**How Does Web Personalization Create Value for Online Retailers? Lower Cash Flow Volatility or Enhanced Cash Flows**


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## Abstract

This study examines the performance consequences of web personalization (WP), a type of personalization in which web content is personalized and recommendations are offered based on customer preferences. Despite the growing popularity of personalization, there is a dearth of research at the firm level on whether and how web personalization creates shareholder value. We develop and test a conceptual model that proposes that the impact of WP on shareholder value is mediated by 1) cash flow volatility and 2) premium price. The hypotheses are tested based on 603 firm-quarter observations spanning 80 firms over six years in the online financial services industry. The results suggest that while WP lowers the volatility of cash flows, it only enables firms to charge premium prices when online trust is high. Additional tests reveal that the reduction in cash flow volatility is because of lower churn as opposed to acquiring new customers or greater cross-buying. Finally, online trust positively moderates the relationship between WP and cash flow volatility and price premia. Practical implications of the findings are discussed.



Keywords: Web personalization, retail strategy, cash flow volatility, price premium, market-to-book ratio, marketing-finance interface

## Introduction

Retailers invest significant dollars in information technology (IT) and customer intelligence tools to enhance their capabilities. The increased emphasis on IT tools stems from changes in the business environment, availability of large amounts of data, and advances in intelligence technologies. A significant trend in the marketplace pertains to retailers using personalization technologies to build stronger relationships with customers. *Personalization* refers to tailoring offerings and communications to meet customer preferences based on stated, observed, and predictive data (Aguirre et al. 2015; Bleier, De Keyser, and Verleye 2018). Personalization is increasingly used as a tool by online retailers because the Internet provides tremendous opportunities to collect and process information. Although personalization is easier to accomplish in offline settings because of greater opportunities to learn about customer preferences (e.g., personal selling), it is pursued increasingly in online settings because customers generate logs of important transactional information when interacting with firms in the online space. Data-driven personalization strategies have been labeled as the "life-blood of retail" (*National Retail Federation* n.d., p. 20).

The type of personalization implemented by online retailers varies (Bleier, De Keyser, and Verleye 2018). For example, the options range from offering transaction flexibility (e.g., personal account maintenance, user recognition, order tracking), targeting banner advertisements (e.g., Facebook and Google advertisements based on search history), morphing website looks (e.g., McDonald's homepage personalization based on user's detected location/time or cognitive styles), and offering product recommendations (e.g., Amazon's recommended items or Spotify's weekly/yearly personalized song suggestions). The focus of this paper is on *web personalization* (hereinafter WP) where content is adapted and personalized recommendations/advice are offered to customers based on their preferences.

The popularity of personalization is underscored by the fact that 94% of senior-level executives believe personalization is critical to reaching customers (*Forbes Insights* 2016) and is therefore worthy of investment. For example, Netflix spends $150 million on an annual basis on personalizing recommendations (Roettgers 2014). Despite the growth in the number of firms offering personalization and the significant increase in retailers' investments on personalization, empirical evidence on whether personalization creates value for firms is scarce. Reports from the business press are not reassuring either. According to Jupiter Research, only 14% of customers noted that personalized recommendations on shopping websites would result in their returning to that website. Moreover, more than two-thirds of consumers are concerned about how firms and brands use their personal data (*Gigya* 2017). However, claims that personalization tools offer opportunities to retailers to build tighter and more profitable customers relationships are quite common in the press (*BCG* 2017; Nunes and Kambil 2001). Moreover, business reports have cited personalization as the primary driver of Facebook, Amazon, Netflix, and Google market capitalization and stock market performance (*Investopedia* 2017). Overall, while investments in personalization systems continue to increase, evidence on returns from such efforts is missing.

How could WP impact firm performance? Prior research in marketing suggests that marketing initiatives create shareholder value for firms by reducing the vulnerability and volatility of cash flows and/or enhancing cash flows (Rao and Bharadwaj 2008; Srivastava, Shervani, and Fahey 1998, 1999). A significant proportion of the market value of firms today lies in intangible, off-balance sheet assets such as brand value and customer satisfaction rather than in tangible book assets (Kerin and Sethuraman 1998; Madden, Fehle and Fournier 2006; Tuli and

Bharadwaj 2009). "Market-to-book" ratios for the Fortune 500 firms are approximately 3.5, which suggests that more than 70% of the market value of the Fortune 500 firms lies in intangible assets (Capraro and Srivastava 1997). Our argument is that WP helps firms to create off-balance sheet assets. These relational assets could enable firms to increase switching costs, build entry barriers to competitors, acquire new customers at lower cost, and allow firms to charge higher prices. Therefore, forward looking performance metrics such as shareholder value are more likely to reflect the future value of intangible assets compared to accounting metrics.

We develop and test a conceptual framework that delineates two distinct routes through which WP creates shareholder value. WP could create shareholder value by stabilizing firm cash flows (Hollensen 2015). It is well known that stable and predictable cash flows reflect firm's stable operations and lower firm risk and cost of capital. For example, although promotional activities (e.g., price-offs) temporarily lift firm revenues, they do not always translate into higher shareholder value because such growth is expensive, introduces volatility in cash flows, and increases firm's working capital requirements. WP could stabilize cash flows in various ways. First, WP could lead to greater customer lock-in (Novshek and Thoman 2006; Peppers and Rogers 1997) because customers invest time and effort in providing information to facilitate personalized services. As a consequence, switching to competitors may not be feasible without customers incurring considerable costs. Second, WP could enable firm to acquire new customers at lower costs and offset revenues from lost customers. This possibility is based on the assumption that new customers might find the firm's personalized offerings to be differentiated and valuable and therefore firms may not need to incur high costs to acquire them. Lastly, WP could stabilize cash flows by increasing cross-buying and offsetting lost revenues from churned customers. Because existing customers (those that have not churned) find value in the firm's personalized web content, it is possible that such customers would be willing to purchase other products from the firm. All of these mechanisms would have a cash flow stabilizing effect and subsequently be valued higher by stock markets.

In addition to lowering cash flow volatility, WP could improve shareholder value by enhancing the net present value of cash flows. Specifically, the ability to personalize content might translate into premium prices as customers might find the service to be valuable as it is tailored to their preferences. Premium prices, in turn, imply greater gross margins and therefore enhanced cash flows. The 'cash flow stabilizing' and 'cash flow enhancing' pathways are not mutually exclusive. It is plausible that WP creates shareholder value through both pathways similar to mindset metrics such as customer satisfaction (Fornell et al. 2006; Gruca and Rego 2005). Nonetheless, understanding whether and how these effects manifest is a managerially relevant issue.

We test our hypotheses on 603 firm-quarter observations spanning 80 firms and six years in the online retail industry in the financial services sector. The model accounts for reverse causality, sample selection, and unobserved heterogeneity. Our study offers a rigorous test of hypotheses, generates insights that provide guidance to retailers, and develops a research agenda.

## Conceptual Framework and Research Hypotheses

Prior research has investigated the effectiveness of personalization as it relates to different aspects such as advertisements, web content and recommendations. There is significant research on whether ad personalization and targeting improve consumer responsiveness. The issues examined are whether personalized ads matched to cognitive styles (Urban et al. 2013), and the stage of the consumer's buying process and preference (Bleier and Eisenbeiss 2015a), improve consumer attitude and behavior towards the personalized effort.

Our study is related to prior research that has examined the effectiveness of personalized website content and recommendations. For instance, previous research examines website morphing (i.e., personalizing the ‘look and feel’ of a website) and analyzes the impact of all prior clicks to determine when to morph for each customer and finds substantial improvement in purchase intentions (Hauser et al. 2009; Hauser, Liberali, and Urban 2014). Likewise, research on personalized recommendation systems finds that higher quality personalization is associated with better decision quality for consumers, greater trust in the recommendation agent, and greater consumer store loyalty (Zhang, Agarwal and Lucas (2011; Komiak and Benbasat 2006). However, Chen and Hitt (2002) do not find the effect of WP to be significantly related to customer switching. Finally, while Pathak et al. (2010) show that personalized online recommendations positively influence price premium and sales rank of the recommended items, Diehl, Kornish, and Lynch (2003) find that the use of RAs lower search costs and improves decision quality but also lowers prices paid by consumers.

Prior research also suggests that a key factor determining the effectiveness of personalization is the level of trust in the retailer. For example, consumer perceptions about the value of personalization depends on whether the information is collected overtly (Aguirre et al. 2015) and whether the effort is perceived to be relatively less obtrusive (Goldfarb and Tucker 2011b). Ensuring consumer privacy is paramount in situations when personalization efforts use more unique information (Tucker 2014).

In summary, prior research reveals that the benefits of personalization are contextual and consumer trust is a necessary condition for unlocking the touted benefits of personalization. However, evidence pertaining to whether WP helps retain customers and charge higher prices is mixed and inconclusive. Importantly, the focus of prior research is on examining the effectiveness of WP at the customer/individual level (i.e., the unit of analysis is the customer or the individual). Marketers have historically focused on understanding how their actions impact customer cognition, attitudes, and behavior (e.g., awareness, satisfaction, and purchases; see Lehmann 2004 and Gupta and Zeithaml 2006 for reviews). However, a focus on these metrics is insufficient to fully understand how value accrues for firms and falls short of establishing accountability (Lehmann 2004). Rao and Bharadwaj (2008), in an important study, provide a formal framework for tracing out the shareholder wealth benefits of marketing actions in terms of ‘released working capital effects’ and ‘net present value of cash flows’. This study shows analytically that two marketing initiatives could impact shareholder value differently even if they have identical effects on expected sales revenues. This difference is because marketing initiatives also impact the working capital requirements of firms through their effects on volatility of cash flows.

This study contributes to the emerging literature on personalization in the following ways. Our study is the first, to the best of our knowledge, to examine the shareholder value impact of WP efforts using firm level data (i.e., firm is the unit of analysis). Using cross-sectional time series data on publicly traded firms, our study offers generalizable insights about WP’s value relevance for stock markets. Next, building on extant research (Srivastava, Fahey, and Shervani 1998; Rao and Bharadwaj 2008), we examine the potential for WP to create shareholder wealth through risk reduction (lowering cash flow volatility) and enhanced cash flows (premium prices). This distinction matters because “if a marketing activity needs investment today, the key to justifying this investment is to articulate how it affects the investor’s cash flows and the shareholder’s wealth” (Rao and Bharadwaj 2008, p.16). The implication is that retailers might be able to better articulate whether WP adds value through lowering working capital requirements or increasing the net present value of cash flows or both. In additional sub-sample analyses, we trace the sources of lower cash flow volatility to mechanisms such as customer retention, customer acquisition, and cross-buying. Finally, building on extant research (Aguirre et al 2015; Bleier and Eisenbeiss 2015b; Goldfarb and Tucker 2011b), we examine whether the risk reduction and/or enhanced cash flow benefits of personalization are contingent on the level of online trust across firms.

We expect marketing actions to impact shareholder value by lowering the volatility of cash flows and/or enhancing cash flows (Rao and Bharadwaj 2008; Srivastava, Shervani, and Fahey 1998, 1999). Accordingly, we argue that personalization could generate higher shareholder value by lowering cash flow volatility and/or by extracting price premia that enhances cash flows. *Cash flow volatility* refers to the periodic variations or changes in the firm's cash flows and it reflects riskiness of the firm's operations. Reduction in cash flow volatility could arise because of multiple possibilities. First, it is plausible that firms experience lower churn, i.e. customers do not switch to competitors, because of higher WP. If so, greater customer retention should yield predictable cash flows for the firm. Second, existing customers could engage in greater cross-buying and offset revenue losses because of churned customers. That is, even if customers churn, WP enables firms to increase the basket size of existing customers by presenting offers that are matched with their preferences and compensate for revenue losses. Third, cash flow volatility could decrease if WP enables firms to acquire new customers at lower costs and offset the revenue losses accrued because of customer churn. In industries such as telecommunications, cable and financial services, stability of cash flows is an important metric because customer churn is significant and firms consequently face enormous pressures to acquire new customers. Acquiring new customers in these industries is challenging because the costs of doing so are high and continues to escalate (Johnson et al. 2004). For example, customer acquisition costs are estimated to be $175 and $315 for TD Waterhouse and Sprint PCS respectively (Safko 2013). If WP could help acquire new customers at lower costs and compensate for lost revenues because of churn, it could stabilize firm cash flows. Stable cash flows reflect lower firm risk and release working capital for outside investment. These effects would lead to higher shareholder value (Anderson, Fornell, and Mazvancheryl 2004; Rao and Bharadwaj 2008; Srivastava, Shervani, and Fahey 1998).

The second route through which WP creates value is the ability of the firm to charge premium prices because of greater match between user preferences and the firm's services. *Premium pricing* refers to the ability of the firm to charge higher prices for the services rendered. The ability to charge price premia and soften price competition should translate into greater cash flows and lead to higher shareholder value. It is worth noting that premium pricing is *distinct* from the notion of price discrimination or personalized pricing. A price discrimination strategy seeks to leverage customer data to charge every customer his/her reservation price. In contrast, premium pricing refers to higher average prices across customers. One of the purported benefits of WP is that it softens price competition and insulates the firm from price wars. This argument implies that customers are likely to focus on non-price attributes and turn less sensitive to higher prices. Previous research in IT, strategy, and economics suggests that increased differentiation is likely to diminish price competition (Lal and Sarvary 1999; Shaked and Sutton 1982). For example, the big three book retailers (Amazon.com, BarnesandNoble.com, and Buy.com) charge an average of $1.72 price premium over other retailers (Zhang, Agarwal, and Lucas 2011). Also, the ability of the firm to personalize should relieve competitive price pressures for the firm as it better caters to consumer needs. Therefore, the higher decision quality engendered through WP might allow the firm to extract a price premium from customers. All else equal, higher prices should bolster contribution margins, enhance the net present value of cash flows and thereby create shareholder value. Based on these arguments, we advance the following mediation hypotheses:

> *$H_{1a}$: The effect of WP on shareholder value will be mediated by cash flow volatility. WP is negatively associated with cash flow volatility and cash flow volatility is negatively related to shareholder value.*
>
> *$H_{1b}$: The effect of WP on shareholder value will be mediated by price premium. WP is positively associated with price premium and price premium is positively related to shareholder value.*

***Moderating Role of Online Trust***

Trust has generally been defined as a state of mind that comprises "the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another" (Rousseau et al. 1998, p. 395). Hence, the essence of trust is accepting risk in (economic or social) exchanges based on positive beliefs regarding integrity and reliability of another entity. The importance of trust is magnified in any transaction that is associated with uncertainty and ambiguity (Moorman, Zaltman, and Deshpande 1992). Because of the spatial and temporal separation between consumers and retailers in the online marketplace, consumers' perceived risk with regards to monetary and privacy loss (i.e., misuse of consumers' personal information) is heightened (Bleier and Eisenbeiss 2015b; Tucker 2014). As a result, due to information asymmetry and consumer uncertainty in online settings, trust plays a decisive role in the consumer decision making process (Aguirre et al. 2015; Hoffman, Novak, and Peralta 1999). Hence, prior research has extensively studied the importance of consumer trust in e-commerce. In a recent meta-analysis on the role of online trust in the B2C context, Kim and Peterson (2017) suggest that online trust leads to higher purchase intention, satisfaction, loyalty, and a more positive attitude towards the merchant.

In this study, we examine the moderating role of online trust in enhancing the cash flows or risk reduction benefits of personalization. Our interest in this construct stems from privacy concerns of consumers that apparently limit the ability of firms to benefit from WP. Consistent with previous research (Bleier and Eisenbeiss 2015b), *online trust* is defined as the buyer's belief that the transaction with the seller will occur in a manner consistent with her expectations. As noted previously, the benefit of personalization lies in reducing information overload and enabling higher quality decisions. However, one transaction-specific risk that users face in the context of personalization is the risk to privacy. Personalization requires that firms collect customer information explicitly as well as implicitly. Users provide data voluntarily in the process of registering on websites, through warranty cards, or in response to surveys. Website technologies are also capable of furtively gathering user data, often without knowledge or permission of the consumer. Whether data are obtained explicitly or implicitly, users are concerned that the firm might act opportunistically (Aguirre et al. 2015). Since some data is collected via transactions within the website, personalization is *not feasible* unless there is some degree of *baseline trust* in the firm. However, trust is not only about one-time interactions but develops gradually as firms and consumers interact with each other. As trust in the firm increases, consumers may be willing to provide more information thus leading to better product recommendations. Prior research supports this line of argument and shows that firms might be able to even charge premium prices if they are able to reduce transaction specific risks (Pathak et al. 2011; Rao and Monroe 1996). Similarly, the likelihood of retaining customers, acquiring new customers, and cross-buying should be higher if there is greater trust towards the firm. Trust in a firm mitigates user concerns about privacy, lowers transaction-specific risks, and helps firms to lower cash flow volatility and/or charge higher prices. In sum, we expect trust to be an important contingency factor that aids firms to lower cash flow volatility and enhance cash flows. Based on these arguments, we propose that:

*$H2_a$: Online trust will strengthen the negative impact of WP on cash flow volatility.*

*$H2_b$: Online trust will strengthen the positive impact of WP on premium price.*

## Research Methodology

### *Data*

The empirical context is online retailers in the financial services industry in the United States. Our choice of examining personalization in the financial services industry was guided by the fact that financial services represent an important and significant industry as it contributes approximately 20% to the GDP of the United States (*Statista* 2017). Furthermore, the online channel is quickly emerging as the dominant channel in terms of usage and revenues compared to offline channels (e.g., telephone, face-to-face, ATMs). A survey by *American Bankers Association* found that 90% of respondents preferred to do their banking online rather than at a branch or an ATM (*CGI* 2015). Academic studies have highlighted the importance of online channel in this industry (Xue, Hitt, and Chen 2011). The reason WP is prevalent in the financial services industry is because the industry is information intensive and customer acquisition costs are high because of intense competition (Safko 2013). As such, retailers in the financial services industry personalize content to build profitable and long-lasting relationships with customers. Financial products that are often personalized include stocks & bonds, banking products (e.g., deposits), mortgages, and credit cards. In many situations, WP centers on tailoring financial market news based on the client's investment profile and providing individualized investment advice and portfolio analysis based on changing risk. Examples of WP in our empirical context would be Charles Schwab offering personalized recommendations on building a financial portfolio based on the user's risk preferences and demographics or Capital One making personalized suggestions for increasing credit card use or enrolling in a loyalty program based on spending patterns of the user.

The data for WP was obtained from Keynote Systems (i.e., erstwhile Gomez advisors), an independent third-party firm that tracks and publishes quarterly scorecards on a number of important online attributes for U.S. firms in the financial services industry. Firms are rated on a 1-10 scale on online attributes (1=lowest; 10=highest). Several features of this dataset are noteworthy. The data are measured consistently over time and comparable across multiple SIC codes.[1] The dataset is assembled by analysts by 1) conducting real transactions with the firm, 2) directly monitoring the firm's online offerings, and 3) interacting with the firm's customer service units over the Internet and telephone. The transaction data are then combined with data from a detailed questionnaire filled out by firms and factor analyzed. The data span a time horizon of twenty-four quarters and cover a broad cross section of online retailers in the financial services sector.

To obtain the final dataset, we dropped observations with missing data. We further dropped observations of privately listed firms because of lack of financial data from Compustat. The final sample is an unbalanced panel of 603 observations corresponding to 80 publicly held U.S. firms over 24 quarters. The frequency distribution of observations across firms appears in Web Appendix 1. The time-periods for which firms are present in our dataset ranges from 2 to 24 quarters. The dataset consists of firms spanning 12 SIC codes. The sample is comprised of 'Commercial Banks' (SIC code = 6020), 'Security Brokers' (SIC codes = 6210, 6211, and 6282), 'Savings Institutions' (SIC codes = 6035 and 6036), 'Personal Credit Institutions' (SIC codes =

[1] Since Keynote Systems employ the same instrument to collect data, the scores are comparable across the 12 SIC codes that span our sample. Therefore, the scores on personalization and price do not refer to highest or lowest scores within a four-digit SIC code.

6141 and 6199), ‘Mortgage Institutions’ (SIC codes = 6162 and 6163), and ‘Insurance Institutions’ (SIC codes = 6310 and 6320). We supplemented the data with other independent and control variables using a number of publicly available secondary data sources. The data on firm size was collected from 10-Q and 10-K statements and Compustat. We assembled the macroeconomic data such as customer confidence index, stock market index, and inflation from the Conference Board, Compustat, and Bureau of Economic Analysis (BEA) respectively. Finally, the data on IT expenditures was assembled by combing through quarterly and annual filings (i.e., 10-Q and 10-K statements).

***Measures***

The operationalization of the variables and the data sources are summarized in Table 1.

--- Insert Table 1 about here ---

*Shareholder Value:* We use market-to-book ratio (M/B ratio) as the measure of shareholder value (Barber and Lyon 1997; Kerin and Sethuraman 1998). The choice of this measure over measures such as annual stock returns and Tobin’s Q was guided by considerations about the unique nature of the financial services industry. Unlike manufacturing firms, the notion of debt is ambiguous in financial services because of the difficulty in distinguishing between customer deposits and debt from bondholders. Customer deposits is akin to the raw material steel used in automobiles because financial service firms use customer deposits as material inputs to invest and generate higher returns. As such, stock response modeling or using Tobin’s Q in the financial services industry may not be appropriate because financial leverage (debts/assets), a key explanatory variable holds a somewhat different meaning in this setting. Previous research, however, notes that comparing the market-to-book ratios between financial and non-financial sectors is a viable approach because the metric behaves similarly across these sectors (see Barber and Lyon 1997 for details). Accordingly, we use market-to-book ratio as the operational measure for shareholder value. We compute market value as the product of the number of common outstanding shares (Compustat data item #CSHOQ) and stock price at the end of the quarter (Compustat data item # PRCCQ). The book value of the firm is the common equity on the firm's balance sheet at the end of the quarter (Compustat data item # CEQQ). The average M/B ratio in our data is little over three, suggesting that almost three quarters of the market value of firms resides in intangible assets. We find that the average M/B ratio of security brokers and finance services firms (commercial banks and savings institutions) is statistically above (below) the overall mean in the sample.

*Web Personalization:* We use the index developed by Keynote Systems as our measure of WP. This measure of WP developed by Keynote Systems captures the extent to which a firm reuses customer data, personalizes its website, supports business and personal needs such as tax reporting or repeated buying, updates account holdings on a real-time basis, provides personalized profile alerts, and offers personalized recommendations/advice and personalized rewards. This measure is to the best of our knowledge, the most comprehensive and consistent measure (i.e., same scoring methodology used across years and firms) on WP that is publicly available. WP is rated on a 1-10 scale, with lower (higher) scores implying lower (higher) levels of WP. We have considerable cross-sectional as well temporal variation on WP scores. We find that 55.36% and 16.75% of the variation is explained by cross-firm and cross-time heterogeneity respectively. Additionally, we also find an increasing time trend in WP. With every additional quarter, the average WP increases by .03. Web Appendix 2 shows the distribution of number of firms and number of observations across different levels of WP.

*Cash Flow Volatility*: Consistent with previous research (Fornell et al. 2006; Gruca and Rego 2005; Srivastava, Shervani, and Fahey 1998), we operationalize cash flow volatility in terms of firm cash flow variability relative to industry cash flow variability. Using a moving window of the previous four quarters, we compute the coefficient of firm cash flow variability as the standard deviation of firm cash flows divided by mean firm cash flows. Since firm cash flow variability can vary significantly across multiple industries, we normalize this by dividing with the coefficient of industry cash flow variability, which is computed using a moving window of four quarters of aggregate quarterly cash flows from all firms in a two-digit SIC. The average cash flow volatility in our sample is 2.28, suggesting that firms in our sample have greater variability in their cash flows than their industry peers. We examined if there are significant time trends in cash flow volatility but find none in our sample.

*Premium Prices:* We use the index developed by Keynote Systems to operationalize the overall price level of a firm. This measure reflects the price paid by customers for a typical basket of products/services (see Table 1 for details of the measure). The measure is on a 1-10 scale with lower (higher) scores implying higher (lower) prices. We reverse coded this measure for ease of interpretation. Similar to WP, we find that cross-sectional (between) variation in price premium is more than temporal (within) variation. We also find a positive time trend in price premium such that the average price premium increases by about 1.5 units in the data period.

*Online Trust:* Following past research (Konana, Menon, and Balasubramanian 2000; Kotha, Rajgopal and Venkatachalam 2004), we use the index developed by Keynote Systems to operationalize online trust. This measure captures the extent to which firms provide *privacy and security guarantees* and *operate reliable websites*. The measure is on a 1-10 scale with lower (higher) scores implying lower (higher) online trust. The average online trust of firms in our sample is 6.38. There is also an increasing time trend in average online trust. This trend is consistent with anecdotal evidence which suggests that over time customers' trust in electronic retailers has increased (Nielsen 2012).

To enhance the confidence in the study's substantive conclusions, we sought to examine the construct validity of the online trust measure. To do so, we compared the attribute ratings from Keynote Systems for online trust with attribute ratings provided by other agencies such as Barron's and Smart Money. These agencies measure trust in terms of the degree to which firm's websites are reliable on aspects such as providing secure transactions, protecting consumer identity, and resolving customer issues related to these issues. According to business reports, Keynote Systems along with Barron's and Smart Money are widely recognized to be the industry leaders in tracking the online performance of firms in the banking and brokerage segments. We collected Barron's and Smart Money ratings on online trust by combing through the archives of Lexis-Nexis. We were able to collect scores from Barron's and Smart Money for only a subset of firms in our sample. The correlations between the Keynote measures on online trust and their counterparts from other agencies are reasonably high (.63 and .66). This analysis provides evidence for the construct validity of the online trust measure provided by Keynote Systems.

*Control Variables:* We control for several firm characteristics that could influence M/B ratio. We include 'ease of use' (defined as the extent to which a firm's website is intuitive, has tightly integrated content, and provides demos and tutorials) and 'onsite resources' (defined as the extent to which firms have depth of product and service lines, electronic forms, information look ups) as control variables. In addition, shareholder value, i.e. M/B ratio, is likely to be impacted by firm size (Jayachandran, Kalaignanam, and Eilert 2013; McConnell and Servaes 1990). We operationalize firm size as the logarithm of its total number of employees. We also include IT intensity, operationalized as the ratio of the firm's IT expenditures to total assets, as a control variable in the model (Kalaignanam et al. 2013). Since annual IT expenditures were not readily available from Compustat, the data were obtained from the firm's quarterly and annual filings with the SEC. The figures reported in the SEC filings include costs incurred on hardware/equipment and software. While we included a number of firm-specific control variables, there might still be unobservable firm characteristics (time invariant) that influence M/B ratio. Likewise, although M/B ratio is a scale-free metric, stock markets impute a greater market value for some industries more than others. Similarly, stock markets are also known to be susceptible to bullish (or bearish) trends in certain years depending on the state of the economy. We control for unobserved firm, industry and time characteristics. That is, we include 11 industry dummies based on four-digit SIC codes to account for unobserved industry characteristics and five-year dummies to account for unobserved temporal shocks. We include random effects at the firm level to control for unobserved firm heterogeneity.

***Model Development and Estimation***

*Controlling for Selection and Attrition Bias:* An issue to consider in model estimation is whether the firm's decision to participate in Keynote System's quarterly or annual ratings is endogenous. In our context, sample selection and sample attrition are two sources of biases that could cloud the interpretation of the results. It is possible that firms appearing and dropping out of the panel are due to systematic reasons related to performance or survivorship. For example, in our dataset, we observe that some firms are present in the panel for two quarters whereas others are present for twenty four quarters. The decision of a firm to participate in Keynote System's survey could lead to a skewed sample. It is possible that industry laggards dropped out of the panel and industry leaders stayed on for multiple periods. Another possibility for higher participation in the Keynote Systems survey could be related to survivorship (failure). For example, a number of firms may cease to exist after economic downturns. If either of these explanations holds, then inferences made from this sample regarding the effectiveness of WP could be misleading and erroneous.

To correct for this bias, we assembled a sample of firms that were not tracked by Keynote Systems in that period. To do this, we matched firms in our sample with publicly listed firms on two criteria: *industry* (i.e., four-digit SIC code match) and *size* (i.e., market capitalization). Consistent with previous research in finance (Li and McNally 2007; Li and Prabhala 2006), the dimension matching was done by ensuring that the market capitalization of the matched sample was within 10% of our original sample. In other words, the matched firms are comprised of 1) all firms not tracked by Keynote Systems, 2) firms that are in the same four-digit SIC code as the focal sample firm, and 3) firms whose market capitalization is within 10% of the focal sample firm. This procedure yielded 2,202 firm-quarter observations for the matched sample (average capitalization of $7.03b) and 603 firm-quarter observations for the Keynote sample (average capitalization of $7.43b). The selection model is estimated on the pooled data (i.e., the main and matched sample). Details on our selection model can be found in Web Appendix 3.

*Ruling out Reverse Causality between Personalization and Firm Performance:* An argument that could threaten the validity of our findings is that firms performing well (i.e., higher past financial performance) tend to offer higher degrees of WP. To account for the possibility of reverse causality, we regressed past retained earnings of the firm (i.e., average of previous three years) on WP and used the residuals from this regression as the measure of WP. Since the WP measure constructed from the residuals is orthogonal to past performance, we can rule out the possibility of reverse causation. Also, since the WP measure is now an estimated variable, we bootstrap the standard errors in estimating the regression models.

*Ruling out Reverse Causality between Personalization and Price Premium:* Another argument that needs to be tested is whether WP leads to price premium, as we propose, or firms that charge higher prices are more inclined to pursue WP. We used Granger Causality tests to establish the direction of causality between these variables. This approach is commonly used for understanding the causal path with observational data (Hanssens, Parsons, and Schultz 2001; Trusov, Bucklin, and Pauwels 2009). The results of this test are reported in Web Appendix 4 and provide evidence supporting a causal link between WP and price premium.

We use random effect estimators with sample selection correction in a panel data context. The direct effect model is specified as follows:

Model 1 (M1):
$$\begin{aligned} MBRAT_{it} = {} & \beta_0 + \beta_i + \beta_1 WP_{it} + \beta_2 TRUST_{it} + \beta_3 WP_{it} * TRUST_{it} \\ & + \beta_4 EASE_{it} + \beta_5 ONSITE_{it} + \beta_6 IT_{it} + \beta_7 SIZE_{it} \\ & + \beta_{8-18} IDUS_i + \beta_{19-23} YEAR_t + \theta_1 \hat{\lambda} + \varepsilon_{it} \end{aligned} \tag{1}$$

where, *i* stands for firm, *t* stands for quarter-year combination, *MBRAT* is market-to-book ratio, *WP* is personalization, *TRUST* is online trust in the retailer, *EASE* is ease of use, *ONSITE* is availability of onsite resources, *IT* is information technology resources, *SIZE* is firm size, *IDUS* are industry dummies, *YEAR* are year dummies, $\hat{\lambda}$ is the inverse mills ratio (sample selection bias control), and $\beta_i$ is firm specific random effect.

The effect of WP on the mediating variables, cash flow volatility and price premium, and their interactions with trust is tested using the following two model specifications (M2 and M3).

Model 2 (M2):
$$\begin{aligned} CFV_{it} = {} & \delta_0 + \delta_i + \delta_1 WP_{it} + \delta_2 TRUST_{it} + \delta_3 WP_{it} * TRUST_{it} \\ & + \delta_4 EASE_{it} + \delta_5 ONSITE_{it} + \delta_6 IT_{it} + \delta_7 SIZE_{it} \\ & + \delta_{8-18} IDUS_i + \delta_{19-23} YEAR_t + \theta_2 \hat{\lambda} + \psi_{it} \end{aligned} \tag{2}$$

Model 3 (M3): $PRM_{it} = \eta_0 + \eta_i + \eta_1 WP_{it} + \eta_2 TRUST_{it} + \eta_3 WP_{it} * TRUST_{it}$
$+\eta_4 EASE_{it} + \eta_5 ONSITE_{it} + \eta_6 IT_{it} + \eta_7 SIZE_{it}$
$+\eta_{8-18} IDUS_i + \eta_{19-23} YEAR_t + \theta_3 \hat{\lambda} + \varsigma_{it}$ (3)

where, *CFV* is cash flow volatility and *PRM* is premium pricing. $\delta_i$ and $\eta_i$ are firm specific random effect. We test H2a and H2b through significance of $\delta_3$ and $\eta_3$, which represent the moderating impact of online trust on WP and the mediating variables.

The following model specification is used for evaluating the impact of cash flow volatility and price premium on M/B ratio in absence (M4) and presence (M5) WP.

Model 4 (M4): $MBRAT_{it} = \mu_0 + \mu_i + \mu_1 CFV_{it} + \mu_2 PRM_{it} + \mu_3 TRUST_{it}$
$+\mu_4 EASE_{it} + \mu_5 ONSITE_{it} + \mu_6 IT_{it} + \mu_7 SIZE_{it}$
$+\mu_{8-18} IDUS_i + \mu_{19-23} YEAR_t + \theta_4 \hat{\lambda} + \upsilon_{it}$ (4)

Model 5 (M5): $MBRAT_{it} = \pi_0 + \pi_i + \pi_1 WP_{it} + \pi_2 CFV_{it} + \pi_3 PRM_{it} + \pi_4 TRUST_{it}$
$+\pi_5 WP_{it} * TRUST_{it} + \pi_6 EASE_{it} + \pi_7 ONSITE_{it} + \pi_8 IT_{it}$
$+\pi_9 SIZE_{it} + \pi_{10-20} IDUS_i + \pi_{21-25} YEAR_t + \theta_5 \hat{\lambda} + \zeta_{it}$ (5)

$\mu_i$ and $\pi_i$ is firm specific random effect. The impact of mediating variables, cash flow volatility, and price premium on shareholder value is captured by $\pi_2$ and $\pi_3$. The test of H1a and H1b is done using $\delta_3$ and $\eta_3$ in Eq (2) and Eq (3) and $\pi_2$ and $\pi_3$ in Eq (5). $\pi_1$ is the indirect impact of WP on shareholder value in the presence of the mediators.

***Results***

The probit results of the sample selection model are presented in Web Appendix 5. As noted before, the dependent variable is whether a firm is present in the sample in a particular quarter. The model fit of the selection model is good with a hit rate of 78.22%. The results suggest that market share, S&P 500 index, and consumer confidence index (CCI) have statistically significant and positive effects on the probability of a firm being in the sample whereas consumer price index (CPI) has a negative effect on the probability of a firm being in the sample.

The summary statistics and correlations between key variables are presented in Table 2. We examined the correlations between the variables for multicollinearity. The maximum VIF and condition index are well within the prescribed limits. We also present model-free evidence on the relationships between average level of WP and average M/B ratio, cash flow volatility, and price premium at different levels of online trust in Figure 1. The pattern of relationships observed in Figure 1(a) suggest that WP is positively correlated with M/B ratio and that this relationship appears stronger in the high online trust sample than in the low online trust sample. Similarly, Figure 1(b) suggests that WP is not (negatively) correlated with cash flow volatility in the low (high) online trust sample. Finally, in Figure 1(c), the impact of WP on price premium is negative in the low online trust sample but positive in the high online trust sample. We next discuss the model-based results.

--- Insert Table 2 and Figure 1 about here ---

The results of the models used for testing moderated-mediation are presented in Table 3. As evidenced in Table 3 the direct effects model (M1) suggest that WP is positively associated with M/B ratio (.4135, $p<.10$). We further find that the effect of WP on cash flow volatility is negative and significant (see M2, -.5861, $p<.10$). However, the effect of WP on premium price is not statistically significant (see M3, .3776, $p>.10$). Collectively, while WP stabilizes firm cash flows, it does not translate into higher prices paid by customers.

--- Insert Table 3 about here ---

We use the procedure advocated by previous research to test the moderated–mediation model (Kachersky 2011; Muller, Judd, and Yzerbyt 2005; Preacher, Rucker, and Hayes 2007). In our case, the effect of WP on premium price and cash flow volatility (the mediators) depends on online trust. In the first stage, we regress M/B ratio on WP with the proposed mediators (cash flow volatility and price premium) excluded from the model. We also include the direct effect of online trust and the interaction between WP and online trust in this model. In the total effects model, we include cash flow volatility and price premium in the model to assess whether its inclusion reduces the effects of WP on M/B ratio. Mediation occurs if the effect of WP on M/B ratio is lower or become insignificant in the presence of cash flow volatility and price premium and overall fit is improved. We find that cash flow volatility is negatively associated with M/B ratio (-.0549, $p<.10$). The total effects model (M5) suggests that the effect of WP on M/B ratio (after accounting for cash flow volatility) is positive and significant at the 10% level (.3637, $p<.10$), albeit the impact is smaller than in the model (M1) which does not include cash flow volatility (.4135, $p<.10$). The Sobel's test statistic for the mediating effect of cash flow volatility is also statistically significant ($p<.10$). Collectively, we find that cash flow volatility partially mediates the impact of WP on firm performance. Thus, $H1_a$ is supported. As expected, premium price is positively associated with M/B ratio (.1369, $p<.05$). However, as noted before, the impact of personalization on premium price is not statistically significant (.3776, $p>.10$). The Sobel's test statistic for the mediation effect of price premium is not significant ($p>.10$). The results do not lend support for the mediating effect of price premium. $H1_b$ is not supported.

Next, we turn to the moderator hypotheses tests. We test if the impact of WP on M/B ratio is positively moderated by trust. The interaction effect of WP and trust in model M1 is positive and significant (.1044, $p<.05$). To gain a better understanding of these interactions, we plot the simple slopes (Figure 2), i.e., the marginal impact of WP, at different levels of trust. As seen in Figure 2(a), the impact of WP on M/B ratio is strengthened as trust increases. At low levels of trust, i.e., below the 20$^{th}$ percentile, the interaction effect is not significant. However, at moderate and high values, trust moderates the impact of WP on M/B ratio. Thus, in our sample, we observe statistically significant interaction effects for 65 firms with moderate to high levels of online trust. $H2_a$ and $H2_b$ pertain to the moderating influence of online trust on the relationships between WP, cash flow volatility, and premium price. The results suggest that the interaction effect of WP and online trust on cash flow volatility is negative and significant (see M2, -.1026, $p<.05$). $H2_a$ is supported. As seen in Figure 2(b), the simple slope analysis suggests that, at low levels of trust, below 25$^{th}$ percentile, WP has no impact on reducing cash flow volatility. However, at moderate and high levels of trust, WP significantly lowers cash flow volatility. The interaction effect is statistically significant for 57 firms in our sample with moderate to high online trust levels. Interestingly (see Figure 2(c)), we also find that at above average levels of online trust, i.e., above 50$^{th}$ percentile, the relationship between WP and premium price turns positive and significant (see M3, .0576, $p<.05$). The interaction is statistically significant for 28 firms in our sample. $H2_b$ is supported. Therefore, the ability of firms to charge premium prices for WP is not likely to manifest unless there is high level of online trust.

--- Insert Figure 2 about here ---

As regards control variables, we find that both ease of use (M5, .2931, $p<.01$) and onsite resources (M5, .2859, $p<.01$) are positively associated with M/B ratio. The effect of IT intensity on M/B ratio is not significant. The results also indicate that the selection control variable is negative and significant (-.1299, $p<.05$), thus indicative of the need to account for sample selection bias.

***Additional Analyses***

The negative effect of WP on cash flow volatility raises interesting questions about the source of these effects. The reduction in cash flow volatility could be because of lower customer churn or the addition of new customers or higher cross-buying by existing customers that offsets revenues lost due to customer churn. We performed additional analyses to understand which of these explanations hold. To assemble data on the number of new customers, repeat customers, and cross-buying, we use comScore's disaggregate panel. The comScore dataset tracks the surfing behavior of a panel of US households using unique machine IDs. We operationalized new customer growth as the quarterly percentage increase in the number of new visitors. Likewise, we operationalized repeat customer growth as the quarterly percentage increase in the number of repeat visitors. We operationalized cross-buying as the ratio of revenues generated to the number of repeat customers. Because of data availability issues, this analysis is limited to a sample of 208 firm-quarter observations out of a total of 603 firm-quarter observations in our original sample.[2]

We estimate models M6-8 (M6, dependent variable: new customer growth; M7, dependent variable: repeat customer growth; M8, dependent variable: cross-buying). To conserve degrees of freedom, we excluded time and industry fixed effects from this model. The results of this analysis appear in Table 4. The results in Table 4 suggest that while WP is positively associated with repeat customer growth (.3801, $p<.05$), the impact of WP on new customer growth and cross-buying is not significant ($p>.10$). Based on this evidence, it is reasonable to infer that the reduction in cash flow volatility is due to lower customer churn rather than new customer acquisition or cross-buying. The insignificance of new customer growth is perhaps because the differentiation benefits of WP are not strong enough to acquire new customers in a competitive industry such as financial services. Alternately, the insignificant finding may be related to the smaller sample used in this analysis. Similarly, the insignificance of cross-buying could be attributed to length time-series being insufficient to capture WP's effect on cross-buying.

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[2] The member panelist for the comScore data varies from year to year.

--- Insert Table 4 about here ---

Following this, we estimate the impact of new customer growth, repeat customer growth and cross-buying on cash flow volatility using the same sub-sample (Model M9). The results presented in Table 4, suggest that while new customer growth and cross-buying are positively associated with cash flow volatility (.0234, $p<.05$; .0306, $p<.10$), repeat customer growth is negatively associated with cash flow volatility (-.0487, $p<.10$). In sum, this analysis sheds additional insights into the value creation mechanisms of WP. The impact of WP on M/B ratio is mediated by cash flow volatility which in turn seems to be driven by lower customer churn. We do not find evidence supporting the touted benefits of increased cross-buying or new customer acquisition from WP.

**Discussion and Conclusion**

Web personalization is rapidly emerging as a basis for competing more effectively in retailing. While anecdotes abound to suggest that WP is beneficial in building profitable relationships with customers, a systematic investigation of how WP impacts performance at the firm level is conspicuously absent in the literature. Similarly, although retailers expect positive returns from their investment in WP, systematic evidence on how value is created is not available. This study makes four contributions to the retailing management literature.

*First*, our study examines the value creation mechanisms of WP and finds that WP creates shareholder value by lowering firm cash flow volatility. We further find that lower cash flow volatility is because of lower customer churn. This finding is in contrast to Chen and Hitt (2002) who report an insignificant effect for the relationship between WP and customer switching. While the data source (i.e., Keynote Systems) used in both studies is the same, there are notable differences. Because we examine the performance effects of WP over a longer time horizon, it is likely that firms learn to deploy WP to create customer lock-ins. Our result is consistent with Chen and Forman (2006), who find that in the context of B2B products, artificial switching costs play a significant role in driving adoption decisions for new IT products. Similarly, Xue, Ray, and Whinston (2006) show that strategic IT investments can increase customer switching costs and hence increase retention probability of customers. In summary, evidence of a positive link between WP and shareholder value operating through the risk reduction pathway is reassuring. Retailers are likely to find the risk reduction potential of WP to be useful in establishing accountability and justifying investments in WP efforts. However, retailers deploying WP tools with the goal of acquiring new customers or stimulating cross-buying might not obtain the return on investment they desire.

*Second*, this study examines whether WP could create shareholder value by enhancing cash flows through higher prices. Evidence from previous research on whether WP allows the firm to charge higher prices from consumers is mixed. One school of thought is that the ability to differentiate through WP might produce a new kind of monopoly and lead to higher prices. This is because firms might have access to captive customers and charge higher prices to cover the costs of WP (Rust and Lemon 2001). An alternate argument is that personalized services may be more similar in overall quality valuation compared to standardized services, making consumers less willing to pay a large premium to purchase a more preferred option (Diehl, Kornish, and Lynch 2003). Therefore, not only does WP improve the quality of the chosen options and reduce the decision effort (Häubl et al. 2004), but it in fact permits the customer to pay a lower price. We find that WP does not allow the firm to charge premium prices unless for firms with high online trust. While customers may value WP because it is matched to their preferences, they are unwilling to pay more for them than for standardized services (Schoder et al. 2006). Contrary to expectations, for most firms, WP does not create value by making consumers insensitive to price.

*Third*, we show that higher trust in the vendor strengthens the relationship between WP and cash flow stability. The implication is that firms seeking to build trust with consumers are likely to realize a 'bigger bang for the buck' from WP efforts. We hurry to caution that building high levels of trust is a slow process that happens gradually over time. Building trust possibly requires venturing beyond assurances about a vendor's competence and integrity. An avenue for firms to build trust is by considering the design of text comments on their websites that have been shown to build trust in buyers (Kim and Benbasat 2006).

*Fourth,* previous research notes that vendors with higher trust might be able to charge higher prices because they are able to reduce transaction specific risks (Aguirre et al. 2015; Bleier and Eisenbliss 2015b). We examined whether WP could enable a firm to stabilize cash flows and charge higher prices if online trust is higher. We argue that trust in the vendor could lessen concerns of privacy that accompany WP, and thereby allow higher prices to be charged. We find that WP only enables firms with high online trust to charge higher prices.

The current study has a few limitations that need to be borne in mind when interpreting the results. *First*, while we examined the benefits of WP among online retailers in the financial services, an important sector of the US economy, caution is warranted in generalizing the results from the study. The financial services industry is unique and it is plausible that there is considerable inertia among customers in this industry to switch to competitors. As a result, the churn-lowering effect of WP could be stronger in the financial services industry compared to other industries. Future research could examine generalizability of our findings in other settings.

*Second*, the study's findings should not be strictly interpreted as causal. Although we used theoretical arguments to establish the direction of causality and econometrically accounted for several factors such as sample selection, reverse causality, and unobserved effects that cloud the interpretation of the results, causal inferences with observational data is not appropriate.

*Third*, as noted before, the inferences made about the mechanisms underlying lower cash flow volatility is based on a sub-sample of firms. We do not rule out the possibility that the insignificance of new customer growth and cross-buying benefits of WP is because of the smaller sample size used for the analysis. Future research needs to test these mechanisms to gain further understanding on whether the routes through which WP creates shareholder value vary in different competitive settings.

Finally, the measures we used for operationalizing trust relies on customers responding to statements such as provision of guarantees and assurances about data security. Furthermore, the measures used were based on the Keynote Systems scoring the retailers on this dimension. Given that trust is a complex construct with cognitive and affective dimensions, the measure used in the study may be coarse and may not fully reflect whether customers "truly" trust the retailer. Future research needs to assess trust based on attitudinal measures that tap into multiple dimensions.

## References


Aguirre, Elizabeth, Dominik Mahr, Dhruv Grewal, Ko de Ruyter and Martin Wetzels (2015), "Unraveling the Personalization Paradox: The Effect of Information Collection and Trust-Building Strategies on Online Advertisement Effectiveness," *Journal of Retailing*, 91 (1), 34-49.

Anderson, Eugene W., Claes Fornell and Sanal K. Mazvancheryl (2004), "Customer Satisfaction and Shareholder Value," *Journal of Marketing*, 68 (4), 172-85.

Barber, Bead M. and John D. Lyon (1997), "Firm Size, Book-to-Market Ratio, and Security Returns: A Holdout Sample of Financial Firms," *The Journal of Finance*, 52 (2), 875-83.

*BCG* (2017), "Personalization Programs Increase Leading Companies' Revenues by 6% to 10%," (accessed 20 June 2017), [available at https://goo.gl/KbV6RU].

Bleier, Alexander, Arne De Keyser, and Katrien Verleye (2018), "Customer Engagement through Personalization and Customization," in *Customer Engagement Marketing*, Robert W. Palmatier, V. Kumar, Colleen M. Harmeling, eds. Palgrave Macmillan, Cham, pp. 75-94.

——————— and Maik Eisenbeiss (2015a), "Personalized Online Advertising Effectiveness: The Interplay of What, When, and Where," *Marketing Science,* 34 (5), 669-88.

——————— and ——————— (2015b), "The Importance of Trust for Personalized Online Advertising," *Journal of Retailing,* 91 (3), 390-409.

Capraro, Anthony J. and Rajendra K. Srivastava (1997), "Part IV: How Do Reputations Affect Corporate Performance? Has the Influence of Financial Performance on Reputation Measures Been Overstated?," *Corporate Reputation Review*, 1 (1), 86-92.

*CGI* (2015), "Financial Consumer Demands for Tomorrow's Digital Bank," (accessed 20 June 20, 2017), [available at https://goo.gl/NDfy3V].

Chen, Pei-Yu and Chris Forman (2006), "Can Vendors Influence Switching Costs and Compatibility in an Environment with Open Standards?," *MIS Quarterly*, 30 (SI), 541-62.

——————— and Lorin M. Hitt (2002), "Measuring Switching Costs and the Determinants of Customer Retention in Internet-Enabled Businesses: A Study of the Online Brokerage Industry," *Information Systems Research*, 13 (3), 255-74.

Diehl, Kristin, Laura J. Kornish and John G. Lynch (2003), "Smart Agents: When Lower Search Costs for Quality Information Increase Price Sensitivity," *Journal of Consumer Research*, 30 (1), 56-71.

Fornell, Claes, Sunil Mithas, Forrest V. Morgeson and M.S. Krishnan (2006), "Customer Satisfaction and Stock Prices: High Returns, Low Risk," *Journal of Marketing*, 70 (1), 3-14.

*Forbes Insights* (2016), "Leading With Customer-Focused Content: Driving Growth through Personalized Experiences," (accessed 19 June 2017), [available at https://goo.gl/vphRHB].

*Gigya* (2017), "The State of Consumer Privacy and Trust in 2017: Fear and Hope, " (accessed 20 June 2017), [available at https://goo.gl/fmyWnr].

Goldfarb, Avi and Catherine E. Tucker (2011a), "Privacy Regulation and Online Advertising," *Management science,* 57 (1), 57-71.

———————— and ———————— (2011b), “Online Display Advertising: Targeting and Obtrusiveness,” *Marketing Science*, 30 (3), 389-404.

Gruca, Thomas S. and Lopo L. Rego (2005), “Customer Satisfaction, Cash Flow, and Shareholder Value,” *Journal of Marketing*, 69 (3), 115-30.

Gupta, Sunil and Valarie Zeithaml (2006), “Customer Metrics and their Impact on Financial Performance,” *Marketing Science,* 25 (6), 718-39.

Hanssens, Dominique M., Leonard J. Parsons, and Randall L. Schultz (2001), *Market Response Models*, 2d ed. Boston: Kluwer Academic Publishers.

Hauser, John R., Guilherme Liberali, and Glen L. Urban (2014), “Website Morphing 2.0: Switching Costs, Partial Exposure, Random Exit, and When to Morph,” *Management Science*, 60(6): 1594-616.

————————, Glen L. Urban, Guilherme Liberali, and Michael Braun (2009), “Website Morphing,” *Marketing Science,* 28(2): 202-23.

Ho, Shuk Ying and David Bodoff (2014), “The Effects of Web Personalization on User Attitude and Behavior: An Integration of the Elaboration Likelihood Model and Consumer Search Theory,” *MIS Quarterly,* 38 (2), 497-520.

Hoffman, Donna L., Thomas P. Novak and Marcos Peralta (1999), “Building Consumer Trust Online,” *Communications of the ACM*, 42(4), 80–5.

Hollensen, Svend (2015), *Marketing Management: A Relationship Approach*, 2d ed. London: Pearson Education.

Hsieh, JJ Po-An, Arun Rai and Sean Xin Xu (2011), “Extracting Business Value from IT: A Sensemaking Perspective of Post-Adoptive Use,” *Management Science,* 57 (11), 2018-39.

*Investopedia* (2017), “Why the FANG Stocks Will Dominate Long Term,” (accessed 17 December 2017), [available at https://goo.gl/cXuj2d]

Jayachandran, Satish, Kartik Kalaignanam, and Meike Eilert (2013), “Product and Environmental Social Performance: Varying Effect on Firm Performance,” *Strategic Management Journal*, 34 (10), 1255-64.

Johnson, Eric J., Wendy W. Moe, Peter S. Fader, Steven Bellman and Gerald L. Lohse (2004), “On the Depth and Dynamics of Online Search Behavior,” *Management Science*, 50 (3), 299-308.

Kachersky, Luke (2011), “Reduce Content or Raise Price? The Impact of Persuasion Knowledge and Unit Price Increase Tactics on Retailer and Product Brand Attitudes,” *Journal of Retailing*, 87 (4), 479-88.

Kalaignanam, Kartik, Tarun Kushwaha, Jan-Benedict E.M. Steenkamp and Kapil R. Tuli (2013), “The Effect of CRM Outsourcing on Shareholder Value: A Contingency Perspective,” *Management Science*, 59 (3), 748-69.

Kerin, Roger A. and Raj Sethuraman (1998), “Exploring the Brand Value-Shareholder Value Nexus for Consumer Goods Companies,” *Journal of the Academy of Marketing Science*, 26 (4), 260-73.

Kim, Dongmin and Izak Benbasat (2006), "The Effects of Trust-Assuring Arguments on Consumer Trust in Internet Stores: Application of Toulmin's Model of Argumentation," *Information Systems Research*, 17 (3), 286-300.

Kim, Yeolib and Robert A. Peterson (2017), "A Meta-Analysis of Online Trust Relationships in E-Commerce," *Journal of Interactive Marketing*, 38 (May), 44-54.

Kobsa, Alfred (2007), "Privacy-Enabled Personalization," *Communications of the ACM,* 50 (8), 24-33.

Komiak, Sherrie Y. X. and Izak Benbasat (2006), "The Effects of Personalization and Familiarity on Trust and Adoption of Recommendation Agents," *MIS Quarterly*, 30 (4), 941-960.

Konana, Prabhudev, Nirup M. Menon and Sridhar Balasubramanian (2000), "The Implications on Online Investing," *Communications of the ACM*, 43 (1), 34-41.

Kotha, Suresh, Shivaram Rajgopal, and Mohan Venkatachalam (2004), "The Role of Online Buying Experience as a Competitive Advantage: Evidence from Third-Party Ratings for e-Commerce Firms," *The Journal of Business*, 77 (S2): S109-S133.

Lal, Rajiv and Miklos Sarvary (1999), "When and How Is the Internet Likely to Decrease Price Competition?," *Marketing Science*, 18 (4), 485-503.

Lambrecht, Anja and Catherine Tucker (2013), "When Does Retargeting Work? Information Specificity in Online Advertising," *Journal of Marketing Research*, 50(5): 561-76.

Lehmann, Donald R. (2004), "Metrics for Making Marketing Matter," *Journal of Marketing*, 68 (4), 73-75.

Li, Kai and Nagpurnanand R. Prabhala (2006), "Self-Selection Models in Corporate Finance," in *Handbook of Corporate Finance: Empirical Corporate Finance,* B. Espen Eckbo, ed. Amsterdam: North-Holland.

——————— and William McNally (2007), "The Information Content of Canadian Open Market Repurchase Announcements," *Managerial Finance*, 33 (1), 65-80.

Madden, Thomas J., Frank Fehle, and Susan Fournier (2006), "Brands Matter: An Empirical Demonstration of the Creation of Shareholder Value through Branding," *Journal of the Academy of Marketing Science*, 34 (2), 224-35.

Mantrala, Murali K., Manfred Kraft, Beibei Dong and Kalyan Raman (2008), "The CRM Process and the Banking Industry: Insights from the Marketing Literature," in *Advances in Banking Technology and Management: Impact of ICT and CRM,* Vadlamani Ravi, ed, Idea Group Inc., Penn. (USA); pp. 159-185.

McConnell, John J. and Henri Servaes (1990), "Additional Evidence on Equity Ownership and Corporate Value," *Journal of Financial Economics*, 27 (2), 595-612.

Moorman, Christine, Gerald Zaltman and Rohit Deshpande (1992), "Relationships between Providers and Users of Market Research: The Dynamics of Trust within and Between Organizations," *Journal of Marketing Research*, 29 (August), 314–28.

Muller, Dominique, Charles M. Judd and Vincent Y. Yzerbyt (2005), "When Moderation Is Mediated and Mediation Is Moderated," *Journal of Personality and Social Psychology*, 89 (6), 852-63.

*National Retail Federation* (n.d.), "Comments of the National Retail Federation and Shop.org before the Federal Trade Commission on Preliminary FTC Staff Report: 'Protecting Consumer Privacy in an Era of Rapid Change' A Proposed Framework for Businesses And Policymakers." (accessed June 20, 2017) [available at https://goo.gl/Txc992].

*Nielsen* (2012), "Consumer Trust in Online, Social and Mobile Advertising Grows," (accessed February 5, 2018), [available at https://goo.gl/C34AUV]

Novshek, William and Lynda Thoman (2006), "Demand for Customized Products, Production Flexibility, and Price Competition," *Journal of Economics & Management Strategy*, 15 (4), 969-98.

Nunes, Paul F. and Ajit Kambil (2001), "Personalization? No, Thanks," *Harvard Business Review,* 79 (4), 32-4.

Pathak, Bhavik, Robert Garfinkel, Ram D. Gopal, Rajkumar Venkatesan and Fang Yin (2010), "Empirical Analysis of the Impact of Recommender Systems on Sales," *Journal of Management Information Systems*, 27 (2), 159-88.

Peppers, Don and Martha Rogers (1997), *Enterprise One to One: Tool for Competing in Interactive Age*. London: Piatkus.

Preacher, Kristopher J., Derek D. Rucker and Andrew F. Hayes (2007), "Addressing Moderated Mediation Hypotheses: Theory, Methods, and Prescriptions," *Multivariate Behavioral Research*, 42 (1), 185-227.

Rao, Akshay R. and Kent B. Monroe (1996), "Causes and Consequences of Price Premiums," *The Journal of Business*, 69 (4), 511-35.

Rao, Ramesh K.S. and Neeraj Bharadwaj (2008), "Marketing Initiatives, Expected Cash Flows, and Shareholders' Wealth," *Journal of Marketing*, 72 (1), 16-26.

Reinartz, Werner, Manfred Krafft and Wayne D. Hoyer (2004), "The Customer Relationship Management Process: Its Measurement and Impact on Performance," *Journal of Marketing Research*, 41 (3), 293-305.

Roettgers, Janko (2014), "Netflix Spends $150 Million on Content Recommendations Every Year," *Gigaom*, accessed 19 June 19, 2017, [available at https://goo.gl/MohPbk].

Rousseau, Denise M., Sim B. Sitkin, Ronald S. Burt and Colin Camerer (1998), "Not So Different After All: A Cross-Discipline View of Trust," *Academy of Management Review*, 23 (3), 393-404.

Rust, Roland T. and Katherine N. Lemon (2001), "E-Service and the Consumer," *International Journal of Electronic Commerce,* 5 (3), 85-101.

Safko, Lon (2013), "How Much Did That New Customer Cost You?," *Entrepreneur*, (accessed 18 June 2017), [available at https://goo.gl/vv3Swq].

Schoder, Detlef, Stefan Sick, Johannes Putzke and Andreas M. Kaplan (2006), “Mass Customization in the Newspaper Industry: Consumers' Attitudes Toward Individualized Media Innovations,” *International Journal on Media Management*, 8 (1), 9-18.

Shaked, Avner and John Sutton (1982), “Relaxing Price Competition through Product Differentiation,” *The Review of Economic Studies*, 49 (1), 3-13.

Srivastava, Rajendra K., Tasadduq A. Shervani and Liam Fahey (1998), “Market-Based Assets and Shareholder Value: A Framework for Analysis,” *Journal of Marketing*, 62 (1), 2-18.

————, ————, and ———— (1999), “Marketing, Business Processes, and Shareholder Value: An Organizationally Embedded View of Marketing Activities and the Discipline of Marketing,” *Journal of Marketing*, 63 (Special Issue), 168-79.

*Statista* (2017), “Value Added to the Gross Domestic Product (GDP) of the United States of America in 2016, By Industry,” (accessed June 20, 2017), [available at https://goo.gl/Tb9E7E].

———— and ———— (2005), “Web Personalization as a Persuasion Strategy: An Elaboration Likelihood Model Perspective,” *Information Systems Research,* 16 (3), 271-91.

Tam, Kar Yan and Shuk Ying Ho (2006), “Understanding the Impact of Web Personalization on User Information Processing and Decision Outcomes,” *MIS Quarterly*, 30(4): 865-90.

Tokman, Mert, Lenita M. Davis and Katherine N. Lemon (2007), “The WOW Factor: Creating Value Through Win-Back Offers to Reacquire Lost Customers,” *Journal of Retailing,* 83 (1), 47-64.

Tucker, Catherine E. (2014), “Social Networks, Personalized Advertising, and Privacy Controls,” *Journal of Marketing Research,* 51(5): 546-62.

Tuli, Kapil R. and Sundar G. Bharadwaj (2009), “Customer Satisfaction and Stock Returns Risk,” *Journal of Marketing,* 73 (6), 184-97.

Urban, Glen L., Guilherme Liberali, Erin MacDonald, Robert Bordley, and John R. Hauser (2013), “Morphing Banner Advertising,” *Marketing Science,* 33 (1), 27-46.

Xue, Mei, Lorin M. Hitt and Pei-Yu Chen (2011), “Determinants and Outcomes of Internet Banking Adoption,” *Management Science*, 57 (2), 291-307.

Xue, Ling, Gautam Ray and Andrew Whinston (2006), “Strategic Investment in Switching Cost: An Integrated Customer Acquisition and Retention Perspective,” *International Journal of Electronic Commerce*, 11 (1), 7-35.

Zhang, Tongxiao, Ritu Agarwal and Henry C. Lucas (2011), “The Value of IT-Enabled Retailer Learning: Personalized Product Recommendations and Customer Store Loyalty in Electronic Markets,” *MIS Quarterly,* 35 (4), 859-81.

## Table 1 – Variables and Data Sources

| Variable | Operationalization | Data Source |
|---|---|---|
| Shareholder value (*MBRAT*) | Market-to-Book ratio = Market value of firm/Book value of firm, where market value is measured as common shares times closing stock price of quarter and book value is measured as the firm's common equity. | Compustat |
| Web personalization (*PER*) | Extent to which firms personalize content and website, reuse customer data, provide personalized recommendations/advice. 1-10 scale; 1= lowest, 10=highest | Keynote Systems |
| Cash flow volatility (*CFV*) | Ratio of the coefficient of firm cash flow variability (standard deviation for firm cash flows divided by average firm cash flow) to coefficient of industry cash flow variability in a four quarter moving window. | Compustat |
| Premium price (*PRICE*) | Overall price level of the firm for a typical basket of personalized products/services. 1-10 scale; 1=lowest, 10=highest. | Keynote Systems |
| Online trust (*TRUST*) | Extent to which firms provide privacy/security guarantees, provide reliable customer service 1-10 scale; 1=lowest, 10=highest. | Keynote Systems |
| Ease of use (*EASE*) | Extent to which the website is intuitive, has tightly integrated content, provides demos and tutorials; 1-10 scale; 1=lowest, 10=highest. | Keynote Systems |
| Onsite resources (*ONSITE*) | Extent to which the website has depth of product and service lines, electronic forms, information look ups, availability information, and seek service requests; 1-10 scale; 1=lowest, 10=highest. | Keynote Systems |
| Information technology intensity (*IT*) | Ratio of information technology expenditures to total assets | SEC filings/ Compustat |
| Firm size (*SIZE*) | Log (Total number of employees) | Compustat |
| Firm market share (*MKTSH*) | Ratio of firm sales to industry sales | Compustat |
| Stock market index (*SP500*) | Annual returns on the S&P 500 index | CRSP |
| Treasury bill rate (*TR90*) | 90 day interest rates on U.S. treasury bills | Compustat |
| Inflation rate (*CPI*) | Rate of change in consumer price index | Bureau of Economic Analysis |
| Consumer confidence index (*CCI*) | Annual consumer sentiment about the U.S economy. The measure is developed using a survey of 5000 random U.S. households and scaled relative to the 1985 baseline of 100 | Conference Board |

**Table 2 – Descriptive Statistics**

| | *Mean* | *S.D.* | MBRAT | PER | CFV | PRM | TRUST | EASE | ONSITE | IT |
|---|---|---|---|---|---|---|---|---|---|---|
| MBRAT | 3.09 | 2.88 | | | | | | | | |
| PER | 4.62 | 1.56 | .16 | | | | | | | |
| CFV | 2.28 | 3.62 | .06 | -.17 | | | | | | |
| PRM | 3.53 | 1.76 | .04 | .14 | .00 | | | | | |
| TRUST | 6.38 | 1.35 | .04 | .33 | -.00 | -.11 | | | | |
| EASE | 5.72 | 1.35 | -.11 | .34 | .14 | .02 | .13 | | | |
| ONSITE | 5.46 | 1.53 | .19 | .26 | -.07 | -.06 | .35 | .28 | | |
| IT | 1.03 | 1.74 | .24 | .06 | -.11 | -.11 | .03 | -.12 | .06 | |
| SIZE | 10.17 | 2.70 | -.23 | .10 | .23 | -.26 | .09 | .16 | .00 | -.50 |

MBRAT = Market-to-book ratio, PER= personalization, PRM = price premium, CFV = cash flow volatility, Ease =ease of use, ONSITE= availability of onsite resources, IT= information technology intensity of the firm, LVRG= financial leverage, ROA= return on assets, SIZE= firm size. Please note that these are based on cross-sectional as well as time-series variation in the data.

**Table 3 – The Effect of Web Personalization on Cash Flow Volatility, Price Premium and Market-to-Book Ratio: Panel Data Results**

| Dependent Variable | M1 M/B Ratio IV→DV | | M2 Cash Flow Volatility Base IV→M | | M3 Price Premium IV→M | | M4 M/B Ratio M→DV | | M5 M/B Ratio IV+M→DV | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Coeff.** | **S.E.** | **Coeff.** | **S.E.** | **Coeff.** | **S.E.** | **Coeff.** | **S.E.** | **Coeff.** | **S.E.** |
| Web Personalization (WP) | .4135* | .2251 | -.5861* | .3059 | .3776 | .2371 | | | .3637* | .2172 |
| Cash Flow Volatility (CFV) | | | | | | | -.0580* | .0306 | -.0549* | .0303 |
| Price Premium (PRM) | | | | | | | .1358** | .0652 | .1369** | .0650 |
| Online Trust (TRUST) | .4377** | .2033 | -.3201** | .1266 | .3159** | .1286 | .3396* | .1771 | .3362* | .2036 |
| WP * TRUST | .1044** | .0511 | -.1026** | .0519 | .0576** | .0295 | | | .0699* | .0420 |
| Ease of Use | .2900*** | .0874 | -.2192** | .0891 | .0426 | .0567 | .2211*** | .0841 | .2931*** | .0874 |
| Onsite Resources | .2960*** | .0872 | -.2093** | .0876 | .0736 | .0562 | .3631*** | .0829 | .2859*** | .0873 |
| IT Intensity | .2237** | .1094 | .4841* | .2887 | .0132 | .1591 | .1050 | .2289 | .1407 | .2259 |
| Firm Size | -.1570* | .0877 | 1.0155*** | .1811 | -.2237*** | .0692 | -.0731 | .0971 | -.0853 | .0957 |
| Sample Selection Control (λ) | -.1766* | .1061 | -.6634** | .2687 | -.4095 | .4255 | -.1295* | .0767 | -.1299* | .0727 |
| Intercept | 3.2547 | 2.9217 | -8.3406* | 4.4825 | 7.9148*** | 2.0389 | 2.0169 | 2.7042 | 2.7634 | 2.9697 |
| Firm Random Effects | Included | | Included | | Included | | Included | | Included | |
| Industry Fixed Effects | Included | | Included | | Included | | Included | | Included | |
| Year Fixed Effects | Included | | Included | | Included | | Included | | Included | |
| Sample size (Parameters Estimated) | 603 (26) | | 603 (26) | | 603 (26) | | 603 (26) | | 603 (28) | |
| Model Fit (Overall $R^2$) | 30.94% | | 53.27% | | 24.49% | | 29.89% | | 31.45% | |

* *p*<.10, ** *p*<.05, *** *p*<.01; IV – independent variable, M- mediator variables, DV- dependent variable

**Table 4 – Additional Analyses: The Effect of Web Personalization on Customer Acquisition, Customer Retention and Cross-Buying**

| **Dependent Variable** | **M6 New Customer Growth** | | **M7 Repeat Customer Growth** | | **M8 Cross-Buying** | | **M9 Cash Flow Volatility** | |
|---|---|---|---|---|---|---|---|---|
| | **Coeff.** | **S.E.** | **Coeff.** | **S.E.** | **Coeff.** | **S.E.** | **Coeff.** | **S.E.** |
| Web Personalization (PER) | 1.0214 | 1.0532 | .3801** | .1585 | 1.0210 | .9508 | | |
| New Customer Growth (NEW) | | | | | | | .0234** | .0120 |
| Repeat Customer Growth (REPEAT) | | | | | | | -.0487* | .0285 |
| Cross-Buying (CROSS) | | | | | | | .0306* | .0168 |
| Online Trust (TRUST) | .1554 | .1599 | .3638* | .2130 | .6407* | .3473 | .0617 | .0709 |
| PER * TRUST | .0816 | .0521 | .1622* | .0937 | .1969 | .1990 | | |
| Ease of Use (EASE) | 1.1638 | 2.1390 | .5220 | 1.0359 | .3967** | .1593 | -.0420* | .0229 |
| Onsite Resources (ONSITE) | -1.0491 | 2.4657 | .2435* | .1341 | .1864 | .1605 | -.0459 | .0451 |
| IT Intensity (IT) | 7.7521** | 3.8326 | .4037 | .8561 | .7206 | .4952 | 1.0094 | .7458 |
| Firm Size (SIZE) | 2.2168*** | .9579 | .0534** | .0254 | .1039* | .0625 | 1.0785*** | .2126 |
| Sample Selection Control (λ) | -1.2168* | .6579 | -.1020* | .0613 | -.4741 | .6236 | -.3044 | .1967 |
| Intercept | -1.4981 | 6.1712 | .3801 | .1585 | -1.7023 | 4.1773 | 2.6164*** | .5857 |
| Sample Size (Parameters Estimated) | 208 (9) | | 208 (9) | | 208 (9) | | 208 (10) | |
| Model Fit (Adjusted $R^2$) | 14.91% | | 16.38% | | 11.59% | | 69.67% | |

Standard errors in parentheses. * $p<.10$, ** $p<.05$, *** $p<.01$

**Figure 1 – Model-Free Evidence: Relationship between the Key Constructs**

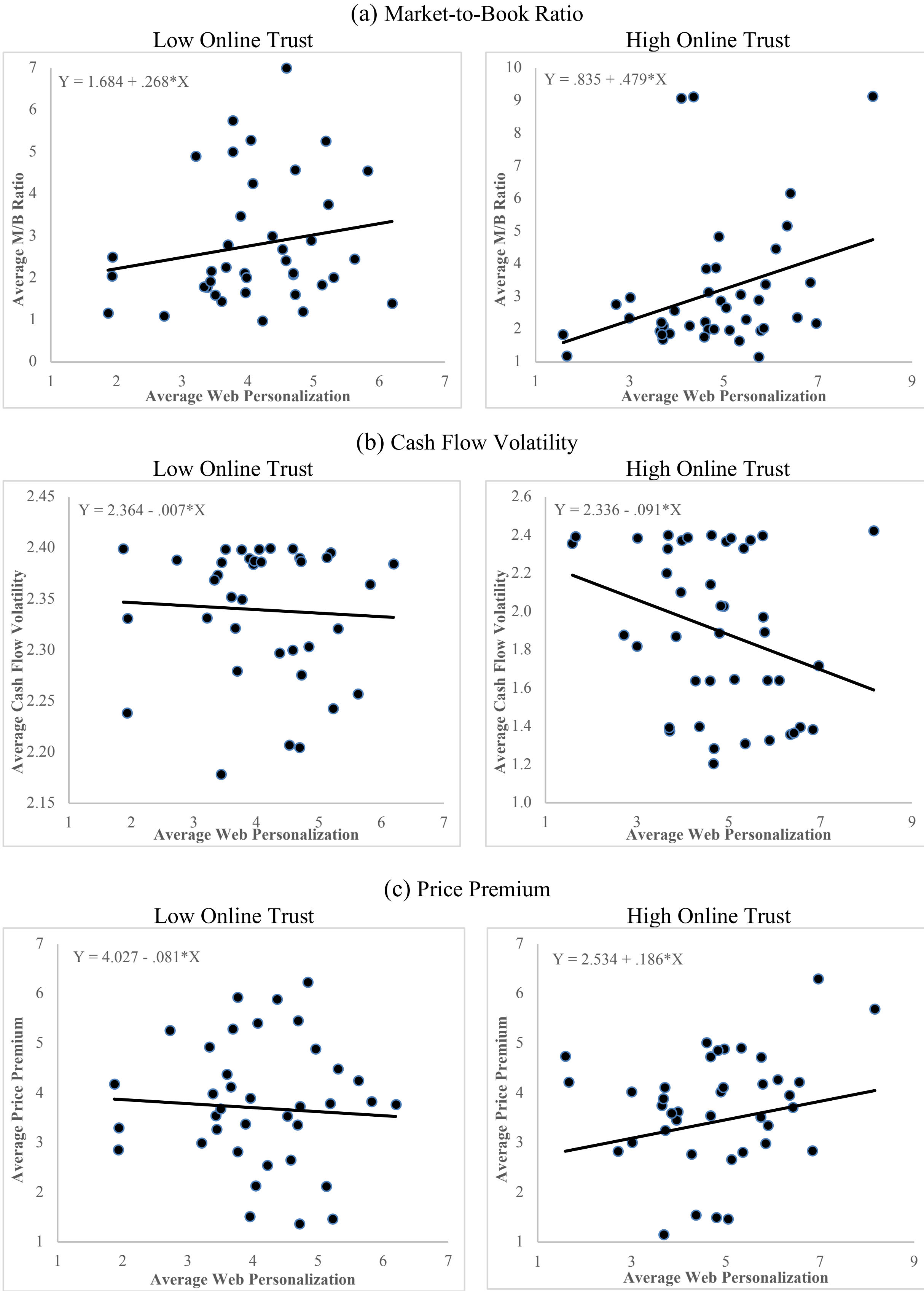
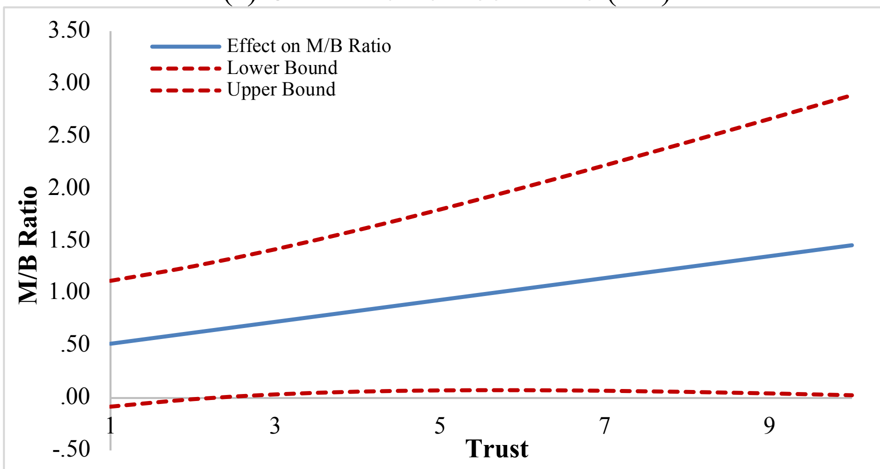
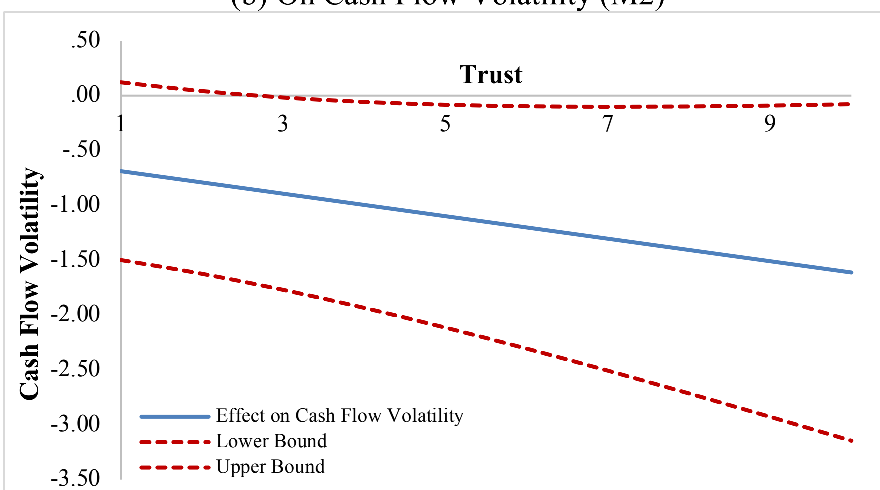


**Figure 2 – Marginal Impact of Web Personalization at Different Levels of Trust**

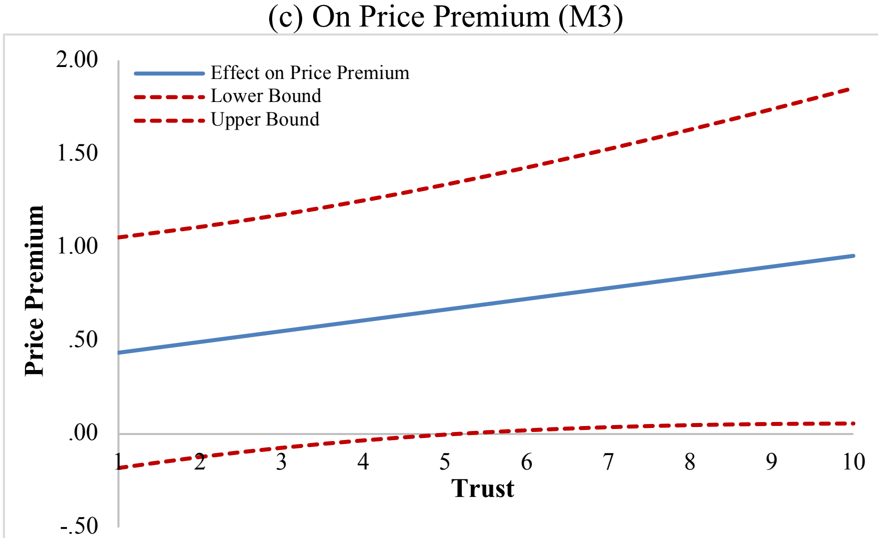
(a) On Market-to-Book Ratio (M1)



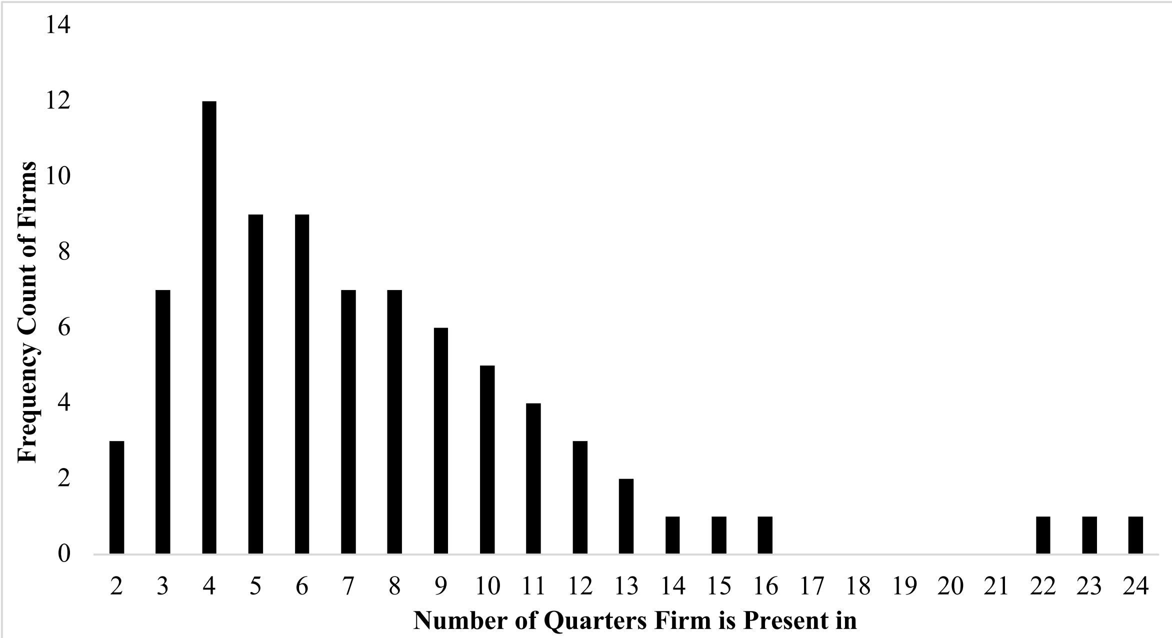

(b) On Cash Flow Volatility (M2)



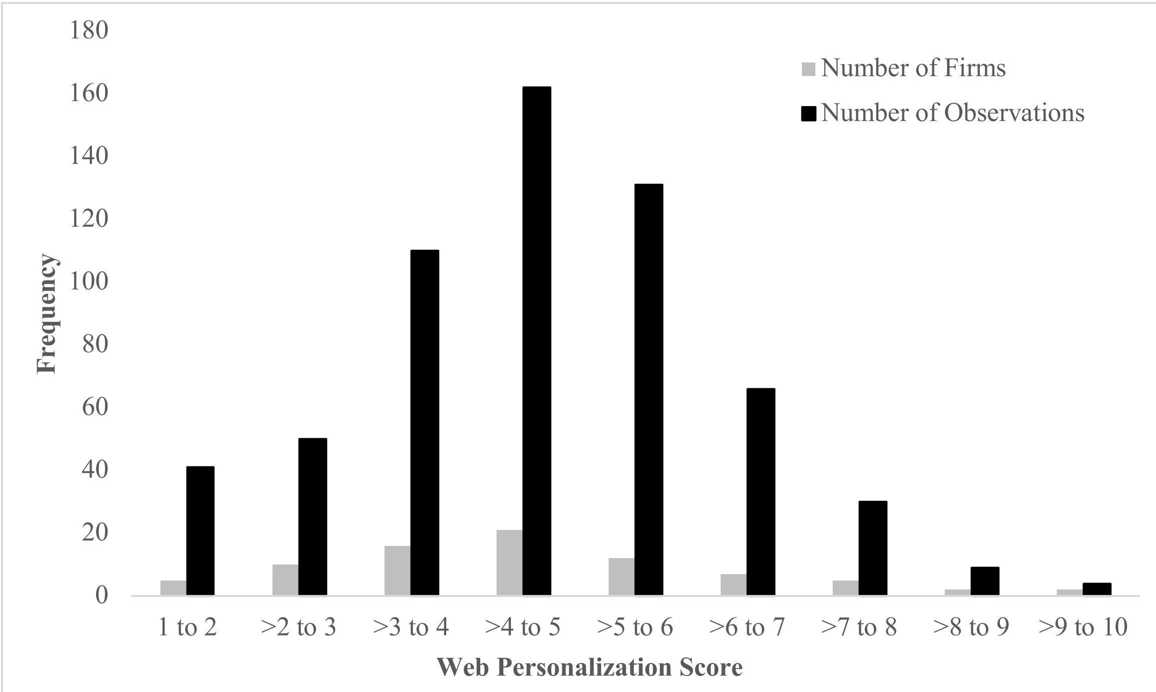

(c) On Price Premium (M3)



## Web Appendix 1 – Distribution of Firms over Quarters



## Web Appendix 2 – Distribution of Web Personalization



## Web Appendix 3 – Correcting for Selection Bias

The selection model is specified as follows:

$$d_{it}^{*} = z_{it}\gamma + \alpha_i + \nu_{it} \tag{1}$$

where, $z_{it}$ is vector of explanatory variables, γ is associated coefficient estimates, $\nu_{it}$ is idiosyncratic error component, and $\alpha_i$ is unobservable firm specific random effect, which is normally distributed. We use market share and macroeconomic variables such as 3-month treasury bill rates, S&P 500 index, consumer price index, and consumer confidence index as covariates ($z_{it}$) to predict the selection choice. We estimate Equation (1) using the random effects estimator. We compute the inverse mills ratio, the selection control term, using the estimated coefficients as follows:

$$\widehat{\lambda_{it}} = \lambda(z_i\widehat{\gamma}_t) = \frac{\varphi(z_i\widehat{\gamma}_t)}{\phi(z_i\widehat{\gamma}_t)}$$

where, $\lambda$ is the Inverse Mills Ratio, $\Phi$ and $\phi$ are the CDF and PDF of the normal distribution.

**Web Appendix 4: Granger Causality Test**

| **Dependent Variable** | **Price Premium** | | **Web Personalization** | |
|---|---|---|---|---|
| | **Coeff.** | **S.E.** | **Coeff.** | **S.E.** |
| Web Personalization | .1597** | .0693 | | |
| Lagged Web Personalization | .2115** | .0935 | .7263*** | .0391 |
| Price Premium | | | .0712* | .0422 |
| Lagged Price Premium | .7344*** | .0506 | .0210 | .0506 |
| Intercept | 1.9226*** | .4578 | 1.7064*** | .3557 |
| Sample Size | 239 | | 239 | |
| Chi Square (Parameters Estimated) | 354.49 (4) | | 225.05 (4) | |

* *p*<.10, ** *p*<.05, *** *p*<.01

**Web Appendix 5 – Probit Results of Sample Selection**

| Dependent Variable: Probability of Selection | Coeff. | S.E. |
|---|---|---|
| Firm Market Share | .0287*** | .0091 |
| S&P 500 Index | .0023*** | .0001 |
| 90 Day US Treasury Bill Rate | .3021 | .2424 |
| Consumer Price Index | -.2281*** | .0602 |
| Consumer Confidence Index | .0459*** | .0112 |
| Intercept | .2011** | .0791 |
| Firm Random Effects | Included | |
| Industry Fixed Effects | Included | |
| Year Fixed Effects | Included | |
| Sample Size (Parameters Estimated) | 2805 (22) | |
| Model Fit (Hit Rate) | 78.22% | |

Standard errors in parentheses. * $p<.10$, ** $p<.05$, *** $p<.01$