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ORIGINAL EMPIRICAL RESEARCH

Do institutional investors pay attention to customer satisfaction and why?

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Abstract Extant marketing, accounting, and finance research has neglected to examine the relevance of customer satisfaction information for institutional investors, despite their potential importance. This study develops and supports a framework suggesting that firms with positive changes in customer satisfaction are more attractive to transient institutional investors than to non-transient institutional investors. We also find that the impact of customer satisfaction on transient institutional investor holdings is contingent upon firm intangible asset intensity, product-market demand uncertainty, and financial market volatility. In addition, transient institutional investor holdings at least partially mediate the effects of changes in customer satisfaction on firm abnormal return and idiosyncratic risk. Thus, transient institutional investor investments represent a mechanism through which customer satisfaction affects firm value.

Keywords Customer satisfaction · Investor community · Institutional investor holding · Intangibles · Marketing-finance interface

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Introduction

Institutional investors are the major players in the capital market. According to the U.S. Securities and Exchange Commission (SEC) 13F filings, U.S. common stocks are mainly owned by institutional investors, such as retirement and pension funds, investment banks, and mutual funds (Yan and Zhang 2009). Total assets held by institutional investors have surpassed $81.90 trillion (Jiang 2010a). Compared to individual investors, institutional institutions typically trade and hold larger amounts of firm stocks, and can therefore more powerfully influence firm stock prices (Bushee and Miller 2012; Helwege et al. 2012).

Figure 1 illustrates prior research on the importance of institutional investors for firm value and the related determinants.[1] Specifically, studies find that institutional investor holdings can affect firm value in terms of abnormal returns and financial risks (Ali et al. 2004; Nofsinger and Sias 1999). Also, institutional investor holdings are determined by management relations (Wahal and McConnell 2000), analyst forecasts (Chen and Cheng 2006), information disclosure (Ke and Ramalingegowda 2005), and intangibles such as corporate social responsibility and R&D spending (Dhaliwal et al. 2011).

However, no published studies in marketing, accounting, finance, or strategy have connected the key marketing metric of customer satisfaction to institutional investors' trading. Although the direct link of customer satisfaction to stock valuation has been studied, the reactions that institutional investors, in particular, exhibit vis-à-vis customer satisfaction have not been examined, nor the question whether such reactions may play an important role in channeling customer satisfaction's impact on firm valuation in the stock market.

Therefore, our study addresses this knowledge gap by investigating the following questions: (1) Are positive changes in

[1] We thank two anonymous reviewers for the suggestion to include this summary.

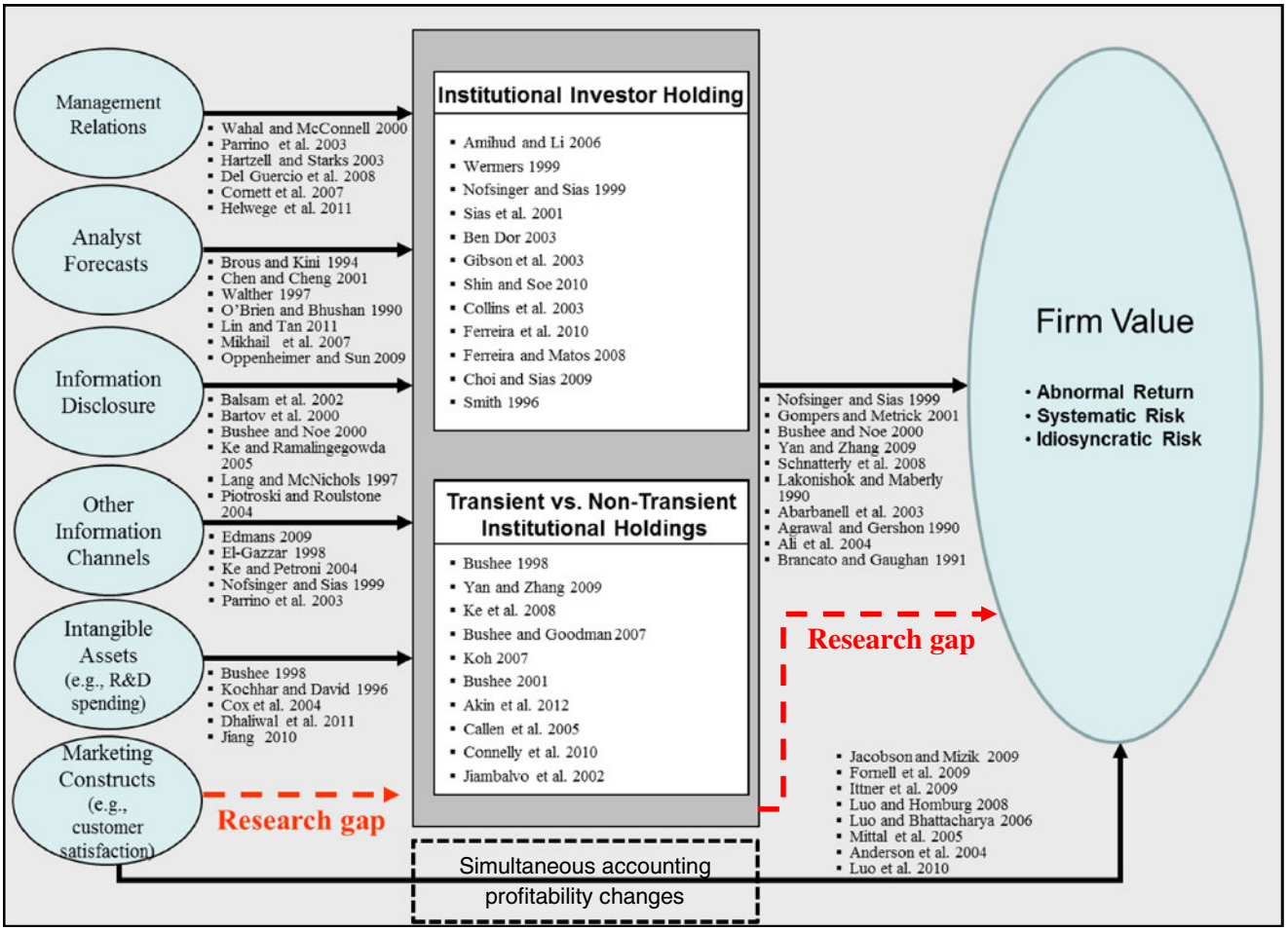


Fig. 1 An overview of institutional investor holding literature

customer satisfaction of a firm related to positive changes in institutional investor holdings for the firm? (2) Do positive changes in customer satisfaction result in different kinds of institutional investor holdings? (3) Can these effects on institutional holdings vary across different situations of intangible asset intensity, product-market demand uncertainty, and financial market volatility? And (4) to what extent do institutional investor holdings channel customer satisfaction's possible impact on firm value?

The key contributions of this research are as follows: First, to our knowledge, we are the first to theorize and test institutional investors' reactions to the core marketing metric of customer satisfaction. Thus, our results provide new understanding of the financial, stock market impact of customer satisfaction to the marketing-finance interface research in general (Hanssens et al. 2009) and to the research on customer satisfaction's financial market impact in particular. This understanding is important also because there is a heated, ongoing debate (Fornell et al. 2009; Jacobson and Mizik 2009a; O'Sullivan et al. 2009) about whether and how customer satisfaction information may influence stock pricing over and above accounting information. We uncover new mechanisms that explicate the financial impact of customer satisfaction, showing how institutional investor trading plays a mediating role between customer satisfaction and firm value in the stock market. Our results also show that "transient" institutional investors are at the forefront in reacting to changes in firms' customer satisfaction, as well as in impounding this information on to firm stock prices. Furthermore, we demonstrate the conditions (e.g., firm intangible asset intensity, product-market demand uncertainty, financial market volatility) wherein transient institutional investors are more likely to react to customer satisfaction changes.

Our work has important practical contributions, especially for marketing executives, but also for investment community. For Chief Marketing Officers (CMOs), our research provides new insights into why investments in customer satisfaction may enhance firm valuation, as well as what kind of communication about the firm's customer satisfaction (and towards which investors) may lead to optimal investor and stock market responses. Thus, with our results, CMOs are able to better communicate firm competitive advantages in terms of customer satisfaction to the Wall Street community. In addition, our study of the role played by the non-financial metric of

customer satisfaction speaks directly to the investment community, considering the guidelines of the Financial Accounting Standards Board (FASB). Because FASB requires firms to disclose such non-financial information to investors that helps them assess the growth and/or volatility of future cash receipts (Gupta 2009; Kimbrough 2007), our work may encourage firms to proactively announce changes in customer satisfaction to certain investors and report the quality of the firm's customer base in reports and Securities and Exchange Commission 10-K/10-Q filings to the investment community.

Literature review: institutional investor behavior

Typically, institutional investors are specialized organizations that invest large pools of money in securities in the capital markets. Examples of institutional investors include retirement and pension funds, investment banks, mutual funds, insurance companies, and hedge funds (Brancato and Gaughan 1991; Kochhar and David 1996). In the following, we provide a brief review of extant literatures on the (1) antecedents of institutional investor investing (i.e., institutional stock ownership or holdings) as well as (2) the consequences of institutional investor investing on stock prices. These literatures, as well as the related research gaps, are illustrated in Fig. 1.

Antecedents of institutional investor investments

Regarding the antecedents of institutional investors' investments in firm stocks, one stream of extant research concentrates on the question of how factors related to firms' management, in particular, influence institutional investors. For instance, Parrino et al. (2003) show that institutional investors may disfavor firms expected to change CEOs, and Bushee and Miller (2012) show that companies initiating investor relations (IR) management programs exhibit increases in institutional investor ownership.

Another research stream studies how actors external to the firm, such as investment analysts, may influence institutional investors' attraction to firm stocks. Chen and Cheng (2006), for instance, find that investment analysts' recommendations for stocks have a significant positive effect on institutional investors' investments, while O'Brien and Bhushan (1990) showed that institutional investor ownership in a firm correlates with the extent to which analysts follow the firm.

The rest of the extant research on the antecedents of institutional investor investing concentrates mostly on how different pieces or sources of information affect institutional investors—which is the closest research stream to present research, focusing on customer satisfaction information. Bushee and Noe (2000) find that the level of information closure by firms themselves is associated with greater institutional investor ownership. Several studies, such as Ke and Ramalingegowda (2005), also find that institutional investors attend to firms' earnings information and are, naturally enough, attracted to invest in firms with positive earnings surprises.

More importantly, extant research also provides preliminary evidence that institutional investors may even react to *non-financial* information—typically called "intangible" information (e.g., Daniel and Titman 2006; Jiang 2010b). Pieces of intangible information, which have been shown to affect institutional investors, include information about firms' R&D, corporate social responsibility (Cox et al. 2004; Dhaliwal et al. 2011; Graves and Waddock 1994; Johnson and Greening 1999), product quality (Mavrinac et al. 1995), and advertising (Grullon et al. 2004; Oak and Dalbor 2010). However, none of these studies have so far investigated the responses of institutional investors to firms' customer satisfaction information. Customer satisfaction information warrants an investigation in its own right, since it is a key marketing performance or outcome metric—unlike the previously studied intangible pieces of information which mostly represent input metrics (e.g., R&D or advertising investments, or CSR programs).

Stock valuation consequences of institutional investor investments

With regard to stock valuation consequences of institutional investor investing, prior literature finds that institutional investors' investments in stocks generally anticipate favorable valuations and returns for those stocks. That is, on average institutional investors buy stocks that subsequently enjoy good returns (Chakravarty 2001; Nofsinger and Sias 1999). This is explained by the fact that institutional investors are typically well "informed" investors, meaning that they have superior resources and abilities to gather and process firm-specific information as a basis of their investment and trading decisions (e.g., Walther 1997; Ke and Ramalingegowda 2005). With the advantage of their information gathering and processing, institutional investors can hence engage in informed trading in response to future-oriented information they gather "privately" (e.g., Ali et al. 2004; El-Gazzar 1998)—that is, prior to or even without the public disclosure of such information. Thus, institutional investors generally have an information advantage regarding the firms they follow, allowing them to make investments in stocks that are likely to perform well subsequently (Arbel et al. 1983; Kochhar and David 1996; Schnatterly et al. 2008).

Prior literature also provides preliminary evidence that institutional investor trading may act as a mediator that channels new firm-specific information about certain tangible (financial accounting-based) or intangible (non-financial-accounting-based) factors into stock valuations. For instance, Ali et al. (2004) and Piotroski and Roulstone (2004) show that institutional investors' buying of stocks plays role in impounding firm-specific earnings information on to subsequent stock prices. Jiang (2010b), in turn, shows that the

tendency of institutional investors to buy stocks based on positive intangible information can also contribute to subsequent value premium for those stocks. However, it remains yet to be studied, whether the intangible marketing metric of customer satisfaction is also information that institutional investors react to and channel to firm valuations. In marketing research, either, it has not been studied whether institutional investors may act as a mediator to the potential effect of customer satisfaction information on firm value, as most extant studies explore the *direct* effect of customer satisfaction on firm value (see details below, and Fig. 1).

Three types of institutional investors

Based on prior literature, it is also possible that not all institutional investors—but only certain kinds of institutional investors—are attracted to invest in firm stocks based on intangible information such as customer satisfaction. Indeed, institutional investors are not a homogeneous group. In the most widely-used classification by Bushee (1998, 2001), institutional investors are classified as "transient", "dedicated", or "quasi-indexer" institutions, based on their investment behaviors, strategies, and horizons.

Specifically, transient institutional investors are characterized by a short investment horizon and high turnover to maximize short-term profits. Typically, they seek near-term appreciation of their stocks, holding a stock for an average of 1.9 years or less (Yan and Zhang 2009). These investors engage in varied information search on a wide selection of firms, to extensively gauge potential investment prospects. In fact, they are often "speculative" traders in the sense that they tend to utilize varied pieces of (a) information that might have implications to firms' earnings forecasts as well as (b) information that might affect the short-term investor sentiment related to a stock (Bushee 2001; Glushkov 2006; Ke and Ramalingegowda 2005). Thus, transient institutions are often willing to trade on any tangible or intangible piece of information, whether related to actual earnings or not, as long as it might affect the firm's short-term returns or sentiment. Moreover, research shows that transient institutions are, on average, effective in doing this: their investing predicts subsequent stock returns (Yan and Zhang 2009).

Compared to transient institutions, dedicated institutions are concentrated on rather few firms at a time, and commit themselves to providing long-term capital and support for their holding firms. In other words, they are virtually permanent shareholders who seek long-term shareholder value, and their goals are more relationship than transaction driven (Porter 1992). Because dedicated institutions hold significant stakes for long periods of time, they may be less sensitive (than transient institutions) to individual pieces of current information, such as current earnings or intangible information in the form of changes in firms' intangible assets (Ali et al. 2004).

The third group of institutional investors, quasi-indexers, use investment strategies characterized by high diversification and low portfolio turnover. They generally follow a passive buy-and-hold strategy with diversified, small holdings. Their diversified strategy leads them to gather relatively little information on firms but, rather, follow the portfolio composition of broader stock indices such as the S&P 500, or termed as quasi-*indexers* (Bushee 1998; Porter 1992).

Hypotheses on customer satisfaction and institutional investors

Figure 2 provides an overview of the relationships in our theoretical framework. This framework suggests that (1) certain institutional investors are attracted to invest in firms that exhibit improved customer satisfaction (i.e., changes in a firm's customer satisfaction have a positive impact on changes in its institutional investor stock holdings), (2) the link between customer satisfaction and institutional investor holdings is moderated by the firm's intangible asset intensity, product-market demand uncertainty, and financial market volatility, and (3) institutional holdings at least partially mediate the relationship between customer satisfaction and firm value (as reflected in stock returns and risk).

As mentioned above, extant research has generally found that satisfaction changes may have direct effects on stock prices (e.g., Anderson et al. 2004; Fornell et al. 2009; Luo et al 2010, 2013; Riley et al. 2003)—but so far concluded that such direct effects are mostly mediated by simultaneous accounting profitability changes (which the satisfaction changes generate) (e.g., Jacobson and Mizik 2009a, b; O'Sullivan et al. 2009). There is also controversy about whether investors in general attend to customer satisfaction information or not (see e.g. Jacobson and Mizik 2009a, b).

Our framework proposes an alternative, indirect channel of influence of customer satisfaction on firm valuation, through institutional investors' trading. This channel is posited as complementary to (i.e., goes over and above) the previously-identified channel through accounting profitability. Thus, we aim to reconcile some of the previous controversy by proposing that (1) *certain institutional investors,* in particular, attend to and get attracted by customer satisfaction information, especially in *some conditions*—even if not all investors would necessarily do so in all conditions. Moreover, we propose that (2) certain institutional investors' trading of stocks based on customer satisfaction information further leads to that information getting impounded on to firm value in terms of stock returns and risk. In other words, certain institutional investors are attracted by customer satisfaction information and act as a previously-unidentified mediating channel that impounds the customer satisfaction information on firm value.

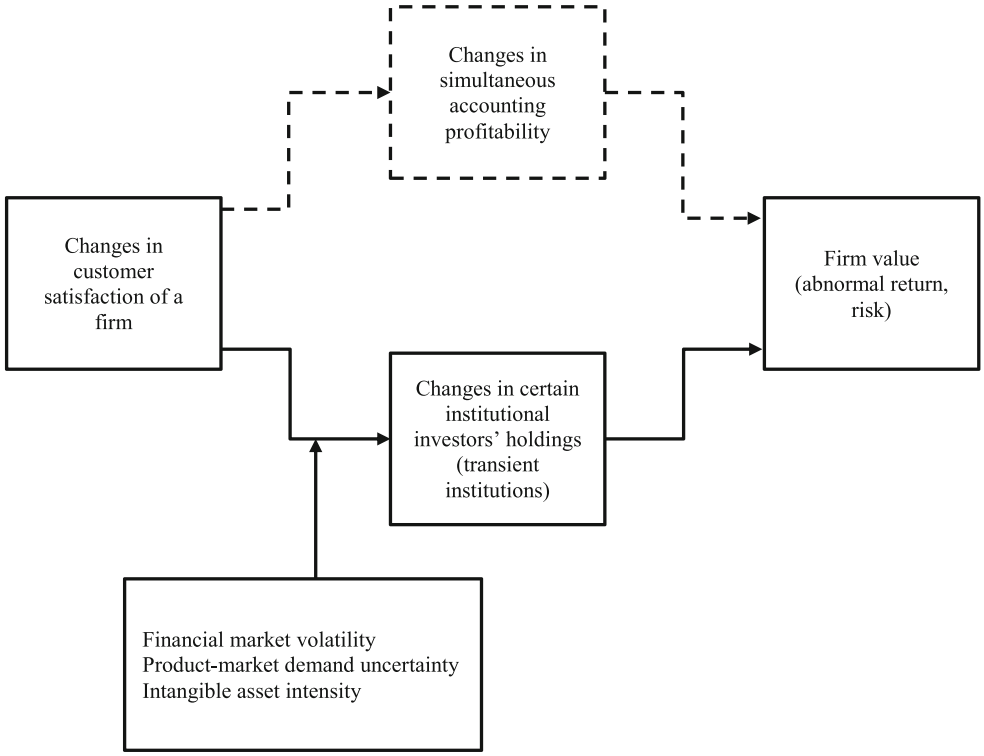


Fig. 2 Theoretical framework. Notes: The bolded boxes and arrows indicate the present the channel of influence examined in the present study, positing that changes in customer satisfaction attract investments from certain institutional investors, which impounds the customer satisfaction changes further into firm value. The dashed arrows indicate the standard influence channel established in previous marketing-finance studies, assuming that customer satisfaction may only influence firm value by simultaneous changes in accounting profitability (e.g., Jacobson and Mizik 2009a, b; i.e., that customer satisfaction does not have firm value effects, when accounting profitability changes are controlled for)

The impact of customer satisfaction on institutional investors

Because different types of institutional investors have various abilities to process information and perform informed trading (Yan and Zhang 2009), we expect different responses to satisfaction between the three types of institutional investors (transient, dedicated, and quasi-indexers). According to Bushee and Noe (2000), the importance of public disclosure to institutional investors depends on their information-gathering capabilities, investment horizon, and governance activities. Prior literature has reached a consensus that when a firm's information is released publicly, transient institutions are more likely to trade on such information (Yan and Zhang 2009). Because transient institutional investors possess higher abilities to monitor firm assets and actively seek near-term share appreciation by trading on firm-specific information, they are expected to be attracted to firms with informative disclosure such as customer satisfaction improvement.

On the other hand, dedicated and quasi-indexer institutions are not frequent traders and the liquidity benefits of disclosure are likely to be less important to them because of their longer investment horizons and lower sensitivity to firm-specific information (Ali et al. 2004; Ke and Petroni 2004; Ke et al. 2008). Thus, compared to transient institutions, dedicated and quasi-indexer institutional investors are less likely to trade based on customer satisfaction information, even if they understand its implications. Thus, we have the following hypothesis.

H1: Positive changes in customer satisfaction of a firm positively influence transient institutional investors' investments in the firm's stock—and more so than dedicated and quasi-indexer institutions' investments.

Moderating conditions

Our theoretical framework also suggests that the influence of customer satisfaction on institutional investors is contingent on certain firm and market conditions. Prior research in marketing suggests that customer satisfaction has different performance effects depending on the degree to which the firm's assets are intangible (i.e., intangible asset intensity = [Total Assets—Property, Plant, and Equipment] /Total Assets; Tuli et al. 2010) and on the volatility or uncertainty of the firm's product-market demand (i.e., product-market demand uncertainty) (Anderson et al. 2004; Luo et al. 2010). This gives reason to expect that institutional investors' attention to customer satisfaction may also differ according to intangible asset intensity and product-market demand uncertainty. In turn, studies in finance and accounting imply that institutional investors' responses to

intangible, non-financial information may be contingent upon financial market volatility as well (Bailey et al. 2003; Dennis and Strickland 2002; Mavrinac and Siesfeld 1997).

Extending these streams of research, hence, we propose that the influence of customer satisfaction on institutional investors can be amplified or buffered, contingent on firm intangible asset intensity, product-market demand uncertainty, and financial market volatility. In effect, we treat the directions of these moderating effects as empirical questions, without posing unilateral hypotheses of their signs. However, we develop, below, alternative hypotheses for the potentially different signs of the effects.

First, it can be expected that the firm's intangible asset intensity, measured as the percentage of intangible assets to total assets, may buffer the influence of customer satisfaction changes on institutional investors. Namely, when a particular firm has a great deal of other intangible assets that could serve as substitutes for customer satisfaction, the changes in the intangible asset of customer satisfaction may have less strong relative influence on institutional investors, than in the case when the firm's other intangible asset base is limited (cf. Mavrinac and Siesfeld 1997). In other words, for firms with high (low) intangible asset intensity, investors may find customer satisfaction information to be less (more) useful in inferring the firm's future cash flows and value.

However, on the other hand, if a firm is low on intangible assets in general, it is necessarily high on tangible assets (Tuli et al. 2010), potentially making firm value simpler to assess, without depending on customer satisfaction.[2] If so, institutional investors would pay less attention to customer satisfaction changes, likely reducing the impact of customer satisfaction on transient institutional investors' investments when the firm is low on intangible assets.

In sum, hence, we provide the following alternative hypotheses concerning the moderating effect that the firm's intangible asset intensity has on the influence of customer satisfaction changes on (transient) institutional investors' investments in firm stocks.

H2: The impact of changes in customer satisfaction on transient institutional investors' investments is weaker for firms with high intangible asset intensity than for firms with low intangible asset intensity.

H2alt: The impact of changes in customer satisfaction on transient institutional investors' investments is stronger for firms with high intangible asset intensity than for firms with low intangible asset intensity.

In addition, previous research has found that when product-market demand is uncertain, critical marketing variables such as market orientation and customer satisfaction play a more important role in determining customer loyalty and, ultimately, firm shareholder value (e.g., Grewal et al. 2010). This is because when demand uncertainty is high, customer satisfaction is a more crucial metric for gauging the quality of the customer base and, hence, firm future performance (Fornell et al. 2006; Grewal et al. 2010; Tuli et al. 2009). In turn, when demand uncertainty is low, market participants' composition and behavior are more predictable and relatively stable (Jaworski and Kohli 1993), and positive changes in customer satisfaction may then play a less important role in forecasting sales performance and a firm's future value. Therefore, it could be expected that customer satisfaction triggers more transient institutional investor trading for firms that operate in product markets with a higher rather than a lower demand uncertainty.

However, an opposite moderating effect is also possible, again. Namely, it is possible that in an uncertain market demand, investment managers may feel it riskier to rely on firm-specific intangible information such as customer satisfaction in making trading decisions. In other words, in such conditions, they may discard intangible information and simply tend to "herd" or mimic other investors' decisions (cf. Nofsinger and Sias 1999) instead of attending to customer satisfaction information. In sum, we propose the following alternative hypotheses:

H3: The impact of changes in customer satisfaction on transient institutional investors' investments is stronger when product-market demand uncertainty is high than when it is low.

H3alt: The impact of changes in customer satisfaction on transient institutional investors' investments is weaker when product-market demand uncertainty is high than when it is low.

Furthermore, studies in the finance and accounting literature suggest that the investment decisions of institutional investors may depend on financial-market wide volatility as well (Bushee and Noe 2000; Yan and Zhang 2009). More importantly, prior studies suggest that in financial markets with high (versus low) volatility, greater fluctuations may increase the difficulty for institutional investors in gathering information for informed trading (Scharfstein and Stein 1990). Under high market volatility, investment managers also become concerned about their reputations and tend towards herding with others instead of trading based on firm-specific information such as customer satisfaction changes (Dennis and Strickland 2002).[3] If this is the case, then institutional investors are likely to spend less effort

[2] We thank one anonymous reviewer for this competing hypothesis logic.

[3] A fund manager's reputation is hurt less if everyone makes the same bad decision than if only the manager makes the bad decision. A risk-averse manager will run with the pack instead of going out on a limb with a contrarian strategy, even if the manager has information that the contrarian strategy has the higher probability of being correct (Scharfstein and Stein 1990).

on collecting, digesting, and trading on customer satisfaction information under high financial market volatility compared to low financial market volatility.

Yet, the contrary may also hold. Similarly as with high product-market demand uncertainty, the financial community may during volatile financial markets recognize and forecast that "a greater portion of the firm value lies in intangibles, rather than tangible assets… Investors thus may bank on companies rich in intangible assets such as brands" (Farrell 2009, p. 64). Consequently, transient institutional investors may become more motivated to attend to intangible customer equity assets such as customer satisfaction, and therefore reflect more on customer satisfaction information in their trading in high than in low financial market uncertainty. In summary:

H4: The impact of changes in customer satisfaction on transient institutional investors' investments is weaker when financial market uncertainty is high than when it is low.

H4alt: The impact of changes in customer satisfaction on transient institutional investors' investments is stronger when financial market uncertainty is high than when it is low.

The mediating role of institutional investors for the effects of customer satisfaction on firm value

Thus far, we have offered hypotheses on the impact of customer satisfaction on institutional investor holdings. As we discussed, institutional investor holdings are directly linked to abnormal returns (Yan and Zhang 2009) and risk (Bushee and Noe 2000). That is, more institutional investor holdings are associated with higher subsequent cash flows and stock returns, as well as lesser vulnerability of those cash flows, indicating lower idiosyncratic stock risk. Given that customer satisfaction affects institutional investor holdings, which in turn affect firm value, it is reasonable to expect a "chained" relationship: from satisfaction to the intermediate outcome of institutional investor holdings and then to firm return and risk. This chain implies that because institutional investor holdings, especially transient institution holdings, likely act as a channel through which news of satisfaction impact stock prices. We believe that insofar as institutional investors can effectively account for firm-specific information, such as customer base quality and satisfaction, their trading more reliably reflects the true value of the firm (McAlister et al. 2007), and the information content of customer satisfaction is more likely to be captured by stock return and risk. The more the firm enjoys positive institutional investor holding with higher levels of satisfaction, the more likely the information content of satisfaction is to pass through their trading and thus contribute to firm value.

In contrast, if institutional investors ignore vital market-based assets such as customer satisfaction, such disregard would contribute to mis-assessment of true firm value and thus generate insignificant associations between customer satisfaction and firm return or risk (Tuli et al. 2009). Thus, institutional investor holding may represent an intermediate mechanism accounting for the impact of customer satisfaction on firm return and risk. We suggest that institutional investor holding may channel the effects of customer satisfaction information on firm value. Nevertheless, as mentioned, there are also alternative channels; the primary alternative channel is constituted by the simultaneous accounting profitability changes, which accompany the customer satisfaction changes, as illustrated in Figs. 1 and 2. Also, satisfaction can affect firm value through other channels. For example, prior research has suggested that satisfaction also affects investment analysts (Luo et al. 2010), who in turn significantly influence firm return and risk (Godes and Mayzlin 2004; Luo 2009). As such, the mediation of the effect of customer satisfaction on firm value through institutional investors is likely to be partial:

H5: Institutional investor holdings at least partially mediate the associations between changes in customer satisfaction and firm return and risk.

Research design

Data

In testing the hypotheses, we collect data on customer satisfaction, institutional investor investments, firm value, and a set of control variables. Multiple sources are involved, including the American Customer Satisfaction Index (ACSI), the Thompson Financial CDA/Spectrum database of SEC 13F filings (Thomson Reuters Institutional [13F] Holdings), the Center for Research in Security Prices (CRSP), and Compustat. Table 1 summarizes the data sources and measures.

Customer satisfaction data

Following the marketing literature (Aksoy et al. 2008; Luo et al. 2010), we measure customer satisfaction using the ACSI, which was developed by the National Quality Research Center of the Stephen M. Ross Business School at the University of Michigan. The index measures the quality of goods and services purchased in the United States produced by both domestic and foreign firms with substantial U.S. market shares, and is a national barometer of customer satisfaction (Fornell et al. 1996). The ACSI reports satisfaction scores on a scale of zero to 100 and produces indexes for 10 national-level economic sectors, 43 industries, and more than 200 companies and federal and local government agencies. The measured companies, industries, and sectors in the index are broadly representative of the U.S. economy serving U.S. households.

Table 1 Data and measures

Variables	Measures	Data source
Institutional Investor Holdings (*INST*)	Percentage ownership of institutional investors relative to total shares outstanding	Thomas Ruters F13 File
Customer Satisfaction (*ACSI)*	The overall consumption experience of customers surveyed in the ACSI; more than 200 customers per firm for nearly 200 companies are surveyed each year	ACSI
Leverage (*LEV)*	Ratio of total debt to total asset	Compustat
Dividend (*DIV)*	Ratio of cash dividends to market value of equity	Compustat
EP Ratio (*EP)*	Ratio of earnings before extraordinary items to market value of equity	Compustat
Book-to-Market Ratio (*BM)*	Ratio of book value to market value of equity	Compustat
Log of Market Capitalization(*MV)*	Natural log of market value of equity	Compustat
Log of Shares (*SHRS)*	Natural log of outstanding shares	Compustat
Sales Growth (*SGR*)	Percentage change of annual sales	Compustat
Std of Return (*SRET*)	Daily stock return volatility	CRSP
Adjusted Return (*MRET)*	Annual market-adjusted returns	CRSP
Beta (*BETA*)	Beta, calculated from a market model using daily stock returns over an annual period	CRSP
Idiosyncratic Return Volatility (*IRISK)*	Standard deviation of market model residuals over an annual period	CRSP
Trading Volume *(TVOL)*	(Average monthly trading volume over an annual period relative to total shares outstanding)*1,000	CRSP
Analyst Coverage (*NANA)*	12-month average of number of analysts who issued annual earnings forecasts in IBES	IBES
Rating (*RATE)*	Stock quality rating	Compustat
Current Ratio (*CR)*	The current ratio of a firm (current asset/current liability)	Compustat
Intangible Asset Intensity (*IA)*	(Total Assets—Property, Plant, and Equipment PP&E)/Total Assets	Compustat
Demand Uncertainty (*DU)*	Volatility of aggregated industry sales in the previous three years	Compustat
Financial Market Volatility (*FMV)*	Degree of fluctuation of the general stock market returns	CRSP Compustat

The ACSI was first published in October 1994. Since then, it has been updated quarterly, on a rolling basis, with new data for one or more of the measured sectors replacing data collected the prior year. Typically, the ACSI results are made publicly available on the third Tuesday of February (fourth-quarter results from the previous year), May (first-quarter results), August (second-quarter results), and November (third-quarter results). We obtain ACSI data for this study over a 15-year period (1995–2009).

Because the ACSI offers satisfaction data quarterly for each company once a year (Fornell et al. 2010; Tuli et al. 2009), we needed a mechanism to carefully merge ACSI data with Thomson Reuters Institutional (13F) Holdings, CRSP, and Compustat data quarter by quarter. As shown in the timeline in Fig. 3, for firms with ACSI scores reported in quarter t of year 2, we calculate the change of institutional investor ownership changes from the beginning of the quarter t to the end of quarter t. We calculate the change in ACSI by taking the difference between the ACSI score in quarter t of year 2 and that in the same quarter of the previous year. When testing the association between the change of ACSI and firm value, we use the return in quarter t and the difference in idiosyncratic risk between quarters $t+1$ and $t-1$.[4] As a result of merging ACSI with Thomson Reuters Institutional (13F) Holdings, CRSP, and Compustat data sources, we obtain 1,032 pooled firm–year observations. Because of changes in the variables, we lose 1 year of observation, which leaves us with 916 usable observations for the final dataset. Table 2 presents the yearly summary statistics for the data on customer satisfaction and institutional investor holdings.

Measuring institutional investor investments

The institutional investor investment data in this study comes from the Thompson Financial CDA/Spectrum database of SEC 13F filings. All institutional investors with greater than $100 million of securities under management are required to report their holdings to the SEC on Form 13F. Holdings are reported quarterly; all common stock positions greater than 10,000 shares or $200,000 must be disclosed. A drawback of

[4] Return is already a change of stock price, so the buy-hold return for quarter t is essentially a change in stock price or firm value triggered by the ACSI announcement in quarter t. We exclude quarter t when investigating the change in firm risk because the risk calculation in quarter t can be contaminated by the ACSI announcement. A comparison of risk between quarters $t+1$ and $t-1$ more cleanly shows the impact of changes in ACSI on firm risk.

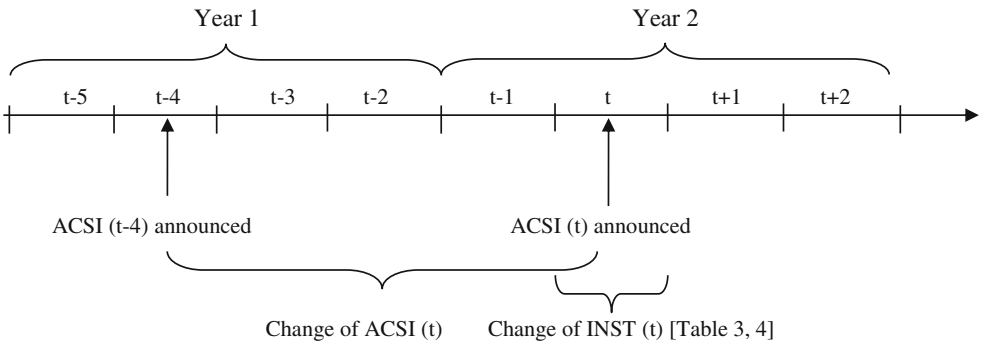


Fig. 3 Timeline for the effects

this measure is that our sample is restricted to larger institutional investors who are required to file Form 13F with the SEC, so not all institutional investments are necessarily counted. Nevertheless, this way our measure of institutional investor investments emphasizes larger institutional investors, who are also the ones which our theory and prior literatures focus on.

Similarly to prior studies (e.g., Ke and Ramalingegowda 2005; Ramalingegowda and Yu 2008), we obtain institutional investors' trading classifications (transient, dedicated, and quasi-indexer) from Brian Bushee's work. According to Bushee (1998), the classification of institutional investors is based on a collection of nine variables that capture the past investment behavior of each institutional investor in terms of both portfolio diversification and turnover. Bushee (1998, 2001) then uses principal component analysis to produce a factor that captures the average size of an institution's stake in its portfolio firms and another factor that captures the degree of portfolio turnover. Cluster analysis is then performed to group similar institutions into three clusters: transient, dedicated, and quasi-indexers.

With the combination of principal component analysis and cluster analysis, Bushee's investor classification approach is very similar to simple customer segmentation approaches. Besides simplicity, the advantage of adopting Bushee's approach is that it is widely used in prior literature and research, making the present results on the transient, dedicated, and quasi-indexer institutions directly comparable to prior work. In effect, the approach classifies most institutions as transient institutions or quasi-indexers, and a minority (appr. 6%) of institutions as dedicated institutions. This is consistent with the observation that transient as well as quasi-indexer investment strategies have become most popular in recent years (Bird et al. 2005; Porter 1992).

The measures used in the analyses for the different institutional investor classes' (transient, dedicated, quasi-indexer) investments, is the percentage of shares owned by each investor class to total shares outstanding. Changes in these percentages are entered into the analyses, as described above.

Model specifications

We consider three different types of institutional investors: dedicated (*DED*), transient (*TRA*), and quasi-indexer (*QIX*) institutional investors. To determine whether customer satisfaction improvements attract institutional investors, we follow Bushee and Noe (2000) and estimate the change model

$$\begin{aligned}\Delta INST_t = {} & \beta_0 + \beta_1 \Delta ACSI_t + \beta_2 \Delta LEV_t + \beta_3 \Delta DIV_t + \beta_4 \Delta EP_t + \beta_5 \Delta BM_t + \beta_6 \Delta MV_t + \beta_7 \Delta SHRS_t + \beta_8 \Delta SGR_t \\ & + \beta_9 \Delta SRET_t + \beta_{10} \Delta MRET_t + \beta_{11} \Delta BETA_t + \beta_{12} \Delta IRISK_t + \beta_{13} \Delta TVOL_t + \beta_{14} \Delta RATE_t + \beta_{15} \Delta NANA_t \\ & + \beta_{16} \Delta CR_t + \varepsilon_{it}\end{aligned} \quad (1)$$

where *INST* represents institutional investors' investments as stock holdings by dedicated (*DED*), transient (*TRA*), or quasi-indexer (*QIX*) institutional investors. *ACSI* represents customer satisfaction.

We include a large number of control variables to capture previously documented determinants of institutional ownership and stock return volatility. *MRET* is the market-adjusted buy-and-hold stock return measured over the past year, which proxies for firm performance and has been shown to be positively associated with institutional ownership and stock return volatility (Lang and McNichols 1997; Bushee and Noe 2000). *SRET* is the log of the standard deviation of return, which has also been shown to be an important determinant of institutional ownership (Bushee and Noe 2000). *TVOL*, a liquidity proxy, is the average monthly trading volume relative to total shares outstanding, and controls for institutional investor preferences for more liquid stocks (Gompers and Metrick 2001); for illustration purpose, we multiply this variable with 1,000.

Following Bushee and Noe (2000), we also include past Beta (*BETA*), calculated from a market model using daily stock returns over an annual period, idiosyncratic risk (*IRISK*), measured as the lagged standard deviation of market model residuals calculated using daily stock returns, and leverage (*LEV*), measured as debt-to-assets, to capture firm risk along different dimensions. In turn, to control for tangible accounting measures, *EP* is the net earnings before extraordinary items,

Table 2 Data for customer satisfaction and institutional holdings

Panel A: Descriptive statistics

	Customer satisfaction				Percentage of stock holdings by transient institutional investors				Percentage of stock holdings by dedicated institutional investors				Percentage of stock holdings by quasi-index institutional investors			
	Mean	STD	Min.	Max.	Mean	STD	Min.	Max.	Mean	STD	Min.	Max.	Mean	STD	Min.	Max.
1995	78.483	6.353	63.000	88.000	6.757	4.948	0.000	20.231	11.638	8.795	0.000	39.640	25.461	13.773	0.116	55.440
1996	78.600	5.977	60.000	88.000	6.681	5.959	0.000	36.286	12.219	9.222	0.000	40.123	23.606	13.063	0.194	53.267
1997	76.426	6.305	60.000	85.000	7.232	6.495	0.000	33.029	13.566	9.428	0.000	41.223	25.578	13.719	0.191	63.420
1998	76.963	6.289	61.000	85.000	10.402	8.549	0.000	50.218	0.241	1.191	0.000	8.117	36.747	19.880	0.024	84.659
1999	75.667	6.659	61.000	86.000	11.344	9.279	0.001	49.360	7.505	6.732	0.000	35.956	30.264	16.690	0.013	66.654
2000	77.259	6.562	59.000	87.000	9.280	6.462	0.000	26.682	8.537	8.322	0.000	45.067	31.084	15.323	0.151	68.753
2001	77.264	5.579	62.000	86.000	18.168	10.244	0.036	48.088	9.614	8.005	0.000	32.294	22.225	11.721	0.071	55.388
2002	77.136	5.764	61.000	87.000	19.353	10.100	0.104	43.267	11.278	8.823	0.000	43.179	22.454	10.489	0.067	39.387
2003	77.217	5.779	63.000	86.000	13.716	8.415	0.149	43.911	9.303	7.165	0.000	27.696	29.438	14.159	0.070	64.665
2004	77.694	5.085	66.000	88.000	6.385	5.112	0.009	24.547	3.509	4.081	0.000	15.399	46.886	20.086	0.824	82.684
2005	76.910	5.877	63.000	87.000	6.405	5.594	0.000	27.745	3.129	3.837	0.000	13.585	47.126	20.955	0.066	82.604
2006	77.536	5.965	63.000	87.000	7.678	5.443	0.162	28.946	3.548	4.082	0.000	16.339	49.822	19.923	1.901	84.216
2007	76.972	5.983	61.000	88.000	10.587	7.237	0.347	41.984	3.158	4.770	0.000	21.711	50.467	19.400	2.185	88.086
2008	77.377	6.293	56.000	87.000	9.646	6.840	0.233	53.972	1.201	3.270	0.000	17.728	51.718	18.192	1.392	85.296
2009	77.542	5.826	63.000	88.000	16.733	8.749	0.017	61.552	2.699	3.078	0.000	12.805	43.175	15.595	0.612	75.729

Panel B: Correlation matrix (top-right: Pearson; bottom-left: Spearman), *p*-value is below the correlation coefficient

		1	2	3	4	5	6	7	8	9
1	ΔTransient		0.168	−0.254	0.054	0.011	0.011	−0.044	0.196	−0.118
			(0.001)	(0.001)	(0.100)	(0.733)	(0.744)	(0.183)	(0.001)	(0.000)
2	ΔDedicated	0.074		−0.229	−0.054	0.036	−0.013	−0.063	−0.030	0.000
		(0.026)		(0.001)	(0.102)	(0.270)	(0.705)	(0.057)	(0.371)	(0.998)
3	ΔQuasi-Indexer	−0.124	−0.096		−0.051	0.048	−0.048	0.058	0.013	0.031
		(0.000)	(0.004)		(0.125)	(0.149)	(0.148)	(0.081)	(0.696)	(0.341)
4	Δlog (Customer Satisfaction)	0.022	−0.050	−0.050		0.004	−0.012	0.055	0.074	−0.052
		(0.501)	(0.131)	(0.127)		(0.915)	(0.710)	(0.095)	(0.024)	(0.115)
5	ΔIntangible Asset (IA)	0.022	−0.045	−0.011	−0.021		0.064	−0.122	0.048	−0.007
		(0.497)	(0.178)	(0.742)	(0.530)		(0.054)	(0.000)	(0.149)	(0.828)
6	ΔDemand Uncertainty (DU)	0.007	−0.015	−0.112	0.008	0.116		0.067	0.075	0.065
		(0.831)	(0.657)	(0.001)	(0.818)	(0.000)		(0.041)	(0.023)	(0.048)
7	ΔFinancial Market Volatility (FMV)	0.025	−0.091	0.055	0.046	−0.130	0.018		0.033	0.201
		(0.456)	(0.006)	(0.095)	(0.165)	(0.001)	(0.585)		(0.318)	(0.001)
8	Quarterly Abnormal Return	0.165	−0.022	−0.005	0.064	0.038	0.080	0.004		−0.211
		(0.001)	(0.513)	(0.885)	(0.051)	(0.252)	(0.016)	(0.894)		(0.001)
9	ΔQuarterly Idiosyncratic Risk	−0.098	−0.062	0.015	−0.022	−0.002	0.082	0.153	−0.135	
		(0.003)	(0.062)	(0.643)	(0.502)	(0.950)	(0.013)	(0.001)	(0.001)	

DIV is dividends, and *BM* is the book value—all these are divided with the market value of equity to get values relative to market capitalization. *SGR* is the percentage change in annual sales. We include *DIV, EP, BM*, and *SGR* to control for changes in firm accounting fundamentals that can affect the investment decisions of institutional investors (Bushee 2001). Firm size, measured as the log of market value (*MV*), captures differences in institutional ownership and stock return volatility between small and large firms. The variable *RATE*, in turn, is the S&P stock rating that captures the preference of institutional investors for well-reputed firms (Del Guercio 1996). The term *SHRS* is the logarithmic transformation of shares outstanding and its change proxies for equity issuance or repurchases that may affect institutional investors following. We also include *NANA*, the number of analysts following (Luo et al. 2010; Ngobo et al. 2012), and *CR*, the current ratio, to control for factors that may also affect institutional investor holdings.

Following Luo et al. (2010) and Tuli et al. (2009), we account for observable heterogeneity with many control variables, as listed above. In addition, we accommodate unobservable heterogeneity by employing the changes-in-changes models. Furthermore, the panel data may have time-serial correlated residuals within a firm, which can violate the assumption that standard errors are independent and identically distributed and thus lead to biased standard errors of coefficients. Following the established procedures recommended by Petersen (2009) in the finance literature, we account for this problem by estimating regressions with clustered standard errors by firm.[5] This clustered error approach is more efficient than other approaches, such as those of Fama-MacBeth, generalized least squares, White, and Newey-West on the basis of simulations (Petersen 2009, p. 435). See Appendix A for more details on this approach.

Considering the high number of independent variables in our model, a check for multicollinearity is warranted. Therefore, for Tables 3, 4 and 5, we report variance inflation factor for each independent variable and none of them is larger than 10. This eliminates the concern of multicollinearity.

Results

Effect of customer satisfaction on institutional investor investments

Hypothesis 1 posits that positive changes in customer satisfaction have a positive effect on institutional investor investing, especially by transient institutional investors. As Table 3 illustrates, the coefficient of customer satisfaction (ACSI) is positive and significant (c=0.105, p<.01). Also, we find that changes in satisfaction do not affect ownership increases by dedicated or quasi-indexer institutional investors (p>.10). Thus, we find evidence supporting H1. In a robustness test, following Tuli et al. (2009) and Luo et al. (2010), we also included the lagged change of ACSI as an independent variable and found that the results remained qualitatively the same with the inclusion of this lagged variable: a positive change in lagged customer satisfaction is associated with transient investors' institutional holdings (lagged term=0.938, p<.01) but not those of non-transient investors (p>.10).

Moderating role of intangible asset intensity, demand uncertainty, and financial volatility

Hypotheses 2 and 2alt predict that the impact of changes in satisfaction on transient institutional investments will be different for firms with low intangible asset intensity and for firms with high intangible asset intensity. As Table 4 shows, the coefficient of Δcustomer satisfaction × Δintangible asset intensity is negative and significant (δ=−2.364, p<.05). Thus, concerning the direction of the effect, the results support H2 and disconfirm the alternative hypothesis H2alt : i.e., the positive impact of satisfaction on transient institutional investor investments is weaker for firms with higher intangible asset intensity. This result is illustrated in Panel A (negative slope) of Fig. 4.

Further, H3 and H3alt predict that the influence of changes in customer satisfaction on transient institutional investor investments is different under higher vs. lower product-market demand uncertainty. As Table 4 shows, the coefficient of Δcustomer satisfaction × Δdemand uncertainty is positive and significant (δ=2.602, p<.01). This result supports H3 and disconfirms H3alt: i.e., when demand uncertainty is high, there is a stronger positive association between customer satisfaction and transient institutional investor investments. This result is illustrated in Panel B (positive slope) of Fig. 4.

Hypotheses 4 and 4alt , in turn, predict that the impact of changes in customer satisfaction on transient institutional investor investments is different in high vs. low financial market volatility. As Table 4 shows, the coefficient of Δcustomer satisfaction × financial market volatility is negative and marginally significant (δ=−19.755, p<.10). Thus H4 is marginally supported, while H4alt is disconfirmed: i.e., when financial market volatility is high, there is a weaker positive association between customer satisfaction and transient institutional investor investments. Panel C (negative slope) of Fig. 4 illustrates this.

Mediating influence of institutional investor investments on firm value

H5 predicts that institutional investor investments at least partially mediate the associations between customer

[5] Petersen (2009) generously provides STATA and SAS codes on how to realize the cluster methods in empirical research on his own website (http://www.kellogg.northwestern.edu/faculty/petersen/htm/papers/standarderror.html).

Table 3 Results for the impact of customer satisfaction changes on institutional investors

	ΔStock holdings by transient institutions			ΔStock holdings by dedicated institutions			ΔStock holdings by quasi-indexer institutions		
	Coefficient	*t*-value	VIF	Coefficient	*t*-value	VIF	Coefficient	*t*-value	VIF
Constant	0.004***	3.02		−0.001	−0.42		0.002	0.45	
Δlog (Customer Satisfaction)	0.105**	2.22	1.03	−0.052	−1.34	1.03	−0.099	−1.41	1.03
ΔLeverage	−0.041	−1.49	1.08	0.011	0.49	1.08	−0.009	−0.12	1.08
ΔDividend	−0.186	−0.67	1.18	0.132	0.73	1.18	−0.110	−0.36	1.18
ΔEarnings	0.002	0.32	2.34	−0.002	−0.60	2.34	0.008	0.91	2.34
ΔBook	0.006	1.57	2.98	0.004	1.21	2.98	−0.001	−0.33	2.98
ΔLog of Market Capitalization	0.024***	2.82	3.01	0.000	0.06	3.01	−0.013	−1.14	3.01
ΔLog of Shares	−0.011	−1.20	1.28	0.004	0.44	1.28	0.016	1.03	1.28
ΔSales Growth	0.004	0.49	1.08	0.013*	1.67	1.08	−0.004	−0.58	1.08
ΔStd of Return	−0.582	−0.61	2.15	−0.878	−1.49	2.15	1.931*	1.74	2.15
ΔAdjusted Return	−0.005	−1.34	1.58	−0.003	−1.02	1.58	0.010*	1.93	1.58
ΔBeta	0.008**	2.09	1.39	0.011***	2.97	1.39	−0.011	−1.47	1.39
ΔIdiosyncratic Return Volatility	0.348	0.32	9.18	0.782	1.03	9.18	−2.289*	−1.67	9.18
ΔTrading Volume	0.073***	2.45	1.24	0.007	0.31	1.24	0.014	0.06	1.24
ΔRating	0.000	−0.58	1.01	0.000	−0.21	1.01	0.000	−0.17	1.01
ΔAnalyst Coverage	0.000	0.66	1.07	0.001	1.36	1.07	0.001*	1.95	1.07
ΔCurrent Ratio	0.000	0.01	1.02	−0.003	−0.47	1.02	0.006	0.56	1.02
Adjusted R^2	0.065			0.012			0.022		
N	916			916			916		

***, **, and * denote significance at the 1, 5, and 10% levels, respectively

satisfaction and firm value. According to Baron and Kenny (1986), to establish mediation, customer satisfaction must affect institutional investor investments, and institutional investor investments must affect firm value. As we already reported above, customer satisfaction affects transient institutional investor investments. In addition, the results in Table 5 suggest that transient institutional investor further affects firm value. Namely, because the inclusion of transient institutional investors' investments in the model reduces the strength of the effect of customer satisfaction on abnormal return (from W=.578, p<.05, to W=.473, p<.10, only marginally significant), the data support a partial mediating role of institutional investor investments, in the link between customer satisfaction changes and firm value in terms of stock returns. This result is as expected in H5. Notably, we observe this mediation even in the presence of the control variables related to simultaneous accounting profitability changes (e.g., earnings, dividends), which suggests that transient institutional investors' buying of the firm's stock following customer satisfaction changes is indeed an alternative channel through which customer satisfaction improvements are channeled to firm value, over and beyond accounting measures.

Furthermore, the inclusion of institutional investor investment makes the influence of customer satisfaction on idiosyncratic risk insignificant (from p<.05 to p>.10), in support of full mediation. Therefore, the data support H5 for firm value in terms of idiosyncratic risk as well. In addition, the inclusion of the mediating effects of institutional investor investments improves the fit of the full models, as Table 5 shows. Specifically, adding transient institutional investments into the model leads to an incremental increase in R-square of .023 (p<.05) for abnormal return, and .01 for idiosyncratic risk, thus explaining significantly more variance of the firm value metrics.

These mediation results are noteworthy because they reveal finer-grained evidence for the presence or absence of the impact of customer satisfaction on firm value (i.e., depending on the mediating role of institutional investors' investments ignored in the previous customer satisfaction literature). Our calculations show that satisfaction's direct effects on abnormal return are 0.473, while its indirect effects through institutional investor holding are 0.108=0.115 * 0.939 (for the corresponding coefficients, see Tables 4 and 5). While customer satisfaction's direct effects on idiosyncratic risk are insignificant, its indirect effects through transient institutional investors' investments are −0.164=0.115 * (−1.426). In addition, we conducted Sobel's (1982) test for mediation to assess whether the indirect mediation effects are statistically significant. The standard Sobel test model is $Z_{value} = ab/\sqrt{a^2 s_b^2 + b^2 s_a^2 + s_a^2 + s_b^2}$, where a and s_a are coefficient and standard error, respectively, for the impact of the independent variable on the mediator, and b and s_b are

Table 4 Results for the moderated impact of customer satisfaction changes on institutional investors

	ΔStock holdings by transient institutions			ΔStock holdings by dedicated institutions			ΔStock holdings by quasi-indexer institution		
	Coefficient	*t*-value	VIF	Coefficient	*t*-value	VIF	Coefficient	*t*-value	VIF
Constant	0.002	1.22		−0.001	−0.39		0.004*	1.79	
Δlog (Customer Satisfaction) (ACSI)	0.115**	2.37	1.17	−0.055	−1.20	1.17	−0.083	−1.23	1.17
ΔIntangible Asset (IA)	−0.018	−0.39	1.12	0.038	1.13	1.12	0.080	1.20	1.12
ΔDemand Uncertainty (DU)	0.014	0.39	1.07	−0.031	−1.09	1.07	−0.157***	−2.68	1.07
ΔFinancial Market Volatility (FMV)	2.872***	3.66	3.47	−0.095	−0.21	3.47	−1.089	−1.30	3.47
ΔACSI * ΔIA	−2.364**	−2.18	1.07	−0.377	−0.39	1.07	1.537	1.04	1.07
ΔACSI * ΔDU	2.602***	2.46	1.17	−0.227	−0.26	1.17	0.952	0.61	1.17
ΔACSI * ΔFMV	−19.755*	−1.74	1.32	4.251	0.48	1.32	−1.111	−0.08	1.32
ΔLeverage	−0.050*	−1.91	1.10	0.007	0.32	1.10	−0.006	−0.09	1.10
ΔDividend	−0.179	−0.59	1.19	0.134	0.74	1.19	−0.400	−1.34	1.19
ΔEarnings	0.001	0.15	2.45	−0.003	−0.87	2.45	0.007	0.62	2.45
ΔBook	0.006	1.20	3.12	0.003	1.00	3.12	−0.004	−0.45	3.12
ΔLog of market capitalization	0.024***	2.82	3.09	0.000	0.02	3.09	−0.028***	−2.77	3.09
ΔLog of shares	−0.007	−0.73	1.31	0.003	0.28	1.31	0.013	0.86	1.31
ΔSales growth	0.004	0.59	1.09	0.013*	1.67	1.09	−0.011	−1.49	1.09
ΔStd of return	−3.904***	−2.62	8.71	−0.756	−1.18	8.71	3.166**	2.24	8.71
ΔAdjusted return	−0.006	−1.58	1.60	−0.003	−0.99	1.60	0.013***	2.49	1.60
ΔBeta	0.022***	3.67	2.12	0.010***	2.81	2.12	−0.021***	−3.47	2.12
ΔIdiosyncratic return volatility	3.040**	2.08	6.10	0.704	0.88	6.10	−3.722***	−2.47	6.10
ΔTrading volume	0.076***	2.46	1.25	0.009	0.37	1.25	0.009	0.19	1.25
ΔRating	0.000	−0.88	1.02	0.000	−0.15	1.02	0.000	−0.21	1.02
ΔAnalyst coverage	0.000	0.74	1.07	0.001	1.26	1.07	0.002***	2.78	1.07
ΔCurrent ratio	0.000	−0.05	1.02	−0.003	−0.45	1.02	0.004	0.47	1.02
Adjusted R^2	0.095			0.007			0.025		
N	916			916			916		

***, **, and * denote significance at the 1, 5, and 10% levels, respectively

coefficient and standard error, respectively, for the impact of the mediator on the dependent variable. We find that the Sobel test results are consistently significant (smallest z value=3.03, $p<.05$) for all indirect mediations. Thus, by and large, customer satisfaction's indirect effects on firm value through institutional investor holdings are significant. We conclude that institutional investor investments serve as a mechanism that partially channels the effects of customer satisfaction on firm return and risk.

Implications and conclusion

Despite the importance of institutional investors suggested in the accounting and finance literature (Bushee and Noe 2000; Jiang 2010b), extant marketing research has neglected to examine the impact of key marketing instruments on institutional investors. Analogously, prior finance and accounting research on institutional investors overlooks customer satisfaction and other marketing constructs. To bridge this gap in the marketing-finance interface (M-F), our study theorizes and supports a framework suggesting that customer satisfaction information is relevant for institutional investors. However, institutional investors are not homogeneous; firms with positive changes in customer satisfaction attract transient institutional investors to a greater extent than non-transient institutional investors. In addition, the impact of customer satisfaction on transient institutional investors' investments is contingent upon firm intangible asset intensity, product-market demand uncertainty, and financial market volatility. Also, transient institutional investor holdings represent a mechanism through which customer satisfaction affects firm value.

Implications for research

This study makes several contributions to marketing research. First, prior literature documents that firms' customer satisfaction information may affect their stock prices and investor relations (Aksoy et al. 2008; Fornell et al. 2006; Luo et al. 2010; Tuli et al.

Table 5 Results for the role of transient institutional holding in the impact of customer satisfaction changes on firm value

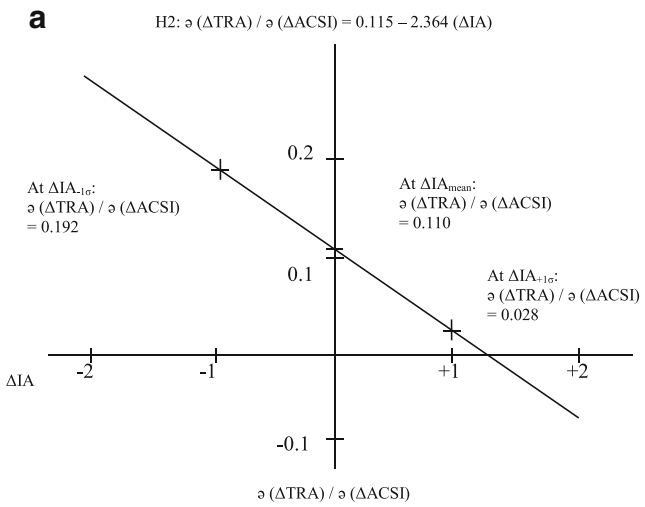
Dependent variable =	Quarterly abnormal return (%)						ΔQuarterly idiosyncratic risk (%)					
	Coefficient	*t*-value	VIF	Coefficient	*t*-value	VIF	Coefficient	*t*-value	VIF	Coefficient	*t*-value	VIF
Constant	0.024**	2.30		0.022**	2.13		−0.074**	−2.41		−0.060*	−1.95	
ΔStock holdings by transient institution				0.939***	4.72	1.13				−1.426**	−2.19	1.13
Δlog (customer satisfaction) (ACSI)	0.578**	2.22	1.17	0.473*	1.92	1.18	−1.462**	−1.98	1.17	−0.312	−0.44	1.18
ΔIntangible Asset (IA)	−0.163	−0.80	1.12	−0.145	−0.71	1.12	0.715	1.18	1.12	0.831	1.26	1.12
ΔDemand Uncertainty (DU)	0.243	0.99	1.07	0.231	0.93	1.07	0.630	0.87	1.07	0.882	1.19	1.07
ΔFinancial Market Volatility (FMV)	7.842**	2.19	3.47	5.114	1.45	3.58	−24.729	−1.95	3.47	−20.884	−1.60	3.58
ΔACSI * ΔIA	1.702	0.28	1.07	3.910	0.64	1.08	−12.838	−0.73	1.07	−15.533	−0.86	1.08
ΔACSI * ΔDU	−6.506	−0.82	1.17	−8.97	−1.11	1.18	10.690	0.41	1.17	5.468	0.23	1.18
ΔACSI * ΔFMV	−101.985	−1.21	1.32	−83.913	−1.03	1.32	365.543*	1.71	1.32	277.722	1.14	1.32
ΔLeverage	−0.136	−0.98	1.10	−0.089	−0.68	1.11	−0.421	−1.20	1.10	−0.131	−0.28	1.11
ΔDividend	−4.064***	−2.46	1.18	−3.816**	−2.24	1.18	13.679***	2.77	1.19	12.788***	2.56	1.19
ΔEarnings	0.116**	2.20	2.45	0.114**	2.13	2.45	−0.435***	−2.72	2.45	−0.358*	−1.90	2.45
ΔBook	0.057	1.44	3.12	0.052	1.32	3.12	−0.042	−0.41	3.12	−0.083	−0.66	3.12
ΔLog of market capitalization	0.221***	5.18	3.08	0.200***	4.60	3.16	−0.047	−0.36	3.09	−0.080	−0.68	3.17
ΔLog of shares	−0.074*	−1.68	1.31	−0.067	−1.60	1.31	0.233**	2.16	1.31	0.249**	2.09	1.31
ΔSales growth	0.033	1.01	1.09	0.029	0.99	1.09	−0.200*	−1.86	1.09	−0.218**	−1.98	1.09
ΔStd of return	4.331	0.64	8.86	8.085	1.28	9.52	31.299	1.34	8.71	32.541	1.30	9.35
ΔAdjusted return	0.037**	1.96	1.59	0.043**	2.34	1.60	0.105	1.55	1.60	0.067	0.88	1.61
ΔBeta	0.011	0.38	2.12	−0.010	−0.35	2.18	−0.125*	−1.81	2.12	−0.124	−1.63	2.18
ΔIdiosyncratic return volatility	−3.806	−0.49	6.25	−6.760	−0.92	6.52	−10.389	−0.43	6.10	−8.563	−0.33	6.36
ΔTrading volume	0.099	0.62	1.25	0.026	0.16	1.26	0.562	0.89	1.25	−0.074	−0.14	1.26
ΔRating	0.001	0.17	1.02	0.001	0.26	1.02	0.024*	1.91	1.02	0.022	1.74	1.02
ΔAnalyst coverage	−0.002	−0.85	1.07	−0.003	−1.06	1.08	−0.006	−0.88	1.07	−0.004	−0.63	1.08
ΔCurrent ratio	0.013	0.44	1.02	0.013	0.45	1.02	−0.111	−1.31	1.02	−0.136	−1.49	1.02
Adjusted R^2	0.189			0.207			0.210			0.217		
N	916			916			916			916		

***, **, and * denote significance at the 1, 5, and 10% levels, respectively

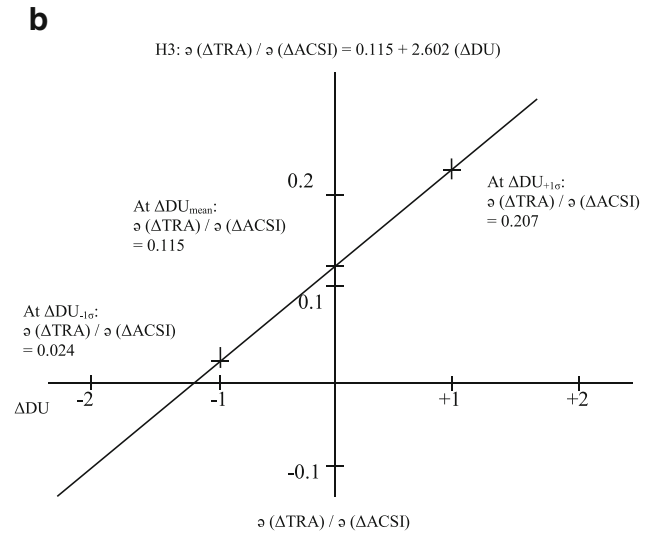
2009). However, there has been controversy (e.g., Jacobson and Mizik 2009a, b) over whether customer satisfaction has any influence on firm value over and above simultaneous accounting profitability changes, as well as whether investors in general, or any investor segments (such as institutions) in particular, attend to or respond to customer satisfaction information. Thus, the present study is important because it shows, for the first time, that especially the transient institutional investors react to customer satisfaction and that a previously neglected channel for how customer satisfaction influences firm value goes through transient institutional investors. These findings partly reconcile the previous controversy about whether or not customer satisfaction predicts stock returns, i.e., by showing that when transient institutional investors react to customer satisfaction changes, those changes are predictive of stock returns and risk.

Second, at a broader level, this study advances the M-F research stream. The rise of institutional investors is a new trend in the financial world (Connelly et al. 2010; Jiang 2010b), and institutional investors are major and powerful players in asset and firm equity pricing (Edmans 2009). We usher in, to M-F research stream, an important set of institutional investor-based metrics directly from the finance and accounting literature. These metrics (institutional investor holdings, and transient, dedicated, quasi-indexer institutional holdings in particular) may enlarge the scope of marketing research because they add a new perspective of marketing's impact on investment community, beyond that of financial analysts (Gupta et al. 2004; Luo et al. 2010; Ngobo et al. 2012).

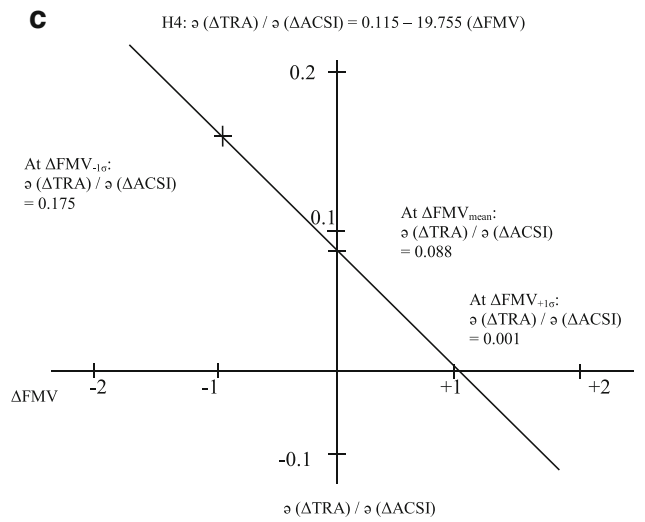
Third, our work makes a contribution by bringing together two streams of research to examine how customer satisfaction



Note: The mean (σ) of ΔIA is 0.0020 (0.0347).



Note: The mean (σ) of ΔDU is 0.0002 (0.0351).



Note: The mean (σ) of ΔFMV is 0.0014 (0.0044).

◀ **Fig. 4** **a** Slope of change of ACSI on change of Transient Institutional Ownership (TRA) over the range of change of Intangible Asset Intensity (IA) **b** Slope of change of ACSI on change of transient institutional ownership (TRA) over the range of change of product-market Demand Uncertainty (DU) **c** Slope of change of ACSI on change of Transient Institutional Ownership (TRA) over the range of change of Financial Market Volatility (FMV)

in the marketing domain can influence institutional investor holdings in the finance domain. For marketing research, we agree with prominent marketing scholars who acknowledge "the importance of the investor community in the design and execution of marketing plans.… Investors do react to changes in important marketing assets and actions that are believed to change the outlook on the firms' cash flows" (Hanssens et al. 2009, p. 118). To this notion, we add the insight that it is crucial to understand the reactions of *different types* of players in the investor community (transient versus non-transient) to customer satisfaction information.

Moreover, our study makes some specific contributions to accounting and finance research as well. First, although institutional investor behavior has been a major interest of accounting and finance, prior studies have largely focused on financial information such as breaks in consecutive earnings increases (Ke and Petroni 2004), future dividend increases (Amihud and Li 2006), and post-earnings announcement drift (Bartov et al. 2000; Ke and Ramalingegowda 2005). In contrast, our research extends the much more limited and nascent research stream examining how institutional investors trade shares in response to non-financial, intangible information in general (Jiang 2010b), and certain pieces of intangible information (e.g., advertising; Grullon et al. 2004; Oak and Dalbor 2010), in particular. Our paper extends this literature by showing that the intangible marketing outcome metric of customer satisfaction also attracts transient institutional investors. We additionally show how the institutional investor behavior further channels the influence of the customer satisfaction on stock prices and firm value. Finally, our results show that transient institutional investors may have an information advantage not only in exploring the value of customer satisfaction, but also in trading on this information according to different conditions, such as firm intangible asset intensity, product-market demand uncertainty, and financial market volatility, to obtain higher investment performance.

Implications for practice

This study offers several implications for marketing managers and executives, as well as portfolio investment managers or investors. First, resonating with Coyne and Witter (2002, p. 30), our results are

consistent with the notion that "what makes firm stock price go up or down" may be largely due to a handful of major institutional investors—especially in the case of a marketing metric such as customer satisfaction. Yet, while the findings show that customer satisfaction changes have a positive effect on transient institutional investors' attraction to the firm's stock, which in turn improves stock returns, the findings do *not* state that all transient institutional investors would *automatically* be aware of or attend to customer satisfaction improvements. This creates a window of opportunity for marketing executives regarding investor relations: If more transient institutional investors are made aware of the firm's customer satisfaction improvements, the firm can expect greater improvements in its firm value (stock returns, risk) to be realized as well.

Thus, CMOs should ramp up communication efforts to ensure that a wide population of transient institutional investors are made aware, whenever the firm is able to achieve customer satisfaction improvements (on its own measures, or third-party measures such as ACSI). Likewise, CMOs should also consider making transient institutional investors aware of steps taken to improve the firm's customer satisfaction, such as customer service investments and consumer brand preferences (Srinivasan et al. 2010) or product design (Aspara 2010).

In terms of how the communication with investors can be done in practice, we agree with Tuli et al. (2009, p. 184) that "it would be useful for firms to disclose their customer satisfaction scores in their annual report to shareholders". We also add that more interactive and instantaneous communication methods (e.g., direct investor relations contacts, mailing list, press releases) should be used to communicate customer satisfaction improvements to transient institutions. This is because transient institutional investors are, by definition, quick in their moves and high in portfolio turnover, and the greatest effect on them is likely to be achieved if they are provided with "early news" of customer satisfaction changes to support their investment decision-making (i.e., more than once per year).

Correspondingly, to investors on Wall Street and investment managers interested in "beating the market," our results provide one key finding. Namely, as to investment strategy, investment managers who pursue abnormal returns should be well-off by "tracking" transient institutional investors' trades on customer satisfaction. That is, following how and in which cases transient institutions react to customer satisfaction improvements, and making similar investments, is likely to be a good investment strategy—for other investors than transient institutions, as well (including other institutional investors and individual investors). Moreover, the results imply that investment managers can not only pursue abnormal returns but also seek reduced investment risk by following transient institutional investors' responses to customer satisfaction information.

Conclusion

In conclusion, this research examines the links between customer satisfaction, institutional investors, and firm value. The results offer important implications for academics and marketing executives as well as investors. We hope that our findings motivate more research to study institutional investor-based mechanisms in the value creation role of market-based assets of customer satisfaction.

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Appendix A

Clustered standard error estimates

Petersen (2009) suggests that in most studies of corporate finance, the data are likely to have a fixed unobserved firm effect. Thus the residuals in the ordinary least squares (OLS) regression consist of a firm-specific component (γ_i) and an idiosyncratic component that is unique to each observation (η_{it}). Then the residue can be specified as

$$\varepsilon_{it} = \gamma_{it} + \eta_{it} \tag{A1}$$

and the independent variable X also has a firm-specific component:

$$X_{it} = \mu_{it} + \upsilon_{it} \tag{A2}$$

The components of X (μ and υ) and ε (γ and η) have zero mean, finite variance, and are independent of each other. Both the independent variable and the residual are correlated across observations of the same firm, but are independent across firms. So,

$$\begin{aligned} corr\left(X_{it}, X_{js}\right) &= 1 && \text{for } i = j \text{ and } t = s \\ &= \rho_X = \sigma_\mu^2 \Big/ \sigma_X^2 && \text{for } i = j \text{ and all } t \neq s \\ &= 0 && \text{for all } i \neq j \\ corr\left(\varepsilon_{it}, \varepsilon_{js}\right) &= 1 && \text{for } i = j \text{ and } t = s \\ &= \rho_\varepsilon = \sigma_\gamma^2 \Big/ \sigma_\varepsilon^2 && \text{for } i = j \text{ and all } t \neq s \\ &= 0 && \text{for all } i \neq j \end{aligned} \tag{A3}$$

Given equations (A1), (A2), and (A3), the true standard error of the OLS coefficient can be determined. The asymptotic variance of the OLS coefficient estimate is

$$AVar\left[\widehat{\beta}_{OLS} - \beta\right] = \frac{\sigma_\varepsilon^2}{\sigma_X^2 NT}\left(1 + (T-1)\rho_X \rho_\varepsilon\right) \tag{A4}$$

Given the assumptions, the within-cluster correlations of both X and ε are positive and equal to the fraction of the variance that is attributed to the firm effect. When the data have a fixed firm effect, the OLS standard errors will understate the true standard error if and only if both ρ_X and ρ_ε are nonzero.

Therefore, the correlation of the residuals within a cluster is the problem the clustered standard errors are designed to correct. The covariance between residuals within the cluster is estimated by squaring the sum of $X_{it}\varepsilon_{it}$ within each cluster and the squared sum of $X_{it}\varepsilon_{it}$ is assumed to have the same distribution across the clusters.

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