of firm sales (DT: REVTQ).	COMPUSTAT	Bharadwaj, Tuli, and Bonfrer (2011)
Industry Growth	The difference in the natural logarithm of the sum of the total sales of the firms within the same four-digit SIC code at the end of the current year from the end of the preceding year (DT: REVTQ).	COMPUSTAT	Bahadir, Bharadwaj, and Srivastava (2008)
Industry Turbulence	The standard deviation of the sum of the total sales of the firms within the same four-digit SIC across the prior four years scaled by the mean value of the sum of the total sales of the firms within the same four-digit SIC code for those four years (DT: REVT).	COMPUSTAT	Fang, Palmatier, and Steenkamp (2008)

Notes. DT = Data Item; SIC = Standard Industrial Classification System; SEC = Securities and Exchange Commission. We refer to year as the aggregation of data over the four quarters corresponding to the period between the American Customer Satisfaction Index scores.

TABLE 3.2: DESCRIPTIVE STATISTICS AND CORRELATION MATRIX

		Correlation Matrix														
	Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
1	$COS_{ij(t+1)}$	1.000														
2	$COP_{ij(t+1)}$	**.834**	1.000													
3	CS_{ijt}	**-.116**	**-.101**	1.000												
4	$Sales_{ijt}$	**.913**	**.969**	**-.116**	1.000											
5	SR_{ijt}	.010	.025	**.125**	-.005	1.000										
6	VOL_{ijt}	**-.268**	**-.228**	**-.161**	**-.253**	**-.172**	1.000									
7	ISL_{ijt}	.019	**.061**	**.279**	.003	-.039	.001	1.000								
8	OSL_{ijt}	**.052**	.006	**-.422**	**.053**	.003	**-.175**	**-.273**	1.000							
9	$CashFlows_{ijt}$	.019	-.050	**.053**	-.022	**.184**	**-.193**	**-.275**	-.046	1.000						
10	$Leverage_{ijt}$	-.012	.007	**-.246**	.009	**-.145**	**.154**	-.046	**.170**	**-.170**	1.000					
11	NBS_{ijt}	**.177**	**.178**	**.111**	**.206**	-.001	**-.093**	-.019	**-.123**	-.016	**-.063**	1.000				
12	$AssetIntensity_{ijt}$	**.112**	**.217**	**-.272**	**.176**	-.008	**-.135**	**-.074**	**.568**	**.113**	.029	**-.337**	1.000			
13	$HERF_{jt}$	**.096**	**.071**	**.311**	**.068**	.028	.003	**.240**	**-.355**	-.023	**-.111**	**.197**	**-.286**	1.000		
14	$GRTH_{jt}$	**.054**	**.072**	-.015	**.061**	**.203**	**-.144**	**-.088**	-.025	**.054**	.007	.027	-.035	-.025	1.000	
15	$TURB_{jt}$	-.031	.006	.008	-.012	-.034	.051	**-.146**	-.044	.044	.036	**-.059**	**-.083**	**.119**	**.163**	1.000
Mean		7.964	9.067	4.349	9.549	.015	-2.538	.092	.297	.124	-.313	2.422	.317	.263	.039	.116
Standard Deviation		1.247	1.351	.081	1.257	.426	.533	.070	.260	.074	2.606	1.495	.184	.177	.115	.071
Minimum		4.314	4.358	3.932	6.003	-3.750	-4.222	.000	.013	-.297	-.869	1	.014	.041	-.535	.008
Maximum		11.391	12.772	4.511	13.010	2.057	-.553	.448	1.724	.863	58.530	8	.835	1.000	.668	.488

Notes. $COS_{ij(t+1)}$ = Cost of Selling of firm *i* in industry *j* at time *t+1*; $COP_{ij(t+1)}$ = Cost of Producing; CS_{ijt} = Customer Satisfaction of firm *i* in industry *j* at time *t*; SR_{ijt} = Stock Returns; VOL_{ijt} = Stock Returns Volatility; ISL_{ijt} = Inventory Slack; OSL_{ijt} = Operating Slack; NBS_{ijt} = Number of Business Segments; $HERF_{jt}$ = Industry Concentration; $GRTH_{jt}$ = Industry Growth; $TURB_{jt}$ = Industry Turbulence. All correlations that are significant at $p < .10$ (two-sided) are put in bold. The mean, standard deviation, minimum, maximum and correlation values of the variables are reported in their logarithm forms (if applicable) before mean centering. There are 1022 observations from 115 firms.

TABLE 3.3: RESULTS

	Panel A		Panel B	
	$COS_{ij(t+1)}$		**$COP_{ij(t+1)}$**	
	Coeff	(SE)	Coeff	(SE)
CS_{ijt}	-.338	(.122)***	-.020	(.124)
$CS_{ijt}*SR_{ijt}$	.381	(.078)***	.445	(.112)***
$CS_{ijt}*VOL_{ijt}$	.226	(.125)*	.302	(.115)***
$CS_{ijt}*ISL_{ijt}$	-3.465	(1.602)**	-3.952	(1.851)**
$CS_{ijt}*OSL_{ijt}$	.250	(.314)	-.192	(.313)
$CS_{ijt}*HERF_{jt}$	.940	(.732)	.537	(.753)
$CS_{ijt}*GRTH_{jt}$	-1.249	(.632)**	-.879	(.535)
$CS_{ijt}*TURB_{jt}$	3.592	(1.161)***	.395	(1.082)
Control Variables				
DV_{ijt}	.943	(.022)***	.863	(.056)***
$Sales_{ijt}$	.052	(.024)**	.130	(.055)**
SR_{ijt}	.092	(.020)***	.144	(.038)***
VOL_{ijt}	-.044	(.017)***	-.017	(.019)
ISL_{ijt}	-.266	(.124)**	-.111	(.145)
OSL_{ijt}	.006	(.056)	-.010	(.070)
$CashFlows_{ijt}$	.451	(.168)***	.007	(.135)
$Leverage_{ijt}$	.005	(.002)***	.001	(.001)
NBS_{ijt}	.005	(.010)	.017	(.011)
$AssetIntensity_{ijt}$	-.156	(.078)**	-.019	(.086)
$HERF_{jt}$	.001	(.052)	-.070	(.050)
$GRTH_{jt}$	.005	(.065)	.046	(.062)
$TURB_{jt}$	-.065	(.113)	.246	(.118)**
Constant	.020	(.020)	-.004	(.033)
Summary Statistics				
Wald's χ^2 (df)	35956.07 (40)***		45379.27 (40)***	
AR(1) test	-4.110***		-3.290***	
AR(2) test	.350		.210	
Hansen test χ^2 (df)	70.19 (399)		83.49 (399)	
Condition Index	14.371		15.056	
N(n)	1022 (115)		1022 (115)	

Notes. * $p < .10$; ** $p < .05$; *** $p < .01$ (two-sided); Coeff = Coefficient; SE = Robust Standard Error; $COS_{ij(t+1)}$ = Cost of Selling of firm *i* in industry *j* at time *t+1*; $COP_{ij(t+1)}$ = Cost of Producing; CS_{ijt} = Customer Satisfaction of firm *i* in industry *j* at time *t*; DV_{ijt} = Lagged dependent variable (i.e., Lagged Cost of Selling or Lagged Cost of Producing); SR_{ijt} = Stock Returns; VOL_{ijt} = Stock Returns Volatility; ISL_{ijt} = Inventory Slack; OSL_{ijt} = Operating Slack; NBS_{ijt} = Number of Business Segments; $HERF_{jt}$ = Industry Concentration; $GRTH_{jt}$ = Industry Growth; $TURB_{jt}$ = Industry Turbulence; χ^2 = Chi-Square; df = degrees of freedom; N = Number of Firm-Year Observations; n = Number of Firms. The time-specific fixed effects are included in our model but not shown due to space constraints.

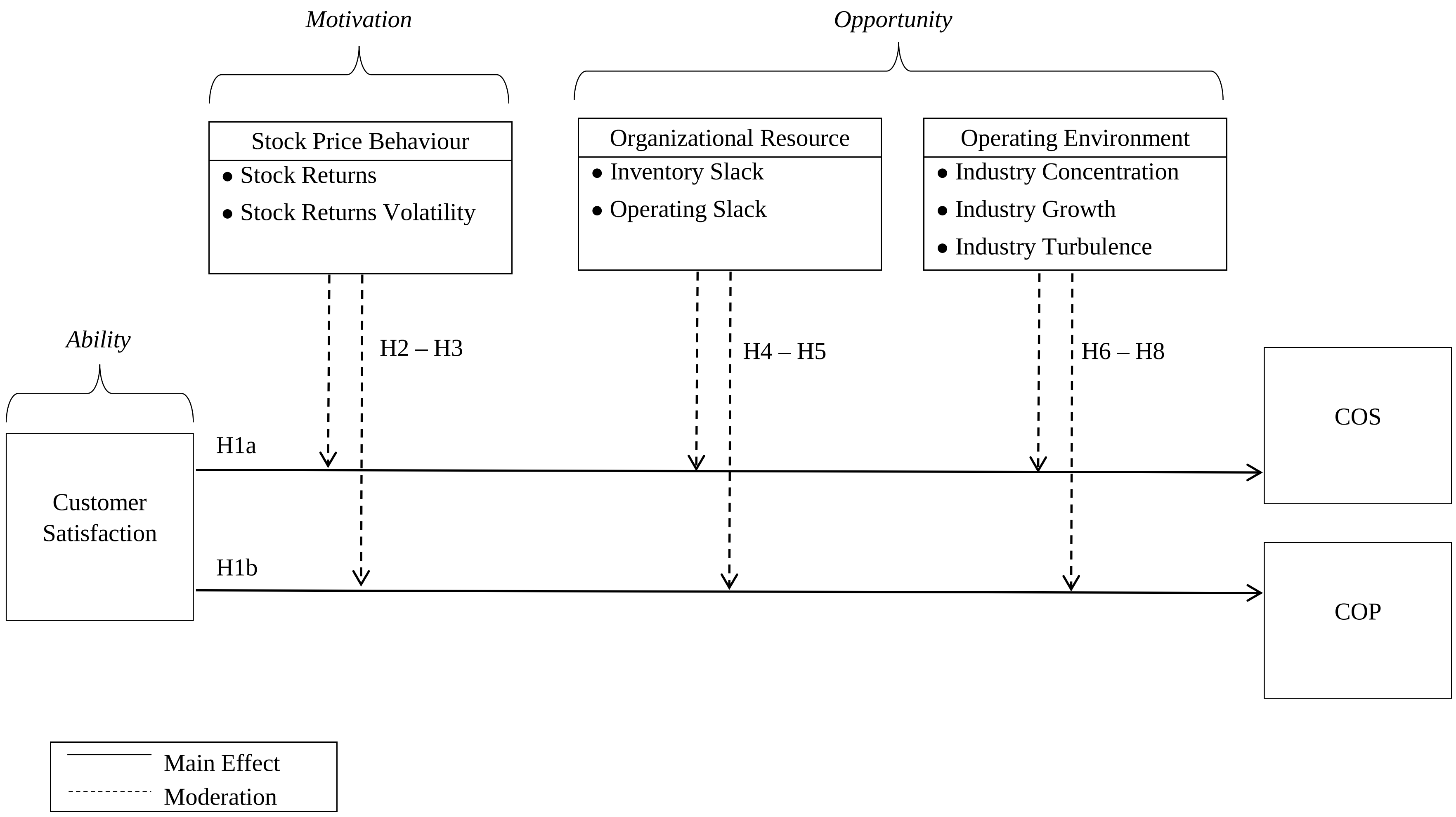
TABLE 3.4: SENSITIVITY ANALYSES

	Using Data Before 2010		Using Data From 2000		Using All Available Instruments		Using First Lags Only	
	$COS_{ij(t+1)}$	$COP_{ij(t+1)}$	$COS_{ij(t+1)}$	$COP_{ij(t+1)}$	$COS_{ij(t+1)}$	$COP_{ij(t+1)}$	$COS_{ij(t+1)}$	$COP_{ij(t+1)}$
	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff
CS_{ijt}	-.283**	-.093	-.335***	.106	-.226**	.062	-.427***	-.108
$CS_{ijt}*SR_{ijt}$	.251*	.410**	.381***	.463***	.308***	.307***	.435***	.510***
$CS_{ijt}*VOL_{ijt}$	.327***	.368***	.167*	.259**	.221**	.323***	.243**	.316***
$CS_{ijt}*ISL_{ijt}$	-4.220**	-3.423**	-4.062***	-5.000***	-1.494	-1.635*	-3.775**	-3.881**
$CS_{ijt}*OSL_{ijt}$	.131	-.033	.238	-.164	.022	-.318	.305	-.377
$CS_{ijt}*HERF_{jt}$	1.327*	-.283	.520	.850	-.115	-.035	.867	.675
$CS_{ijt}*GRTH_{jt}$	-1.365**	-.997**	-1.544***	-.994**	-1.197**	-1.090**	-1.269**	-.827*
$CS_{ijt}*TURB_{jt}$	3.438***	-.344	3.296***	-.370	2.952***	.545	3.500***	.436
Summary Statistics								
Wald's χ^2 (40)	20221.190***	25338.900***	32984.450***	31671.160***	90320.570***	90456.060***	17249.110***	21845.290***
AR(1) test	-4.710***	-2.820***	-3.550***	-2.930***	-3.960***	-3.250***	-4.100***	3.110***
AR(2) test	-1.220	-1.610	.500	.370	.310	.080	.310	.220
Hansen test χ^2 (df)	70.18 (291)	79.17 (291)	73.46 (338)	74.60 (338)	78.60 (924)	83.11 (924)	68.17 (256)	77.26 (256)
N(n)	752 (112)	752 (112)	877 (110)	877 (110)	1022 (115)	1022 (115)	1022 (115)	1022 (115)

Notes. * $p < .10$; ** $p < .05$; *** $p < .01$ (one-sided); Coeff = Coefficient; $COS_{ij(t+1)}$ = Cost of Selling of firm *i* in industry *j* at time *t+1*; $COP_{ij(t+1)}$ = Cost of Producing; CS_{ijt} = Customer Satisfaction of firm *i* in industry *j* at time *t*; DV_{ijt} = Lagged dependent variable (i.e., Lagged Cost of Selling or Lagged Cost of Producing); SR_{ijt} = Stock Returns; VOL_{ijt} = Stock Returns Volatility; ISL_{ijt} = Inventory Slack; OSL_{ijt} = Operating Slack; $HERF_{jt}$ = Industry Concentration; $GRTH_{jt}$ = Industry Growth; $TURB_{jt}$ = Industry Turbulence; χ^2 = Chi-Square; df = degrees of freedom; N = Number of Firm-Year Observations; n = Number of Firms. The time-specific fixed effects and all the control variables are included in our model but not shown due to space constraints.

FIGURE 3.1

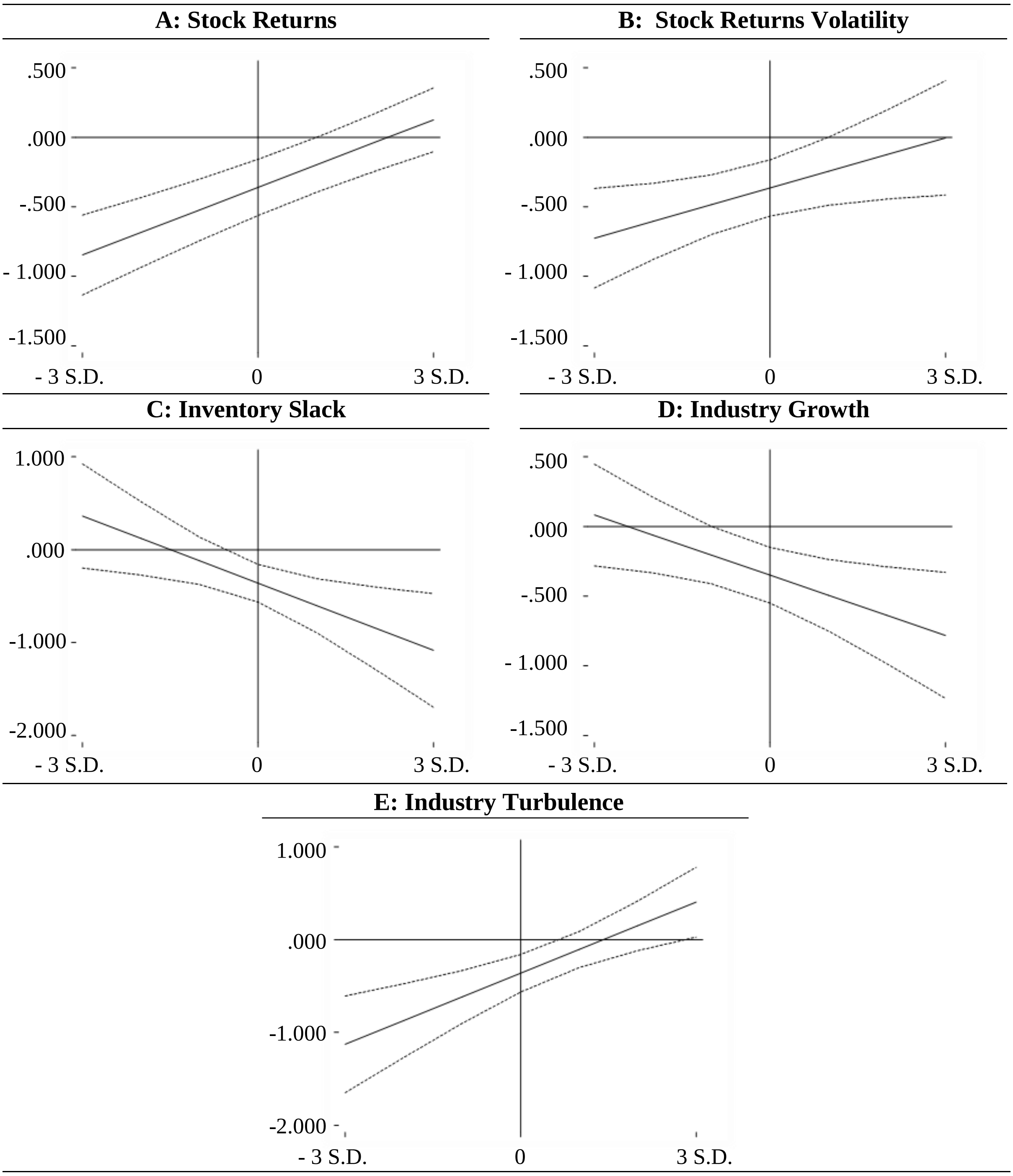
ANALYZING THE IMPACT OF CUSTOMER SATISFACTION ON COS AND COP USING THE MOA FRAMEWORK



Notes. COS = Cost of Selling; COP = Cost of Producing; MOA = Motivation-Opportunity-Ability.

FIGURE 3.2

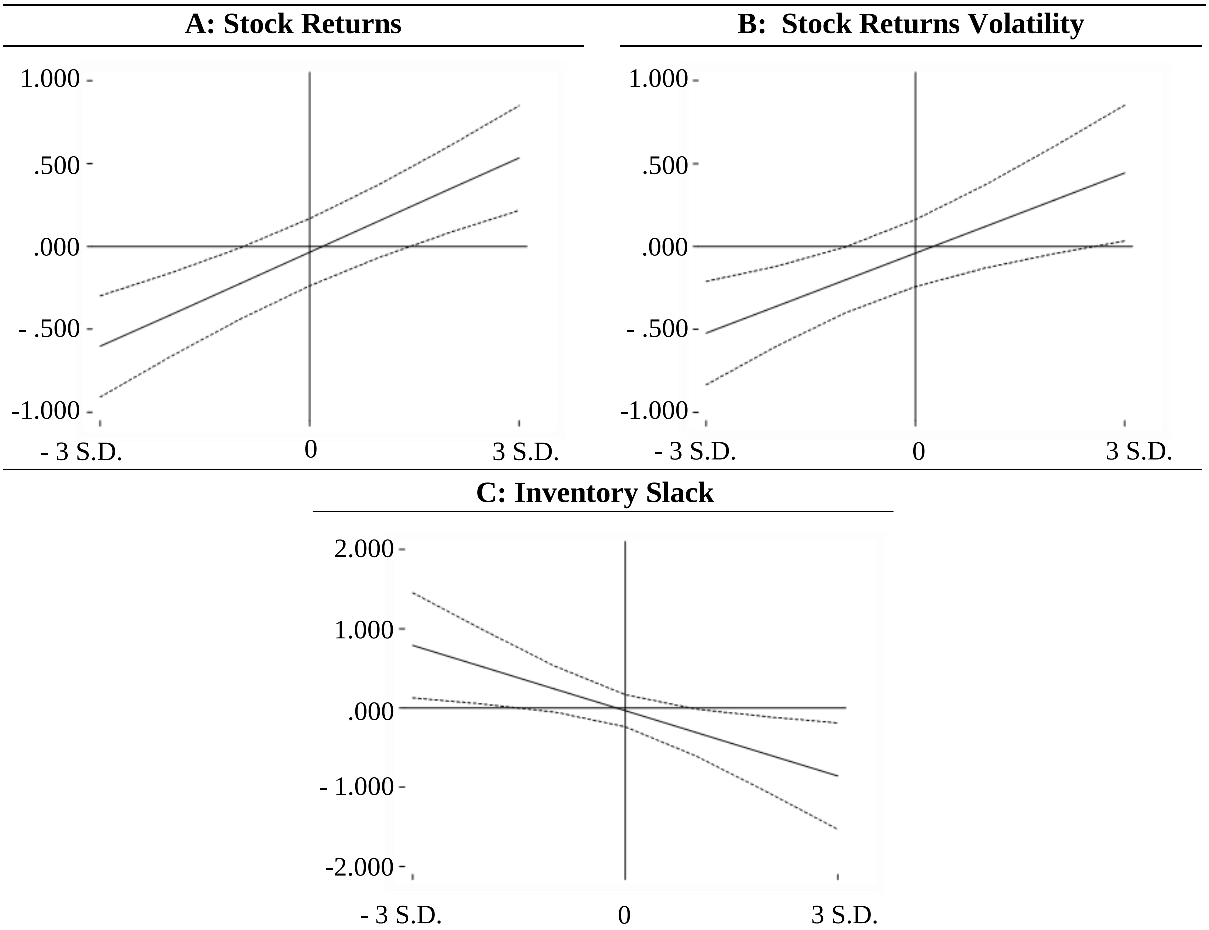
MARGINAL EFFECTS OF CUSTOMER SATISFACTION ON COST OF SELLING ACROSS CHANGES IN MODERATING VARIABLES



Notes. S.D. = Standard Deviation. The horizontal axis of every graph represents the different values of the corresponding moderating variable. The dashed lines indicate the 90% confidence interval bands. The vertical axis of every graph represents the marginal effects (in percentage change) of *Customer Satisfaction* on *Cost of Selling* across changes in the corresponding moderating variable. Note that we only generated the plots for the significant ($p < .10$, two-sided) interaction effects.

FIGURE 3.3

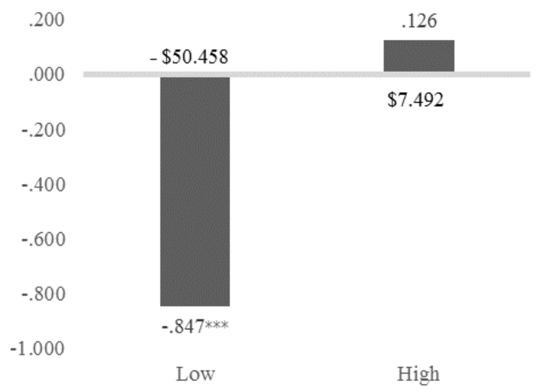
MARGINAL EFFECTS OF CUSTOMER SATISFACTION ON COST OF PRODUCING ACROSS CHANGES IN MODERATING VARIABLES



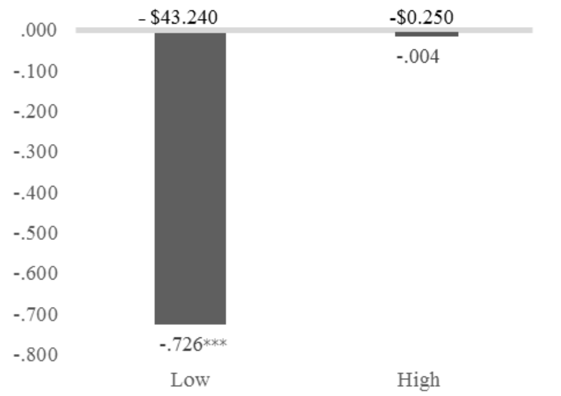
Notes. S.D. = Standard Deviation. The horizontal axis of every graph represents the different values of the corresponding moderating variable. The dashed lines indicate the 90% confidence interval bands. The vertical axis of every graph represents the marginal effects (in percentage change) of *Customer Satisfaction* on *Cost of Producing* across changes in the corresponding moderating variable. Note that we only generated the plots for the significant ($p < .10$, two-sided) interaction effects.

FIGURE 3.4
DOLLAR VALUES OF THE MARGINAL EFFECTS OF CUSTOMER SATISFACTION ON COST OF SELLING ACROSS CHANGES IN MODERATING VARIABLES

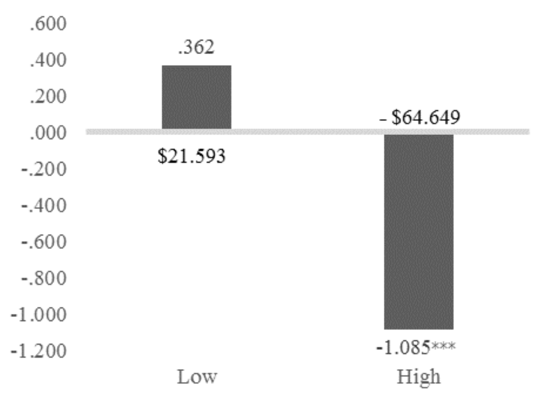
A: Stock Returns



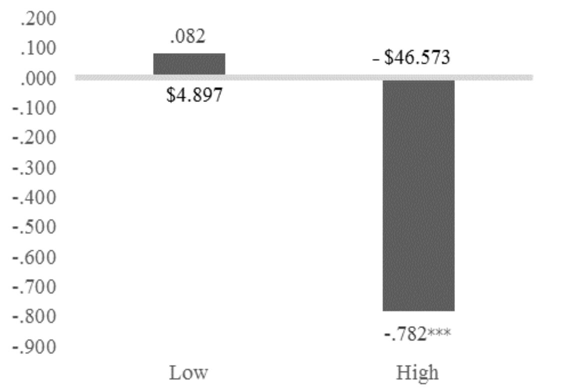
B: Stock Returns Volatility



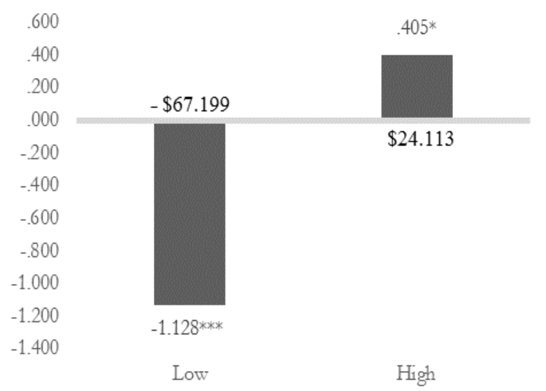
C: Inventory Slack



D: Industry Growth

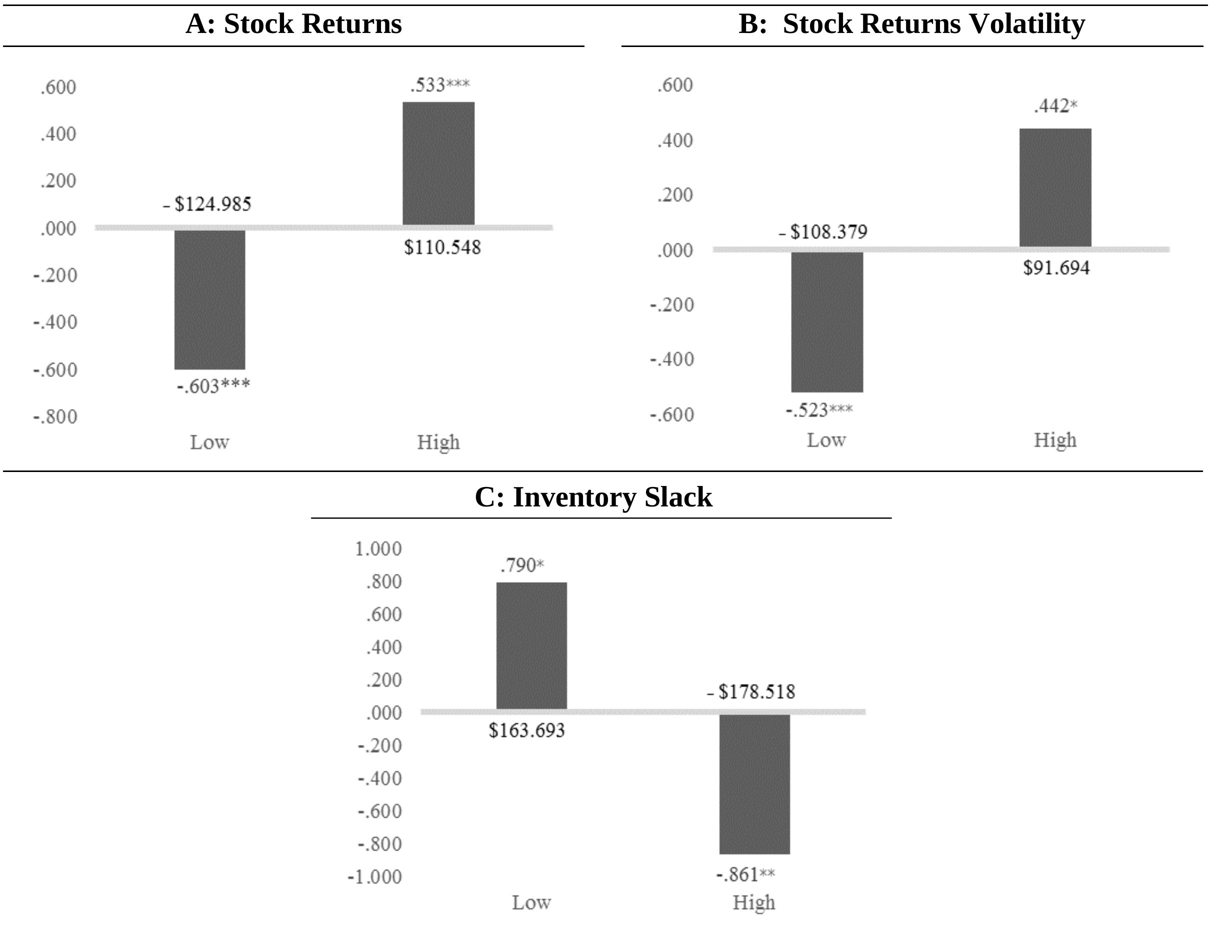


E: Industry Turbulence



Notes. * $p < .10$; ** $p < .05$; *** $p < .01$ (two-sided). The *p*-values indicate the statistical significance of the marginal effects. The horizontal axis of every graph represents the different values of the corresponding moderating variable. The vertical axis of every graph represents the dollar values of the marginal effects of *Customer Satisfaction* on *Cost of Selling* across changes in the corresponding moderating variable. We identify the moderating variable to be High (Low) if its value is equivalent to 3 standard deviations above (below) the mean of the distribution within our sample of 1022 observations from 115 firms. We report all the marginal effects in percentage change and their dollar values in millions of dollars. We derive the dollar values of the marginal effects by multiplying the marginal effects with the average *Cost of Selling* within our sample of 1022 observations from 115 firms. Note that we only computed the dollar values of the marginal effects that are included in Figure 3.2.

FIGURE 3.5
DOLLAR VALUES OF THE MARGINAL EFFECTS OF CUSTOMER SATISFACTION ON COST OF PRODUCING ACROSS CHANGES IN MODERATING VARIABLES



Notes. * $p < .10$; ** $p < .05$; *** $p < .01$ (two-sided). The *p*-values indicate the statistical significance of the marginal effects. The horizontal axis of every graph represents the different values of the corresponding moderating variable. The vertical axis of every graph represents the dollar values of the marginal effects of *Customer Satisfaction* on *Cost of Producing* across changes in the corresponding moderating variable. We identify the moderating variable to be High (Low) if its value is equivalent to 3 standard deviations above (below) the mean of the distribution within our sample of 1022 observations from 115 firms. We report all the marginal effects in percentage change and their dollar values in millions of dollars. We derive the dollar values of the marginal effects by multiplying the marginal effects with the average *Cost of Producing* within our sample of 1022 observations from 115 firms. Note that we only computed the dollar values of the marginal effects that are included in Figure 3.3.

Chapter 4

Stakeholder-Specific Outcomes of Airlines Mergers and Acquisitions: Policy Implications from an Empirical Examination

4.1 Introduction

> "*Increasing consolidation among large airlines has hurt passengers. The airlines have copied each other in raising fares, imposing new fees on travellers, reducing or eliminating service on a number of city pairs, and downgrading amenities.*"
>
> *– The United States Department of Justice 2013*

Mergers and acquisitions (M&As) are popular strategic alternatives for value creation (BCG 2016; Deloitte 2016). Not surprisingly, recent years have witnessed a global surge in M&As with a record-setting $4.3 trillion in 2007, $4.4 trillion in 2015, and $3.7 trillion in 2016, the three most active years for mergers (Farrell 2015; Mattioli 2016). U.S. airlines are among those responsible for the huge waves of M&As (Elliott 2016). With a combined market capitalization of nearly $130 billion dollars (Holmes 2016), and transporting up to 719 million passengers in a year (BTS 2017c), the U.S. airlines industry supports about 7.3% of the total employment and contributes up to 5.1% of the country's GDP (ATA 2017). Since the Airlines Deregulation Act in 1978 (see Public Law 95-504 1978), the U.S. airlines industry had undergone a number of M&As. These mergers have changed the dynamics of the industry drastically. Today, four major airlines hold almost 85% of the total market share (Forbes Trefis Team 2016) and four out of five passengers travel on one of this four airlines (Mutzabaugh 2015).

Despite their popularity, it is not clear if M&As bring more benefits than costs for the airlines industry. Regulators such as the U.S. Government Accountability Office (GAO) often argue that M&As lower competition which leads to fewer choices and higher prices for consumers (e.g., GAO 2013). For example, following its merger with US Airways in 2013, American Airlines increased the price of its main cabin extra seats from a range of $8 to $159 to a range of $20 to $280 and reduced the usability of a discount fare program to only on selected routes (e.g., Elliott 2016; Gajanan 2016). Furthermore, M&As typically also result in reductions in employee benefits (e.g., Schultz 2000), pay cuts (e.g., Maynard 2005b), and even layoffs (e.g., Laryea 2016). In fact, investors have often viewed M&As with scepticism as the anticipated benefits of M&As are typically not realized (e.g., Rao, Yu, and Umashankar 2016) and most M&As end up destroying, rather than creating value (e.g., BCG 2016). As such, it is not clear as to who really benefits from a M&A.

Extant research predominantly examines the impact of M&As on performance outcomes such as prices (e.g., Borenstein 1990; Peters 2006), with little focus on other performance outcomes such as the quality of the airline services, and those that reflect the impact of M&As for other stakeholders (see Table 4.1). More importantly, these outcomes are usually examined in isolation, and a holistic investigation of the costs and benefits of M&As for the key stakeholders is rarely undertaken. Considering the interests of key stakeholders is important because firms are under increasing pressure to deliver the anticipated benefits of a M&A to these stakeholders (Neely and Potter 2015; PwC 2014b). In addition, firms also have to fulfil their interests in order to ensure continued support for M&As (Donaldson and Preston 1995; Ferrell et al. 2010).

[Insert Table 4.1 about here]

Evaluating M&As from specific performance outcomes in isolation does not necessarily reflect the interests of a stakeholder as the resulting implications are confined to only the costs and benefits within that particular outcome. For example, if a M&A results in lower prices, consumers may still not benefit from if the reduced price comes at the cost of lower quality. The decline in quality might have a negative impact on loyalty, thereby resulting in adverse consequences for the firm. Even if the M&A does not directly result in any unfavourable outcomes for consumers, if it is accompanied by layoffs and reduction in employee benefits, the firm is still susceptible to negative repercussions due to the higher workload per employee (e.g., Thompson 2017) and employees' lack of incentive to improve performance (e.g., Goldmanis and Ray 2015) following the M&A.

Given that M&As are often pursued due to their potential to create value for the firm (e.g., Rehm, Uhlaner, and West 2012; Zenger 2016), if the M&A does not result in benefits for any of the key stakeholders, it is likely to end up destroying, as opposed to creating value. In this way, adopting a stakeholder-specific approach provides a more comprehensive view of the implications of M&As which can also complement the findings of both the proponents and the oppositions of M&As in the airlines industry. Accordingly, we examine the consequences of M&As in the U.S. airlines industry through the evaluation of their effects on the airline's primary stakeholders.

4.2 Proposed Holistic View

As advocated by stakeholder theory, it is important for firms to evaluate the impact of a strategic action by taking into account the needs of its primary stakeholders (Freeman 1984). Consistent with existing research (e.g., Eesley and Lenox 2006), we identify an airline's primary stakeholders as the consumers, employees, senior managers and investors. A firm is contractually obligated to its primary stakeholders (Eesley and Lenox 2006) and hence is dependent on them for its continued survival (Freeman and Reed 1983). As such, by examining the impact of a M&A on an airline's primary stakeholders, we are looking at the individuals or groups that are most affected by the M&A.

Given the relatively sparse literature that examines the impact of airlines M&As from the perspectives of primary stakeholders, we adopt an exploratory empirical approach in determining the respective performance outcomes that capture the interests of each of these primary stakeholders. In particular, we draw on the promises of the airlines involved in the five most significant M&As in the last decade – US Airways and American West in 2005, Delta and Northwest in 2008, United and Continental in 2010, Southwest and AirTran in 2011 and American Airlines and US Airways in 2013 (Forbes Trefis Team 2016) – and the concerns raised by regulators and the business press relating to these M&As to establish the variables. Even though these five M&As form only part of the data we used for our empirical analyses (i.e., we analyse 14 M&As in this study), we choose to base the identification of the performance outcomes on these five M&As because they are widely viewed as the most influential within the industry.

Our identification procedure is as follows. First, we identify the promises made by these airlines based on the text-analyses of their financial filings, i.e., U.S. Securities and Exchange Commission (SEC) Form 425.[22] Second, we obtain the information on the concerns relating to these M&As from the text-analyses of interviews, case studies, business articles and press coverages featuring the M&As. Finally, we compare the promises made by these airlines prior to the approval of the M&A to their related concerns in order to identify the performance outcome(s) that best captures the interests of each of the airline's primary stakeholder. Table 4.2 provides some examples of the promises and concerns relating to these five most significant M&As, and Figure 4.1 lists the proposed variables.

[Insert Table 4.2 and Figure 4.1 about here]

[22] According to the Securities Exchange Act of 1933 rules 425 and 165, companies involved in a M&A are required to file prospectus form 425 describing the communication and information in relation to the M&A (SEC 1999).

4.3 Method

4.3.1 Empirical Strategy

To estimate the impact of M&As on the primary stakeholders of the airline industry, we compare the changes in the respective dependent variables of the acquiring airlines that undergo a M&A against other airlines that did not around the time in which each M&A occurred. In line with existing M&A studies (e.g., Prabhu, Chandy, and Ellis 2005; Sorescu, Chandy, and Prabhu 2007), we focus on the comparisons with the acquiring airlines because the outcomes of a M&A typically depends on the strategic decisions of these airlines following the M&A. Not only do they have a higher bargaining power over the target airlines, they also have a greater stake – the benefits accruing from a M&A are usually in favour of the acquirer.

Drawing on existing research in finance, accounting and economics, we adopt a stacked generalized difference-in-difference (GDID) approach (see Gormley and Matsa 2011; Gormley and Matsa 2016; Wooldridge 2007). We first construct a cohort of acquiring airlines that undergo a M&A and other airlines that did not using airline-quarter observations for the two years before and after the M&A for each quarter in which a M&A occurred. We use a two-year time window because prior studies in the M&A literature, as well as practitioners, consider two years as the period that is necessary to realize most of the effects of a M&A (e.g., Focarelli and Panetta 2003). Next, we pool the data across cohorts (and hence across all M&As) to estimate the average treatment effect of M&As. This approach is similar to the traditional different-in-difference (DID) approach in the following ways: 1) airlines that had undergone a M&A belong to the treatment group and those that did not belong to the control group, where M&A is the treatment, 2) given that our research context requires the examination of multiple treatments, i.e., we have more than one M&A in our sample periods and an airline can undergo more than one M&A, the construction of the cohorts allow us to isolate the impact of each treatment (i.e., M&A) as in the traditional DID approaches. Appendix A summarizes the number of airlines in the M&A group and the control group for each cohort. Accordingly, we specify the following equation:

$$\mathrm{Y_{ict}} = \beta_0 + \beta_1 \mathrm{MA_{ict}} + \gamma_{\mathrm{ic}} + \alpha_{\mathrm{ct}} + \omega_{\mathrm{i}} + \epsilon_{ict} \qquad (1.1)$$

where $\mathrm{Y_{ict}}$ is one of the dependent variables that captures the impact of M&As on the primary stakeholders of airline i in quarter t, $\mathrm{MA_{ict}}$ represents the impact of the *M&A*, a dummy variable that takes the value of 1 if airline i in cohort c undergo a M&A in quarter t, γ_{ic} is a set of cohort dummy variables to control for any possible mean differences in the specified dependent variable across cohorts, α_{ct} is a set of quarter dummy variables which is similar to time fixed effects and control for the mean differences between the period before and after the M&A, ω_{i} is a set of airline dummy variables to account for possible covariance among airlines (i.e., to account for code sharing, alliances, cross-ownership, etc.), and ϵ_{ict} is a random error term. From equation 1.1, the coefficient of interest is β_1 as it can be interpreted as the causal estimate of a M&A if the parallel trends assumption (i.e., acquiring airlines that undergo a M&A and other airlines that did not are identical in the specified dependent variable before the occurrence of the M&A), a key identifying assumption of the stacked GDID approach (Angrist and Pischke 2009), is satisfied.

Our approach has the following advantages. First, consistent with existing studies that have used the stacked GDID approach (Gormley and Matsa 2011; Gormley, Matsa, and Milbourn 2013), airlines are not required to be in our sample for the full four years and can be present in the control group in multiple cohorts even when they undergo a M&A at some point in the sample period. In the language of Gormley and Matsa (2016), we are adopting the matching with replacement strategy which can reduce the potential imbalances between the control and the M&A group (Stuart 2010). Second, the construction of the cohort of airlines allows us to more easily isolate a particular window of interest around each M&A. Third, while the presence of multiple M&As in our sample mitigates concerns regarding the violation of the parallel trends assumption, the inclusion of the cohort dummy variables also mitigates these concerns as it accounts for any possible selection bias that is due to the time-invariant cohort-specific or airline-specific omitted variables (see Gill, Sridhar, and Grewal 2017). However, our approach is still susceptible to the criticism of endogeneity since an airline's involvement in a M&A is not random and the possibility of selection bias might still exist if the bias is driven by airline-specific omitted variables that differ across airlines and time periods. Thus, we seek to account for the potential bias by augmenting equation 1.1 with $\mathrm{Z_{it}}$, a set of covariates that 1) have a relationship with the specified dependent variable and 2) can account for an airline's likelihood to undergo a M&A:

$$\mathrm{Y_{ict}} = \beta_0 + \beta_1 \mathrm{MA_{ict}} + \gamma_{\mathrm{ic}} + \alpha_{\mathrm{ct}} + \omega_{\mathrm{i}} + \beta_2 \mathrm{Z_{it}} + \epsilon_{ict} \qquad (1.2)$$

Existing research on M&As suggests that an airline's main motivation to enter a M&A is to increase its power and control within the industry (e.g., Ashenfelter, Hosken, and Weinberg 2015; Borenstein 1990). The power-related advantages stemming from the M&A, is likely to, in turn, influence the airline's performance on the dependent variables that reflect the interests of its primary stakeholders. For example, an airline might choose to enter a M&A so as to exert influence on prices (e.g., Kim and Singal 1993). This may potentially result in unobserved systematic differences between acquiring airlines that undergo a M&A and other airlines that did not. As such, in order to preserve the parallel trends assumption, the set of covariates should include airline-specific variables that proxy for an airline's strategic motives to enjoy power-related advantages through a M&A. In particular, we include *Firm Size*, *Leverage*, *Liquidity* and *Competition* as covariates because the financial structure of the airline and the level of competition it faces are likely to influence its likelihood of enjoying greater power to influence its performance on the dependent variables for each stakeholder.

Given that we are unable to observe all important variables that may influence an airline's decision to enter a M&A, we combine the stacked GDID approach with the Heckman (1979) two-step selection model (see Gill, Sridhar, and Grewal 2017; Shi et al. 2017 for examples of a similar approach). Specifically, in the first-step, we specify a selection model to estimate an airline's likelihood of undergoing a M&A using a probit specification:

$$\mathrm{MA_{ict}} = \delta_0 + \delta_1 \mathrm{Z_{it}} + [\delta_2 \mathrm{PMA_{it}} + \delta_3 \mathrm{MAP_{it}}] + \mu_{ict} \qquad (1.3)$$

where $\mathrm{MA_{ict}}$ represents the impact of the *M&A*, and μ_{ict} is the error term.

The selection model includes the set of covariates ($\mathrm{Z_{it}}$) that are also included in equation 1.2, as they predict an airline's choice of entering a M&A (i.e., *Firm Size*, *Leverage*, *Liquidity*, *Competition*). For the purpose of identification, we also include additional variables (i.e., exclusion restrictions, the variables in the square brackets in equation 1.3) that affect this choice but do not directly influence any of the dependent variables. We include two exclusion restrictions that proxy for peer influence in an airline's decision to enter a M&A. Building on the argument that "mergers occur because other mergers have already occurred" (e.g., Haleblian et al. 2012, p. 1039), we calculate two exclusion restrictions. First, we use a simple count measure that takes into account the influence of peers' decisions at the industry level, by calculating the number of competing airlines that entered into a M&A in the preceding four quarters, i.e., *Prior M&A* ($\mathrm{PMA_{it}}$).

A key limitation of the preceding variable is that it assumes that M&As by all rivals are likely to exert equal pressure on the focal airline. To address this limitation, we calculate a second exclusion restriction, *MAPROB* ($\mathrm{MAP_{it}}$) that presents a weighted measure of M&A

pressure on the focal airline. Specifically, we first calculate the route overlap between the focal airline and all other airlines that operate in the domestic US market. Next, we identify whether these airlines underwent a M&A in a given quarter. Finally, using the route overlap as a weight, we calculate the weighted average of the number of M&As undertaken by an airline's rivals. Using route overlaps allows us to adopt a more granular measure of the M&A pressures that an airline faces. In summary, we argue that both *Prior M&A* and *MAPROB* are conceptually related to an airline's decision to engage in M&As. However, there is little reason to expect these variables to directly influence firm-specific performance as they represent the joint decision by either the airline industry or the focal airline's closest rivals (Lev and Sougiannis 1996; Sridhar et al. 2016).

In the second step, we compute the inverse Mills ratio which we obtained from equation 1.3 (see Appendix C for more details) and we augment equation 1.2 by including the inverse Mills ratio as a selection correction term:

$$\mathrm{Y_{ict}} = \beta_0 + \beta_1 \mathrm{MA_{ict}} + \gamma_{\mathrm{ic}} + \alpha_{\mathrm{ct}} + \omega_{\mathrm{i}} + \beta_2 \mathrm{Z_{it}} + \beta_3 \mathrm{IMR_{it}} + \epsilon_{ict} \qquad (1.4)$$

where $\mathrm{IMR_{it}}$ represents the inverse Mills ratio of airline i in quarter t.

Given that we have multiple dependent variables, we estimate the system of equations (i.e., the system of equations comprises of fourteen equations all following the specification of equation 1.4) using seemingly unrelated regression in order to account for the potential correlations between the error terms across equations (Wooldridge 2010).

4.3.2 Airline Data

We construct the dataset for our study using information from multiple data sources managed by the U.S. Bureau of Transportation Statistics (BTS). First, we obtain the airlines' financial data from the Air Carrier Financial Reports (ACF) Schedule P-1.2, P-6, P-1(a) and B-1. Second, we collect non-stop segment and on-flight market data from the Air Carrier

Summary (ACS): T2: U.S. Air Traffic and Capacity Statistics by Aircraft Type. Third, we obtain on-time departure and arrival data from the Airline On-Time Performance Data (OTP). Finally, we collect data on quality from the Air Travel Consumer Reports (ATCR). At the intersection of these databases, we obtain data for U.S. airlines that have more than $20 million in annual operating revenues and have at least one percent of the total domestic market share. Given that we also hypothesize about the effects of M&As on consumers, we do not consider cargo airlines and non-scheduled/chartered airlines. To align the datasets, we aggregate the monthly-route-airline level data from OTP and the monthly-airline level data from ATCR to quarterly-airline level (see Luo and Homburg 2008 for a similar practice). Our final sample consists of an unbalanced quarterly panel of airline-quarter observations from 17 airlines between 1998 to 2015. Based on this sample, we identified the quarters in which a M&A occurred and the airlines involved in these M&As.

4.3.3 Identification Strategy

Consistent with prior literature (e.g., Sorescu, Chandy, and Prabhu 2007; Swaminathan, Murshed, and Hulland 2008), we identify whether an airline in our sample had undergone a M&A in a given quarter using data from the Securities Data Corporation Thompson Mergers and Acquisitions (SDC) database. Specifically, we first review all the 1,932 M&A agreements undertaken by the airlines industry in the SDC database from the first quarter of 1998 to the fourth quarter of 2015 before matching the M&A agreements to the airlines in our sample.[23] We consider an airline to have undergone a M&A if the M&A agreement in the SDC database fulfils the following conditions: 1) SDC indicates that the M&A has been completed (not rumoured), 2) the acquirer acquires and owns 100% of the target after the transaction, 3) it is a horizontal merger, i.e., both the target and the acquirer are from the

[23] We define the airlines industry in SDC as any M&A agreements that involve targets and/or acquirers from industries with the following Standard Industrial Classification (SIC) codes: 4513 Air Courier Services; 4522 Air Transportation, Nonscheduled; 4512 Air Transportation, scheduled; 4581 Airports, Flying Fields, and Airport Terminal Services (see OSHA 2017 for the definition of the SIC codes).

same industry, 4) it is an operational merger (not financial mergers such as stock swaps), and 5) both target and acquirer are U.S airlines. We draw upon the "Target" and "Acquirer" identifiers, as well as the synopsis of the M&As in the SDC database to identify the acquiring and target airlines. Taken together, all acquiring airlines that fulfil the above stated conditions are placed in the M&A group.

As the reliability of the stacked GDID approach depends on the identification of a clean control group (e.g., Meyer 1995), we also adhere to several strict conditions in identifying the airlines that belong to the control group. In particular, we do not include any airlines that undergo any form of M&As (i.e., including but not limited to operational acquisitions, financial mergers, partial acquisitions, purchase of assets, stock swaps etc.) in the two years before and after the focal acquiring airline's M&A. In addition, we also do not include the target airlines in the control group.

We identify the quarter in which a M&A occurred based on its completion date (i.e., date effective in the SDC database). To ensure the reliability of our treatment window, we verify the completion dates using the electronic search engine FACTIVA. In cases where there are any discrepancies in the completion dates, we use the earliest one. Since we are using a two-year time window and the time period of our sample ranges from 1998 to 2015, we only consider M&As from 2000 to 2013.[24] All in all, we consider a total of 14 M&As.

4.3.4 Measures

Price. Consistent with existing research (e.g., Phillips and Sertsios 2013), we measure price using a common price indicator in the airline industry, i.e., "yield", the ratio between an airline's operating revenues and its revenue passenger miles. In this way, price captures the average price per mile that each revenue passenger is paying. While data on operating

[24] This is to ensure that both airlines in the M&A group and the control group have up to two years of data both before and after the quarter in which the M&A occurred.

revenues is obtained from the ACS: Schedule P-1.2, data on revenue passenger miles is obtained from the ACS: T2: U.S. Air Carrier Traffic and Capacity Statistic by Aircraft Type. To make the coefficients more interpretable, price is scaled up by a factor of 1000.

Complaints. We measure complaints as the number of consumer complaints scaled by the total number of revenue passengers carried, which is equivalent to the quotient of revenue passenger miles and total aircraft miles flown in revenue service. We obtain data on consumer complaints from the ATCR, which comprises of the voluntary consumer complaints filed against all airlines both classified in a number of categories and aggregated across all categories.[25] Airlines with at least five complaints filed against them during the reporting period are listed individually whereas an aggregated number is reported for airlines with less than five complaints (see ATCR 2016). Since it is not possible for us to breakdown the aggregated number individually for these airlines, we let airlines with less than five complaints be the lower bound. In other words, for all airlines for which data on consumer complaints are not listed individually in a particular reporting period, we set the total number of consumer complaints for that airline in that period to be four. To compute the total number of revenue passengers carried, we obtain data from the ACS: T2: U.S. Air Carrier Traffic and Capacity Statistic by Aircraft Type.

Delays. We measure delays as the number of flights that depart or arrive more than fifteen minutes after the scheduled time scaled by the total number of flights using data from the OTP. We compute number of flight delays using the departure delay and arrival delay indicators as provided by BTS in the dataset. Specifically, the departure (arrival) delay indicator takes the value of 1 if the difference between the actual departure (arrival) time of

[25]As of the report issued in February 2016 (see ATCR 2016), there are 12 complaint categories. However, there are also some existing categories that were added as new categories (i.e., previously they were subsumed under another category) and/or categories that were removed (i.e., previously they were reported as separate categories but are now subsumed under an existing category) in earlier reports. That said, these changes should not affect our results as we are using the total number of complaints across all complaint categories and there are no new complaint categories that are actually added or removed.

the airline is fifteen minutes longer than the scheduled departure (arrival) time (BTS 2017b; BTS 2017d). The summation of the instances in which these indicators take the value of 1 provides the total number of flight delays.

Mishandled Baggage and Denied Boarding. We measure the mishandled baggage (denied boarding) as the number of passengers per 1000 (10,000) passengers that faced problems of mishandled baggage (were denied boarding).

Number of Flights. We measure number of flights using the variable "Flights" as provided by BTS in the OTP (see BTS 2017d).

Number of Routes. Consistent with existing research (e.g., Mantin and Rubin 2016), we measure number of routes based on airport pairs using data from OTP. We define an airport pair as a pair of departure and arrival airport codes on a flight itinerary. For example, a flight departing from John F. Kennedy Airport to Los Angeles Airport is travelling on a separate route as one that departs from Los Angeles Airport to John F. Kennedy Airport[26].

Employee Salaries, Senior Manager Salaries and Employment Benefits. We measure Senior Manager Salaries using the variable "SalariesMgmt", Employee Salaries by subtracting Senior Manager Salaries from the variable "Salaries" and employment benefits using the variable "Benefits". Data on these three variables are as provided by BTS in the ACF: Schedule P-6.

Number of Employees. BTS provides the monthly average of the total number of full-time and part-time employees in the ACF: Schedule P-1(a) through the variable "TotalEmployees". Therefore, to derive the number of employees within a quarter, we take the mean of the monthly averages to align it to the quarterly-level.

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[26] For all subsequent mentions of routes, we refer to this definition.

Operating Margin and Operating Expenses. Following BTS (e.g., BTS 2016), we compute operating margin as the ratio of an airline's operating profit or loss to its operating passenger revenues using data from ACF: Schedule P-1.2. In addition, we also derive an airline's operating expenses from the variable "OpExpenses" found in the same database.

Revenue Passenger Miles. We obtain data on revenue passenger miles from the variable "RexPaxMiles" as provided by BTS in the ACS: T2: U.S. Air Carrier Traffic and Capacity Statistic by Aircraft Type. BTS defines revenue passenger miles as "one revenue passenger transported one mile in revenue service", and compute this variable by taking the "summation of the products of the revenue aircraft miles on each interairport segment multiplied by the number of revenue passengers carried on that segment" (see BTS 2017a).

Control Variables. We measure *Firm Size* using the airline's total assets, *Leverage* using the debt-to-equity ratio and *Liquidity* using its current ratio. Data utilized for the computation of these three variables is obtained from ACF: Schedule B-1. As for *Competition*, we derive this variable using data from the OTP. Specifically, we first compute the number of competing airlines travelling on the same route as the focal airline and then scale this value by the total number of routes that the focal airline travels on.

Exclusion Restrictions. We compute *Prior M&A* as the number of competing airlines that were involved in M&As in the two years prior to the focal airline's M&A and we measure *MAPROB* as the product of competitors' percentage of route overlap with the focal airline and the dummy variable indicating whether these competitors were involved in M&As in the last two years. While the identification of the airlines that were involved in M&As is consistent with the derivation of the main effect variable, *M&A*, we derive the percentage of route overlap using data in the OTP. We first create a matrix of airline pairs, where each airline pair reflects the number of routes where they overlap. The percentage of route overlap is then computed by dividing the number of route overlaps for each competing airline to the focal airline with the total number of routes that the focal airline travels on.

Table 4.3 outlines the variables, their measures and data sources, while Table 4.4 provides the descriptive statistics for the measures. Due to their skewed distributions (see Table 4.4), we take the natural logarithm of *Number of Flights*, *Number of Routes*, *Employee Salaries*, *Senior Manager Salaries*, *Employment Benefits*, *Number of Employees*, *Revenue Passenger Miles*, *Operating Expenses* and *Firm Size*.

[Insert Table 4.3 and 4.4 about here]

4.4 Results

4.4.1 Assessing the Potential Violation of the Parallel Trends Assumption

In order to further ensure the fulfilment of the parallel trends assumption, we pool the data across cohorts and compute the mean values of the fourteen dependent variables and four covariates across acquiring airlines that undergo a M&A and other airlines that did not both in the year before and two years before the M&A. To account for the potential covariance among airlines (i.e., to account for code sharing, alliances, cross-ownership, etc.), we use standard errors that are clustered at the firm-level in order to derive the *t*-test statistic and hence the *p*-values. This approach is consistent with prior research that utilize the stacked GDID approach (e.g., Gormley and Matsa 2011). We find that the dependent variables and the covariates do not differ significantly between firms that undergo a M&A and those that did not both in the year before and two years before the M&A (see Table 4.5). As such, the two groups of airlines are similar in these dimensions at the aggregate level.

Taken together, these findings lower concerns against the violation of the parallel trends assumption and lends support to our use of the stacked GDID approach in the current research context. We will now discuss our findings.

[Insert Table 4.5 about here]

4.4.2 Results of the Focal Model

We first discuss the results of the selection equation (i.e., equation 1.3) (see Appendix 4.C, Table 4.C1 for the results of the selection model). In particular, we find support for one of the exclusion restrictions as an airline's likelihood of entering a M&A increases when it faces greater M&A pressures from its closest rivals ($\delta_3 = 0.675, p < 0.01$). However, we find that whether more airlines within the industry are engaging in M&As does not significantly impact an airline's probability of engaging in M&As ($\delta_2 = 0.031, p > 0.10$). In addition, we also find that the selection correction term is significant in all the equations in which the treatment variable, *M&A*, is also significant (see Table 4.6). As such, the results support the importance of accounting for selection bias. We now discuss the results of our focal model. Table 4.6 reports the estimation results of our focal model.

[Insert Table 4.6 about here]

Results suggest that consumers face significantly higher prices ($\beta_{1_{price}} = 0.051, p < 0.01$) following a M&A. The impact of M&As on quality is negative; while M&As do result in greater complaints and delays ($\beta_{1_{complaints}} = 1.517, p < 0.01$; $\beta_{1_{delays}} = 0.117, p < 0.01$), there is no impact on mishandled baggage or denied boarding ($\beta_{1_{mishandled\ baggage}} = -0.103, p > 0.10$; $\beta_{1_{denied\ boarding}} = 0.249, p > 0.10$). However, it is clear that consumers face lower choices, as the number of flights and routes decline significantly following a M&A ($\beta_{1_{number\ of\ flights}} = -0.091, p < 0.01$; $\beta_{1_{number\ of\ routes}} = -0.215, p < 0.01$).

With respect to employees and senior managers, results indicate that M&As benefit only the senior managers. While senior managers can look forward to enjoying a pay raise following a M&A($\beta_{1_{senior\ managers'salaries}} = 1.450, p < 0.01$), employees should brace themselves for pay cuts ($\beta_{1_{employees'salaries}} = -0.272, p < 0.01$). More importantly, M&As

also result in reductions in employment benefits and headcount ($\beta_{1_{employment\ benefits}} = -0.412, p < 0.01$; $\beta_{1_{number\ of\ employees}} = -0.216, p < 0.01$).

Results indicate that the impact of M&As for investors is unclear. Although a M&A can increase an acquiring airline's profitability and also result in cost savings ($\beta_{1_{operating\ margin}} = 0.113, p < 0.01$; $\beta_{1_{operating\ expenses}} = -0.157, p < 0.01$), it reduces the demand for the acquiring airline's service ($\beta_{1_{revenue\ passenger\ miles}} = -0.316, p < 0.01$).

4.4.3 Sensitivity Analyses

We performed several sensitivity analyses to examine the robustness of our results, which we summarize in Table 4.7 (detailed estimation results are available in Appendix 4.B, Table 4.B1 and the estimation results for the selection model of these analyses are available in Appendix 4.C, Table 4.C1). We will discuss each of these analyses in the subsequent sections.

Alternative Exclusion Restrictions. We examine the robustness of our results to alternative exclusion restrictions. First, consistent with existing research (e.g., Gill, Sridhar, and Grewal 2017), we re-estimated our focal model by including only one of the two exclusion restrictions. Second, we also examined the robustness of our results when we measure the exclusion restrictions using a one-year, as opposed to a two-year time period prior to the quarter in which the focal M&A occurred. Across all analyses, our conclusions remain largely unchanged.

Alternative M&A Date. Given that findings from previous M&A studies suggest that operational synergies or strategic alliances may occur even before the completion of a M&A (e.g., Swaminathan, Murshed, and Hulland 2008), we also assess the sensitivity of our results to the identification of the quarter in which the M&A occurred. Specifically, we use the announcement, as opposed to the completion dates. Our results remain largely unchanged.

Alternative Time Windows to Construct Cohorts. Consistent with existing research that adopt the stacked GDID approach (e.g., Gormley and Matsa 2011), we also assess the robustness of our results to alternative time windows used to construct the cohorts. In particular, we repeat the estimation process using 1-year, 3-year, 4-year and 5-year time windows to construct the cohorts. Due to to the availability of data required to construct each cohort, the 2 M&As that occurred in 2013, i.e., Endeavor Air and Delta, and US Airways and American Airlines, are dropped in the sensitivity analyses that use the 3-year, 4-year and 5-year time window, and the M&A that occurred in 2001, i.e., Trans World Airways and American Airlines, is also dropped in the sensitivity analyses that use the 4-year and 5-year time window. In addition, the 2 M&As that occurred in 2011, i.e., AirTran and Southwest Airlines, and ExpressJet Airlines and Atlantic Southeast Airlines, are also dropped in the sensitivity analysis that uses the 5-year time window. Our substantive conclusions remain largely unchanged across all of these analyses.

[Insert Table 4.7 about here]

4.5 Post-Hoc Analyses

4.5.1 Exploring the Heterogeneity in M&As Effects: Moderating Role of Prior Service Emphasis

The results of the main effects analysis (see Table 4.6) indicates that M&As do not only result in negative implications for consumers, they also result in negative implications for employees and the benefits for investors remain unclear. Despite the promises made by the airlines prior to the approval of the M&A, the only stakeholders that are benefiting from the M&A are the senior managers. Taken together, the results underscore the importance for regulators to consider evaluating the impact of M&As using a stakeholder-specific approach. However, several questions remain: Given that it is impractical for regulators to block all M&As, how can regulators identify the M&As that do lesser harm than others? For example, prior research suggests that an airline that puts more emphasis on serving its passengers are more likely to adopt a customer-oriented as opposed to a cost reduction strategy to improve its profitability (Rust, Moorman, and Dickson 2002). Thus, are some of the negative consequences driven by different ex ante airline characteristics, such as an airline's prior service emphasis? To answer these questions, we now examine the cross-sectional heterogeneity of the impact of M&As across airlines with different prior service emphasis.

In order to explore the moderating role of airlines' prior service emphasis, we modify our empirical examination so that we can compare the impact of M&As involving acquiring airlines with different prior service emphasis. Specifically, we augment equation 1.4 by including an airline's prior service emphasis as a moderator:

$$\mathrm{Y_{ict}} = \beta_0 + \beta_1 \mathrm{MA_{ict}} + \gamma_{ic} + \alpha_{ct} + \omega_i + \beta_2 \mathrm{Z_{it}} + \beta_3 \mathrm{IMR_{it}} + \beta_4 \mathrm{MA_{ict}} \times PSE_{ict} + \epsilon_{ict} \quad (1.5)$$

where PSE_{ict} corresponds to the prior service emphasis of airline i in cohort c in quarter t. We measure an airline's service emphasis using its passenger service expenses (DT: PaxService, in Thousands of dollars) obtained from the ACS: Schedule P-1.2. This is a good proxy because it accounts for the total expenditure that an airline devotes to activities that contribute to the "comfort, safety and convenience of passengers while in flight and when flights are interrupted" (Code of Federal Regulations 2017). In order to account for the size of an airline with respect to the amount it spends on serving passengers, we scale passenger service expense by the total number of revenue passengers carried, which is equivalent to the quotient of revenue passenger miles (DT: RevPaxMiles, in Thousands) and total aircraft miles flown in revenue service (DT: RevAirMiles, in Thousands). We obtain this data from the ACS: T2: U.S. Air Carrier Traffic and Capacity Statistic by Aircraft Type. Since we wish to test the differential impact of M&As involving acquiring airlines with different ex ante service emphasis, we take the value of this ratio in the year prior to the focal M&A to obtain the moderator specified in equation 1.5, *Prior Service Emphasis* (PSE_{ict}).[27]

To facilitate the interpretation of parameter estimates, we normalize *Prior Service Emphasis* by its sample standard deviation and demean it with respect to its sample mean.[28] Taken together, β_1 represents the impact of a M&A involving acquiring airlines with average prior service emphasis and β_4 represents the incremental impact of a M&A for a standard deviation increase in an acquiring airline's prior service emphasis.

[Insert Table 4.8 about here]

Table 4.8 presents that estimation results of the moderating effect of prior service emphasis. We find that the impact of M&As involving acquiring airlines with average prior service emphasis is consistent to that of the main effects analysis (see Table 4.6) in all but one instance. Specifically, we find that whereas the impact of M&As on denied boarding is not statistically significant in the main effects analysis, M&As involving acquiring airlines with average prior service emphasis result in significantly greater denied boarding ($\beta_{1_{denied\ boarding}} = 0.516, p < 0.10$).

Our results also suggest that there is significant heterogeneity in the impact of M&As involving acquiring airlines with different prior service emphasis. Although we do not find any differential impact on prices across airlines with different prior service emphasis ($\beta_{4_{price}} = 0.002, p > 0.10$), we find that a one standard deviation increase in an acquiring

[27] We follow the same procedure as that of the fourteen dependent variables and the covariates to verify that the moderator, *Prior Service Emphasis*, does not violate the parallel trends assumption in the year before and two years before the focal M&A. In comparing the means for the 2 years before the M&A, we measure *Prior Service Emphasis* in the two years, as opposed to a year, before the occurrence of the focal M&A. We find that the mean value of *Prior Service Emphasis* does not differ significantly across the acquiring airlines and the other airlines that did not undergo a M&A in the year before ($1013.149, p > .10$) and two years ($1052.827, p > .10$) before the M&A.

[28] The main effect of this moderator drops out in the estimation of equation 1.5 because it is time-invariant and perfectly collinear with the cohort (γ_{ic}) and the airline (ω_i) dummy variables by construction (see Gormley, Matsa, and Milbourn 2013 for a similar explanation).

airline's prior service emphasis is associated with a smaller increase in complaints, delays and denied boarding ($\beta_{4_{complaints}} = -0.455, p < 0.01$; $\beta_{4_{delays}} = -0.011, p < 0.01$; $\beta_{4_{denied\ boarding}} = -0.135, p < 0.05$). Similarly, results also indicate that higher prior service emphasis cushions the negative impact of M&As on choices as there is a significantly smaller decline in the number of flights and routes following M&As involving acquiring airlines with higher prior service emphasis ($\beta_{4_{number\ of\ flights}} = 0.053, p < 0.01$; $\beta_{4_{number\ of\ routes}} = 0.066, p < 0.01$).

The impact of M&As, when evaluated from the perspectives of employees and senior managers, also exhibit differential responses with respect to the acquiring airlines' prior service emphasis. Specifically, M&As involving acquiring airlines with higher prior service emphasis result in both a smaller reduction in employee salaries and a smaller increment in senior managers salaries ($\beta_{4_{employees'\ salaries}} = 0.072, p < 0.01$; $\beta_{4_{senior\ managers'\ salaries}} = -0.202, p < 0.01$). More importantly, these M&As also result in smaller reductions in employment benefits and headcount ($\beta_{4_{employment\ benefits}} = 0.066, p < 0.01$; $\beta_{4_{number\ of\ employees}} = 0.039, p < 0.01$).

An acquiring airline's prior service emphasis also moderates the impact of M&As when evaluated from the investor perspective. Although higher prior service emphasis is associated with a smaller decrease in the demand for an acquiring airline's service ($\beta_{4_{revenue\ passenger\ miles}} = 0.051, p < 0.01$), it is also associated with a smaller increase in its profitability and cost savings ($\beta_{4_{operating\ margin}} = -0.015, p < 0.01$; $\beta_{4_{operating\ expenses}} = 0.071, p < 0.01$).

The observed heterogeneous effects of M&As with respect to the different prior service emphasis of the acquiring airlines is also robust to alternative measures of the moderator. Specifically, we assess the sensitivity of these results to three alternative measures – *Prior Service Emphasis* relative to industry average, *Prior Service Emphasis* before normalizing or demeaning, and computing *Prior Service Emphasis* in the two years, as opposed to a year, before the occurrence of the focal M&A.[29] As observed in Table 4.8, our conclusions remain unchanged across all analyses.[30]

4.6 Discussion

The results underscore the importance of considering the impact of M&As using a stakeholder-specific approach, thereby responding to recent calls for more research that adopts the stakeholder perspective in marketing (see Mishra and Modi 2016, p. 43), and more studies that account for the societal consequences of marketing actions (Moorman and Day 2016, p. 29). Specifically, we find that only senior managers of the acquiring airlines benefit from the M&As. While consumers face higher prices, poorer quality and fewer choices, employees find their wages and benefits being cut on top of the risk of being laid off. More importantly, it is also not clear if investors actually benefit. The higher profits and greater cost savings accruing from these M&As might be short-lived as the acquiring airline faces lower growth following the M&A.

4.6.1 Implications for Policy Makers

Through the exploration of the heterogeneous effects of M&As, this study not only underscores the main effects of mergers, but also identifies an airline's prior service emphasis as an ex ante airline characteristic that regulators can consider when evaluating whether to approve a M&A. In particular, the moderating effect of prior service emphasis identify the

[29] We take the difference between an airline's *Prior Service Emphasis* and the industry average value to obtain *Prior Service Emphasis* relative to industry average. The industry average value of *Prior Service Emphasis* excludes the airline's own value. To make the coefficients more interpretable, *Prior Service Emphasis* before normalizing or demeaning is scaled down by a factor of 1000.

[30] The estimation of all models except the *Two Years Before M&A* model results in a reduction in sample size from 1,312 (as in the main effects analysis) to 1,281 because there are some airlines in the control group that are not present in the year before the occurrence of the focal M&A but are present in the two years before (see Appendix A for more details).

boundary conditions for the main effects of M&As on the respective dependent variables. To illustrate these boundary conditions, we calculate the marginal effects of M&As on each of the dependent variables for which the interaction effects are significant ($p < 0.05$, two-sided) and plot them across different levels of prior service emphasis (see Figure 4.2a, 4.2b and 4.2c).

[Insert Figure 4.2a about here]

Figure 4.2a identifies the boundary conditions for the observed negative effects of M&As on the dependent variables that reflect the perspective of the consumer. As observed in Panels A, B and C, the negative effects of M&As on quality are significantly cushioned by the acquiring airline's prior service emphasis – M&As involving acquiring airlines with high service emphasis can reduce the negative impact of M&A on delays by about 3%, denied boarding by more than 35% and complaints by almost 125%.[31] In fact, the negative effects of M&As on delays are only significant for M&As involving acquiring airlines with low prior service emphasis (see Panel C). Similarly, higher prior service emphasis also lowers the reduction in choices following M&As (see Panel D and E). In particular, M&As involving acquiring airlines with high prior service emphasis can reduce the number of flight cuts by almost 15% and the number of route cuts by almost 18%.

[Insert Figure 4.2b about here]

We present the marginal effects of M&As from the perspectives of employees and senior managers in Figure 4.2b. As illustrated in Panels A, C and D, acquiring airlines with high prior service emphasis tend to reduce employee salaries, benefits and headcount by almost 20%, 18% and 11% less than acquiring airlines with lower service emphasis following

[31] We identify an acquiring airline to have high (low) prior service emphasis if its value of prior service emphasis is at the 95 (5) percentile of the sample distribution. For all further mentions of high and low prior service emphasis in this section, we refer to this definition.

a M&A. The increase in senior manager salaries following M&As involving acquiring airlines with high prior service emphasis is also more than 50% lower than M&As involving acquiring airlines with low prior service emphasis.

[Insert Figure 4.2c about here]

Figure 4.2c illustrates the moderating effect of prior service emphasis on the impact of M&As with respect to the dependent variables reflecting the investor perspective. Although acquiring airlines with high, as opposed to low, prior service emphasis enjoy lower increments in operating margins following a M&A, it is only by a small amount of 4%. They also enjoy a 20% smaller reduction in operating expenses. However, acquiring airlines with high prior service emphasis result in a 14% smaller reduction in revenue passenger miles.

Given that the airlines industry contributes up to 7.1% of the total employment in the U.S. (ATA 2017), and that the Federal Trade Commission (FTC)'s objective is to prevent M&As that are likely to result in consumers facing "higher prices, lower quality, reduced service or fewer choices as a result of the merger" (FTC 2017), regulators should indeed consider adopting a more holistic approach and taking into account an airline's prior service emphasis when evaluating future M&As in this industry.

Table 4.1
Summary of Literature on M&As in the Airlines Industry

Paper	Dependent Variables Examined in this Study														No. of M&As Examined
								Salaries							
	Price	Complaints	Delays	Mishandled Baggage	Denied Boarding	No. of Flights	No. of Routes	Employees	Senior Managers	Benefits	No. of Employees	O. Margin	O. Expenses	RPM	
Borenstein (1990)	√														2
Brueckner, Dyer, and Spiller (1992)	√														2
Kim and Singal (1993)	√	√				√	√								14
Morrison (1996)	√						√								3
Singal (1996)	√														14
Peters (2006)	√														5
Kwoka and Shumilkina (2010)	√						√								1
Prince and Simon (2017)	√	√	√	√											5
This paper	√	√	√	√	√	√	√	√	√	√	√	√	√	√	14

Notes. M&A = Merger and Acquisition; No. = Number; O. = Operating; RPM = Revenue Passenger Miles. We do not argue that this is an exhaustive list of papers that examine M&As in the airlines industry but rather, we seek to provide examples of the representative studies that examined some of these dependent variables.

Table 4.2
Examples of Concerns and the Promises Made by the Airlines involved in M&As

Concern	Promise	Stakeholder Affected
"*The US Airways-America West deal may mimic what happened when American purchased the assets of bankrupt T.W.A. in 2001. It eliminated dozens of flights, particularly at T.W.A.'s home base in St. Louis and laid off thousands of T.W.A. employees*." - (Maynard 2005a, The New York Times)	*"…US Airways wants to bring the global airlines group an added bonus through its proposed merger with America West: more destinations."* - (US Airways 2005, SEC Filing Form 425)	Consumers
"*In markets where Southwest and AirTran compete head to head, such as Baltimore, Orlando and Milwaukee, prices are likely to go up if they combine*." - (Hunter 2010, CNN)	"*Growth is possible due to the joining of two low-cost, low-fare airlines that have very little route overlap. Expanding Southwest's low-fare service to additional domestic markets will generate hundreds-of-millions in annual savings to Consumers as well as increased economic activity in the markets we serve.*" - (Southwest Airlines Co. 2011, SEC Filing Form 425)	Consumers
"*But many of the employee unions at Northwest were quick to voice opposition to the deal, even though Delta said it is not looking to cut non-office staff*." - (Isidore 2008, CNN Money)	"*The merger will create a financially stronger airline, better positioned to protect jobs, compensation and benefits. Delta and Northwest worked side by side with their employees to obtain passage of the Pension Protection Act of 2006, to make pension funding more affordable. The transaction will make employee pensions and benefits more secure*." - (Delta Air Lines 2008, SEC Filing Form 425)	Employees & Senior Managers
"*It seems to be understood that the merger will lead to lay-offs. It seems to be understood that the merger will lead to lay-offs. Bill McGee, aviation consultant at the Consumers Union, recently told a Congressional committee: "These sterile corporate terms – downsizing, rightsizing, outsourcing, offshoring, furloughing – really mean that two workforces already shell-shocked from two decades of layoffs will experience more trauma."*" - (Clark 2010, The Guardian)	"*The Merger Provides Job Stability for Employees: …The merger will offer our employees improved long-term career opportunities and enhanced job stability by being part of a larger, financially stronger and more geographically diverse carrier that is better able to compete successfully in the global marketplace and withstand the volatility of our industry…we expect that any necessary reductions in front line employees will come from retirements, normal attrition and voluntary programs.*" - (UAL Corporation 2010, SEC Filing Form 425)	Employees & Senior Managers
"*While American has been losing money over the last several years, US Airways has improved its financial situation recently. But the combination of the two does not promise to generate tremendous improvements in their combined operating positions*." - (Cohan 2013, Forbes.com)	"*The transaction is expected to generate more than $1 billion in annual net synergies in 2015, including $900 million in network revenue synergies, resulting predominantly from increased passenger traffic, taking advantage of the combined carrier's improved schedule and connectivity, an improved mix of high-yield business, and the redeployment of the combined fleet to better match capacity to customer demand. Estimated cost synergies of approximately $150 million are net of the impact of the new labour combined contracts at American Airlines and US Airways*." - (American Airlines 2013, SEC Filing Exhibit 99.1)	Investors

Notes. M&A = Merger and Acquisition.

Table 4.3
Variables, Measures, and Data Sources

Variable	Operationalization	Source
M&A	= 1 if airline undergoes a M&A.	SDC; FACTIVA
Price	Ratio of operating passenger revenues (DT: TransRevPax, in Thousands of dollars) to revenue passenger miles (DT: RevPaxMiles, in Thousands) scaled up by a factor of 1000.	ACF: Schedule P-1.2; ACS: T2 : U.S. Air Carrier Traffic and Capacity Statistics by Aircraft Type
Complaints	Number of consumer complaints scaled by total number of revenue passengers carried, which is equivalent to the quotient of revenue passenger miles (DT: RevPaxMiles, in Thousands) and total aircraft miles flown in revenue service (DT: RevAirMiles, in Thousands).	Air Travel Consumer Reports; ACS: T2 : U.S. Air Carrier Traffic and Capacity Statistics by Aircraft Type
Delays	Number of flights that depart (DT: DepDel15) or arrive (DT: ArrDel15) more than 15 minutes after the scheduled time scaled by total number of flights (DT: Flights).	Airline On-Time Performance Data
Mishandled Baggage	Number of passengers per 10,000 passengers that were denied boarding.	Air Travel Consumer Reports
Denied Boarding	Number of passengers per 1000 passengers that faced problems of mishandled baggage.	
Number of Flights	Total number of flights (DT: Flights).	
Number of Routes	Total number of routes based on airport pairs, where an airport pair is defined as a pair of departure (DT: OriginAirportID) and arrival (DT: DestAirportID) airport codes on a flight itinerary.	Airline On-Time Performance Data
Employee Salaries	Difference between total salaries (DT: Salaries, in Thousands of dollars) and salaries from general management personnel (DT: SalariesMgt, in Thousands of dollars).	
Senior Manager Salaries	The salaries from general management personnel (DT: SalariesMgt, in Thousands of dollars).	ACF: Schedule P-6
Employment Benefits	Total related fringe benefits (DT: Benefits, in Thousands of dollars).	
Number of Employees	Total employees (DT: TotalEmployees).	ACF: Schedule P-1(a)
Operating Margin	Ratio of operating profit or loss (DT: OpProfitLoss, in Thousands of dollars) to operating passenger revenues (DT: TransRevPax, in Thousands of dollars).	ACF: Schedule P-1.2
Operating Expenses	An airline's operating expenses (DT: OpExpenses, in Thousands of dollars).	ACF: Schedule P-1.2
Revenue Passenger Miles	Revenue passenger miles (DT: RevPaxMiles, in Thousands), computed by summation of the products of the revenue aircraft miles on each interairport segment multiplied by the number of revenue passengers carried on that segment.	ACS: T2: U.S. Air Carrier Traffic and Capacity Statistics by Aircraft Type
Firm Size	Total assets (DT: Assets, in Thousands of dollars).	
Leverage	Total long-term debt (DT: LongTermDebt, in Thousands of dollars) scaled by total assets (DT: Assets, in Thousands of dollars).	ACF: Schedule B-1
Liquidity	Ratio of current assets (DT: CurrAssets, in Thousands of dollars) to current liabilities (DT: CurrLiabilities, in Thousands of dollars).	
Competition	Number of competing airlines that travel on the same routes as that of the focal airline scaled by the total number of routes that the focal airline travels on.	Airline On-Time Performance Data
Prior M&A	Number of competing airlines that were involved in M&As in the last two years.	SDC; FACTIVA
MAPROB	The product of competitors' percentage of route overlap with the focal airline and the dummy variable indicating whether these competitors were involved in M&As in the last two years.	Airline On-Time Performance Data; SDC; FACTIVA

Notes. M&A = Mergers and Acquisition; MAPROB = M&A Pressures from Closest Competitors; DT: Data Item; SDC = Securities Data Corporation Thompson Mergers and Acquisitions; ACF = Air Carrier Financials; ACS = Air Carrier Summary. All variables are measured at the quarterly level.

Table 4.4
Descriptive Statistics

		Mean	Standard Deviation	Minimum	Maximum
1	M&A (D)	0.079	0.269	0	1
2	Price	0.139	0.045	0.070	0.337
3	Complaints	0.729	1.147	0.019	13.175
4	Delays	0.172	0.061	0.030	0.375
5	Mishandled Baggage	5.052	2.883	0.790	16.167
6	Denied Boarding	0.994	0.827	0.000	5.010
7	Number of Flights (No.)	90,938.040	60,485.760	11,997.000	298,762.000
8	Number of Routes (No.)	312.143	197.889	34.000	1,058.000
9	Employee Salaries (No.)	315,274.700	328,814.500	22,872.260	1,857,045.000
10	Senior Manager Salaries (No.)	8,726.782	8,888.373	129.000	66,682.000
11	Employment Benefits (No.)	143,700.300	157,432.300	8,705.910	848,543.700
12	Number of Employees (No.)	23,549.880	22,070.950	2,670.000	106,972.700
13	Operating Margin	0.019	0.117	-0.926	0.292
14	Operating Expenses (No.)	1.637E+06	1.742E+06	1.259E+05	1.040E+07
15	Revenue Passenger Miles (No.)	1.020E+10	1.010E+10	5.510E+08	5.460E+10
16	Firm Size (No.)	8.469E+06	9.331E+06	2.090E+05	5.760E+07
17	Leverage	0.319	0.227	0.000	0.954
18	Liquidity	1.019	0.554	0.120	4.326
19	Competition	0.925	0.398	0.200	2.552
20	Prior M&A (No.)	6.836	3.694	0	13
21	MAPROB	0.377	0.469	0.000	2.466

Notes. M&A = Mergers and Acquisition; MAPROB = M&A Pressures from Closest Competitors; D = Dummy Variable; No. = Number. We take the natural logarithm of *Number of Flights*, *Number of Routes*, *Employee Salaries*, *Senior Manager Salaries*, *Employment Benefits*, *Number of Employees*, *Operating Expenses*, *Revenue Passenger Miles* and *Firm Size* due to their skewed distributions. There is a total of 1,312 observations from 17 airlines. All variables are ratios unless otherwise stated in parenthesis. The reported descriptive statistics in this table are before taking the logarithm (if applicable), where *Employee Salaries*, *Senior Manager Salaries*, *Employment Benefits*, *Operating Expenses* and *Firm Size* are in thousands of dollars, and *Revenue Passenger Miles* is in thousands. We report the descriptive statistics of M&A as the proportion of observations where the dummy variable takes the value of 1.

Table 4.5
Comparing Means of Dependent Variables and Covariates before M&A

		Control Group	M&A Group	Difference	p-value of Difference
	1 Year Before the M&A	*Mean*	*Mean*		
1	Price	0.142	0.132	0.011	0.723
2	Complaints	0.701	1.465	-0.765	0.205
3	Delays	0.177	0.191	-0.015	0.648
4	Mishandled Baggage	5.330	4.348	0.982	0.529
5	Denied Boarding	1.079	0.790	0.289	0.436
6	Number of Flights	11.119	11.728	-0.609	0.257
7	Number of Routes	5.440	6.102	-0.663	0.219
8	Employee Salaries	12.060	12.917	-0.857	0.190
9	Senior Manager Salaries	8.573	8.914	-0.342	0.505
10	Employment Benefits	11.150	12.136	-0.986	0.207
11	Number of Employees	9.590	10.367	-0.777	0.187
12	Operating Margin	0.012	0.043	-0.031	0.642
13	Operating Expenses	13.683	14.626	-0.943	0.194
14	Revenue Passenger Miles	22.436	23.398	-0.962	0.172
15	Firm Size	15.215	16.227	-1.012	0.233
16	Leverage	0.334	0.238	0.096	0.452
17	Liquidity	0.972	1.143	-0.171	0.641
18	Competition	0.870	1.097	-0.226	0.393
Observations		285	54		
Airlines		13	8		
		Control Group	**M&A Group**	**Difference**	**p-value of Difference**
	2 Years Before the M&A	*Mean*	*Mean*		
1	Price	0.140	0.128	0.012	0.708
2	Complaints	0.686	1.536	-0.850	0.125
3	Delays	0.173	0.183	-0.010	0.730
4	Mishandled Baggage	5.029	4.290	0.739	0.637
5	Denied Boarding	1.057	0.876	0.181	0.629
6	Number of Flights	11.168	11.777	-0.609	0.262
7	Number of Routes	5.472	6.123	-0.652	0.250
8	Employee Salaries	12.123	13.035	-0.912	0.221
9	Senior Manager Salaries	8.589	8.989	-0.400	0.494
10	Employment Benefits	11.218	12.274	-1.057	0.237
11	Number of Employees	9.654	10.471	-0.817	0.219
12	Operating Margin	0.016	0.030	-0.014	0.835
13	Operating Expenses	13.703	14.709	-1.006	0.203
14	Revenue Passenger Miles	22.478	23.492	-1.014	0.186
15	Firm Size	15.278	16.338	-1.060	0.176
16	Leverage	0.342	0.246	0.096	0.476
17	Liquidity	0.952	1.067	-0.115	0.721
18	Competition	0.842	1.046	-0.205	0.400
Observations		596	102		
Airlines		13	8		

Notes. M&A = Mergers and Acquisitions; M&A (Control) Group = Acquiring (other) airlines that did (not) undergo a M&A. We take the natural logarithm of *Number of Flights*, *Number of Routes*, *Employee Salaries*, *Senior Manager Salaries*, *Employment Benefits*, *Number of Employees*, *Operating Expenses*, *Revenue Passenger Miles* and *Firm Size* due to their skewed distributions. We compute the *p*-value (two-sided) from a *t*-test for the difference between airlines in the no M&A and M&A group, where the standard errors are clustered at the airline level to allow for potential covariance among airlines (i.e., in the airline context, to account for code sharing, alliances, cross-ownership, etc.).

Table 4.6
Results of Main Effects

	CONSUMERS						
	Price	Quality				Choice	
		Complaints	Delays	Mishandled Baggage	Denied Boarding	Number of Flights	Number of Routes
Variables	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**
M&A	0.051 (0.006) ***	1.517 (0.258) ***	0.117 (0.015) ***	-0.103 (0.513)	0.249 (0.253)	-0.091 (0.041) **	-0.215 (0.044) ***
Firm Size	0.033 (0.002) ***	0.310 (0.086) ***	-0.027 (0.005) ***	0.361 (0.171) **	-0.490 (0.084) ***	0.147 (0.013) ***	0.191 (0.015) ***
Leverage	0.030 (0.005) ***	-0.742 (0.215) ***	-0.008 (0.012)	2.128 (0.427) ***	0.930 (0.211) ***	-0.151 (0.034) ***	-0.219 (0.037) ***
Liquidity	-0.009 (0.002) ***	0.061 (0.079)	-0.028 (0.005) ***	0.231 (0.157)	-0.101 (0.077)	-0.014 (0.012)	0.053 (0.014) ***
Competition	-0.011 (0.003) ***	-0.286 (0.132) **	-0.041 (0.008) ***	-2.014 (0.264) ***	0.052 (0.130)	-0.238 (0.021) ***	0.031 (0.023)
IMR	-0.030 (0.004) ***	-0.720 (0.145) ***	-0.061 (0.008) ***	-0.092 (0.289)	-0.175 (0.143)	0.083 (0.023) ***	0.136 (0.025) ***
	EMPLOYEES & SENIOR MANAGERS				*INVESTORS*		
	Employee Salaries	Senior Manager Salaries	Employment Benefits	Number of Employees	Operating Margin	Operating Expenses	Revenue Passenger Miles
Variables	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**
M&A	-0.272 (0.055) ***	1.450 (0.245) ***	-0.412 (0.077) ***	-0.216 (0.039) ***	0.113 (0.027) ***	-0.157 (0.040) ***	-0.316 (0.038) ***
Firm Size	0.224 (0.018) ***	-0.338 (0.081) ***	0.179 (0.026) ***	0.099 (0.013) ***	0.024 (0.009) ***	0.384 (0.013) ***	0.190 (0.013) ***
Leverage	-0.054 (0.046)	-0.117 (0.204)	-0.202 (0.064) ***	-0.058 (0.032) *	0.032 (0.023)	0.050 (0.033)	-0.107 (0.032) ***
Liquidity	0.130 (0.017) ***	-0.349 (0.075) ***	0.098 (0.024) ***	0.088 (0.012) ***	-0.017 (0.008) **	0.047 (0.012) ***	0.047 (0.012) ***
Competition	-0.190 (0.028) ***	-0.302 (0.126) **	-0.294 (0.040) ***	-0.173 (0.020) ***	-0.009 (0.014)	-0.136 (0.021) ***	-0.120 (0.020) ***
IMR	0.202 (0.031) ***	-0.808 (0.138) ***	0.234 (0.043) ***	0.151 (0.022) ***	-0.075 (0.015) ***	0.090 (0.022) ***	0.182 (0.021) ***

Notes. * p < .10; ** p < .05; *** p < .01 (two-sided); Coeff = Coefficient; SE = Standard Error; M&A = Mergers and Acquisitions; IMR = Inverse Mills Ratio. We take the natural logarithm of *Number of Flights*, *Number of Routes*, *Employee Salaries*, *Senior Manager Salaries*, *Employment Benefits*, *Number of Employees*, *Operating Expenses*, *Revenue Passenger Miles* and *Firm Size* due to their skewed distributions. There is a total of 1,312 observations from 17 airlines. The cohort dummy variables, year-quarter dummy variables and firm dummy variables are estimated but results are not shown due to space constraints.

Table 4.7
Sensitivity Analyses

Dependent Variable	Alternative Exclusion Restrictions			Alternative M&A Date	Alternative Time Windows to Construct Cohorts			
	Using Only Prior M&A	Using Only MAPROB	Using Alternative Measures		Using 1-year Time Window	Using 3-year Time Window	Using 4-year Time Window	Using 5-year Time Window
Price	√	√	√	√	√	√	√	√
Complaints	√	√	√			√	√	√
Delays	√	√	√	√	√	√	√	√
Mishandled Baggage		√	√	√	√		√	
Denied Boarding	√	√			√	√	√	
Number of Flights	√	√	√	√		√	√	√
Number of Routes	√	√	√	√	√	√	√	√
Employee Salaries	√	√	√	√	√	√	√	√
Senior Manager Salaries		√	√	√	√	√	√	√
Employment Benefits	√	√	√	√	√	√	√	√
Number of Employees	√	√	√	√	√	√	√	√
Operating Margin	√	√	√	√	√	√	√	√
Operating Expenses	√	√	√	√	√	√	√	√
Revenue Passenger Miles	√	√	√	√	√	√	√	√

Notes. √ = The effect, in terms of its sign and statistical significance, is consistent to that of the focal analysis; M&A = Mergers and Acquisitions; IMR = Inverse Mills Ratio; MAPROB = M&A Pressures from Closest Competitors.

Table 4.8

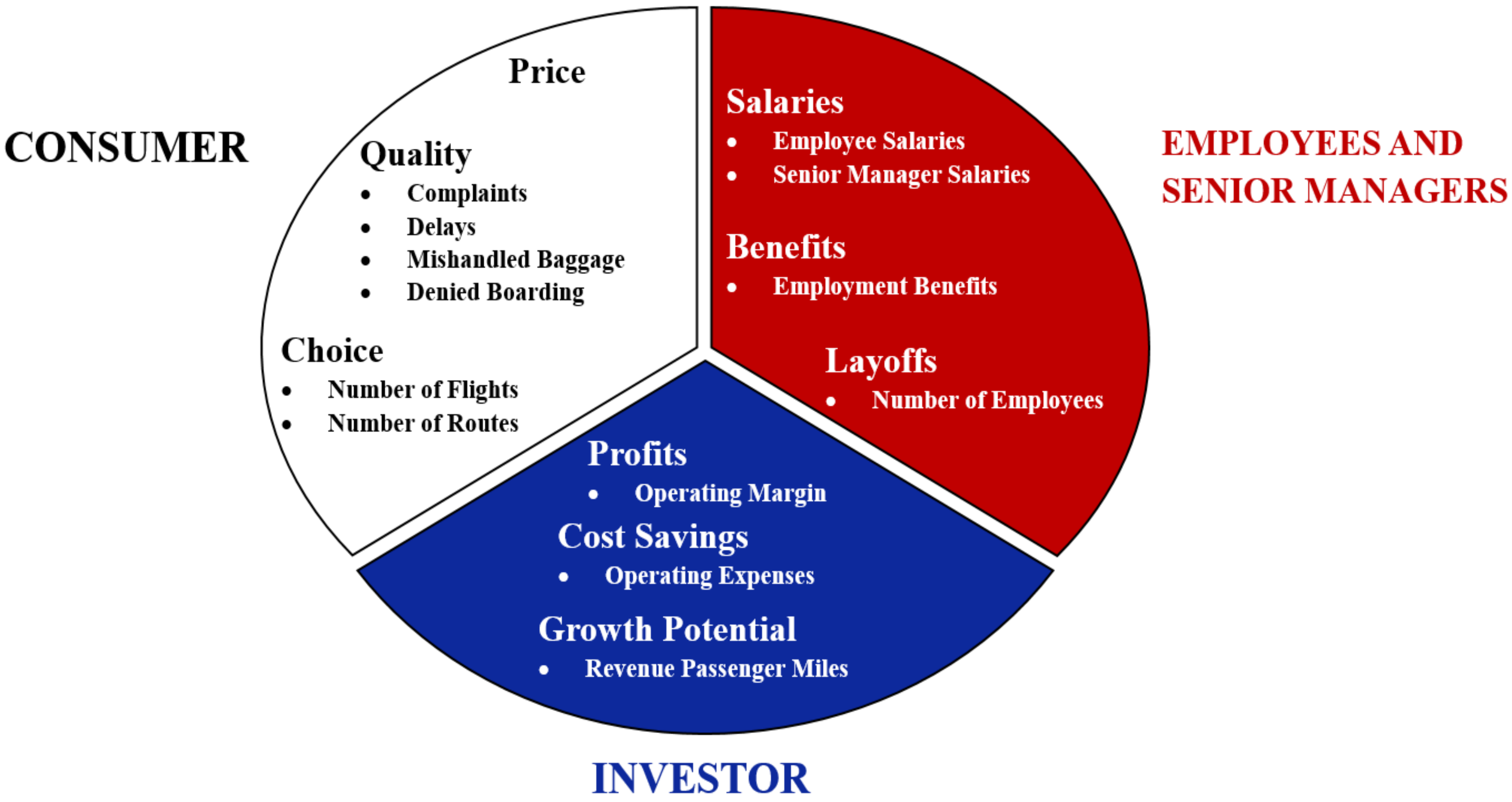
Results of Moderating Effect of Prior Service Emphasis

			CONSUMERS						
			Price	Quality				Choice	
				Complaints	Delays	Mishandled Baggage	Denied Boarding	Number of Flights	Number of Routes
		Variables	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**
Focal Model		M&A	0.048 (0.007) ***	2.461 (0.289) ***	0.140 (0.017) ***	-0.258 (0.571)	0.516 (0.290) *	-0.212 (0.045) ***	-0.371 (0.049) ***
		M&A*PSE	0.002 (0.002)	-0.455 (0.064) ***	-0.011 (0.004) ***	0.123 (0.126)	-0.135 (0.064) **	0.053 (0.010) ***	0.066 (0.011) ***
Alternative Measures of Moderator	Relative to Industry Average	M&A	0.048 (0.007) ***	2.476 (0.293) ***	0.140 (0.017) ***	-0.317 (0.577)	0.555 (0.293) *	-0.215 (0.046) ***	-0.376 (0.050) ***
		M&A*PSE	0.002 (0.002)	-0.450 (0.065) ***	-0.010 (0.004) ***	0.146 (0.128)	-0.149 (0.065) **	0.053 (0.010) ***	0.066 (0.011) ***
	Not Normalized or Demeaned	M&A	0.046 (0.008) ***	2.923 (0.325) ***	0.150 (0.019) ***	-0.383 (0.642)	0.652 (0.326) **	-0.266 (0.051) ***	-0.437 (0.055) ***
		M&A*PSE	0.002 (0.002)	-0.450 (0.063) ***	-0.010 (0.004) ***	0.122 (0.124)	-0.133 (0.063) **	0.053 (0.010) ***	0.065 (0.011) ***
	Two Years Before M&A	M&A	0.045 (0.007) ***	2.654 (0.297) ***	0.142 (0.017) ***	-0.445 (0.602)	0.644 (0.296) **	-0.215 (0.047) ***	-0.365 (0.051) ***
		M&A*PSE	0.003 (0.002)	-0.463 (0.065) ***	-0.010 (0.004) ***	0.144 (0.133)	-0.167 (0.065) **	0.052 (0.010) ***	0.063 (0.011) ***

			EMPLOYEES & SENIOR MANAGERS				*INVESTORS*		
			Employee Salaries	Senior Manager Salaries	Employment Benefits	Number of Employees	Operating Margin	Operating Expenses	Revenue Passenger Miles
		Variables	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**
Focal Model		M&A	-0.450 (0.062) ***	1.893 (0.278) ***	-0.573 (0.086) ***	-0.317 (0.044) ***	0.145 (0.031) ***	-0.313 (0.045) ***	-0.440 (0.043) ***
		M&A*PSE	0.072 (0.014) ***	-0.202 (0.061) ***	0.066 (0.019) ***	0.039 (0.010) ***	-0.015 (0.007) **	0.071 (0.010) ***	0.051 (0.009) ***
Alternative Measures of Moderator	Relative to Industry Average	M&A	-0.456 (0.063) ***	1.948 (0.281) ***	-0.581 (0.087) ***	-0.322 (0.044) ***	0.147 (0.031) ***	-0.321 (0.045) ***	-0.446 (0.043) ***
		M&A*PSE	0.073 (0.014) ***	-0.222 (0.062) ***	0.068 (0.019) ***	0.040 (0.010) ***	-0.015 (0.007) **	0.073 (0.010) ***	0.052 (0.010) ***
	Not Normalized or Demeaned	M&A	-0.523 (0.070) ***	2.098 (0.312) ***	-0.639 (0.097) ***	-0.357 (0.049) ***	0.160 (0.035) ***	-0.385 (0.050) ***	-0.492 (0.048) ***
		M&A*PSE	0.071 (0.013) ***	-0.200 (0.060) ***	0.065 (0.019) ***	0.038 (0.010) ***	-0.015 (0.007) **	0.070 (0.010) ***	0.050 (0.009) ***
	Two Years Before M&A	M&A	-0.424 (0.064) ***	1.940 (0.286) ***	-0.551 (0.090) ***	-0.295 (0.045) ***	0.144 (0.032) ***	-0.316 (0.046) ***	-0.427 (0.044) ***
		M&A*PSE	0.064 (0.014) ***	-0.207 (0.063) ***	0.059 (0.020) ***	0.033 (0.010) ***	-0.013 (0.007) *	0.067 (0.010) ***	0.047 (0.010) ***

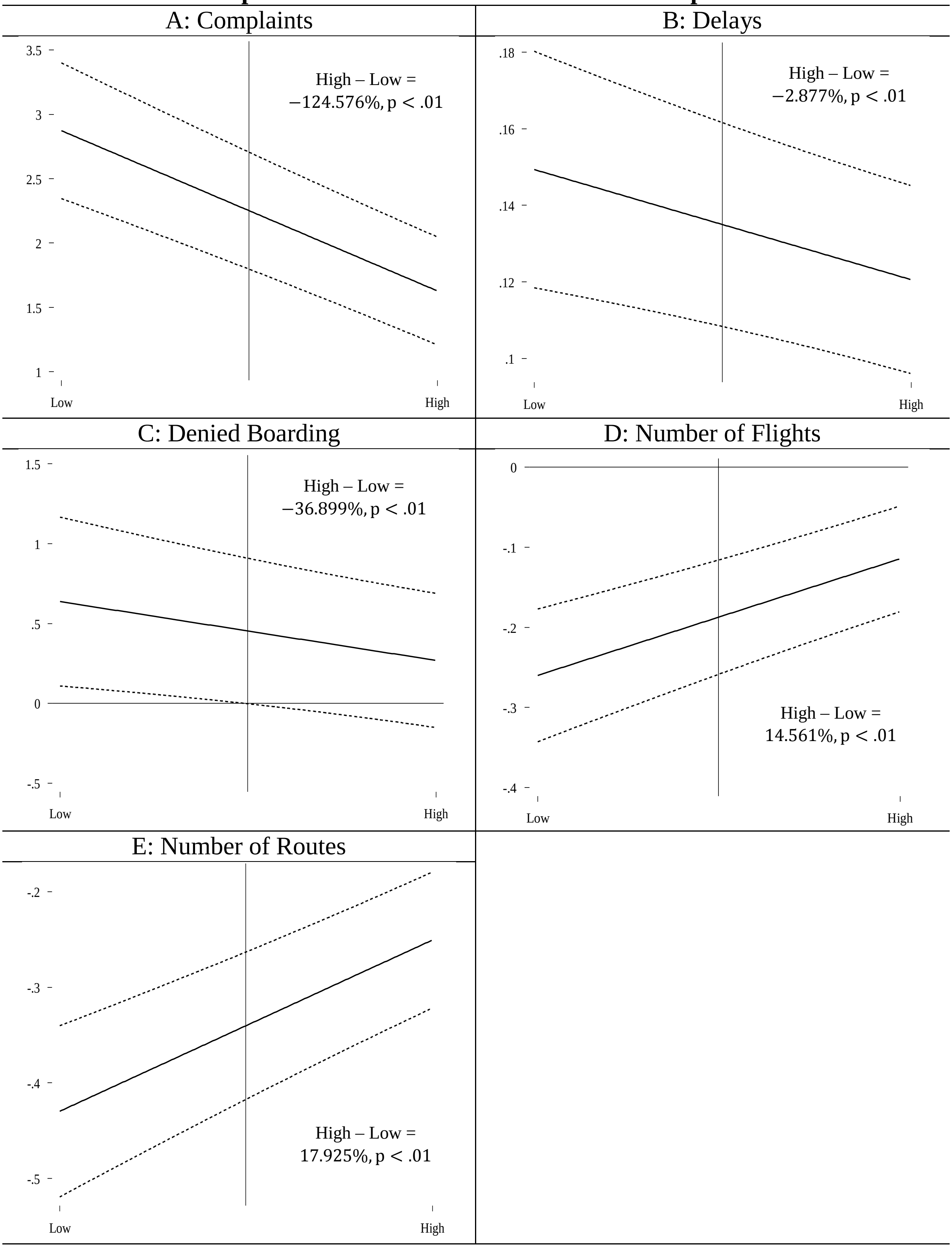
Notes. * p < .10; ** p < .05; *** p < .01 (two-sided); Coeff = Coefficient; SE = Standard Error; M&A = Mergers and Acquisitions; PSE = Prior Service Emphasis. We take the natural logarithm of *Number of Flights*, *Number of Routes*, *Employee Salaries*, *Senior Manager Salaries*, *Employment Benefits*, *Number of Employees*, *Operating Expenses*, *Revenue Passenger Miles* and *Firm Size* due to their skewed distributions. There is a total of 1,281 observations from 17 airlines in all models except the *Two Years Before M&A* model, which contains a total of 1,312 observations from 17 airlines. The cohort dummy variables, year-quarter dummy variables, firm dummy variables and control variables are estimated but results are not shown due to space constraints.

Figure 4.1
Proposed Holistic View



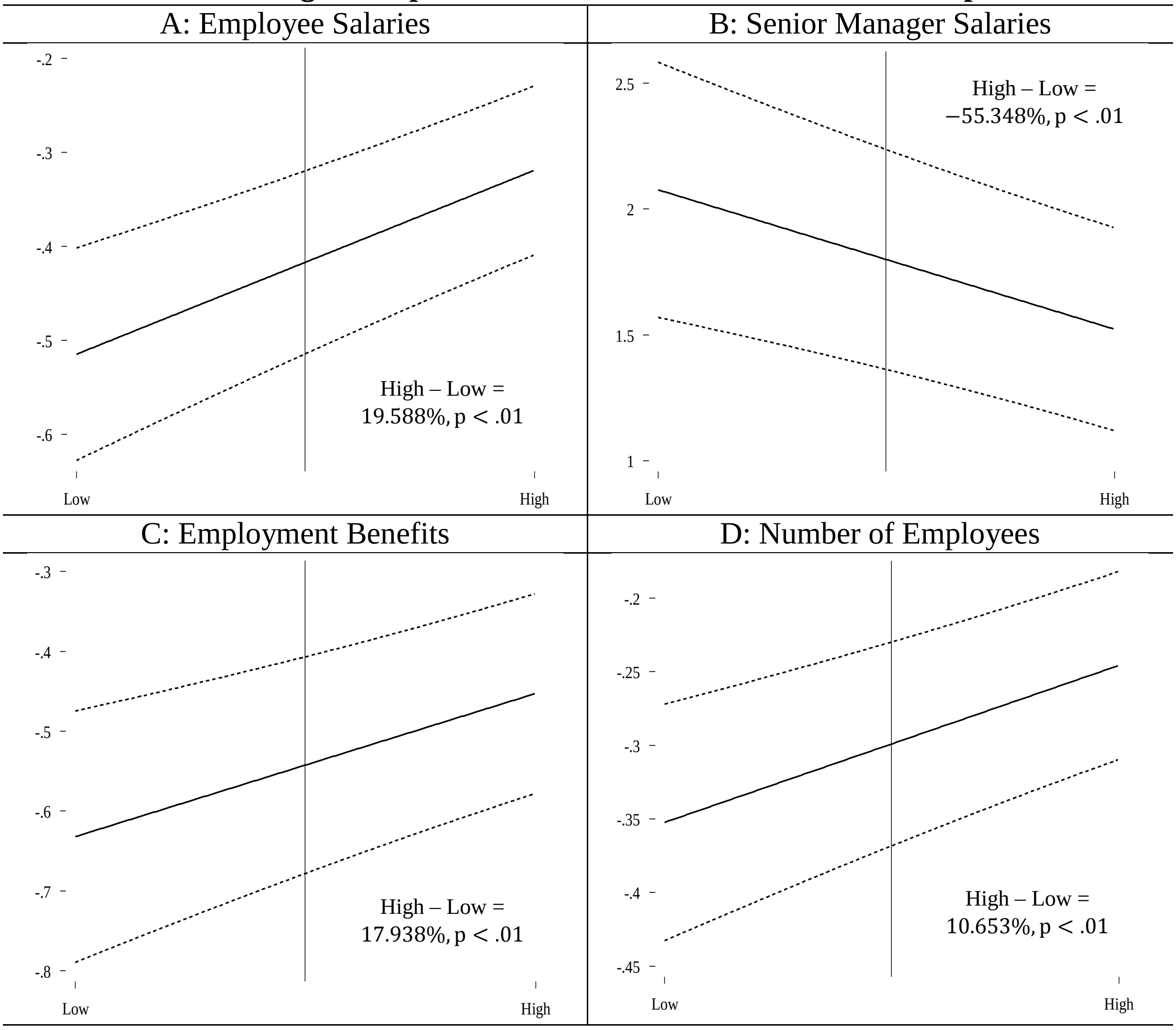
Notes. The proposed holistic view and the included variables are derived based on the extant views of the impact of mergers and acquisitions in the airline industry, i.e., from regulators, business press, etc., as illustrated in-text and in Table 4.2. We do not argue that these variables are exhaustive but instead, we seek to empirically test a view that captures the actual opinions of the stakeholders.

Figure 4.2a
Marginal Effects of M&A on Dependent Variables Reflecting the Consumer Perspective Across Levels of Prior Service Emphasis



Notes. M&A = Mergers and Acquisitions; Low (High) = 5 (95) Percentile Value of *Prior Service Emphasis*; High – Low = Difference between M&A and control group when there is high (versus) low prior service emphasis. The horizontal axis of every graph represents the different values of *Prior Service Emphasis* across the data range in our sample. The dashed lines indicate the 90% confidence interval bands. The vertical axis of every graph represents the marginal effects of M&A on the corresponding dependent variables across changes in *Prior Service Emphasis*. Note that we only generate the plots for the significant (p < .05, two-sided) interaction effects.

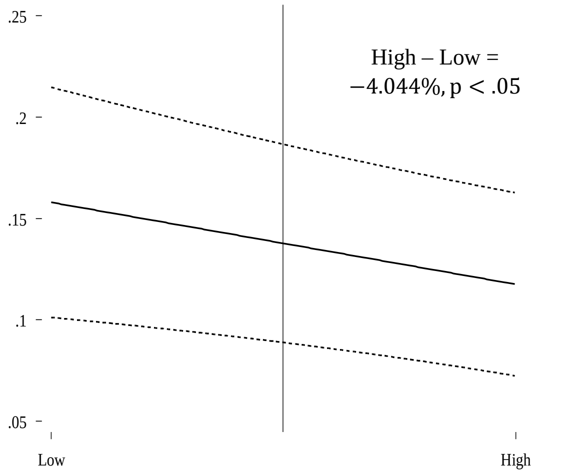
Figure 4.2b
Marginal Effects of M&A on Dependent Variables Reflecting the Employee and Senior Manager Perspective Across Levels of Prior Service Emphasis



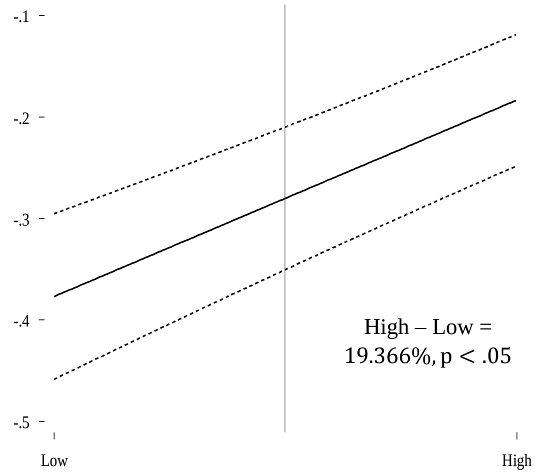
Notes. M&A = Mergers and Acquisitions; Low (High) = 5 (95) Percentile Value of *Prior Service Emphasis;* High – Low = Difference between M&A and control group when there is high (versus) low prior service emphasis. The horizontal axis of every graph represents the different values of *Prior Service Emphasis* across the data range in our sample. The dashed lines indicate the 90% confidence interval bands. The vertical axis of every graph represents the marginal effects of M&A on the corresponding dependent variables across changes in *Prior Service Emphasis*. Note that we only generate the plots for the significant (p < .05, two-sided) interaction effects.

Figure 4.2c
Marginal Effects of M&A on Dependent Variables Reflecting the Investor Perspective Across Levels of Prior Service Emphasis

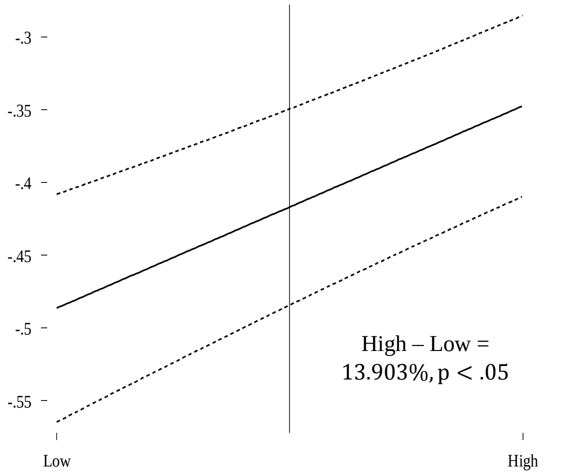
A: Operating Margin



B: Operating Expenses



C: Revenue Passenger Miles



Notes. M&A = Mergers and Acquisitions; Low (High) = 5 (95) Percentile Value of *Prior Service Emphasis*; High – Low = Difference between M&A and control group when there is high (versus) low prior service emphasis. The horizontal axis of every graph represents the different values of *Prior Service Emphasis* across the data range in our sample. The dashed lines indicate the 90% confidence interval bands. The vertical axis of every graph represents the marginal effects of M&A on the corresponding dependent variables across changes in *Prior Service Emphasis*. Note that we only generate the plots for the significant (p < .05, two-sided) interaction effects.

Appendix 4

Appendix 4.A: Distribution of M&A and Control Group by Cohort

Table 4.A1 - Distribution of M&A and Control Group by Cohort

Main Effects

	Control Group		M&A Group		Total	
Cohort	*Observations*	*Airlines*	*Observations*	*Airlines*	*Observations*	*Airlines*
1	113	8	16	1	129	9
2	104	10	16	1	120	11
3	87	10	10	1	97	11
4	101	11	10	1	111	12
5	94	11	12	1	106	12
6	86	10	16	1	102	11
7	83	12	16	1	99	13
8	77	11	16	1	93	12
9	77	6	16	1	93	7
10	60	4	13	1	73	5
11	64	5	16	1	80	6
12	52	4	16	1	68	5
13	55	5	16	1	71	6
14	54	4	16	1	70	5
Total Observations					1,312	

Moderating Effect of Prior Service Emphasis

	Control Group		M&A Group		Total	
Cohort	*Observations*	*Airlines*	*Observations*	*Airlines*	*Observations*	*Airlines*
1	113	8	16	1	129	9
2	104	10	16	1	120	11
3	87	10	10	1	97	11
4	101	10	10	1	111	11
5	91	11	12	1	103	12
6	83	10	16	1	99	11
7	72	9	16	1	88	10
8	69	8	16	1	85	9
9	77	6	16	1	93	7
10	60	4	13	1	73	5
11	64	5	16	1	80	6
12	48	3	16	1	64	4
13	53	4	16	1	69	5
14	54	4	16	1	70	5
Total Observations					1,281	

Notes. M&A = Mergers and Acquisitions. Since an airline can undergo more than 1 M&A in our sample, the total number of airlines will not add up to 17 as the same airline can be present in both the control and the M&A group in different cohorts.

Appendix 4.B: Detailed Estimation Results of Sensitivity Analyses

Table 4.B1 - Detailed Estimation Results of Sensitivity Analyses

			CONSUMERS						
				Quality				Choice	
			Price	Complaints	Delays	Mishandled Baggage	Denied Boarding	Number of Flights	Number of Routes
			Coeff (SE)	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**
Focal Model (Main Effects)		M&A	0.051 (0.006) ***	1.517 (0.258) ***	0.117 (0.015) ***	-0.103 (0.513)	0.249 (0.253)	-0.091 (0.041) **	-0.215 (0.044) ***
		Observations	1,312	1,312	1,312	1,312	1,312	1,312	1,312
Alternative Exclusion Restrictions	Using Only Prior M&A	M&A	0.081 (0.007) ***	1.576 (0.233) ***	0.092 (0.014) ***	1.039 (0.487) **	-0.201 (0.232)	-0.447 (0.044) ***	-0.259 (0.045) ***
		Observations	1,487	1,487	1,487	1,487	1,487	1,487	1,487
	Using Only MAPROB	M&A	0.053 (0.006) ***	1.476 (0.265) ***	0.105 (0.015) ***	0.146 (0.526)	0.285 (0.259)	-0.101 (0.042) **	-0.200 (0.046) ***
		Observations	1,312	1,312	1,312	1,312	1,312	1,312	1,312
	Using Alternative Measures	M&A	0.075 (0.007) ***	1.530 (0.266) ***	0.089 (0.016) ***	0.621 (0.546)	-0.609 (0.262) **	-0.342 (0.046) ***	-0.395 (0.047) ***
		Observations	1,413	1,413	1,413	1,413	1,413	1,413	1,413
Alternative M&A Date		M&A	0.043 (0.006) ***	0.214 (0.207)	0.112 (0.014) ***	-0.045 (0.497)	-0.483 (0.243) **	-0.164 (0.039) ***	-0.311 (0.042) ***
		Observations	1,335	1,335	1,335	1,335	1,335	1,335	1,335
Alternative Time Windows to Construct Cohorts[a]	Using 1-year Time Window	M&A	0.033 (0.009) ***	0.016 (0.328)	0.110 (0.022) ***	-1.029 (0.751)	0.000 (0.331)	-0.058 (0.054)	-0.137 (0.057) **
		Observations	722	722	722	722	722	722	722
	Using 3-year Time Window	M&A	0.050 (0.005) ***	1.711 (0.187) ***	0.121 (0.012) ***	0.847 (0.426) **	-0.211 (0.219)	-0.181 (0.034) ***	-0.240 (0.036) ***
		Observations	1,766	1,766	1,766	1,766	1,766	1,766	1,766
	Using 4-year Time Window	M&A	0.060 (0.005) ***	2.042 (0.129) ***	0.117 (0.011) ***	-0.094 (0.387)	0.025 (0.203)	-0.125 (0.030) ***	-0.115 (0.031) ***
		Observations	2,085	2,085	2,085	2,085	2,085	2,085	2,085
	Using 5-year Time Window	M&A	0.049 (0.004) ***	0.711 (0.196) ***	0.090 (0.010) ***	1.003 (0.352) ***	-0.529 (0.185) ***	-0.261 (0.029) ***	-0.325 (0.031) ***
		Observations	2,484	2,484	2,484	2,484	2,484	2,484	2,484

Table 4.B1 – (Continued)

			EMPLOYEES & SENIOR MANAGERS				*INVESTORS*		
			Employee Salaries	Senior Manager Salaries	Employment Benefits	Number of Employees	Operating Margin	Operating Expenses	Revenue Passenger Miles
			Coeff (SE)	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**	**Coeff (SE)**
Focal Model (Main Effects)		M&A	-0.272 (0.055) ***	1.450 (0.245) ***	-0.412 (0.077) ***	-0.216 (0.039) ***	0.113 (0.027) ***	-0.157 (0.040) ***	-0.316 (0.038) ***
		Observations	1,312	1,312	1,312	1,312	1,312	1,312	1,312
Alternative Exclusion Restrictions	Using Only Prior M&A	M&A	-0.396 (0.054) ***	0.274 (0.226)	-0.357 (0.072) ***	-0.369 (0.039) ***	0.197 (0.026) ***	-0.063 (0.038) *	-0.397 (0.042) ***
		Observations	1,487	1,487	1,487	1,487	1,487	1,487	1,487
	Using Only MAPROB	M&A	-0.280 (0.057) ***	1.515 (0.251) ***	-0.443 (0.079) ***	-0.241 (0.040) ***	0.111 (0.028) ***	-0.154 (0.041) ***	-0.327 (0.039) ***
		Observations	1,312	1,312	1,312	1,312	1,312	1,312	1,312
	Using Alternative Measures	M&A	-0.404 (0.061) ***	0.807 (0.255) ***	-0.404 (0.082) ***	-0.344 (0.043) ***	0.183 (0.029) ***	-0.126 (0.042) ***	-0.413 (0.045) ***
		Observations	1,413	1,413	1,413	1,413	1,413	1,413	1,413
Alternative M&A Date		M&A	-0.426 (0.052) ***	1.031 (0.240) ***	-0.569 (0.072) ***	-0.342 (0.036) ***	0.159 (0.026) ***	-0.281 (0.038) ***	-0.365 (0.035) ***
		Observations	1,335	1,335	1,335	1,335	1,335	1,335	1,335
Alternative Time Windows to Construct Cohorts[a]	Using 1-year Time Window	M&A	-0.278 (0.078) ***	1.144 (0.334) ***	-0.497 (0.107) ***	-0.274 (0.054) ***	0.144 (0.041) ***	-0.276 (0.055) ***	-0.235 (0.049) ***
		Observations	722	722	722	722	722	722	722
	Using 3-year Time Window	M&A	-0.327 (0.046) ***	1.112 (0.227) ***	-0.441 (0.062) ***	-0.235 (0.032) ***	0.159 (0.023) ***	-0.194 (0.035) ***	-0.366 (0.031) ***
		Observations	1,766	1,766	1,766	1,766	1,766	1,766	1,766
	Using 4-year Time Window	M&A	-0.181 (0.041) ***	1.348 (0.213) ***	-0.364 (0.056) ***	-0.130 (0.028) ***	0.176 (0.022) ***	-0.156 (0.033) ***	-0.349 (0.027) ***
		Observations	2,085	2,085	2,085	2,085	2,085	2,085	2,085
	Using 5-year Time Window	M&A	-0.513 (0.038) ***	1.408 (0.192) ***	-0.658 (0.054) ***	-0.328 (0.026) ***	0.220 (0.021) ***	-0.254 (0.028) ***	-0.407 (0.026) ***
		Observations	2,484	2,484	2,484	2,484	2,484	2,484	2,484

Notes. * p < .10; ** p < .05; *** p < .01 (two-sided); Coeff = Coefficient; SE = Standard Error; M&A = Mergers and Acquisitions; IMR = Inverse Mills Ratio; MAPROB = M&A Pressures from Closest Competitors. We take the natural logarithm of *Number of Flights*, *Number of Routes*, *Employee Salaries*, *Senior Manager Salaries*, *Employment Benefits*, *Number of Employees*, *Operating Expenses*, *Revenue Passenger Miles* and *Firm Size* due to their skewed distributions. To facilitate the interpretation of parameter estimates, we normalize *Prior Service Emphasis* by its sample standard deviation and demean it with respect to its sample mean. [a]Due to the availability of data required to construct each cohort, the 2 M&As that occurred in 2013, i.e., Endeavor Air and Delta, and US Airways and American Airlines, are dropped in the sensitivity analyses that use the 3-year, 4-year and 5-year time window, and the M&A that occurred in 2001, i.e., Trans World Airways and American Airlines, is also dropped in the sensitivity analyses that use the 4-year and 5-year time window. In addition, the 2 M&As that occurred in 2011, i.e., AirTran and Southwest Airlines, and ExpressJet Airlines and Atlantic Southeast Airlines, are also dropped in the sensitivity analysis that uses the 5-year time window. The cohort dummy variables, year-quarter dummy variables, firm dummy variables and control variables are estimated but results are not shown due to space constraints.

Appendix 4.C: Inverse Mills Ratio and Selection Model Results

Computation of the Inverse Mills Ratio

In the computation of the inverse Mills ratio, we follow the steps illustrated by Greene (2002, p. 232 – 233). First, we specify a selection model to estimate an airline's likelihood of undergoing a M&A, $\mathrm{MA_{ict}}$, using a probit specification, i.e., equation 1.3, to obtain its linear prediction, $p_{it}\alpha$. Second, we compute the normal density function and the cumulative normal distribution of α to obtain $f(p_{it}\alpha)$ and $F(p_{it}\alpha)$ respectively. Finally, we compute the inverse Mills ratio for each airline in the control group and the M&A group using the following equations:

$$\mathrm{IMR_{it}} = \frac{f(p_{it}\alpha)}{F(p_{it}\alpha)} \; if \; \mathrm{MA_{ict}} = 1 \qquad \text{(B1.1)}$$

$$\mathrm{IMR_{it}} = \frac{-f(p_{it}\alpha)}{1-F(p_{it}\alpha)} \; if \; \mathrm{MA_{ict}} = 0 \qquad \text{(B1.2)}$$

Taking equations B1.1 and B1.2 together, we obtain the following:

$$\mathrm{IMR_{it}} = \mathrm{MA_{ict}} * \left(\frac{f(p_{it}\alpha)}{F(p_{it}\alpha)}\right) + (1 - \mathrm{MA_{ict}}) * \left(\frac{-f(p_{it}\alpha)}{1-F(p_{it}\alpha)}\right) \qquad \text{(B2)}$$

As such, we derive the inverse Mills ratio of acquiring airline i in quarter t using equation B2.

Table 4.C1 - Results of Selection Model

	Main Effects (Moderating Effect of Service Emphasis)			Alternative Exclusion Restrictions									Alternative M&A Date		
				Using Only Prior M&A			Using Only MAPROB			Using Alternative Measures					
Variables	**Coeff**	**(SE)**		**Coeff**	**(SE)**		**Coeff**	**(SE)**		**Coeff**	**(SE)**		**Coeff**	**(SE)**	
Firm Size	0.079	(11.010)	***	0.793	(0.070)	***	0.079	(10.960)	***	0.788	(0.072)	***	0.843	(0.078)	***
Leverage	-0.191	(0.492)		-0.909	(0.436)	**	-0.213	(0.498)		-0.926	(0.479)	*	-0.669	(0.514)	
Liquidity	1.018	(0.120)	***	0.726	(0.097)	***	1.011	(0.118)	***	0.722	(0.096)	***	1.061	(0.120)	***
Competition	0.915	(0.184)	***	1.090	(0.153)	***	0.912	(0.181)	***	1.064	(0.168)	***	1.069	(0.191)	***
Prior M&A	0.031	(0.020)		0.062	(0.018)	***				0.027	(0.025)		0.054	(0.020)	***
MAPROB	0.675	(0.202)	***				0.772	(0.190)	***	0.557	(0.284)	*	0.560	(0.200)	***
Observations	1,312			1,487			1,312			1,413			1,335		

	Alternative Time Windows to Construct Cohorts[a]											
	Using 1-Year Time Window			Using 3-Year Time Window			Using 4-Year Time Window			Using 5-Year Time Window		
Variables	**Coeff**	**(SE)**		**Coeff**	**(SE)**		**Coeff**	**(SE)**		**Coeff**	**(SE)**	
Firm Size	0.782	(0.097)	***	0.847	(0.071)	***	0.823	(0.063)	***	0.748	(0.056)	***
Leverage	-0.331	(0.592)		-0.955	(0.449)	**	-1.040	(0.397)	**	-0.711	(0.357)	**
Liquidity	0.898	(0.150)	***	1.052	(0.109)	***	0.988	(0.099)	***	0.993	(0.096)	***
Competition	0.883	(0.233)	***	1.177	(0.161)	***	1.155	(0.139)	***	1.420	(0.131)	***
Prior M&A	0.047	(0.026)	*	0.058	(0.018)	***	0.063	(0.017)	***	0.072	(0.017)	***
MAPROB	0.535	(0.249)	**	0.452	(0.178)	**	0.481	(0.155)	***	0.038	(0.165)	
Observations	722			1,766			2,085			2,484		

Notes. * p < .10; ** p < .05; *** p < .01 (two-sided); Coeff = Coefficient; SE = Standard Error; M&A = Mergers and Acquisitions; MAPROB = M&A Pressures from Closest Competitors. [a]Due to the availability of data required to construct each cohort, the 2 M&As that occurred in 2013, i.e., Endeavor Air and Delta, and US Airways and American Airlines, are dropped in the sensitivity analyses that use the 3-year, 4-year and 5-year time window, and the M&A that occurred in 2001, i.e., Trans World Airways and American Airlines, is also dropped in the sensitivity analyses that use the 4-year and 5-year time window. In addition, the 2 M&As that occurred in 2011, i.e., AirTran and Southwest Airlines, and ExpressJet Airlines and Atlantic Southeast Airlines, are also dropped in the sensitivity analysis that uses the 5-year time window.

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