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The Capital Market Outcomes of Marketing Executives' Insider Trades
Information Content and Stock Returns Risk Implications

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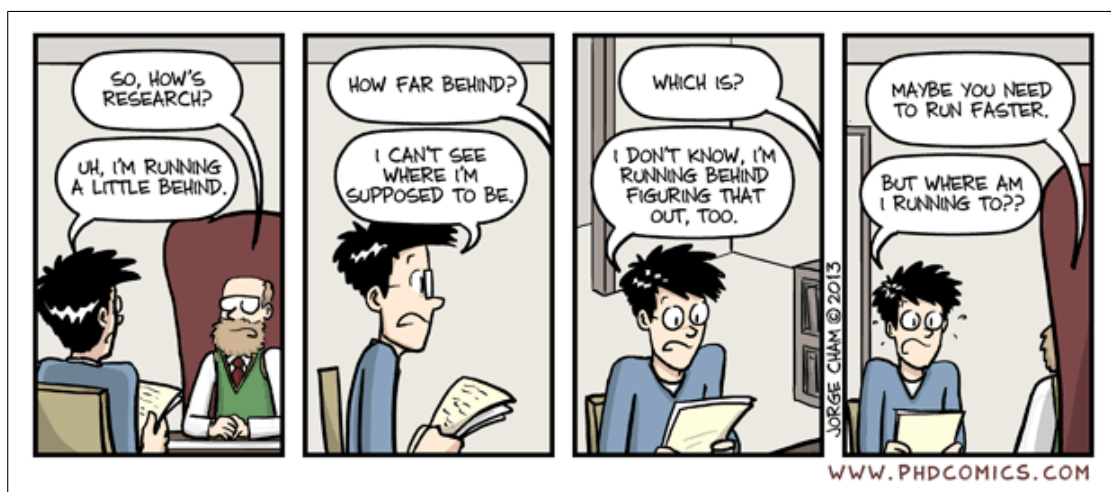

Figure 1:
"Piled Higher and Deeper" by Jorge Cham www.phdcomics.com

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Summary

On the one hand, previous research in finance and accounting suggests that traditional financial statements are subject to restrictions in demonstrating the value implications of investments in intangible market-based assets. As a consequence, investors have to find alternative sources of information to reduce the resultant information asymmetries between corporate management and capital markets. In this context, a well established object of investigation is the trading of managers in the stocks of their own corporation, because insider trading is perceived as a tool for management to disclose material non-public information to capital markets. On the other hand, research in marketing highlights that stock markets consider marketing information as valuable signals when updating their expectations about a firm's prospects. Some of a firm's most valuable market-based assets, such as brands and customer relationships, are under the responsibility of marketing, and thus, marketing is perceived to have superior knowledge about the future outcomes associated with these investments. However, until today, finance largely neglected that stock markets may distinguish between insider trading signals from different functional areas, when searching for non-public information. In contrast, marketing research ignored that insider trading may be a means of disclosing value relevant marketing information to investors. Therefore, this dissertation fills this gap by combining prior evidence from these two disciplines, and introducing a function-specific perspective to the analysis of insider trading.

Study 1 of *Project I* focuses on the research question, if marketing and finance induced insider purchases exhibit differences in their information content, which is measured as the excess return subsequent to the announcement of an insider trading event. Building on signaling theory and upper echelons theory, the study suggests and demonstrates that at least in the short-run, capital market response is stronger for marketing related insider

trading signals. That is, when the insider is more involved in the value-generating operations of a firm. In contrast, signals from the rather administrative finance function exhibit a lower information content. However, the obtained results indicate that these differences disappear in the long-run.

Study 2 of *Project I* examines whether a firm's financial statement informativeness influences the effects that are observed in *Study 1*. Furthermore, it takes into consideration an additional attribute that constitutes a firm's information environment, and a measure of an insider trading signal's credibility. The results of *Study 2* demonstrate that financial statement informativeness moderates the market reaction that occurs subsequent to a marketing insider's transaction. More specifically, it mitigates the observed effect. However, significant differences between marketing and finance induced insider purchases only occur in the short run.

Project II strives to answer the question, whether insiders' purchasing signals serve as indicators for changes in stock returns risk. Building up on previous work in marketing and finance, this project conducts exploratory analyses. The project examines both short-term and long-term changes in a firm's systematic and idiosyncratic risk around insider transaction dates. However, the results demonstrate that in the short run, both systematic and idiosyncratic risk significantly decrease around marketing insider purchases. Finance related transactions only exhibit downward changes in idiosyncratic risk. Moreover, in the short run, differences between marketing and finance transactions do not occur. In the long run, downside systematic risk of firms that experience marketing insider purchases increases, whereas firms that experience finance insider trading exhibit decreasing idiosyncratic and downside idiosyncratic risk. Furthermore, in the long run, significant differences between the two groups exist for idiosyncratic risk and downside systematic risk. However, the latter effect remains significant even after taking into account commonly used control variables.

In summary, this thesis contributes to an enhanced understanding of stock market response to the disclosure of marketing information. From a theoretical perspective, it contributes to research in both marketing and finance by investigating the implications of insider trading signals from a function-specific perspective. In particular, it highlights the role of marketing insider purchase signals as a means of information disclosure when

the information content of traditional financial statements is limited. Moreover, the dissertation demonstrates that insider trading signals from marketing and finance also exhibit various implications for a firm's stock returns risk, even though the obtained results are ambiguous and may need further examination. From a practical perspective, the findings from this thesis could help firms to alter marketing information disclosures (e.g., investor relations, voluntary disclosures). Furthermore, accounting standard setters can use the obtained results to identify potential areas in financial reporting that may need improvement in order to further reduce information asymmetries between firms and investors.

Short Table of Contents

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List of Abbreviations

NYSE	New York Stock Exchange
OLS	Ordinary Least Squares
OTC	Over The Counter
p.	Page
P/B ratio	Price to Book Ratio
pp.	Pages
PPS	Price per Share
R&D	Research and Development
ROA	Return on Assets
ROI	Return on Investment
SD	Standard Deviation
SEC	US Securities and Exchange Commission
SFAS	Statement of Financial Accounting Standards
SG&A	Selling, General, and Administrative
SNR	Simple Net Return
SOX	Sarbanes-Oxley Act
UK	United Kingdom
US	United States
USC	Code of Laws of the United States of America
VIF	Variance Inflation Factor
vs.	Versus

1 Introduction

"Not everything that can be measured is important and not everything that is important can be measured."

– Albert Einstein [1]

1.1 Motivation

If you wanted to find out more about the future prospects of a firm's business, would you ask one of the finance guys or would you rather ask a member of the marketing department? Maybe, you assume that finance knows best about the value and future options associated with a firm's assets, but is this always true? Recent developments might have caused a shift in competences that are needed to evaluate a firm's future potential.

During the last decades, intangible assets gained more and more importance in the stock market's valuation of firms. Nowadays off-balance sheet assets like customer relationships, brands, research and development (R&D), and so forth, became the most important drivers of firm value and represent more than 60% of Fortune 500 listed companies' market capitalization (PricewaterhouseCoopers 2009).[2] However, markets tend to systematically misprice the stocks of firms with extensive intangible assets and often overvalue internet based companies and undervalue those in traditional industries (Lev

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[1] Lehmann and Reibstein (2006) tracked this quote down to Albert Einstein.

[2] The value of intangible assets can be very volatile. As a consequence of the financial crisis, market-to-book ratios of Fortune 500 firms dropped to 1.5 in 2009 from a three year average of 2.7 prior to 2007 (PricewaterhouseCoopers 2009). In 2000, the market-to-book ratio of S&P 500 companies reached its all-time high of 7.5 (Lev 2003, p. 17).

2004). The latter applied to the *New Economy* firms and ended up with the burst of the *dot-com bubble*. However, despite this example, firms like Amazon – with its customer base – and Google – with the large user base of its search engine technology –, have demonstrated that intangible assets also are sustainable sources of cash flows, and these firms are prospering.

The widespread mispricing of intangibles has several reasons. Investors that are seeking value relevant information, won't find them in ordinary financial reports because *Generally Accepted Accounting Principles* (GAAP) treat almost all intangible assets that were generated in-house as immediate expenses rather than as investments (Lev 2002; 2004; IFAC 2008). Furthermore, firms are not required to disclose any material information related to investments in intangible assets (Lev 2004). Another problem stems from the unique character of off-balance sheet assets that makes it almost impossible for investors to draw inferences from observing the performance and activities of firms in similar businesses (Aboody and Lev 2000). Thus, investors seek alternative sources of information.

At the same time, marketing that is responsible for creating and maintaining shareholder value from intangible market-based assets (Srivastava, Shervani, and Fahey 1998), is losing its influence in top management teams and core marketing competencies are shifted away to other corporate functions (Reibstein, Day, and Wind 2009; Verhoef and Leeflang 2009; Verhoef and Pennings 2012). One reason for this development is due to the perception that marketing is lacking accountability (Baker and Holt 2004). In response, marketing strives to demonstrate the value relevance of marketing information for financial markets (Hanssens, Rust, and Srivastava 2009; Srinivasan and Hanssens 2009), and the contribution of marketing's presence and influence on firms' financial performance (Nath and Mahajan 2008; 2011; Verhoef and Leeflang 2009).

However, this lack in accountability may be due to the fact that it is difficult to express the rather complex mechanisms associated with value generation from market-based assets, in a way that fits in traditional financial statements. In this regard, previous research in finance and accounting already examined situations, in which traditional financial statements provide only limited information about the value implications of a firm's assets (e.g., Aboody and Lev 2000; Frankel and Li 2004; Veenman 2012). For

instance, these studies demonstrate that investors observe when managers trade in the stocks of their own corporation and use these signals as an argument to update their expectations about a firms prospects (e.g., Aboody and Lev 2000; Frankel and Li 2004; Veenman 2012). However, despite previous evidence that the information, which insiders possess, depends on the role they have in a corporation (e.g. Knewtson and Nofsinger 2014; Seyhun 1986; Wang, Shin, and Francis 2012), prior research in finance and accounting did not consider an insider's functional affiliation, but solely focused on hierarchical differences.

In summary, there is a gap in both the marketing and the finance and accounting literature. On the one hand, marketing is perceived to be responsible for value creation from market-based assets, but until now, research in marketing was not able to demonstrate, whether investors perceive that marketing managers possess valuable information about the future of a firm's business. On the other hand, research in finance demonstrates that trading signals from corporate managers provide valuable information for investors, but largely neglected that insiders should not be treated as a homogenous group. Thus, this dissertation wants to fill this gap by investigating the capital market outcomes of marketing induced insider trades. In particular, this thesis investigates, whether stock market response to insider trading is different for trades made by marketing and finance insiders. That is, whether investors associate marketing and finance insiders to possess different levels of information about a firm's future. Hence, this dissertation answers the recent call for research that analyzes the capital market outcomes of marketing information disclosures (Srinivasan and Sihi 2012) and makes various important contributions to existing research and practice.

1.2 Research Questions

First, drawing from established theories in economics and management, this dissertation is the first to empirically investigate insider trading from a function-specific perspective. Although prior research in finance suggests that insiders should not be treated as a homogenous group (Knewtson and Nofsinger 2014; Seyhun 1986; Wang, Shin, and Francis 2012), previous work in this area solely focuses on hierarchical differences. However, previous research in management suggests that the behavior and capabilities of

managers are largely different, depending on their functional background (Guadalupe, Li, and Wulf 2014; Hambrick and Mason 1984). Thus, from a signaling perspective (Spence 1973) the observation of marketing and finance related insider trades should stimulate different stock market reactions. Therefore, this thesis is the first to demonstrate, if capital markets respond differently to trading signals from marketing and finance insiders.

Second, this dissertation provides insight into the role of a firm's information environment on stock market reactions subsequent to insider trading. Previous research acknowledges that insider transactions convey management's privately held information, and that insider trading even can be used as a substitute for traditional disclosures (Carlton and Fischel 1983). Furthermore, there is empirical evidence that the informativeness of traditional financial statements and other factors that constitute the level of information, which is available for a firm, influence the information content of insider transactions (Frankel and Li 2004; Veenman 2012). However, these studies neglect the functional affiliation of the insider who trades and thus, may ignore effects that stem from function-specific capabilities and competences. Therefore, this dissertation is the first to demonstrate the moderating role of financial statement informativeness on stock market response to marketing and finance induced insider trading.

Third, this thesis is the first to investigate the stock returns risk implications of insider trading from a function-specific perspective. Overall, empirical research in this area is scarce (e.g., Cai et al. 2007; Dickgiesser and Kaserer 2010; Seyhun 1988), and these studies neglect function-specific differences as well. However, previous empirical evidence suggests that both a firm's financial structure (e.g., Bartov 1991; Hertzel and Jain 1991) and the future options associated with a firms market-based assets (e.g. McAlister, Srinivasan, and Kim 2007; Tuli and Bharadwaj 2009) affect a firm's stock returns risk. Therefore, it is astonishing that previous work on insider trading did not investigate, if function-specific differences matter, when managers signal that their firms may be undervalued due to mispricing of information related to the risk associated with a firm's prospects.

In summary, this thesis wants to gain further insight into the capital market outcomes of marketing information disclosures by investigating stock market response to marketing

and finance induced insider trading, and thus answering the recent call for additional research in this area (Srinivasan and Sihi 2012). Figure 1.1 visualizes the research questions and the main contributions of this dissertation.
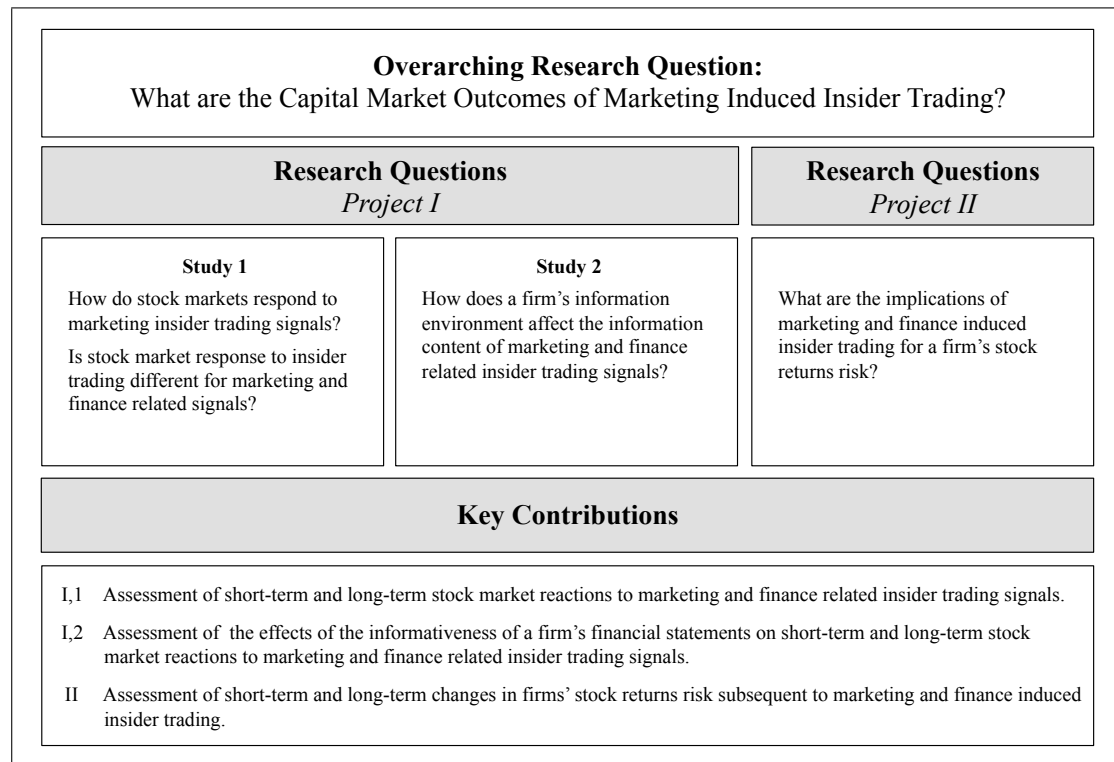
Figure 1.1: Research Questions and Contributions

1.3 Structure of the Thesis

The structure of this dissertation is illustrated in Figure 1.2. Following this introduction, Chapter 2 presents the conceptual basis of this thesis. This chapter provides a definition of insider trading as used in this dissertation and presents previous findings in the field. Furthermore, it briefly discusses the theory of efficient markets and describes the emergence of research at the intersection of marketing and finance in the academic literature.

The two empirical projects are presented in Chapters 3 and 4. First of all, Chapter 3 out-

lines the overall background for Studies 1 and 2, and describes the empirical setting. It continues with the two studies in Sections 3.3 and 3.4. For each study, I present the conceptual basis and continue with the applied methodology, before presenting the obtained results. Each study ends with a presentation and discussion of the findings. Chapter 4 presents the second project. It opens by briefly presenting the overall background and the conceptual basis. The project continues with a description of the methodology and the dataset. It ends with a presentation and discussion of the findings.

Finally, Chapter 5 closes with an overall discussion. It summarizes the key findings of the two projects and elaborates on the contributions and implications for both research and practice. It concludes with suggestions for future research in marketing, finance and accounting that are derived from the findings and limitations of this dissertation.

1 Introduction
Motivation and Research Questions

2 Conceptual Basis
Insider Trading, Capital Market Efficiency, Marketing and the Financial Markets

3 Project I	**4 Project II**
The Information Content of Marketing Induced Insider Trading	Marketing Induced Insider Trading and Stock Returns Risk

5 General Discussion, Conclusions, and Future Outlook
Summary of the Key Findings
Implications for Research and Practice,
Limitations and Outlook

Figure 1.2: Structure of the Thesis

2 Conceptual Basis

2.1 Insider Trading

Insider trading describes the behavior of firm executives, when trading in the stocks of their own corporation. Previous work in finance and accounting used insider trading behavior to measure the degree of information asymmetry between firms and capital markets (e.g., Frankel and Li 2004). Insiders are perceived to have superior knowledge about firms' strategies and future potential, and investors use disclosers of insider transactions to resolve uncertainties that arise from traditional financial reports (Veenman 2012).

These studies built on extensive literature about insider trading and its implications for stock markets. Thus, the following section introduces this topic. It will provide a commonly used definition and discuss the findings of previous work in the finance literature. It will conclude with arguments that show why insider trading provides a new opportunity to analyze the financial market outcomes of marketing information disclosures.[3]

2.1.1 The Fundamentals of Insider Trading

In public, insider trading is often associated with criminal conduct. In the recent past this perception was primarily shaped by several insider trading scandals that hit the

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[3] The explanations given here, focus on the characteristics of the US stock market. Regulations in other countries, like Germany or the United Kingdom (UK), are similar in some place but not the same. The empirical analyses in this thesis are based on US data. For an overview of US, German, and UK regulations on insider trading, see e.g., Dymke (2011); Fidrmuc, Goergen, and Renneboog (2006); Rau (2004); Seeger (1998).

United States during the 1980s (Engel 1991, p. 387). More recently it received further attention from reports about US hedge fund managers, who were convicted of insider trading in 2011 (FT.com 2011; sueddeutsche.de 2011).[4]

Despite the negative examples, the term insider trading describes a wide range of actions. Basically, insider trading refers to "trading in securities while in possession of material nonpublic information" (Bainbridge 2000, p. 1). The SEC describes insider trading as "a term that most investors have heard and usually associate with illegal conduct. But the term actually includes both legal and illegal conduct. The legal version is when corporate insiders – officers, directors, and employees – buy and sell stock in their own companies. Illegal insider trading refers generally to buying or selling a security, in breach of a fiduciary duty or other relationship of trust and confidence, while in possession of material, nonpublic information about the security. Insider trading violations may also include 'tipping' such information, securities trading by the person 'tipped,' and securities trading by those who misappropriate such information" (SEC 2012). The first part, which describes the legal version of insider trading, represents the focus of this dissertation.

However, this description does not represent a precise definition because there is a need for additional specifications. Insider trading was incorporated into US *Federal Securities Law*, when the United States enacted the *Securities Act of 1933* (Securities Act) and the *Securities and Exchange Act of 1934* (Exchange Act).[5] The Exchange Act defines *corporate insiders* as "[e]very person who is directly or indirectly the beneficial owner of more than 10 percent of any class of any equity security [...] or who is a director or an officer of the issuer of such security". The term 'officer' in this case includes: "company president; principal financial officer; principal accounting officer; any vice president in charge of a principal business unit division, or function (such as sales, administration, or

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[4]   However, the history of insider trading already begins in the late 18th century, when the first recorded insider case hit the United States (Geisst 2004). The events of those days were closely connected with the foundation of the *New York Stock Exchange* in 1863 (MacDonald and Hughes 2007) and mark the beginning of self-regulation in US securities markets.

[5]   Both acts are a consequence of the devastating stock market crashes of the late 1920s and the early 1930s. The Securities Act governs the primary market for securities (i.e., it is aimed at the issuers of securities and formulates requirements on disclosure). The Exchange Act governs the secondary market (i.e., the actual securities exchange). Prior to the Federal Securities Laws from the 1930s, insider trading was exclusively regulated in the Common Law of the individual states, which required a fiduciary relationship between transaction partners (Weber 1999, p. 46-47).

finance); and any other person who performs a policy-making function in the company" (Bettis, Coles, and Lemmon 2000, p. 195).

Insiders have to disclose both purchases and sales of securities to the SEC "before the end of the second business day following the day on which the subject transaction has been executed" (15 USC §78p (a)(2)(C)).[6] This represents a modification of the disclosure requirements of insider trading that occurred with the enactment of the *Sarbanes-Oxley Act* (SOX) of 2002, which is an amendment to Section 16(b) of the Exchange Act of 1934 (Brochet 2010). Furthermore, the SEC wants to ensure that corporate insiders don't unfairly make use of private information. Thus, short swing profits with holding periods less than six month must be returned to the issuer of the security (15 USC §78p, Section 16b), whereas long-term investments are supported.

2.1.2 Reported Insider Trading – Current Knowledge

The literature on insider trading is vast. On the one hand investors are interested in corporate insiders' trading reports (Chang and Suk 1998; Jaffe 1974)[7], and on the other hand academics want to understand how financial markets process information about insider trading (e.g., Fidrmuc, Goergen, and Renneboog 2006; Lin and Howe 1990; Seyhun 1986). The first studies on reported insider trading were conducted between the 1940s and the 1960s. However, they did not yet focus on insider trading as information generating events. Researchers those days were rather interested in whether corporate insiders are better in timing their purchase and sales transactions (Lorie and Niederhoffer 1968; Rogoff 1964; Smith 1940)[8], and whether stocks traded by insiders perform better than the market (Glass 1966; Lorie and Niederhoffer 1968).[9] Lorie and

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[6] Corporate insiders must file their trades on the SECs Form 4. The rules in the Exchange Act ensure free access to all corporate insider trading data back to the 1930s. The data from these reports is used in almost all empirical work on insider trading in the US (Jeng, Metrick, and Zeckhauser 2003).

[7] From 1979 to 1980 there were almost 50 reports solely in the *Wall Street Journal* on individual firms' corporate insiders' trades or insider trading in general (Givoly and Palmon 1985).

[8] Smith (1940, p. 117) shows that "insiders as a group did not consistently sell at high prices and buy at low prices" but they sold around price peaks and purchased shortly after prices recovered from downtrends.

[9] Lorie and Niederhoffer (1968) also discuss the issue of data quality because early SEC filings only contained the month in which an insider traded but not the actual trading day. Furthermore, they find evidence for *inertia* in insider trades and show that the odds for transactions of the same kind increase with the number of equal transactions made before.

Niederhoffer (1968) demonstrate that over a time horizon of six month, stocks that were accumulated by insiders will probably outperform the market. In contrast, Wu (1972) is not able to confirm the results of these previous studies. He analyzes insider trading and stock price movements for a sample of 50 firms from 1957 through 1961, and his results indicate that insiders indeed make profits but they don't outperform the market (Wu 1972)[10].

However, the early works on insider trading almost exclusively focus on the ability of insiders to forecast prices and market movements, and thus, on their ability to capitalize on privately held information. These studies are not able to answer the question whether the occurrence of insider trading represents a valuable signal for stock markets. Subsequent research demonstrates that not only insiders but also outsiders can make profits by imitating corporate insiders' trading behavior (Bettis and Vickrey 1997; Jaffe 1974; Pratt and DeVere 1972). They may even realize similar return rates (Pratt and DeVere 1972).[11] Finnerty (1976a) argues that insiders do have valuable information that enables them to make stock performance forecasts and that the markets follow their trading behavior in the short-term. He provides two explanations for these findings: either outside investors buy stocks with high observable insider activity or the insiders' information becomes publicly available shortly after they traded (Finnerty 1976a). The latter might be due to intensive market research or market sensing that is triggered by the insider trading signal. Chang and Suk (1998, p. 115) go even one step further and "test whether [the] secondary dissemination of [insider trading] information affects stock prices". They use data from the weekly published Wall Street Journal *Insider Trading Spotlight*.[12] By using a market model approach, they show that the secondary dissemination of insider trading reports provides valuable information (Chang and Suk 1998, p. 120). Their finding indicates that stock markets might price-in insider trading signals only gradually.

Analyzing the determinants of insider profits in more detail, Seyhun (1986, p. 206) dis-

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[10]   The study is a very condensed version of Wu's unpublished dissertation "Corporate Insider Trading Profitability and Stock Price Movement", which he submitted at the University of Pennsylvania 1963.

[11]   Seyhun (1986) finds low positive returns for outsiders that however disappeared after accounting for transaction costs.

[12]   These reports contain the ten largest purchase and sale transaction of the week.

covers that "insider information arises as a result of insiders' association with the firm, since insiders who are closer to day-to-day decision-making trade on more valuable information". This finding is also supported by Lin and Howe (1990). The unequal distribution of value relevant information is also observed across hierarchy levels of corporate insiders (Fidrmuc, Goergen, and Renneboog 2006). Fidrmuc, Goergen, and Renneboog (2006, p. 2001) use this finding to formulate a *Information Hierarchy Hypothesis* (IHH), which "postulates that the information content of the transactions depends on the type of director who trades". Moreover, the dollar volume of the transaction and the size of the firm are additional determinants of insider returns (Seyhun 1986). Lakonishok and Lee (2001) discover that "insiders' trades are informative for longer investment horizons, suggesting that the market underacts to this information" (Lakonishok and Lee 2001, p. 82). Furthermore, insider purchases tend to carry more information than insider sales (Lakonishok and Lee 2001).

More recently, based on the findings from (Fidrmuc, Goergen, and Renneboog 2006) and Seyhun (1986), Wang, Shin, and Francis (2012) as well as Knewtson and Nofsinger (2014) questioned whether insiders should be treated as a homogenous group and can be examined as a whole. They argue that managers serve different roles within an organization and therefore they expect differences in the information content of CFO and CEO transactions (Wang, Shin, and Francis 2012; Knewtson and Nofsinger 2014). Wang, Shin, and Francis (2012) demonstrate that CFOs earn higher abnormal returns than CEOs, and add that CFO insider buying is more frequently associated with positive earnings surprise. Knewtson and Nofsinger (2014) build up on their findings and find out that the differences between CEO and CFO trades disappear in the post-SOX period.

Moreover, insider trading signals can also be used to make predictions about the whole market. Seyhun (1988) focuses on the information content of aggregate insider trading. He hypothesizes that corporate insiders consider firm-specific, industry-specific and economic factors, when trading on private information, and therefore, insider transactions might uncover economy wide influences that are not yet reflected in stock prices. His results indicate that aggregate insider trading activity can predict future stock returns and aggregate insider trading is positively related to future stock market performance

(Seyhun 1988).[13] Later, Seyhun (1992) attributed this effect to changes in the business environment and future real activity.

Methodological issues associated with the *Capital Asset Pricing Model* (CAPM) (Lintner 1965a; Sharpe 1964) that might affect the results of previous studies, were discovered by Banz (1981) and Reinganum (1981), who show that CAPM returns are biased to size and e/p ratio effects. Therefore, the results of previous studies (e.g., Jaffe 1974) that employed this method must be viewed critical. Seyhun (1986) employs a market model approach and reports return rates that are below those of previous studies. He concludes that the "failure of the CAPM to properly measure expected returns, as well as inappropriate choice of estimation periods, can result in larger estimates of abnormal profits following insider transactions" (Seyhun 1986, p. 199). In the same context Brick, Statman, and Weaver (1989, p. 422) discover that "both the magnitude of the excess returns and their statistical significance were sensitive to the model used". These effects that stem from size, e/p ratios and transaction costs in particular affect the returns generated from outsiders (Rozeff and Zaman 1988). Thus, it depends on the model whether outsiders earn abnormal profits that are significantly different from zero or not (Brick, Statman, and Weaver 1989).[14] These methodological issues and the associated shortcomings, are attributed by either using the market model approach or the Fama and French (1993) and Carhart (1997) factor models as common practice.

During the period from the years 2001 through 2010, there was only little interest in research on insider trading. However, the topic regained attention with the enactment of SOX, and researchers examined whether this change in the regulatory framework influences the information content of insider trading signals (e.g., Brochet 2010; Hossain and Bhabra 2010; Knewtson and Nofsinger 2014). Overall, the findings of these studies indicate that the information content increased as a consequence of the more timely disclosure of the transactions (Brochet 2010; Hossain and Bhabra 2010).

In summary, insider trading, at least in some occasions, can serve as a valuable signal for stock markets. However, it depends on firm-specific factors and on the individual

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[13]   For individual firms, Lakonishok and Lee (2001) show that insider trading can forecast market movements better than ordinary contrarian strategies, in particular for firms with low market capitalization.

[14]   Lin and Howe (1990), who study insider trading on the *over the counter* (OTC) market, however, find no evidence for a size effect.

insider's position in the firm, whether insider trading leads to unexpected stock price movements.

Albeit the large number of insider trading studies, it is astonishing that to my best knowledge, no study ever analyzed the relationship between the function of a particular insider in the corporation and the financial market outcomes of the observed trading behavior – especially in light of the empirical findings associated with the IHH and recent findings that examine differences between CEO and CFO transactions. However, the latter rather explores differences in hierarchy than between functions. Thus, this dissertation wants to fill this gap, by investigating the financial market outcomes of marketing executives' insider trading. Furthermore, since previous work in finance demonstrates that CFO trades are apparently associated with similar or higher information content than CEO trades, this dissertation will use finance trades as a benchmark and will compare stock market response to marketing induced insider trades and finance induced insider transactions. Table 2.1 summarizes the findings of studies that examined the effects of insider trading.

Table 2.1: Studies on Insider Trading

Study	Sample	Key Findings
Studies on Insider Trading		
Bettis and Vickrey (1997)	US, January 1985–December 1990, N=5,022	insiders earn abnormal returns, outsiders can capitalize on mimicking insider transactions even when accounting for transaction costs
Brick, Statman, and Weaver (1989)	US, July 1976–June 1979, 200 highest equity value firms, N=5,832	results are sensitive to the excess returns model, outsiders imitating insider transactions don't realize positive excess returns
Brochet (2010)	US Form 4 Filings, CEOs, CFOs, COOs, board chairs, and presidents, 1997–2006, N=53,503	abnormal returns and trading volumes after insider purchases increase in the post SOX era, SOX reduces information asymmetries between insiders and investors
Chang and Suk (1998)	US Wall Street Journal Insider Trading Spotlight, August 1988–December 1990, N=1,149	abnormal returns following secondary dissemination of insider trading information, increased trading volume subsequent to insider trading and disclosure dates
Dickgiesser and Kaserer (2010)	Germany, July 2002–October 2007, N=5,128	abnormal returns are higher for stocks with high idiosyncratic risk, market response to insider trading reports is weak due to costs from arbitrage risk
Dymke (2011)	German directors' dealings, July 2002–April 2005, N=1,828	stock prices adjust gradually to insider trading information, outsiders can make profits by mimicking insider transactions, market response is negatively related to transaction value
Fidrmuc, Goergen, and Renneboog (2006)	UK directors' dealings, 1999–1998, N=35,439	markets respond quickly to insider transactions, purchases have higher information content than sales, no support for information hierarchy hypothesis

continued overview of studies on insider trading

Study	Sample	Key Findings
Finnerty (1976a)	US, January 1969–December 1972, N=31,089	in the short-term, insiders possess information about future performance
Glass (1966)	US, January 1961–June 1966	insider trading can be used as an indicator for future stock price performance
Hossain and Bhabra (2010)	US, January 1996–May 2009, N=42,794	information content of insider transactions improved in the post-SOX period, and after the 2007 credit crunch
Jaffe (1974)	US, random sample with 200 large firms, 1962–1968, N=952	insider trading occurs frequently, insider trades are informative about future prices, findings are inconsistent with research on market efficiency
Knewtson and Nofsinger (2014)	US, 1992–2009, N=17,340	CFO-based portfolios yield higher abnormal returns than CEO-based portfolios, profitability of CFO trades decreased after SOX, no significant differences between CEO and CFO portfolios in post-SOX period
Lakonishok and Lee (2001)	US, 1975–1995, N>1,000,000	the market tends not to respond to insider trading reports, aggregate insider trading predicts market performance, insiders act as contrarian investors, insider performance depends on firm size
Lin and Howe (1990)	US, only firms in the OTC/ NASDAQ market, January 1975–April 1983, N=38,992	insiders have the ability to forecast prices, transactions costs eliminate abnormal returns, outsiders cannot profit from mimicking strategies
Lorie and Niederhoffer (1968)	US, stratified random sample of 105 firms, January 1950–December 1960, N=8,277	insiders purchase before price increases, transaction value is positively related to insider returns
Pratt and DeVere (1972)	US, January 1960–June 1966, N=52,000	insider transactions provide information about future performance

continued overview of studies on insider trading

Study	Sample	Key Findings
Rau (2004)	German directors' dealings, March 2001–December 2003, N=5,044	insiders realize positive abnormal returns, outsiders can make profits by mimicking insider transactions, return is negatively associated with firm size, insiders closer to daily operations earn higher returns
Rogoff (1964)	US, random sample, 1957–1960, N=1,507 monthly observations	insiders exhibit forecast capabilities for their own firm's stocks, outsiders cannot capitalize on this information, because performance variation is too high
Rozeff and Zaman (1988)	US, January 1973–December 1982, N=698 (insider sample), N=622 (outsider sample)	outsider returns are sensitive to the excess returns model, insiders earn abnormal profits even after accounting for transaction costs
Seyhun (1986)	US, 1975–1981, N=59,148	insiders have information about future stock prices, insiders increase trading volume when information content is greater, directors and chairmen have better information, outsiders can not capitalize on insider trading information
Seyhun (1988)	US, 1975–1981, N=59,148	aggregate insider trading has a positive relation with market returns, insiders anticipate future performance, negative relation between insider performance and firm size, insiders perform better if firms exhibit higher market risk
Seyhun (1992)	US, January 1975–December 1989, N=844,407	positive relationship between aggregate insider trading and future abnormal returns, firm size effect
Wang, Shin, and Francis (2012)	US, January 1992–July 2002, N=58,421	CFOs earn higher abnormal returns than CEOs over a period of 12-months, future earnings surprise occurs more often after CFO purchases

2.2 Capital Market Efficiency

The occurrence and outcome of corporate insider trading is often discussed in connection with the concept of efficient markets, which presents a fundamental part of modern capital market theory (Rau 2004). To ensure a proper allocation of resources, security prices must be accurate and reliable value indicators, which requires a market that processes information efficiently (Fama 1976). Thus, in an efficient market, "prices always 'fully reflect' available information" (Fama 1970, p. 383). This definition is based on the following assumptions (Fama 1970, p. 387):

- *no transaction costs in trading securities,*

- *all available information is costlessly available to all market participants,*

- *all agree on the implications of current information for the current price and distributions of future prices of each security.*

Other authors, however, often perceive this definition as being too extreme and too far from reality and suggest definitions that also account for transaction costs. Jensen (1978, p. 96) for instance, suggests that "a market is efficient with respect to information set θ_t, if it is impossible to make economic profits[15] by trading on basis of information set θ_t". However, Fama (1991, p. 1575) responded that "the extreme version of the market efficiency hypothesis is surely false", but he argues that it constitutes a clean benchmark that is independent of any assumptions concerning transaction costs[16].

The theory of efficient markets, which is also called the *Efficient Market Hypothesis* (EMH), was not developed as a genuine theory that subsequently was tested but emerged as the result of an accumulation of empirical findings (Fama 1970). Academics have been interested in analyzing the properties of stock prices quite early. According to Mandelbrot (1966), the first empirical contribution in the field can be attributed to Bachelier (1900), who developed stochastic models of price behavior. Even though the idea of prices as a coordinator, when information is dispersed, was already discussed by

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[15]   Economic profit in this case is defined as the "risk adjusted return net of all costs" (Jensen 1978, p. 96).

[16]   Transaction costs in this case refer to the costs associated with gathering value relevant information and trading costs (Fama 1991).

Hayek (1945)[17], Fama (1970) was the first one to introduce a comprehensive concept of efficient markets in which he distinguished three types of market efficiency, dependent on different subsets of relevant information. To date, the efficient market hypothesis is widely accepted in the academic literature of finance and accounting, and below, the three types are discussed in more detail.

In markets that are efficient according to the *weak form*, security prices only reflect the information contained in historical prices (Fama 1970). This indicates that stock prices have no memory and the future development of stock prices is independent of its past (Fama 1965a). As a consequence an analysis of past stock price movements will not reveal any pattern or other information that enables investors to make profitable forecasts of future stock price behavior (Hirshleifer and Riley 1979).[18] If future stock price changes are independent of their own past, then changes occur only if new information is dispersed to the market, and since new information occurs randomly, prices change randomly, too (Perridon and Steiner 2003). Therefore, stock prices are perceived to follow a *random walk* (e.g. Fama 1965b; 1970; Perridon and Steiner 2003), and the literature that focuses on the statistical properties of stock price series is vast (Mandelbrot 1966)[19].

If markets are efficient according to the *semi-strong form*, "current prices 'fully reflect' all obviously publicly available information" (Fama 1970, p. 404). This means that prices adjust to any information generating event (e.g. publication of financial reports, dividend changes, product launches, advertising campaigns or any other disclosure of information) in such a way that investors are not able to make economic profits by trading on this information. This implies that also fundamental analysis will not serve as an appropriate method that enables investors to make profitable forecasts of future stock price behavior, and as a consequence, in the absence of transaction costs, stock prices won't be subject to over- or undervaluation (Fama 1965b). In this context, it is important to note that the information that leads to stock price movements does not need to be the reason for a price change. For instance, Miller and Modigliani (1961) suggest that

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[17] Hayek (1945) realized that prices reflect information that is dispersed among many people, but he focused too closely on the issue of information about scarcity (Stiglitz 2000).

[18] This particularly affects common techniques like *chartism* or *technical analysis* that are widely used by professionals (Fama 1965b).

[19] Fama (1970; 1991) for instance, provides a review of empirical work on this topic.

changes in dividend policies carry a certain information content that leads to an update of price expectations even though the dividend change itself is not the cause for the price change. This argument is also supported Fama et al. (1969) in their analysis of stock price adjustments to stock splits. They conclude that stock splits serve as a signal concerning dividend growth or stability, and stock prices adjust to this information rather quickly (Fama et al. 1969). Further evidence comes from Scholes (1972), who analyzed the adjustment of stock prices to large secondary offerings. He concludes that sales made by firms and corporate officers are signals that carry value relevant information, which triggers the reevaluation of a firm's prospects, and prices incorporate the new information rapidly (Scholes 1972). One of his major findings is that the strongest market reaction occurs, if stocks are sold by firms and corporate officers. Today, the semi-strong form stands for the accepted paradigm of market efficiency that is commonly used in the academic literature but often insufficiently specified in terms of *publicly available information* (Jensen 1978).

If markets are efficient according to the *strong form*, "all available information is fully reflected in prices in the sense that no individual has higher expected trading profits than others because he has monopolistic access to some information" (Fama 1970, p. 409). Individuals with monopolistic access to information might include corporate officers, specialists on the New York Stock Exchange (NYSE) and mutual fund managers (Fama 1970). However, their ability to achieve economic profits higher than expected, may have different reasons. It could be that they either have the better skills that enable them to gain deeper insight from publicly available information than is already reflected in market prices or they may have access to information that is virtually not available to others (Fama 1970). Counter evidence can be found especially in the empirical literature on insider trading, where several authors have shown that corporate insiders are able to earn abnormal profits (e.g. Jaffe 1974; Rogoff 1964; Seyhun 1986), and the merely limited validity of the strong form of the efficient market hypothesis was mentioned by Fama (1970; 1991), too.[20]

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[20] In a later article Fama (1991) adopted a different terminology that rather described the applied methodology to test market efficiency than the degree of information efficiency. He distinguishes between *tests for return predictability*, *event studies* and *tests for private information* Fama (1991). However, the older formulations are still widely used in the academic literature.

In summary, this thesis builds on the semi-strong form and the strong form of market efficiency, because insiders are perceived to be trading either on privately held information or on publicly available information that is not yet reflected in stock prices. However, as mentioned above, insider trading may not be the reason for price updates, but triggers stock price movements by signaling that value relevant information exists. Thus, it is important to understand the type and origin of value relevant information that marketing insiders may trade on. This will become clearer after discussing research at the intersection of marketing and finance.

2.3 Marketing and the Financial Markets

During the past decades, marketing underwent a fundamental paradigm shift (e.g., Morgan and Hunt 1994; Vargo and Lusch 2004). While in the past, the achievement of marketing objectives was primarily evaluated on the basis of market share, sales, and satisfied customers, marketing nowadays has to take responsibility for the economic viability of a firm and is expected to act as an enabler of creating shareholder value from market-based assets (Srivastava, Shervani, and Fahey 1998).[21] Thus, Vargo and Lusch (2004, p. 14) declare that "Marketing practice accepts responsibility for firm financial performance by taking responsibility for increasing the market value rather than the book value of the organization as it builds off-balance-sheet assets such as customer, brand, and network equity". Both scholars and practitioners agree that marketing actions must be accountable in order to demonstrate their financial outcome (i.e., the shareholder value added) that can be attributed to them, in order to accomplish this task successfully (Verhoef and Pennings 2012).

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[21]   The term *market-based assets* was first introduced by Sharp (1996), who discussed the value of intangible assets in the context of professional service firms. He differentiates between internal intangible assets, i.e. a firm's capabilities, and market-based assets that comprise loyalty, brand, distribution as well as supplier and customer relationships. Later the term was adopted by Srivastava, Shervani, and Fahey (1998) in their conceptual framework of the marketing-finance interface. Both Sharp (1996) and Srivastava, Shervani, and Fahey (1998) adopt the criteria from the resource based view to determine essential characteristics of market-based assets. The contribution of an asset to competitive advantage and thus, to firm value, depends on to what extent an asset is valuable, rare, imitable, and substitutable (Amit and Schoemaker 1993; Barney 1991; Hunt and Morgan 1995; Peteraf 1993).

In response, marketing academia fostered the integration of marketing and finance, by investigating the financial outcomes of typical marketing actions and marketing strategies (Hanssens, Rust, and Srivastava 2009; Hyman and Mathur 2005; Srinivasan and Hanssens 2009; Zinkhan and Verbrugge 2000b).[22] However, bringing together these two perspectives is not an easy task. Zinkhan and Verbrugge (2000a) highlight that marketing and finance have very different approaches to do their business and their view on the firm is completely different. Marketing's focus is predominantly directed at the customers and their behavior, perceptions, and attitudes.

The finance discipline's predominant vantage point is the perspective of the owner. Another challenge stems from the different data sources the two disciplines primarily use. In the case of marketing it is often data from the individual customer and in the case of finance it's often highly aggregated firm or industry data (Hozier and Schatzberg 2000). Furthermore, primary performance indicators from a finance perspective include cash flows and stock price, from a marketing perspective it is sales, market share and profits (Zinkhan and Verbrugge 2000a).

To decrease the distance between the two disciplines, marketing strived to adopt both language and concepts that are commonly used in finance (e.g., Gupta and Lehmann 2003; Gupta, Lehmann, and Stuart 2004; Kumar and Umashankar 2012; Rust, Lemon, and Zeithaml 2004). Furthermore, researchers empirically demonstrate the impact of different marketing metrics on a variety of financial measures (e.g., Fornell, Mithas, and Morgeson 2009), and how market based assets influence firms' financial performance (e.g. Anderson 1996; Anderson, Fornell, and Rust 1997; Aksoy et al. 2008; Fang, Palmatier, and Steenkamp 2008; Srivastava, Shervani, and Fahey 1998).

However, despite these developments that affect both marketing research and practice, the role of marketing within firms is changing, which to some extent, is due to the perceived lack of marketing's accountability. Thus, the next sections discuss marketing's role within firms and the disclosure of marketing information.

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[22] The increasing relevance of research in this area has been highlighted in the Marketing Science Institute's (MSI) top research priorities, where this and related topics were listed for several consecutive years (Marketing Science Institute 2004; 2006; 2008).

2.3.1 The Role of Marketing Within the Firm

In the academic literature there is an ongoing discussion about marketing's role both within the firm and for shareholders (e.g., Boyd, Chandy, and Cunha 2010). Academics and practitioners recognize a decline of marketing as a corporate function that comes along with a loss of influence in firms' top management teams (Nath and Mahajan 2008; Reibstein, Day, and Wind 2009; Webster Jr., Malter, and Ganesan 2005), where marketing is facing the threat of being pushed from influencing corporate strategy to primarily tactical tasks (Sheth and Sisodia 2005).

One reason for these developments is the proceeding dispersion of marketing within the firm (Reibstein, Day, and Wind 2009; Webster Jr., Malter, and Ganesan 2005). Organizations have become more market oriented, with the effect that marketing responsibilities are no longer located in distinct departments, but have become the responsibility of everyone. Today, the marketing function is perceived to be primarily responsible for "advertising; customer satisfaction measurement and management; segmentation; targeting, and positioning; and relationship and loyalty programs" (Verhoef and Leeflang 2009, p. 22). Whereas, strategically important responsibilities, like pricing, promotion budgeting, and new product decisions that were traditionally performed by marketing, have moved to other functions, such as finance (Reibstein, Day, and Wind 2009; Sheth and Sisodia 2005; Verhoef and Pennings 2012). As a result, the marketing function is in decline, whereas, the influence of the finance department gained importance, and finance changed its role from a support function to a strategic decision maker (IBM 2010).

The second reason, is an often criticized weak link between marketing and finance that manifests in a tremendous lack of marketing accountability (Doyle 2000; Kumar and Shah 2009; Verhoef and Pennings 2012). This represents a crucial issue, because marketing managers are expected to be aware of the financial outcome of their decisions but at the same time they are not perceived sophisticated enough to understand the consequences of their decisions on financial performance (Webster Jr. 1981). Baker and Holt (2004, pp. 557, 560) summarize "that marketers are perceived to be 'unaccountable' by the rest of the organization; they are seen as unable to demonstrate a return on investment in the activities they have control over", and "senior non-marketers per-

ceive marketers to be 'unaccountable, untouchable, slippery and expensive'." In fact, there still is a lack of research devoted to analyzing the mechanisms that explain the impact of marketing on firms' financial performance and shareholder value (Srinivasan and Sihi 2012; Zinkhan and Verbrugge 2000a), and "the effectiveness of marketing activities is more often assumed than empirically verified" (Zinkhan and Verbrugge 2000a, p. 144).

In theory there is no doubt that marketing provides unique capabilities that are related to the identification and development of new markets, the creation and maintenance of sustainable competitive advantage and performance improvements (Boyd, Chandy, and Cunha 2010; Krasnikov and Jayachandran 2008). According to Moorman and Rust (1999), marketing provides firms with the capabilities that are necessary to connect customers with product development and new products, service delivery, and financial accountability. Furthermore, marketing departments have the ability to foster the market orientation of the whole corporation, and thus, contribute to improvements in business performance (Verhoef and Pennings 2012). Therefore, marketing executives should play a central role for many firms because they manage the relationship between firms and their customers that represent their actual source of cash flows (Boyd, Chandy, and Cunha 2010). In summary, marketing's contribution to shareholder value could either stem from its informational role, by identifying new cash flow potentials from both existing and prospect customers, from its decisional role on the design and type of investments in marketing related activities (Boyd, Chandy, and Cunha 2010) or its "relational role by developing and managing a firm's relationships with external stakeholders, such as customers, advertising agencies, and alliance partners" (Boyd, Chandy, and Cunha 2010, p. 1164).

The findings of empirical work that examined the impact of top marketing executives on firm value, however, are rather mixed. While Nath and Mahajan (2008) report that the presence of a top management marketing executive does not have an effect on firm value, Weinzimmer et al. (2003) find a positive impact on business performance. But marketing is only one of several functions within a firm and thus, not the only one that is responsible for financial performance increases (Boyd, Chandy, and Cunha 2010). Hence, it is not easy to isolate the value contribution of the marketing function relative to their counterparts from other departments. Boyd, Chandy, and Cunha (2010, p.1163)

criticize that "the uncertainty surrounding the role of the top marketing executive in the firm has important implications for marketing practice and theory". From the practical perspective, it might be in question whether marketing is important enough to deserve being a member in top management teams, and scholars might ask whether further research about marketing's role in top management teams is necessary at all (Boyd, Chandy, and Cunha 2010).

2.3.2 The Disclosure of Marketing Information

Usually, corporate information is disclosed via financial reporting that is required by the SEC. Thus, firms communicate with investors either on a regular basis and the release of quarterly and annual reports[23] or through a variety of planned and unplanned events, like conference calls or various press releases (Srinivasan and Sihi 2012). The disclosure of marketing information that can be defined as "any information the firm discloses about its marketing activities and programs, marketing assets, and marketing personnel" (Srinivasan and Sihi 2012, p. 108)[24] often does not fit into this framework of required disclosures.

Marketing assets are primarily intangible, and even though United States Generally Accepted Accounting Principles (US-GAAP) provide a rich disclosure environment (Leuz and Verrecchia 2000), they entail strong limitations on firms' disclosures related to intangible assets that they want to put on their balance sheets. Furthermore, marketing activities are *flows* that firms use to build value relevant intangible assets (Dierickx and Cool 1989)[25]. This implies that marketing expenditures exhibit the properties of investments, but must be treated as immediate expenses due to the economic ambiguity that is associated with the future payoffs from investments in intangibles (Dean 1966; Hall, Griliches, and Hausman 1986; Telser 1961; Wyatt 2005). Hence, the costs and benefits of marketing activities in many situations do not occur in the same reporting period,

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[23]   Quarterly and annual reports are filed to the SEC using forms 10-Q and 10-K, respectively.

[24]   They further specify them as "disclosures about the firm's products, prices, distribution channels, entry into new markets, marketing alliances, and appointments (departures) of marketing executives" (Srinivasan and Sihi 2012, p. 108).

[25]   Dierickx and Cool (1989) use the term *nonappropriable* to describe these type of assets, which stems from rather fuzzy property rights and problems associated with bookkeeping feasibility.

because the payoff generated from these expenditures in fact will be realized only in the future.

As a consequence, there is only a limited set of marketing expenditures disclosed in standard quarterly and annual reports, i.e., spendings for R&D and – if the amount is material – also advertising. Whether advertising spendings are material is at the discretion of management (Heitzman, Wasley, and Zimmerman 2010).[26] In contrast, according to *Statement of Financial Accounting Standards No. 2* (SFAS 2) the reporting of R&D spendings is mandatory at all events for every filing period. As a result the long history of R&D disclosures, investors might have gained more experience with the evaluation of R&D expenditures than with other intangible investments (Maines et al. 2003).

However, any other spending related to marketing activities does not require separate reporting. Some researchers, therefore, identified firm's selling, general, and administrative (SG&A) expenditures as a measure for marketing expenditures (e.g., Mizik 2010). Dutta, Narasimhan, and Rajiv (1999, p. 556) argue that SG&A serve as a good approximation "for the amount the firm spends on its market research, sales effort, trade promotion expenses, and other related activities". However, SG&A also include a variety of spendings for administration, rents, and salaries that are not related to marketing (Srinivasan and Sihi 2012). Thus, for investors and other stakeholders it is not easy to acquire standardized quantitative marketing information for a variety of marketing activities, and making inferences based on the available sets of information is difficult.

With standard financial reporting being both backward looking and primarily focusing on tangible assets (Maines et al. 2002), together with the economic ambiguity that is associated with the future payoffs from investments in intangibles (Wyatt 2005), mandatory filings are not capable of providing insights into a firm's prospects related to market based assets and marketing activities. However, as the importance of intangible market based assets steadily increases, the relevance of financial statements declines (Amir and Lev 1996; Maines et al. 2003).[27]

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[26] In this context, Simpson (2008) analyzed the behavior of firms reporting advertising spendings, and she found out that firms with more effective advertising continued to report their spendings after the mandatory disclosure of advertising spendings was omitted with *Financial Reporting Release 44* (FRR 44) in 1994.

[27] Amir and Lev (1996) show that in technology firms, standard financial information alone are not

As a consequence, various stakeholder groups have called for more extensive disclosures of nonfinancial information (Maines et al. 2002).[28] Hence, firms disclose information about their intangible market based assets through a variety of alternative channels and media (Gerpott, Thomas, and Hoffmann 2008). In the case of marketing information, this is accomplished by using channels and events that are primarily targeted to other stakeholder groups, such as new product announcements, which are targeted at customers, vendors and others (Srinivasan and Sihi 2012). Prior research has demonstrated that financial markets react upon marketing disclosures, such as product preannouncements (Sorescu, Shankar, and Kushwaha 2007), advertising (Joshi and Hanssens 2010), marketing expenditures (Kim and McAlister 2011), CMO announcements (Boyd, Chandy, and Cunha 2010), and brand quality (Bharadwaj, Tuli, and Bonfrer 2011). However, due to the lack of a standardized framework for evaluation, it is not easy for outside investors to keep track of intangible market based assets and to capture the full information content of these disclosures to determine the future potential of these assets (Gerpott, Thomas, and Hoffmann 2008; Wyatt 2005).

However, the general information content of voluntary disclosures is not clear. Whereas Banghøj and Plenborg (2008) show that investors either ignore this information or are not able to use this information when forming expectations about a firm's prospects, other empirical studies demonstrate that voluntary disclosures can be useful and reduce information asymmetries (Petersen and Plenborg 2006). An important factor that determines the ability of being valuable for financial market actors, might be the temporal focus of voluntary disclosures (Leuz and Verrecchia 2000). While forward-looking information can improve forecast accuracy, backward-oriented information doesn't reveal such an effect (Luft and Shields 2002; Vanstraelen, Zarzeski, and Robb 2003). Furthermore, firm-specific characteristics determine whether non financial disclosures are useful or not (Maines et al. 2002).

In summary, the disclosure of information can be described along four dimensions:

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value relevant, whereas non financial information is. Furthermore, they find that a combination of non financial measures related to intangible assets with traditional financial measures, can increase the explanatory power of the latter.

[28] Since a firms marketing activities are closely connected to a potential competitive advantage, many firms will strive not to give this information away to competitors and they will keep such information undisclosed. Thus, investors and other capital market actors might be seeking for additional indicators that assist them by evaluating firms' future potential.

quality, quantity, temporal focus, and mode (Leuz and Verrecchia 2000; Srinivasan and Sihi 2012). Srinivasan and Sihi (2012) propose a conceptual framework for research that relates the disclosure of marketing information to financial market consequences and conclude that future research is needed to better understand the effects and consequences of marketing information disclosures. Therefore, this dissertations pursues the objective to provide further insight into these mechanisms.

3   Project I: The Information Content of Marketing Induced Insider Trading

3.1 Overall Background

General evidence suggests that stock prices adjust to both the disclosure of corporate insider trading and the disclosure of marketing information. On the one hand, studies in marketing investigate that the release of customer satisfaction scores (Aksoy et al. 2008; Fornell et al. 2006), product preannouncements (Sorescu, Shankar, and Kushwaha 2007), innovation and advertising expenses (Srinivasan et al. 2009), and CMO announcements (Boyd, Chandy, and Cunha 2010) result in significant believe revisions and thus, stock price adjustments. On the other hand, studies in finance find evidence that insider returns are greater for firms with higher investments associated with intangibles (e.g., Aboody and Lev 2000; Joseph and Wintoki 2013) and firms facing greater information uncertainty (Frankel and Li 2004; Veenman 2012). Since marketing managers should have more and better information on intangible market-based assets (e.g., customers, brands, advertising), it's astonishing that an integration of both perspectives is still lacking.

Therefore, results of this study have important contributions by integrating these different views on the capital market outcomes of information disclosures. Analyzing how stock markets respond to the disclosure of insider trading from different corporate functional areas (e.g., marketing and finance), would contribute to both the field of marketing and the field of finance. In so far, this project is a response to the recent call from marketing academia for a more profound analysis of information disclosure characteristics that should capture firm characteristics, the temporal focus of information disclosures

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(i.e., whether it is ex-post or a future outlook), and different ways of information dissemination (Srinivasan and Sihi 2012).

From a finance perspective, this project can extend the limited research on insider trading with data from the post SOX era[29](e.g., Brochet 2010), which had a "significant impact on insider trading, its motives, and its consequences" (Lev 2007, p. 233). In addition, it can build up on recent findings in finance, which suggest that insiders should not be treated as a homogenous group (Knewtson and Nofsinger 2014; Wang, Shin, and Francis 2012). Hence, this dissertation adds a function-specific perspective to research at the intersection of marketing and finance, as proposed by Verhoef and Pennings (2012).

From a marketing perspective, this project can extend the knowledge about marketing information disclosures by using insider trading as a rather standardized means of information transmission that is also highly visible and retraceable to an individual event. This may be a new way to add additional insights into "the effects of different types of information", and "the effects of the medium of marketing information disclosures (e.g., who releases the information, where the information is released, over what period the information is released)" (Srinivasan and Sihi 2012, p. 121). Furthermore, it can provide new insights into the perceived importance of marketing information by stock market actors.

Against this background, the primary goal of this project is to examine whether and and how stock markets respond to the disclosure of marketing executives insider purchases in the post SOX era.[30] Altogether, this research wants to address the following issues. First, to investigate whether stock markets show an unexpected price adjustment after the announcement of marketing induced insider purchases. Second, to analyze if abnormal returns for marketing transactions are different to those of finance related transactions. Third, to determine if there are short-term or long-term effects.

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[29] Before August 2002, corporate insiders were required to file their transactions with the SEC within ten days after the close of the calendar month in which the transaction had occurred. "The Sarbanes-Oxley Act of 2002 is a far-reaching federal law aimed at improving the reliability of both corporate governance and the financial reporting process. SOX addresses the issue of insider trading disclosure in Section 403, which amends Section 16(b) of the Exchange Act of 1934 by requiring insiders to report their trades to the SEC on Form 4 within two business days." (Brochet 2010, p. 419-420).

[30] Veenman (2012) emphasizes the advantageous conditions in the post-SOX era for investigating capital market response to insider trading.

And fourth, to investigate if a firm's underlying information environment influences the outcome.

3.2 Data and Empirical Setting

To answer these questions I apply quantitative methodologies adopted from the finance discipline that have already been used in a variety of marketing studies. The following sections provide an outline of the methodological basis that is used in *Project I* and introduce the basic dataset that is used in *Project I (Study 1* and *Study 2)* as well as in *Project II*.

3.2.1 Methodological Basis

The standard practice for analyzing the information content of corporate disclosures is the event study methodology. The event study technique, as it is used today, was developed in the seminal work of Ball and Brown (1968) and Fama et al. (1969).[31] Event studies have been employed in a multitude of empirical work in the fields of economics, finance, accounting, management, and marketing (Corrado 2011; Delattre 2007; Kothari and Warner 2005).[32]

During the last decades a growing demand for such a method is observable in marketing research, too. As a result of the emerging field of research at the intersection of marketing and finance (McAlister, Bolton, and Rizley 2006; Hanssens, Rust, and Srivastava

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[31]   According to MacKinlay (1997) one of the first known event studies was already performed years before by Dolley (1933), who analyzed price changes following stock splits. He also refers to the work of Ashley (1962); Barker (1956; 1957; 1958); Myers and Bakay (1948), who made substantial improvements to the methodology, for instance by addressing the issue of confounding events. However, the difference and the success of the technique that was developed by Ball and Brown (1968) and Fama et al. (1969) is primarily due to their use of the *market model* and the improvements in data availability through the *Center for Research in Security Prices* (Corrado 2011).

[32]   For the years 1974 through 2000, 565 articles that employed event study analysis were published in five leading finance journals (Kothari and Warner 2005). Kothari and Warner (2005) counted articles published in the *Journal of Business*, *Journal of Finance*, *Journal of Financial Economics*, *Journal of Financial and Quantitative Analysis*, and the *Review of Financial Studies*.
Delattre (2007) provides an overview of event studies applied in marketing research. He lists 21 marketing articles that reported event study results during the period from 1980 through 2005.

2009), this approach was adopted in several studies that were published in recent years (e.g. Agarwal and Bayus 2002; Sorescu, Shankar, and Kushwaha 2007; Sood and Tellis 2009). It has become the standard methodology to determine stock price reactions to the release of new information or the occurrence of events such as earnings announcements, new product announcements or insider trading activity (Binder 1998; Corrado 2011; Mitchell and Netter 1994). Moreover, it is often used as a general term for "estimating abnormal returns and testing their significance" (Armitage 1995, p. 26).

The core idea of the event study methodology is to separate the effects of firm specific information (e.g., a new product announcement or a corporate insider's transaction) and information that affects the whole market (e.g., an increase in inflation or changes in the federal funds rate) (Mitchell and Netter 1994). This implies that stock markets are efficient in such a way that information carrying events will lead to an update of price expectations and at a certain point in time, stock prices fully reflect all the information that is available (Fama et al. 1969; Fama 1970; 1991; Miller and Modigliani 1961). Thus, "the market return of an event of a firm is the change in the stock price of that firm due to that event, above that due to the general market at the time of the event" (Sood and Tellis 2009, p. 446). This is denoted as *abnormal return* (AR), which is the portion of the return that exceeds what was expected under the given market conditions. The abnormal return can be described with the following equation:[33]

$$AR_{i,t} = R_{i,t} - E[R_{i,t}],$$

    where

    $AR_{i,t}$ = abnormal return for firm i at time t,

    $R_{i,t}$ = actual return for firm i at time t,   (3.1)

    $E[R_{i,t}]$ = expected return for firm i at time t,

    t = time index.

Altogether, abnormal returns that are significantly different from zero, indicate that the event under analysis provides a value relevant information content.

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[33]   The abnormal return can be calculated on a daily, monthly or annual basis, for instance.

3.2.2 Dataset and Data Collection

The basic requirement to apply the event study methodology is to identify the first occurrence of the events that cannot be anticipated by the market (Goerke 2009). In the case of insider trading, the event information is sort of standardized. Corporate insiders must file all their transactions to the SEC that makes them publicly available. Furthermore, several database operators and other secondary sources, like the *Wall Street Journal*, regularly publish at least a selection of insider transactions.

I obtained insider transactions from *www.secform4.com*, where Form 4 filings are collected and published on a daily basis. The reports include information on the nature of the insider transaction, that is, whether it is a purchase or a sale, both the date of the transaction and when it was reported to the SEC (i.e., made publicly available), company name, ticker symbol, insider relationship, which comprises the insider's name and function (e.g., CFO, 10% owner, etc.), the number of shares traded in the focal transaction, the average price per share paid, the total dollar amount of the transaction, and the insider's total share ownership. Appendix A.1 provides an example of insider reports as they can be found on www.secform4.com.

I downloaded the full population of insider trades, covering the period from July 28, 2003 through February 2, 2010. given the focus of this thesis on insider purchases, all transactions other than in common stock and insider sales were removed. In finance research, there is general agreement that insider sales are less informative than insider purchases, because sales occur more likely due to portfolio rebalancing, consumption or liquidity needs (e.g., Chowdhury, Howe, and Lin 1993; Jeng, Metrick, and Zeckhauser 2003; Lakonishok and Lee 2001). They are often the result of option exercises and not connected to the insider's expectations about a firm's prospects. Furthermore, option transactions are not the focus of this study either. The motives for option transactions are different to those of common stock purchases, too. They are generally perceived to carry only limited informational value associated with firms' future performance but rather stem from management compensation plans.

In a next step, a keyword search was conducted to identify and separate marketing and finance insider transactions from the sample. Keywords for marketing comprise "Marketing", "Mkt", "CMO", "Sales", and "Customer". Keywords for finance were

"Finance", "Financial", and "CFO". Table 3.1 shows a clear description of the insider trading dataset and how the number of usable observations was selected from the population. The full dataset contains a total of 429,655 common stock transactions. Thereof, 115,276 were insider purchases, and 8,902 made by either marketing or finance insiders.

Table 3.1: Insider Trading Sample Description

Transactions	Numbers	Percent
Common stock transactions reported on SECForm4.com	429,655	100.00%
Purchases	115,276	26.83%
Marketing or Finance	8,902	2.07%
No match firm name or ticker with Thomson Ticker	2,716	.63%
Excluded because insider was not an individual but a firm or stock return data was missing	1,425	.33%
Marketing restricted to keywords	487	.11%
Removed because also CEO	0	
Finance restricted to keywords	4,274	.99%
Removed because also CEO	67	
Marketing observations used	487	.11%
Finance observations used	4,207	.97%

Note: The sample covers the period from July 28, 2003 through February 2, 2010.

Stock return data was obtained from *Thomson Reuters* pricing and performance database. I use the *simple net return* (SNR) including dividend payments. If $P_{i,t}$ is the price of a security of firm i at time t and dividends are included, then the SNR for one period between periods *t-1* and *t* is calculated as (Tray 2002, p. 2):

$$R_{i,t} = \frac{P_{i,t} + D_{i,t}}{P_{i,t-1}} - 1, \tag{3.2}$$

where $D_{i,t}$ is the dividend payment of firm i in period t.

To match insider transaction data with stock return data and firm-level accounting data that was obtained from *Thomson Reuters Worldscope* database, several steps of data processing were necessary. First, ticker symbols were used as identifiers to search for corresponding *Thomson Tickers*. Since ticker symbols can change over time, I next

checked whether company names in the insider database and the company names that were linked to the respective *Thomson Ticker* were equal. Cases without a direct match between ticker symbol, company name and *Thomson Ticker* were checked manually, and company names were used to search for *Thomson Tickers*. This revealed cases where ticker symbols or company names had changed. For several observations a unique identifier was not found by applying this procedure. These observations and those with missing values in return or accounting data were excluded. In total this leads to a sample of 439 marketing and 3470 finance transactions, respectively.

The three Fama French factors (Fama and French 1993) and the Carhart momentum factor (Carhart 1997) were obtained from Kenneth French's Data Library that is available on his web site (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_libra ry.html).

Correlations and descriptive statistics are displayed in Table 3.2.[34]

Table 3.2: Correlations and Descriptive Statistics

Variable	1	2	3	4	5
1. Market Cap. (bn)	1				
2. P/B ratio	$-.068^{***}$	1			
3. Shares traded (tsd)	$-.009$	.027	1		
4. Average Price	$.280^{***}$	$-.177^{***}$	$-.049^{***}$	1	
5. Total Amount (tsd)	$.069^{***}$	$-.026^{*}$	$.197^{***}$	$.064^{***}$	1
M	1.600	.729	16.780	16.822	55.545
SD	6.353	.926	268.584	17.250	667.159
MD	.199	.541	1.000	11.460	5.980
$N_{Marketing}$ = 439					
$N_{Finance}$ = 3470					

$^{***}p < .01, \,^{**}p < .05, \,^{*}p < .1$

The average number of shares traded in a transaction was 16,780 (SD = 268,584), with an average price per share of \$16.82 (SD = 17.25) that lead to transaction values ranging from \$10.00 to \$26,691,874.00 within the overall sample. Half of the firms in the sample had a market capitalization above \$198,961,669.00 and the average market-to-book

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[34] Differences in sample size in comparison to Table 3.1 stem from missing values in the variables reported here.

ratio was .73 (SD = .93). Additional descriptive statistics are reported in the individual studies.

3.3 Study 1: Stock Market Response to Marketing Executives' Insider Purchase Transactions

3.3.1 Conceptual and Theoretical Basis

When corporate insiders trade in the securities of their own companies, they are "in possession of material nonpublic information" (Bainbridge 2000, p. 1). The information they trade on is perceived to be not already reflected in current stock prices. Therefore, some authors vindicate insider trading as an useful tool for financial markets because as a consequence of insider transactions, stock prices will move closer to their actual value (Manne 1966a; Young 1985).

In fact, a major role in communicating firm internal information to external stakeholders is attributed to insider transactions, and thus affects securities' price building (Joseph and Wintoki 2013). The general belief suggests that insider transactions are perceived to be a source of valuable information about management's perceptions of firms' current and future performance (SEC 2003). They generate signals that investors use when forming their expectations about a firm's prospects (Joseph and Wintoki 2013; SEC 2003). Therefore, I draw upon signaling theory (Akerlof 1970; Spence 1973) to examine whether and how the functional affiliation of a corporate insider serves as a valuable and credible signal of his or her knowledge about a firms future prospects.

Signaling has been employed in a variety of prior studies in finance, management, and marketing (e.g., Eliashberg and Robertson 1988; Heil and Robertson 1991; Joshi and Hanssens 2010; McNichols and Dravid 1990; Moorman et al. 2012; Sorescu, Shankar, and Kushwaha 2007; Zhang and Wiersema 2009). The main reason why market participants seek after valuable signals, stems from the information asymmetries between firms' management and capital market participants. In addition to voluntary disclosure through traditional channels, this imbalance in information accuracy can be reduced by undertaking signaling (Banghøj and Plenborg 2008; Spence 1973; Srinivasan and Sihi

2012).

In general, a "signal is an observable attribute that reflects an underlying hard-to-verify reality" (Zhang and Wiersema 2009, p. 693). In conjunction with insider transactions, the hard-to-verify reality might be the set of private information that corporate insiders trade on. When the market receives a signal, it becomes aware that a particular information exists. However, market participants don't have insight into the underlying information content (Verrecchia 1983). Thus, they have to act solely based on the signal's attributes. Indeed, even incomplete and uncertain information can represent a signal by informing market participants about the mere existence of valuable assets or by giving a hint to other information sources (Wyatt 2008).

In this context, Carlton and Fischel (1983) discuss insider trading as a tool that enables firms to control the amount and flow of information to the markets, since insider trading will move stock prices closer to the level they would have taken, if the underlying information was disclosed. Carlton and Fischel (1983) further describe a continuum, where at one end, insider trading can be as informative as full disclosure, though normally carries less information.

Another advantage of insider trading as a means of communication is that ordinary disclosure has to be continuous, whereas insider transactions don't. "Thus, insider trading gives firms a tool either to increase or to decrease the amount of information that is contained in share prices" (Carlton and Fischel 1983, p. 868). Firms can disclose information that could not be communicated through other channels because "an announcement would destroy the value of the information, would be too expensive, not believable, or – owing to the uncertainty of the information – would subject the firm to massive damage liability if it turned out ex post to be incorrect" (Carlton and Fischel 1983, p. 868). Furthermore, information that is related to a firms competitive advantage is crucial and must not be disseminated through traditional disclosures (IFAC 2008). Therefore, signals can be employed to convey value relevant information to capital markets.

Empirical evidence for signaling effects exists in different areas. Research in finance, for instance, demonstrates that firms signal private information through their split factor choice, which conveys information about future earnings (McNichols and Dravid

1990).[35] In a marketing context, Eliashberg and Robertson (1988) and Joshi and Hanssens (2010) investigate how senders of signals can affect the evaluation of marketing actions and strategies. Sorescu, Shankar, and Kushwaha (2007) have shown that the reliability of product announcements is a strong moderator in the relationship of announcement specificity and short-term and long-term abnormal stock returns, indicating that the credibility of firms making product preannouncements has to be high to have an effect on unexpected stock returns. Sood and Tellis (2009) demonstrate that signals of announcements related to development activities affect stock returns, too.

Moreover, firms can signal unobservable capabilities through the implementation of different strategies, for instance (Moorman et al. 2012). Stock markets that associate changes in future earnings with these signals will respond with price adjustments. The same observation can be made for signals indicating strategic shifts that are related to value appropriation (Mizik and Jacobson 2003). Since firm capabilities are hard to verify, stock markets use observable actions of firm strategies as signals for unobservable firm potential and skills (Moorman et al. 2012). However, it is unclear, whether prices adjust rapidly or rather gradually to different signals associated with such information (Joshi and Hanssens 2010).

In order to establish signal credibility, signals must be associated with certain costs for the sender (Lee 2001; Milgrom and Roberts 1986). In the case of insider purchases the money that corporate insiders invest represents the costs. It demonstrates the belief in their transactions. As a consequence, insiders will trade only on valuable information, stimulate additional market transactions and thus, let market efficiency improve (Manne 1966a; Young 1985).

Due to the underlying hard-to-verify reality associated with signals, market participants have to either rely on signal characteristics or perceive signals as an invitation to conduct additional search for information. Prior work in management addressed this issue and used signaling theory to explain how characteristics of the background of directors and top management can signal value relevant information to investors (e.g., Higgins and Gulati 2003; 2006). Empirical evidence suggests that the uncertainty associated with particular events leads investors to rely on corporate managers' characteristics to make

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[35]   However, other findings indicate that stock splits are associated with an liquidity effect rather than a
        signal for future earnings (Muscarella and Vetsuypens 1996).

inferences about a firms quality and potential (Zhang and Wiersema 2009).

If one assumes that both marketing and finance insiders trade on the type of information that is closely related to their functional capabilities and characteristics, there should be observable differences in stock market response to their transactions. I selected marketing and finance insiders as a starting point for understanding function-specific differences in the stock market's evaluation of insider trading signals. These two functions are rather different in their orientation, competences and capabilities, and the metrics they use (see Table 3.3 for an overview), and both are important corporate functions.

Based on the work of Miles et al. (1978) and Hayes and Abernathy (1980), marketing and finance can be classified to different functional tracks, where marketing is an output function and finance is "not integrally involved" (Hambrick and Mason 1984, p. 199). Guadalupe, Li, and Wulf (2014) refer to marketing as a product function and finance as an administrative function. They "regard harmonizing information as the key information-processing task faced by functional managers" (Guadalupe, Li, and Wulf 2014, p. 838), and argue that finance in general creates "a standardized set of financial measures", whereas "for the marketing function, harmonizing information may involve substantial subjective interpretation" due to the diversity in marketing performance evaluation.

On the one hand, finance managers are responsible for the communication with investors and financial markets, and on the other hand marketing managers are responsible for the relationship between firms and customers – the most fundamental source of a firm's cash flows. However, the finance function is still dominated by transactional and control tasks (IBM 2010; Verhoef and Pennings 2012). Even though a shift to a more future oriented perspective is expected to emerge in finance as well, many organizations still lack this transformation. This is reflected in capabilities and metrics that are used, and the job tasks that are performed in finance departments. The past-oriented perspective is still dominating (IBM 2010).

The finance function is generally responsible for the firm's financial reporting (Menz 2012). Therefore, finance probably has the most immediate influence of all corporate functions on decisions affecting firms' financial accounting (Ge, Matsumoto, and Zhang 2011). Furthermore, empirical evidence suggests that financial reporting de-

Table 3.3: Different Thought Worlds of Marketing vs. Finance. Source: (Verhoef and Pennings 2012)

	Marketing	Finance
Orientation	Customers, channels Products and brands Revenues Long term	Shareholders, owners Corporate image Risk and costs Short term
Competences	Market and customer knowledge Creation and execution of marketing campaigns	Financial market knowledge Financial planning, controlling
Metrics	Perpetual metrics (i.e., brand awareness/ attitudes) Sales metrics, market share Market asset metrics (i.e., brand equity, customer equity)	Financial metrics (i.e., ROI, ROA, NPV) Firm value metrics (Tobin's Q, stock price)

cisions are influenced by "individual characteristics that arise from numerous factors including their dispositions, personal situations and prior experience" (Ge, Matsumoto, and Zhang 2011, p. 1141). Altogether, finance executives are perceived responsible for rather short-term performance, but they can influence firms' financial results.

In contrast, marketing strives to develop forward-looking measures that go beyond short-term success on the product marketplace (e.g., Gupta and Lehmann 2003; Gupta, Lehmann, and Stuart 2004; Kumar and Umashankar 2012; Rust, Lemon, and Zeithaml 2004). Even though the value implications of marketing information cannot be presented in a standardized fashion, marketing research demonstrated the impact of different marketing metrics on a variety of financial measures (e.g., Anderson 1996; Anderson, Fornell, and Rust 1997; Aksoy et al. 2008; Fang, Palmatier, and Steenkamp 2008; Fornell, Mithas, and Morgeson 2009). Therefore, signals from marketing and finance may provide different value implications.

From a theoretical perspective, upper echelons theory (Hambrick and Mason 1984; Hambrick 2007) may provide an explanation why market response to signals from marketing and finance would be different. According to Hambrick and Mason (1984), ob-

servable managerial characteristics as indicators of the capabilities and knowledge that managers posse, often stem from their functional background. Overall, strategic decisions in many situations reflect executives' peculiarities that influence both their assessment and expectations of future and current events (Hambrick and Mason 1984; March and Simon 1958).

As a consequence, insider transaction signals might reflect a particular view on the firms' prospects, and markets adjust prices according to these expectations. Thus, investors would anticipate that insiders act following their functional background and functional characteristics that affect their processing of information.

In summary, signaling theory and upper echelons theory can help to explain why capital markets may associate insider trading signals from the two functional areas differently according to their information content. Capital market response might depend upon the credibility of an individual insiders and the function they have in their company. These assumptions will be tested in the subsequent sections.

3.3.2 Methodology

To test whether capital markets react upon the disclosure of marketing insider trades and whether the reaction is different in comparison to the disclosure of finance induced transactions, I selected the Fama French three-factor model (Fama and French 1993) with the Carhart (1997) extension as a benchmark model to estimate the expected returns. Carhart (1997) added momentum as a forth factor, to account for the persistence effect in stock returns.[36] Within a variety of benchmark models that were developed primarily during the 20th century, this model was probably most frequently used in recent marketing studies that analyzed stock market response after marketing information disclosures.

The Fama French multi-factor model with Carhart's extension can be described using

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[36]   Jegadeesh and Titman (1993) had shown that trading strategies that focused on buying stocks with good past performance and selling stocks with bad past performance, lead to significant abnormal returns over holding periods of three to twelve months. A persistence effect for mutual funds was also documented by Brown and Goetzmann (1995), Hendricks, Patel, and Zeckhauser (1993), and Goetzmann and Ibbotson (1994).

the following equation:

$$R_{i,t} - R_{F,t} = \alpha_i + \beta_{M,i}(R_{M,t} - R_{F,t})$$
$$+ \beta_{SMB,i}SMB_t + \beta_{HML,i}HML_t + \beta_{UMD,i}UMD_t + \varepsilon_{i,t},$$

where

$R_{i,t}$ = actual return for firm i at time t,

$R_{F,t}$ = risk free rate of return at time t,

$R_{M,t}$ = market return at time t,

α_i = constant for firm i,

$\beta_{M,i}$ = parameter of the market risk factor,

$\beta_{SMB,i}$ = parameter of the size risk factor,

$\beta_{HML,i}$ = parameter of the value risk factor,

$\beta_{UMD,i}$ = parameter of the momentum factor,

SMB_t = the difference in returns between small

and big stocks at time t,

HML_t = the difference in returns between high

book-to-market value stocks

and low book-to-market value stocks,

UMD_t = the difference in returns between high prior return stocks

and low prior return stocks,

$\varepsilon_{i,t}$ = regression residual,

t = time index.

(3.3)

The risk free return $R_{F,t}$ is the one-month treasury bill rate, the market return $R_{M,t}$ the value-weight return on all NYSE, AMEX, and NASDAQ stocks. The residuals have an expected value of $E[\varepsilon_{i,t}] = 0$ and a variance of $Var[\varepsilon_{i,t}] = \sigma_{\varepsilon_i}^2$.

Thus the expected return is given by:

$$E[R_{i,t}] = R_{F,t} + \hat{\alpha}_i + \hat{\beta}_{M,i}(R_{M,t} - R_{F,t})$$
$$+ \hat{\beta}_{SMB,i}SMB_t + \hat{\beta}_{HML,i}HML_t + \hat{\beta}_{UMD,i}UMD_t,$$

(3.4)

and thus, from equation 3.1 follows:

$$
\begin{aligned}
AR_{i,t} = R_{i,t} - [R_{F,t} + \hat{\alpha}_i + \hat{\beta}_{M,i}(R_{M,t} - R_{F,t}) \\
+ \hat{\beta}_{SMB,i}SMB_t + \hat{\beta}_{HML,i}HML_t + \hat{\beta}_{UMD,i}UMD_t].
\end{aligned}
\tag{3.5}
$$

According to Ikenberry, Lakonishok, and Vermaelen (1995), for short event horizons, the calculated abnormal returns are not very sensitive to the selected benchmark model. However, for long-term analysis, the approach should be selected properly. Furthermore, MacKinlay (1997) argues that more complex multi-factor models only provide limited improvements in comparison to the simpler market model approach.

Short-term abnormal returns can be calculated from the difference between the actual return and the estimated return that is computed with a benchmark model (i.e., the return that would be observed if the event didn't occur). The model parameters are estimated by performing time-series ordinary least squares (OLS) regressions on a specified pre-event window. However, there is no general rule for a reasonable estimation period. Sood and Tellis (2009) use an estimation period from 270 to 6 days prior to the event, Dinner, Mizik, and Lehmann (2009) chose an estimation period from 252 to 21 days prior to the event, and Sorescu, Shankar, and Kushwaha (2007) used the period of 100 trading days before the event. Other alternatives for different estimation windows can be found in the review of Delattre (2007).

The short-term abnormal return analysis is normally performed on a five-to-six-day window that is either centered on the day of a particular event or covering a period ranging from two days before the event to three days after the event.

Since there is no general rule, I use an estimation window of 253 days to 3 days prior to the event, to cover a period of up to one year before the event. The event window starts two days before, and ends three days after an event. The timing sequence is illustrated in Figure 3.1.
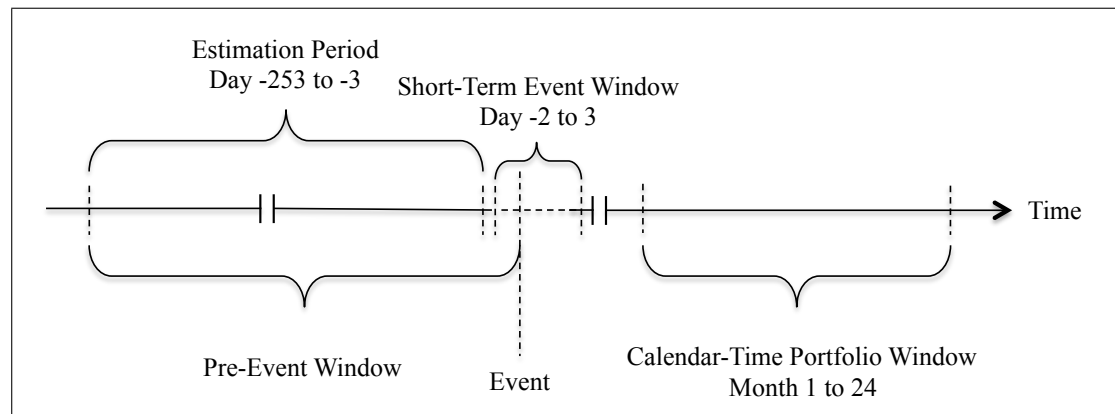
Figure 3.1: Illustration of Abnormal Return Computation Timing Sequence
Source: Own Illustration.

Finally, the daily abnormal returns or the *cumulative abnormal returns* (CAR) – a single measure that covers the whole event period if daily excess returns are summed up over the event-window – can be used for further analysis:

$$CAR_{i,(t,T)} = \sum_{t}^{T} AR_{i,t},$$

where

$CAR_{i,(t,T)} =$ cumulative abnormal return for firm i in period t to T,

$t =$ beginning of the event window,

$T =$ end of the event window.

(3.6)

Long-term abnormal returns may be subject to confounding events (Goerke 2009), because "a potential concern with any measure of long-term stock performance is the extent to which it captures the abnormal returns caused by the event under study rather than other idiosyncratic events that may occur during the measurement window" (Sorescu, Shankar, and Kushwaha 2007, p. 476). However, studies by Lyon, Barber, and Tsai (1999) and Mitchell and Stafford (2000) demonstrate that random samples of firms exhibit abnormal portfolio returns that are not different to zero over a one year period. Hence, their findings suggest that other idiosyncratic events have an information content that on average equals zero.

Therefore, to analyze long-term effects I use the calendar-time portfolio approach (or Jensen-alpha approach). Even though there are other alternatives to compute long-term abnormal returns (e.g., Buy-and-Hold Abnormal Returns), these methods are often criticized for their "inability to account properly for cross-sectional dependency (or overlap) between events that could lead to misleading statistical inference" (Sorescu, Shankar, and Kushwaha 2007, p. 474). To address this issue, calendar-time portfolios are often recommended to perform long-term abnormal return analyzes (Lyon, Barber, and Tsai 1999; Mitchell and Stafford 2000; Sorescu, Shankar, and Kushwaha 2007).

The greatest limitation of the calendar-time portfolio approach is that it does not generate abnormal return measures for every single event. Thus, it is not possible to conduct further cross-sectional analyses as can be done with the abnormal return measures from the event study. When using a calendar-time portfolio approach, it is necessary to form different groups into portfolios and compare the abnormal return measures of these entire groups. The calendar-time portfolio's abnormal return is estimated using the model from equation 3.3 with monthly stock returns. If the constant term $\hat{\alpha}$ is significant its value indicates an abnormal return that is different from zero.

I form one portfolio for marketing transactions and one for finance transactions. The timing sequence for the calendar-time portfolio approach is also illustrated in Figure 3.1. The procedure for the 1 to 24 month portfolio composition is depicted in Figure 3.2. To test the difference between marketing and finance portfolios (marketing–finance) a zero investment portfolio is formed by buying stocks in the marketing portfolio and short selling stocks in the finance portfolio (e.g., Aksoy et al. 2008, p. 114).
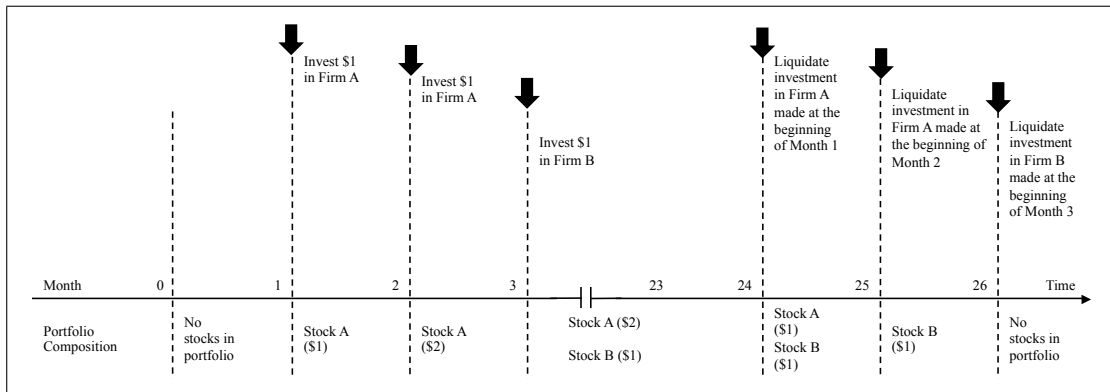
Figure 3.2: Illustration of Calendar-Time Portfolio Composition
Source: Own Illustration on the Basis of Sorescu, Shankar, and Kushwaha (2007, p. 484).

3.3.3 Results

After removing outliers[37], the short-term abnormal return analysis reveals that abnormal post-event returns occur for both insider groups. Figure 3.3 depicts the cumulative average abnormal returns for the short-term event window.
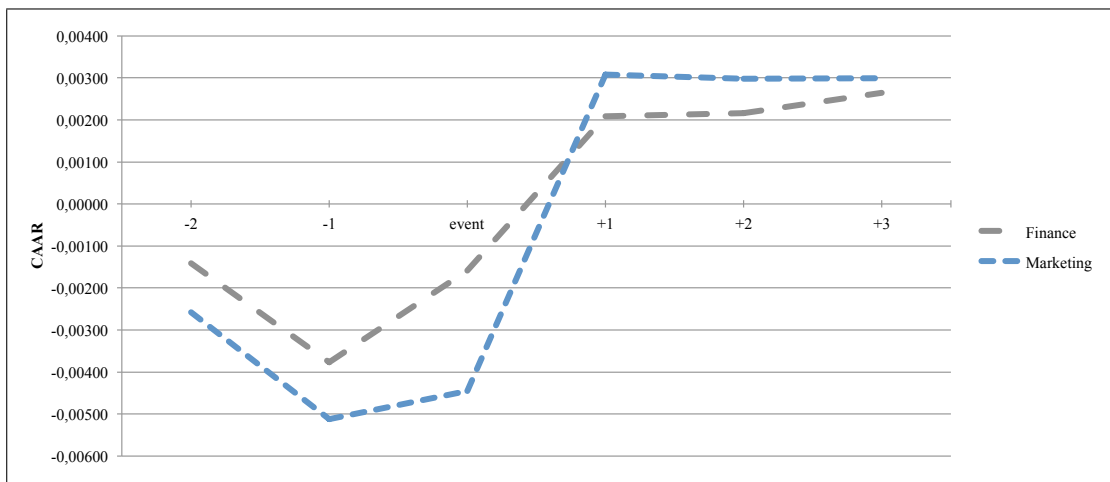
Figure 3.3: Cumulative Average Abnormal Returns for Marketing and Finance Insiders
Source: Own Illustration.

I applied t-tests on each day's abnormal return during the short-term event window. The

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37 I removed all observations that fell into the 5% or 95% percentile at least on one day in the event window.

tests indicate that for both insider groups significant negative abnormal returns can be detected before the actual event. Furthermore, for the marketing insider group, significant abnormal returns greater than zero occur on the day following the event ($M = .0075$; $t = 5.56$; $p < .01$). Whereas for the finance insider group, significant positive abnormal returns can be observed on both the event day ($M = .0022$; $t = 4.95$; $p < .01$) and the day following the event ($M = .0037$; $t = 8.25$; $p < .01$).

However, after performing group comparisons to test for differences in abnormal returns between marketing and finance insider transactions, it turns out that the abnormal return of the finance insider group on the event day is not significantly different from the marketing insider group's abnormal return ($M_{M\text{-}F} = -.0015$; $t = -1.08$; $p = .27$). On the contrary, the abnormal return on the day following the event is significantly greater for the marketing insider group ($M_{M\text{-}F} = .0038$; $t = 2.76$; $p < .01$).[38] An overview of the results and additional non-parametric tests that lead to the same conclusions, are displayed in table 3.4. In summary, significant positive abnormal returns only appear within one day following the event. From the day+2, abnormal returns are not significantly different from zero any longer.

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[38]   I tested for unequal variances and used both the Satterthwaite approximation for degrees of freedom and the Cochran and Cox approximation for the *p*-values, if variances were not equal. If variances were unequal, I report Cochran and Cox *p*-values. This is the case on day+2, only.

Table 3.4: Abnormal Returns – Descriptive Statistics and Tests

Insider Group		-2	-1	Event	+1	+2	+3
Marketing (1)	M	−.0026	−.0025	.0007	.0075	−.0001	.0000
	SE	.0014	.0013	.0014	.0014	.0014	.0013
	t-test t	−1.868*	−1.934*	.472	5.565***	−.071	.0061
	sign test M	−10	−14	16*	28***	−10	−6
	signed-rank test S^a	−2.317	−2.559*	.654	6.813***	−1.101	−.682
Finance (2)	M	−.0014	−.0024	.0022	.0037	.0001	.0005
	SE	.0005	.0004	.0004	.0004	.0004	.0004
	t-test t	−3.098***	−5.331***	4.947***	8.246***	.206	1.211
	sign test M	−34	−109***	49*	83***	−25	−615
	signed-rank test S^a	−83.922**	−196.124***	141.172***	212.036***	−29.205	23.502
Diff (1) − (2)	M_Diff	−.0012	−.0001	−.0015	.0038	−.0002	−.0005
	SE	.0014	.0014	.0014	.0014	.0012	.0012
	t-test t	−.81	−.14	−1.08	2.76***	−.14	−.16
	rank-sum test Z	−.8842	−.1057	−.662	2.908***	−.6355	−.6377

Notes: All tests are two-sided; ^a indicates numbers are in thousands.
*** $p < .01$, ** $p < .05$, * $p < .1$

For the long-term abnormal return analysis, calendar-time portfolio returns were tested for 1–3, 1–6, 1–12, and 1–24 months time horizons, as displayed in Tables 3.5 and 3.6. The values represent the monthly abnormal returns.

The marketing portfolios reveal significant abnormal returns for the 1–3 month post-event period, only (α = .0140; t = 2.39; p < .05). The abnormal return disappears for longer time horizons. The long-term abnormal returns for the finance portfolio are significant for the 1–3 (α = .0074; t = 2.37; p < .05) and 1–6 month horizon (α = .0055; t = 1.87; p < .1). In all other periods the intercept is not significant. Further, the difference between the marketing and the finance portfolio reveals no group differences over the long-term horizons.

Table 3.5: Calendar-Time Portfolio Returns

Variables	3 Months		6 Months	
	Marketing	Finance	Marketing	Finance
Intercept	.0140**	.0074**	.0087	.0055*
	(.0069)	(.0030)	(.0053)	(.0028)
$R_M - R_F$	1.0531***	.8315***	1.0579***	.8418***
	(.1812)	(.0798)	(.1387)	(.0738)
SMB	.2446	.6578***	.6501***	.6446***
	(.3141)	(.1383)	(.2447)	(.1303)
HML	.1707	.0243	−.0023	.1255
	(.3006)	(.1324)	(.2318)	(.1234)
UMD	.0276	−.1639***	−.0815	−.1139**
	(.1357)	(.0598)	(.1049)	(.0558)
R^2	43.71%	79.07%	61.19%	80.97%
F-Value	14.95***	72.70***	31.53***	85.11***
No. of Obs.	82	82	85	85
Difference (M) − (F)	.0066		.0032	
	(.0069)		(.0050)	

Notes: Standard errors are in parentheses. The number of observations refers to the number of months of observations.
***p < .01, **p < .05, *p < .1

Table 3.6: Calendar-Time Portfolio Returns (contd.)

Variables	12 Months		24 Months	
	Marketing	Finance	Marketing	Finance
Intercept	.0031	.0041	.0028	.0027
	(.0042)	(.0025)	(.0035)	(.0024)
$R_M - R_F$	1.0591***	.8162***	1.0367***	.8863***
	(.1075)	(.0645)	(.0914)	(.0622)
SMB	.5309**	.6245***	.3785**	.6696***
	(.1923)	(.1161)	(.1688)	(.1148)
HML	−.0924	.2731**	−.0165	.2818***
	(.1805)	(.1089)	(.1558)	(.1060)
UMD	−.1368	−.1156**	−.2115***	−.1598***
	(.0849)	(.0512)	(.0744)	(.0507)
R^2	69.53%	83.53%	73.54%	85.41%
F-Value	49.07***	109.00***	68.00***	143.45***
No. of Obs.	91	91	103	103
Difference (M) − (F)	-.0011		.0000	
	(.0037)		(.0034)	

Notes: Standard errors are in parentheses. The number of observations refers to the number of months of observations.
***$p < .01$, **$p < .05$, *$p < .1$

3.3.4 Summary and Discussion of Findings

This is the first empirical study that uses insider transactions to analyze how stock markets react to the disclosure of marketing related information. It is also the first study that enhances the empirical literature on informed trading by investigating whether the occurrence of abnormal stock returns varies for insider trading signals from different corporate functional areas. Until now, research in finance and accounting has only investigated the role of the hierarchical position of corporate insiders and the associated stock market response following the disclosure of insider transactions (e.g., Fidrmuc, Goergen, and Renneboog 2006; Knewtson and Nofsinger 2014; Wang, Shin, and Francis 2012).

As theory suggests, stock markets regard insider trading signals as value relevant information. Furthermore, the short-term price reaction seems to be completed rapidly after the disclosure of insider purchase transactions. In particular, the findings show

that after finance induced transactions, the adjustment already begins on the event day and is completed on the day following the event. The price adjustment following marketing transactions begins and is completed on the first day after the event occurred. If reactions to marketing transactions occur only during a rather short period of time, the signal might be completely priced-in rather quickly. This explanation is supported by prior research on the adjustment of prices and the short-term and long-term abnormal returns associated with insider trading.

Prior studies in marketing indicate that the pricing of marketing related information normally takes longer, and stock prices adjust only gradually. This is contrary to the findings that were obtained here, where the greatest price adjustment occurs on the day following the event. One possible explanation might be the form and the channel where the information generating event is reported. Marketing information (e.g., retention levels, customer satisfaction, advertising campaigns, R&D) like other investments in intangibles are hard to evaluate and hard to compare between firms. Insider trading, however, is some sort of standardized information that carries a similar signal for all insiders, i.e., the expectation that prices will increase. Whereas, other marketing information is harder to associate with a particular financial outcome.

An explanation for the short delay in the reaction following marketing transactions could be that the insider signals stimulate additional search for information. Due to the more complex interpretability of marketing information, it might be possible that market participants conduct additional research before they react. Finance related information on the contrary, might be easier to interpret and to process (Guadalupe, Li, and Wulf 2014).

The long-term effects are rather inconclusive. On the one hand, the results indicate that significant calendar-time portfolio returns disappear after three months following marketing insider transactions, whereas finance induced insider trading exhibits significant abnormal returns for up to six months. On the other hand, the results indicate that significant group differences between the marketing and finance portfolios do not exist. Therefore, the calendar-time portfolio analysis provide only limited insight.

In line with previous research, this study confirms that stock markets react upon the disclosure of insider trading and prices adjust rapidly to this new information. Mar-

ket reaction following the disclosure of insider trading varies between marketing and finance induced transactions. However, long-term effects can only be detected for individual portfolios but differences are not significant.

Overall, Study 1 merely represents a first test of function-specific differences in stock market response to insider trading. Therefore, Study 2 takes into account additional variables that may provide further insight into the observed effects.

3.4 Study 2: Firms' Information Environment and the Information Content of Marketing Induced Insider Purchases

As discussed in *Study 1*, signaling theory suggests that insider transactions can be used to communicate value relevant information that has not yet been fully disclosed through other channels. Furthermore, upper echelons theory provides an explanation why marketing and finance induced insider purchases may be diverse in terms of their information content, due to differences in insiders' capabilities and background. However, the previous study could not clarify, whether other variables would explain the observed stock price reaction – especially in the short-term.

There is agreement in the financial accounting literature that the information content and relevance of traditional financial statements deteriorates (e.g., Collins, Maydew, and Weiss 1997; Francis and Schipper 1999; Lev and Zarowin 1999). However, at the same time high levels of information asymmetry can foster the disclosure of privately held information (Tasker 1998), whereas superior information disclosures can reduce the occurrence of insider trading (Heflin, Shaw, and Wild 2000). Therefore, *Study 2* was designed to investigate whether additional attributes related to the transaction or the information environment of the firm entail these differences. Thereby, this study is a response to the call for research on the credibility of disclosures outside of financial statements because it is important to understand how investors respond to such information (Healy and Palepu 2001)

3.4.1 Conceptual Basis and Hypotheses

In fact, *Study 1* demonstrates that stock market reactions subsequent to marketing and finance induced insider purchases differ depending on the insiders' functional affiliation. In order to advance these findings, *Study 2* incorporates this effect in a multivariate setting. Thus, the following hypothesis is put forth:

> H_1 : *Marketing insider signals have a positive effect on cumulative abnormal returns.*

Financial statement informativeness. An obvious explanation for differences in market response to insider trading signals might be the level of available disclosures (Veenman 2012). This can apply to either the quality or the quantity of disclosure or even both (Leuz and Verrecchia 2000). In general, there is agreement in the financial accounting literature that financial reporting is a useful instrument to reduce information asymmetries between shareholders and firms' management (e.g., Healy and Palepu 2001). However, not all types of information can be conveyed through traditional financial statements. This issue stems from the fact that traditional financial accounting comes with some limitations when firm performance is primarily built on intangibles (e.g., Francis and Schipper 1999; Joseph and Wintoki 2013; Lev and Zarowin 1999) and "when firms are in continuous operation" (Dechow 1994, p. 4). Moreover, firms doing business in fast-changing environments with changing complexity suffer from information asymmetries that can be attributed to limitations in reporting requirements (Amir and Lev 1996; Bartov and Bodnar 1996), and changing complexity might be a consequence of investments in intangibles.

The deterioration of traditional financial reports is mostly due to the increasing importance of intangible assets (Collins, Maydew, and Weiss 1997). Outsiders often are not aware of the value and performance implications of investments in off-balance sheet assets (Wyatt 2008). A fact, that is further exacerbated with the transition to more service-related business models (Collins, Maydew, and Weiss 1997). As a consequence, traditional performance indicators like earnings, book values or cash flows become less relevant in industries that are built on intangibles (Amir and Lev 1996), and financial statement informativeness declines (Francis, Schipper, and Vincent 2002). Furthermore, due to the complexity induced by off-balance sheet assets, the requirements for information gathering and processing have substantially increased (Francis, Schipper, and Vincent 2002), and investors have difficulties in making reliable evaluations.

In particular, marketing investments that are associated with intangibles (e.g., customer relationships, advertising, brands, etc.) in most cases do not appear on the balance sheet. However, they share certain attributes that make evaluation more complex than for their tangible counterparts. Aboody and Lev (2000) identify three characteristics of intangibles' that constitute this complexity: uniqueness, absence of organized markets, and the treatment of intangibles in accounting standards. These characteristics have

important implications for the informativeness of financial statements in the presence of intangible assets.

While investments in property, plant and equipment share similarities across firms, investors cannot learn from observing unique factors of competing firms in order to make inferences about the value implications of intangibles (Aboody and Lev 2000). As a consequence, the unstandardized character of off-balance sheet assets makes it difficult to make reliable cash flow predictions (Dechow 1994; Wyatt 2008).

For intangibles, in contrast to both physical and financial tangible assets, organized markets do not exist. Thus, there is no organized price determination process, which might hint to the future performance of intangibles (Aboody and Lev 2000). As a consequence, in comparison to tangible assets, information from prices is not available for off-balance sheet assets.

Finally, investments in intangibles are treated differently in accounting and disclosure regulations. In most cases, investments in intangibles are treated as immediate expenses.[39] Therefore, investors won't receive updates on the current value of these expenses (i.e., investments in intangibles are not subject to impairment tests) (Aboody and Lev 2000).

Previous research on insider trading provides empirical evidence for these assumptions. Findings indicate that insider purchases stimulate more intensive market response for firms, where information uncertainty is high (Veenman 2012), but insider trading decreases if information asymmetry is reduced in the presence of greater financial statement informativeness (Frankel and Li 2004). Aboody and Lev (2000) show that corporate insiders realize higher abnormal returns when they trade in the securities of R&D intensive firms, because the distinct characteristics of R&D investments result in higher levels of information asymmetry that cannot be resolved by traditional financial statements. Recently, Joseph and Wintoki (2013) demonstrated that abnormal returns are greater if insiders trade in the securities of firms with higher advertising expenditures. They argue that intangible investments related to advertising represent a major source of information asymmetry, which can be exploited by corporate insiders (Joseph and Wintoki 2013).

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[39]   With the exception of purchased intangibles.

Overall, previous work in finance and accounting has empirically demonstrated a link between the informativeness of financial statements and capital market reactions following corporate insider trading. If the level of financial disclosure is high, information asymmetries are lower and the content of insiders' private information is expected to decrease. Thus, financial statement informativeness has a negative effect on realized abnormal returns.

> H_{2a} : *Financial statement informativeness has a negative effect on cumulative abnormal returns.*

The function-specific perspective that is proposed in the present dissertation has not yet been investigated in this context. However, there are arguments that financial statement informativeness moderates the effect of an insider's functional affiliation's signal. Guadalupe, Li, and Wulf (2014) differentiate product functions (e.g., marketing) and administrative functions (e.g., finance) that are different in terms of harmonizing information. They conclude that it is much more complex for product functions to provide standardized information because in those cases information is heterogenous and firm specific (Guadalupe, Li, and Wulf 2014). Moreover, Tasker (1998, p. 138) hypothesizes that corporate executives closer to innovative tasks (e.g., product development, customer relationship management) are "more likely to possess private information about the firm's performance not reflected in their financial statements". Thus, high (low) financial statement informativeness may mitigate (enhance) the effect of marketing insider trading signals.

> H_{2b} : *Financial statement informativeness moderates (mitigates) the positive effect of marketing insider signals on cumulative abnormal returns.*

Firm size. A second attribute of a firm's information environment is firm size. Atiase (1985) suggests that empirical research, which wants to analyze the outcome and effectiveness of corporate disclosure, should control for market capitalization, since the obtained effects may depend on firm size. However, empirical findings are mixed. Jeng, Metrick, and Zeckhauser (2003) for instance, were not able to identify an effect of firm size on insider excess returns. Other empirical evidence suggests that insiders can earn higher abnormal returns when trading in the securities of smaller firms, and stock prices of larger firms incorporate new earnings information faster (e.g., Finnerty 1976b; Free-

man 1987; Seyhun 1988). Elliott, Morse, and Richardson (1984) suggest that stock prices of smaller firms are less efficient in processing and aggregating available information, and Bhushan (1989, p. 203) summarizes "that the marginal information content of earnings announcements is related to firm size".

Furthermore, the level of corporate insiders' private information may depend on firm size, because analyst coverage depends on firm size, and there is a tendency that larger firms have more analysts following (Elliott, Morse, and Richardson 1984; Collins, Kothari, and Rayburn 1987). Collins, Kothari, and Rayburn (1987) explain the effect with more resources that are spent for acquiring information about larger firms either through analysts or an increased number of trades. As a consequence, firm size may also determine the level of information available to the market. That is, information will be widely available for lager firms, whereas smaller firms exhibit greater information asymmetries between management and capital markets.

In summary, findings from previous studies suggest that firm size increases publicly available information and its incorporation into security prices. Thus, this study expects a negative effect of firm size on abnormal stock returns.

> *H_3 : Firm size has a negative effect on cumulative abnormal returns.*

Transaction value. As discussed in *Study 1*, capital market response to information disclosures particularly depends on experiences with the signals reliability and credibility (e.g., Maines et al. 2002). In order to establish signal credibility, trading signals must be associated with certain costs for the insider, who trades (Lee 2001; Milgrom and Roberts 1986). That is, the insider transaction's monetary value. If insiders would not believe in a favorable future outcome, they might abstain from trading. Furthermore, the credibility of signals addressed to capital markets has been explored in different contexts, such as product preannouncements and CEO certifications (e.g., Sorescu, Shankar, and Kushwaha 2007; Zhang and Wiersema 2009).

Prior research has examined how transaction volume and transaction value of insider trades affect abnormal returns (e.g., Jaffe 1974; Jeng, Metrick, and Zeckhauser 2003; Seyhun 1986; 2000). Seyhun (2000) suggests that the information content of insider transaction increases with trading volume. In contrast, Jaffe (1974) does not discover a significant difference between small and large transactions. Jeng, Metrick, and Zeck-

hauser (2003, p.461) argue that there "are logical reasons to believe that the highest-volume trades would reflect the strongest insider beliefs about corporate performance", but he also constrains that there might be other reasons than an insider's private information that affect trading volumes. Positive evidence comes from Seyhun (1986), who concludes that insiders can distinguish the value of their informational advantage and capitalize on their knowledge by increasing trading volumes. Therefore, this study expects a positive association between the value of insider transactions and abnormal returns.

H_4 : Transaction value has a positive effect on cumulative abnormal returns.

Figure 3.4 displays the hypothesized model.
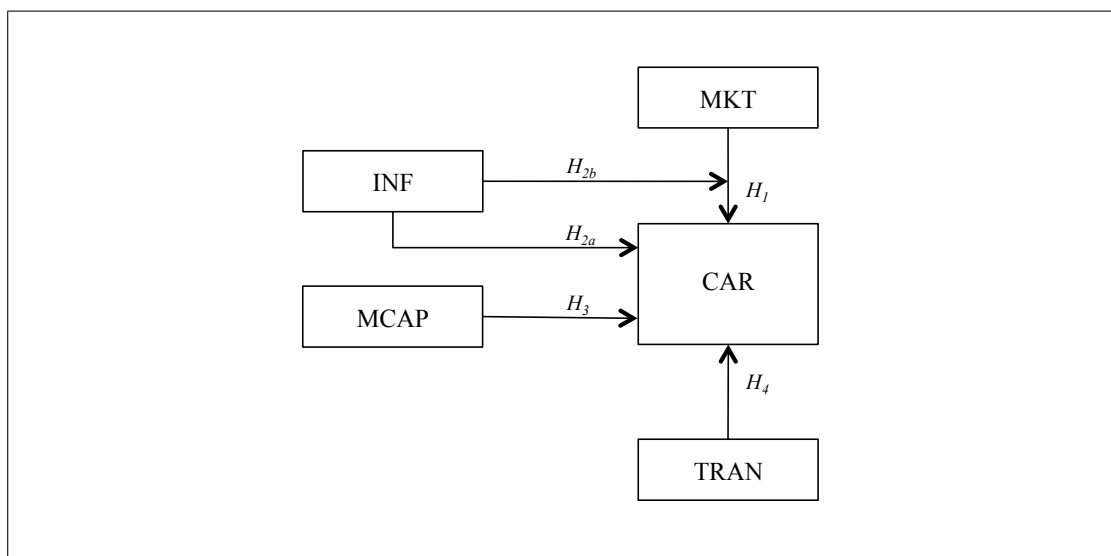
Figure 3.4: Hypothesized Model

3.4.2 Methodology and Data

To test the hypotheses that were presented in Section 3.4.1, an appropriate measure of financial statement informativeness (INF) is needed. According to Frankel and Li (2004), studies in finance and accounting often use the R-squares from cross-sectional regressions of share prices on earnings and book values to evaluate the informativeness of financial statements (e.g., Collins, Maydew, and Weiss 1997; Ely and Waymire 1999;

Francis and Schipper 1999). However, Brown, Lo, and Lys (1999) analytically show that cross-sectional R-squares in some occasions represent unreliable measures. Therefore, in the present study, INF was computed following an approach that was proposed by Frankel and Li (2004). They use the adjusted R-squares from company-specific time-series regressions following the model shown in equation 3.7 to test the relationship between financial statement informativeness and information asymmetries between insiders and outsiders.

$$P_{i,t} = \alpha_i + \beta_{1,i}E_{i,t} + \beta_{2,i}BV_{i,t} + \varepsilon_{i,t},$$

$\quad$ where

$\quad P_{i,t} =$ price per share of firm i at the end of the first fiscal quarter

$\quad$ following fiscal year-end t,

$\quad E_{i,t} =$ earnings per share of firm i during fiscal year t, $\hfill$ (3.7)

$\quad BV_{i,t} =$ book value per share of firm i at the end of fiscal year t,

$\quad \varepsilon_{i,t} =$ regression residual,

$\quad t \neq t_{transaction},$

$\quad t =$ time index.

This approach produces firm-individual INF measures on an annual basis, because observations corresponding to the year of the insider trading event are excluded from the data that is used to estimate INF scores (Frankel and Li 2004).

The data that is need to compute the measure for INF was obtained from *Thomson Reuters Worldscope* database for the fiscal years from 2000 through 2011. To estimate the adjusted R-squares, a minimum of four yearly observations is necessary. However, the lengths of the time-series that were used can vary from four to twelve years. Due to data availability, the time-series data does not always consist of observations from consecutive years. Thus, the computation was performed with at least four observations of a particular company from the 2000 to 2011 period. Firm size as another explanatory variable is measured as the natural logarithm of firms' market capitalization (MCAP). The monetary value of an insider transaction (TRAN) is computed from the number of

shares traded multiplied with the price per share that was payed by the insider. The abnormal returns computed in *Study 1* are used to measure the capital market reaction. They are cumulated for the period of the event date (i.e., the day of the transaction report) until three days following the event. Table 3.7 displays correlations and descriptive statistics.

Table 3.7: Correlations and Descriptive Statistics

Variable	1	2	3	4
1. CAR	1			
2. MCAP	−.026	1		
3. TRAN	.1369***	.129***	1	
4. INF	−.004	.093***	−.042**	1
M	.007	19.700	8.502	.350
SD	.041	1.826	2.140	.282
MD	.003	19.575	8.652	0.353
$N_{Marketing}$ = 288				
$N_{Finance}$ = 2548				

*** $p < .01$, ** $p < .05$, * $p < .1$

Although the uni- and bivariate tests in *Study 1* demonstrate that daily abnormal returns exhibit significant differences only on the day following the event, I will test the cumulative abnormal returns in a multivariate setting. The insider's corporate affiliation is expressed through a dummy-variable that takes a value of one if the transactions was performed by a marketing insider, and zero indicates a finance induced purchase.

Short-term cumulative abnormal returns. To test the hypotheses that were presented above, four different models based on equation 3.8 are estimated using OLS regression with White's robust standard errors (White 1980), because both Breusch-Pagan and White tests indicate heteroscedasticity.[40]

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[40] Greene (2012) notes that the White estimator is particularly useful when the true nature of the heteroscedasticity is unknown.

$$CAR_i = \alpha + \beta_1 MKT_i + \beta_2 INF_i + \beta_3 MCAP_i + \beta_4 TRAN_i + \beta_5 MKT_i \times INF_i + \zeta_i,$$

where

CAR_i = three day cumulative abnormal return following insider
transaction i,

MKT_i = corporate insider group dummy; value of 1 if transaction i
was performed by a marketing insider,

INF_i = financial statement informativeness calculated from   (3.8)
Equation 3.7,

$MCAP_i$ = natural logarithm of market capitalization for insider
transaction i's firm at the end of the fiscal quarter prior to the transaction,

$TRAN_i$ = monetary value of insider transaction i,

$MKT_i \times INF_i$ = interaction term between MKT_i and INF_i,

ζ_i = regression residual.

Model 1 includes only the corporate insider group dummy, and in Model 2 the measure for financial statement informativeness is added. Model 3 adds firm size that represents an additional characteristic of the firms' information environment, and the monetary value of insider transactions as a credibility attribute. Model 4 also includes an interaction term between insider group dummy and financial statement informativeness to test for the moderator effect. Table 3.8 displays the regression analysis.

Long-term abnormal returns. To assess the long-term impact of insider trading the calendar-time portfolio approach from *Study 1* that is described with Equation 3.3 is used. To form informativeness insider portfolios, a median split is conducted to assign both marketing insider transactions and finance insider transactions to a high financial statement informativeness group (INF_H) and a low financial statement informativeness group (INF_L). Hence, the long-term abnormal return analysis is conducted with four portfolios. The results are displayed in Table 3.9. The calendar-time portfolios will provide further insight into the long-term implications.

3.4.3 Results

Short-term cumulative abnormal returns. The results for post event cumulative abnormal returns are displayed in Table 3.8. Neither Model 1 nor Model 2 exhibit significant *F*-Statistics. After adding firm size and transaction value in Model 3, the *F*-Test indicates a highly significant model ($p < .01$) with an R-squared of 2.14%. Model 4 is also highly significant ($p < .01$). Taking into account the interaction between the insider group dummy and financial statement informativeness leads to a slight increase in R-squared to 2.38%, which represents the best fit of the models tested here.

Table 3.8: Short-Term OLS: Dependent Variable = CAR (day 3 to day 6)

Variables	Model 1 Coefficients	Model 2 Coefficients	Model 3 Coefficients	Model 4 Coefficients
Intercept	.0064***	.0071***	.0033	.0015
	(.0008)	(.0013)	(.0083)	(.0083)
MKT	.0032	.0032	.0024	.0103**
	(.0027)	(.0027)	(.0027)	(.0042)
INF		−.0020	−.0006	.0018
		(.0028)	(.0028)	(.0030)
MCAP			−.0010**	−.0010**
			(.0004)	(.0004)
TRAN			.0027***	.0028***
			(.0003)	(.0003)
MKT x INF				−.0233***
				(.0082)
$\text{VIF}_{\text{average}}$	1.00	1.00	1.02	1.64
VIF_{max}	1.00	1.00	1.03	2.56
R^2	.05%	.07%	2.14%	2.38%
F-Value	1.54	1.05	15.49***	13.76***

Notes: Standard errors are in parentheses. $N_{\text{Marketing}} = 288$, $N_{\text{Finance}} = 2588$.
*** $p < .01$, ** $p < .05$, * $p < .1$

Comparing the two significant models reveals a substantial change after adding the interaction term. It affects the insider group dummy, which exhibits a significant effect ($\beta = .0103$; $p < .05$) only in Model 4. The main effect of financial statement informativeness isn't significant in any of the four models. However, this effect is in line with the conceptual argumentation that insider trading signals only from sources that are ex-

pected to be better informed about off-balance sheet assets exhibit a greater information content. Firm size and transaction volume have a significant effect with the expected direction in both Model 3 and Model 4. In Model 4, cumulative abnormal returns decrease with firm size (β = -.00010; p < .05) and increase with transaction value (β = .0028; p < .01). Moreover, the interaction term in Model 4 indicates that marketing insiders' cumulative abnormal returns also increase, when financial statement informativeness is lower (β = -.0233; p < .01).

Figure 3.5 shows the interaction plot for H_{2b}. While for high financial statement informativeness cumulative abnormal returns for both insider groups exhibit similar values. Low financial statement informativeness substantially increases marketing insider cumulative excess returns, whereas finance insider returns show only a slight increase.
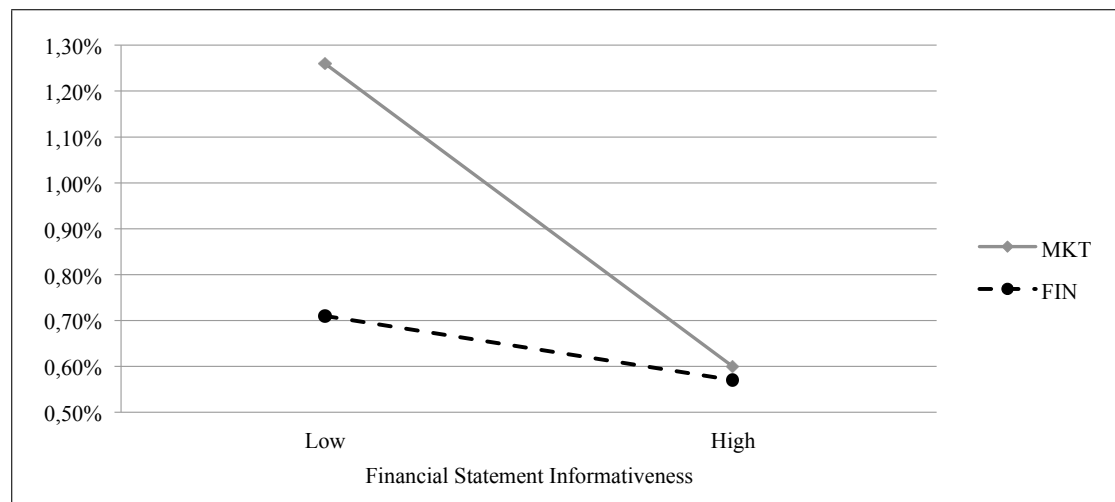
Figure 3.5: Significant Interaction Plot

In addition, I check if multicollinearity might affect the model results, and I conduct an additional robustness check for low value stocks. First, I examine variance inflation factors (VIF). All scores are between 1.03 and 2.56, which is considerably below the threshold of 10 (Hair et al. 1998). Thus, multicollinearity does not influence the results.

To test whether the obtained effects are due to low value stocks (e.g., Ball, Kothari, and Shanken 1995; Hertzel et al. 2002), in two steps I remove transactions with average share prices below \$2.00 and below \$5.00, and estimate Model 4 again for these

subsamples. The results show that the results remain stable. The model outputs can be found in Appendix B.1.

Figure 3.6 summarizes the results of the hypothesis tests.

☑ H_1:   *Marketing insider signals have a positive effect on cumulative abnormal returns.*

☐ H_{2a}: *Financial statement informativeness has a negative effect on cumulative abnormal returns.*

☑ H_{2b}: *Financial statement informativeness moderates (mitigates) the positive effect of marketing insider signals on cumulative abnormal returns.*

☑ H_3:   *Firm size has a negative effect on cumulative abnormal returns.*

☑ H_4:   *Transaction value has a positive effect on cumulative abnormal returns.*

Figure 3.6: Summary of Results

Long-term abnormal returns. The results of the calendar-time portfolios are displayed in Table 3.9. Panel A shows the results for the INF_L portfolios and Panel B the results for the INF_H portfolios.

As can be seen from Panel A, significant abnormal returns only appear for the marketing insider group in the six month portfolio (α = .0133; p < .1). The significant effect disappears for longer time horizons. Furthermore, differences between both marketing and finance insider portfolios are not statistically different from zero.

Panel B exhibits positive abnormal returns for both of the high informativeness portfolios. The abnormal marketing portfolio returns are significantly positive over 3 months α = .0131; p < .1) and 24 months α = .0074; p < .1). However, they disappear in the other long-term tests. In contrast, the finance insider portfolio reveals significant positive abnormal returns for every time horizon that was tested. However, the abnormal returns in the finance insider portfolio decrease over time. Again, there are no significant differences between marketing and finance insiders in the high informativeness portfolios.

Table 3.9: Calendar-Time Portfolio – Informativeness Groups

Panel A	INF < MD		
Variables	Marketing	Finance	Diff (M) - (F)
Intercept (3 months)	.0158	.0052	.0105
	(.0108)	(.0034)	(.0109)
Intercept (6 months)	.0133*	.0028	.0110
	(.0077)	(.0029)	(.0073)
Intercept (12 months)	.0029	.0019	.0010
	(.0061)	(.0026)	(.0055)
Intercept (24 months)	−.0026	−.0003	−.0023
	(.0043)	(.0026)	(.0042)
Panel B	INF ≥ MD		
Variables	Marketing	Finance	Diff (M) - (F)
Intercept (3 months)	.0131*	.0088**	.0038
	(.0078)	(.0041)	(.0071)
Intercept (6 months)	.0064	.0075**	−.0016
	(.0055)	(.0038)	(.0048)
Intercept (12 months)	.0063	.0058*	.0001
	(.0048)	(.0034)	(.0042)
Intercept (24 months)	.0074*	.0052*	.0018
	(.0041)	(.0031)	(.0038)

Notes: Standard errors are in parentheses.
***$p < .01$, **$p < .05$, *$p < .1$

3.4.4 Summary and Discussion of Findings

In summary, Study 2 demonstrates that in the short run, differences in stock market response to marketing and finance related insider purchases are influenced by the underlying information environment. Both attributes that are used as proxies for information asymmetries between management and investors and the transaction signal's credibility exhibit a significant influence on the short-term price reaction. Moreover, Study 2 shows that capital market response to marketing insider purchases is stronger, if value relevant information provided in traditional financial statements is limited. Additional analyses reveal that these findings are robust when low-priced stocks are removed from the sample. In contrast, the results for long-term market reactions are ambiguous. While marketing insider portfolios exhibit positive abnormal returns over a six months time

horizon when financial statement informativeness is low, differences between marketing and finance portfolios are not significant. Furthermore, both marketing and finance insider portfolios earn significant abnormal returns, when financial statement informativeness is high, but again, there are no significant differences between the two insider groups.

The findings of Study 2 suggest that it is not productive to analyze stock market response to insider trading without taking into account additional variables that characterize both the firm, whose stocks are traded and the transaction itself. In line with previous research, this study demonstrates that insider trading signals provide a greater information content for smaller firms. Thus, these firms may be subject to greater information asymmetries. Furthermore, insiders can increase the information content of their trades, by strengthening the credibility with the amount of money they spend on a particular transaction. This result corroborates previous findings that discuss the motivations and intentions of insider transactions. Since insider purchases are often motivated by making financial gain, this finding is reasonable.

Moreover, the present study is the first empirical evidence that the informativeness of a firm's financial statements moderates the function-specific information content of insider trading signals. This finding is very important, because it demonstrates that capital market actors apparently believe that marketing managers have superior information about the value implications of a firm's off-balance sheet assets. This finding is also fostered by the insignificant main effect of financial statement informativeness, because it indicates that information asymmetries that stem from insufficient financial statements, are not resolved by finance insiders' purchases. These findings also confirm both empirical work and theoretical considerations in marketing research. Prior studies have demonstrated that hard to evaluate actions, strategies, and intangible investments establish information asymmetries. However, since investors rather rely on established frameworks when making evaluations, they are often not able to determine their performance implications. Insider trading seems to provide a signal they are experienced with, and thus, update their future expectations.

The long-term effects are ambiguous. On the one hand, the results indicate that the marketing insider portfolio earns excess returns, when financial statement informativeness

is low. On the other hand, the findings do not confirm that the information content of marketing insider purchases is greater in comparison to finance induced transactions. Furthermore, when financial statement informativeness is high, there are no significant differences between marketing and finance insider portfolios. However, there may be different explanations for these findings. First, the calendar-time portfolio approach, as it is applied in this study, is not capable to comprehensively detect the impact of different levels of financial statement informativeness. Or second, the short-term price reaction may almost completely consider the differences between the information content of marketing and finance related transactions.

Overall, at least in the short run, marketing related insider purchase signals provide more information for capital markets than finance insider transactions. Moreover, information content increases when the informativeness of traditional financial statements is only limited.

3.5 Project I: Contributions and Outlook

3.5.1 Contributions and Implications

Findings of this project have various implications for research and practice. First, this project advances the literature that examines the capital market outcomes of marketing information disclosures. In contributes to previous work in this area by providing new evidence and a better understanding of stock market response to marketing information disclosures. In particular, it responds to the recent call by Srinivasan and Sihi (2012), who emphasize the need for research that investigates both marketing information types and disclosure channels. By using insider trading signals for measuring the information content of marketing disclosures, the present research employs a rather standardized and established signal. Furthermore, it can be used to compare marketing and finance related disclosures, which are of the same nature. Furthermore, previous research in marketing investigates capital market response to disclosures that are either based on observable marketing metrics or marketing strategies. In contrast, this research, employs signals that are based on corporate agents' actual behavior. Even more importantly, insider trading signals represent forward looking information, and thus, this work provides a

new way for investigating the outcomes of marketing information disclosures.

Second, this project contributes to the current discussion about the importance of marketing information for capital markets. Both studies provide additional evidence that stock markets perceive information related to marketing as relevant and important. The findings further suggest that investors assume that marketing managers possess better information about a firm's future prospects, when traditional financial statements provide only limited insight. Thus, one implication of this project could be that marketing insiders have certain capabilities that enable them to make better evaluations of the future options associated with market-based assets.

Third, this projects advances research in finance that focuses on the stock market outcomes of insider trading. Previous research in this field either treats insiders as a homogenous group or merely focuses on hierarchical differences (e.g., Knewtson and Nofsinger 2014; Seyhun 1988; Wang, Shin, and Francis 2012). Thus, the present studies provide further insight into capital market response to insider trading by demonstrating that insider trading signals related to different corporate functions significantly vary in their information content. Moreover, recent findings in finance suggest that insider trades from CFOs are more informative than trades made by CEOs (Knewtson and Nofsinger 2014; Wang, Shin, and Francis 2012). Hence, building on these results, the findings obtained in the present project may lead to the conclusion that function-specific differences in the information content of insider trading signals, might be greater than across hierarchy levels. Overall, the findings of this project demonstrate that function-specific differences must not be neglected in research on insider trading.

Fourth, this work expands the rather scarce literature on insider trading in the post-SOX era. As Lev (2007, p. 233) notes, "the Sarbanes-Oxley Act of 2002, [...] had a significant impact on insider trading, its motives, and its consequences". Thus, in line with the findings obtained by Brochet (2010), this project demonstrates that the faster disclosure of insider trading results in rather rapid price adjustments, and a large portion of significant abnormal returns occurs within the first couple of days subsequent to a purchase transaction.

Fifth, this project contributes to the financial accounting literature. It confirms previous results from Frankel and Li (2004), who demonstrate that insider trading can reduce

information asymmetries between corporate management and investors that arise from the limitations of traditional financial statements. Moreover, the present project investigates these mechanism from a function-specific perspective on insider trading. Hence, it advances prior research in this field that did not examine the impact of an insider's functional affiliation.

Finally, the results of this project contribute to the academic literature on stock market efficiency, by providing further support for the semi-strong form of market efficiency. The results indicate that stock prices occasionally do not fully reflect the value implications of a firm's future prospects, when information from traditional financial statements is limited. Prices adjust, when insiders disclose their privately held information. However, the findings of this present project suggest that stock prices adjust rather rapidly to the insider trading signals, and hence the market is efficient in processing this information.

From a practical perspective, the outcome of this projects provides information for managers, how they could convey firm internal information to investors. In line with the view of Carlton and Fischel (1983) that insider trading can serve as a tool for firms to control the amount of information that is available to the market, this study demonstrates that insider trading indeed serves as a supplement for financial reporting information. In this manner firms would be able to disclose even critical value relevant information without unveiling crucial information about their business models and sources of their competitive advantage (e.g. IFAC 2008).

Moreover, the results of the present project indicate that information about the future options associated with market-based assets – at least as perceived by the market – is not equally distribute within the different functions of a corporation. As a consequence, CEOs and other general managers should put a greater focus on the knowledge and skills of their marketing personnel. They may further rely on the capabilities, which are located in the marketing departments, when seeking new ways for improving the informativeness of traditional disclosures. To accomplish this, management has to identify the nature of the information that marketing insiders trade on, and how they determine the value implications of this information.

Finally, accounting standard setters could use the findings of this project to identify

ways that help them improve the informativeness of traditional financial statements. In contrast to most other marketing information disclosures, insider trading signals are rather standardized, and the motivation for insider purchases should be associated with positive future expectations. Hence, authorities and standard setters should think of ways how to translate information associated with off-balance sheet assets into standardized value indicators. However, this does not necessarily mean that these indicators must be quantitative in nature. Alternatively, investors could be provided with information, which explains the underlying mechanisms that are associated with value generation from market-based assets, because previous research demonstrates that investors often are not able to interpret nonfinancial information (Booker, Heitger, and Schultz 2010).

3.5.2 Limitations and Future Research

This project is subject to a number of limitations that could be addressed in future research. First, the present study focuses only on two corporate functions and does not include actual marketing and finance information. Therefore, the results are not generalizable and do not provide a direct link between firms' strategies and market reactions, although marketing and finance insider trading signals may serve as good proxies for on the one hand, hard to evaluate information related to intangibles and on the other hand, standardized performance information. However, future research should investigate how capital markets respond to insider trading signals from other corporate agents under different information environments, and additionally consider firms' strategies. For instance, prior research has demonstrated that R&D initiatives and advertising can serve as sources for substantial information asymmetries and that insiders can capitalize on this knowledge (Aboody and Lev 2000; Joseph and Wintoki 2013). Hence, future research could investigate, wether signals from insiders closer to advertising and R&D trigger stronger market reactions under different information environments. Moreover, future research should build up on recent findings in management to conduct further analyses to expand the functional perspective. One way could be to employ the differentiation used by Guadalupe, Li, and Wulf (2014) and examine the group of product functions and administrative functions or functional and general managers, because information processing and harmonizing information is conducted differently within these

groups.

Second, a central limitation stems from the financial statement informativeness measure. The approach that is used in this project delivers individual values for every fiscal year, but these values are computed with observations that cover both the periods before and after an insider transaction. However, this approach can capture an extended period and thus is less prone to short-term variations. It rather characterizes the informativeness of a firm's financial statements over time. Thus, the employed approach may provide a useful proxy. Nevertheless, future research could use a different way of measuring and estimating financial statement informativeness, and examine whether a different approach can confirm the results that are obtained in the present project.

Third, the calendar-time portfolio approach allows to test only one attribute specification at each time. Thus, calendar-time portfolios might not be capable of providing full insight into the nature of abnormal return differences. Splitting the sample into smaller subsamples, such as quintiles, might be an option to overcome these limitations. However, due to the small sample size, especially for marketing insider transactions, further sample splits would have been critical. Future research should try to address these limitation by using a longer time horizon. To date, four additional years of observations are available for future researchers. This might be a good starting point for their analyses.

Fourth, this study uses a relatively short observation period that results in a rather small number of events compared to previous work in this area. One reason is that it only uses observations from the post-SOX era.[41] Thus, future research in finance and accounting could apply the function-specific perspective of insider trading on research that examines the enactment of SOX and its implications for information dissemination with the pre-SOX period (e.g., Brochet 2010). Since SOX changed the disclosure environment, it is complicated to compare the findings of this project with previous results.

Fifth, this study is not able to unveil the nature of the information that marketing and finance insiders trade on. Thus, future studies should investigate whether the unexpected price adjustment is a result of an update of expectations regarding future earnings or past earnings implications, for instance (e.g., Veenman 2012). Moreover, I was not

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[41]   SOX was enacted in July 2002.

able to observe whether marketing and finance executives really trade on marketing and finance information, respectively. My focus was the functional origin of the trading signals. Hence, future research could investigate what information insiders from different corporate functions actually use, when making their purchase decision.

Finally, the sample period covers a severe financial crisis that changed the behavior of market participants and entailed new regulations. A longer time horizon might enable future researchers to address the influence of the financial crisis on both insider trading behavior and the behavior of market participants.

4 Project II: Marketing Induced Insider Trading and Stock Returns Risk

4.1 Overall Background

As the results obtained in *Project I* of this thesis demonstrate, marketing insiders apparently trade on information that is not disclosed in traditional financial statements. Thus, an obvious conclusion might be that they trade on undisclosed value implications related to intangible market-based assets (Srivastava, Shervani, and Fahey 1998).

However, market-based assets do not only exhibit direct value implications. They are also perceived to possess certain characteristics that can decrease the risk of stock returns in the long run, by lowering the volatility of cash flows (Srivastava, Shervani, and Fahey 1998; Tuli and Bharadwaj 2009). Therefore, it would be interesting to know, whether marketing insider trading signals not only come along with unexpected stock price movements but also convey risk relevant information.

Previous work in finance and accounting particularly focused on risk relevant signals that also affect the financial structure of a firm (e.g., Bartov 1991; Hertzel and Jain 1991). In contrast, empirical evidence on the risk implications of insider trading is rather scarce (e.g., Dickgiesser and Kaserer 2010; Seyhun 1988). However, when managers signal that their firm is undervalued, this might not only be due to mispricing of information related to future earnings but also due to the risk associated with a firms prospects (Hertzel and Jain 1991). Therefore, this project wants to investigate whether marketing insider purchase signals have implications for the traded securities' risk.

4.2 Conceptual Basis

In general, information associated with a firm's risk is important for both management and investors. Thus, risk management is one of the major objectives of finance executives (Zhao 2004). Managers want to smoothen cash flows and avoid discontinuity in cash flows, because risk is associated with a firm's capital costs (Luo and Bhattacharya 2009). If risk is high, investors demand higher compensation to take this risk. Moreover, risk related information is also of high importance for making investment decisions, because "in a world of uncertainty, the desirability of an investment depends not only on the expected payoff, but also on the risk of the future payoffs" (Lui, Markov, and Tamayo 2007, p. 630). Hence, risk is an important determinant in the evaluation of an investment in firm equity (Luo and Bhattacharya 2009). As a consequence, a firm's stock market risk is directly connected to the risk of its business model, and both risk and capital costs will increase when cash flows become uncertain or vulnerable (Luo and Bhattacharya 2009).

As illustrated in Figure 4.1, firm's overall risk consists of a systematic and an idiosyncratic risk component. A firm's systematic risk indicates the degree of stock price movements that are associated with changes in the overall market. These movements are driven by factors that include unemployment rate, inflation, exchange rates, raw material prices and so on. They affect the whole market and in particular competing firms. During economy wide downturns, customers may change their purchasing behavior and exhibit lower consumption. Idiosyncratic risk reflects the component that stems from firm individual characteristics (Fu 2009; Lui, Markov, and Tamayo 2007). This could be the strength of direct competitors, price sensitivity of the installed customer base, market growth and market potential.

Investors can get rid of idiosyncratic risk, if they invest into a fully diversified portfolio (Lintner 1965b; Sharpe 1964). Certainly, not every investor can hold a fully diversified portfolio, and empirical research has shown that investors do consider idiosyncratic risk and price it in (Ang et al. 2006). In particular, households do not have fully diversified portfolios. Thus, they are not able to diversify away idiosyncratic risk. During the period from 2000 through 2010, on average 39.2 % of equities in the US were held by the household sector (U.S. Census Bureau 2013). In contrast, systematic risk cannot be

diversified away by holding a fully diversified portfolio. However, studies from Goyal and Santa-Clara (2003) and Gaspar and Massa (2006) demonstrate that systematic risk accounts for less than 20% of the total risk.
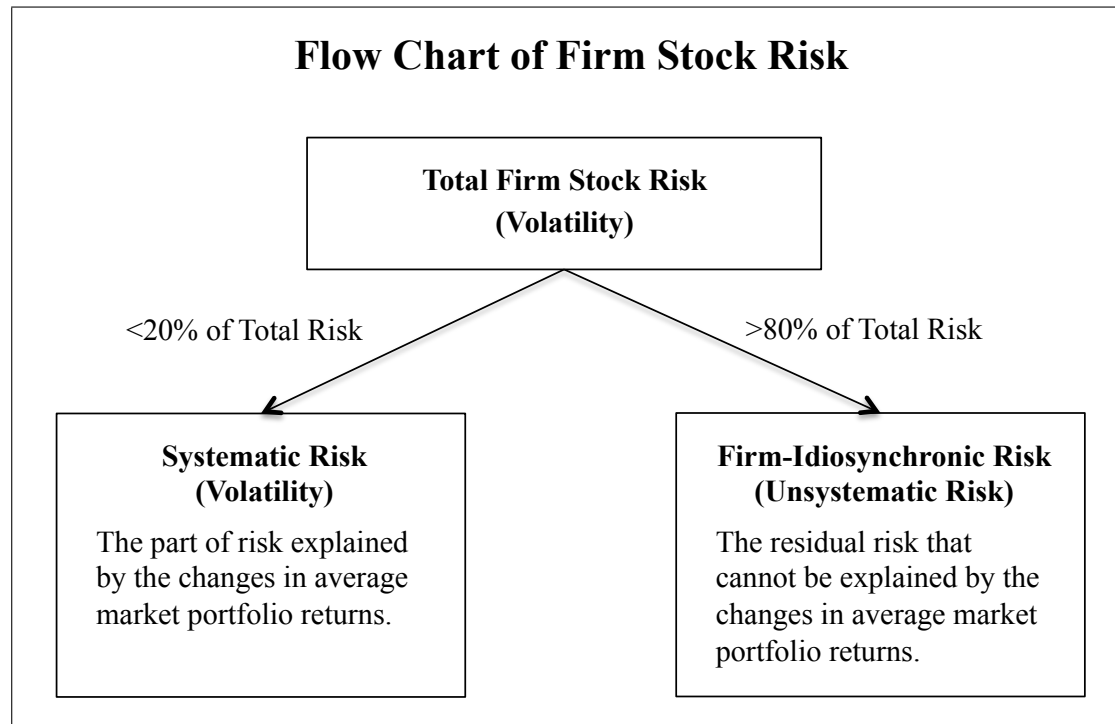
Figure 4.1: Firm Stock Risk
Source: Luo and Bhattacharya (2009)

Previous research investigates how investors evaluate different risk exposures. There is both theoretical and empirical evidence that investors rate upside and downside risk differently (Ang, Chen, and Xing 2006; Kahneman and Tversky 1979; Roy 1952). Even though some investors might accept higher overall risk if they receive a return premium, others are interested in avoiding high risk investments (Ang, Chen, and Xing 2006). Hence, both investors and management are interested in evaluating and managing risk according to their needs.

In this context, Srinivasan and Sihi (2012) suggest, that firms might face lower risk as a result of marketing related disclosers that provide capital markets with a qualitatively better set of information about a corporations future prospects. Thus, the following section will discuss the how marketing strategies might affect firm risk.

4.2.1 Marketing Strategy and Firm Risk

Overall, research in marketing that takes into account the implications of marketing actions on a firm's risk exposure are rather scarce (Tuli and Bharadwaj 2009). However, theoretical work in marketing suggests that market-based assets can assist firms in decreasing both cash flow volatility and vulnerability, and thus help firms to decrease their overall risk (Srivastava, Shervani, and Fahey 1998).

In this context, empirical work often uses the satisfaction of a firm's customers as object of investigation (e.g., Fornell et al. 2006; Gruca and Rego 2005; Tuli and Bharadwaj 2009), because the established customer base constitutes one of a firm's most important market-based assets. Other research that analyzes the associations between marketing and risk focuses on brands (Madden, Fehle, and Fournier 2006), innovations (Sorescu and Spanjol 2008), advertising and R&D (McAlister, Srinivasan, and Kim 2007).

The central argument in empirical work on the association between marketing actions and a firm's stock market risk is their capability to smoothen cash flows. Tuli and Bharadwaj (2009) argue that high customer satisfaction will increase customer loyalty and thus, decrease the risk of defection during market downturns. Furthermore, it will reduce customer management and service costs, which altogether results in less volatile cash flows from customers and hence, reduces both systematic and idiosyncratic risk (Tuli and Bharadwaj 2009). Further evidence comes from Gruca and Rego (2005). They show that customer satisfaction has a positive effect on cash flow growth and cash flow stability, which ultimately results in a decrease in risk. McAlister, Srinivasan, and Kim (2007) provide similar arguments for a firm's R&D and advertising. They conclude that both can stabilize cash flows during downturns (McAlister, Srinivasan, and Kim 2007). Moreover, they suggest that advertising provides higher quality information for investors (McAlister, Srinivasan, and Kim 2007).

Fornell et al. (2006) suggest that investors can capitalize on these effects by demonstrating that portfolios of firms with high customer satisfaction scores not only generate higher returns than the market portfolio, but also exhibit lower systematic risk. Madden, Fehle, and Fournier (2006) obtain similar results for a portfolio of firms with strong brands, which yields higher returns than a portfolio without strong brands and at the same time, is subject to lower risk.

However, marketing initiatives may not always lead to risk reductions. Overall, reductions in cash flow volatility can result in both a decrease or an increase in systematic risk (Scordis, Barrese, and Wang 2008). The direction of the effect depends on a firm's asset value in relation to its future opportunities (Scordis, Barrese, and Wang 2008). Moreover, Sorescu and Spanjol (2008) find an increase in risk for breakthrough innovation in firms. They argue that these innovations might increase the uncertainty associated with future performance and thus, affect a firm's risk at the very beginning (Sorescu and Spanjol 2008). Furthermore, Bharadwaj and Menon (1993) find evidence that high relative market share can increase business risk for service firms. However, they can not provide additional insight into the nature of their finding.

In summary, marketing initiatives and market-based assets are associated with a firm's business risk and the risk of its stock returns. Albeit the direction of the effect seems to be ambiguous. In light of the conceptual considerations and findings in *Project I* of this thesis, marketing corporate insiders should be aware of the outcome of such marketing strategies. Hence, marketing insider purchase signals might not only provide information on the future value of the securities they trade in, but also on the associated risk.

4.2.2 Insider Trading and Firm Stock Risk

Empirical evidence suggests that both systematic and idiosyncratic risk is higher for firms that experience insider trading. Findings from Seyhun (1988) indicate that insiders primarily trade in firms that exhibit higher systematic risk. He concludes that insiders "trade on the basis of mispricing caused by economy wide factors" (Seyhun 1988, p. 22). Recently, Dickgiesser and Kaserer (2010) discovered a relationship between firms' idiosyncratic risk and the magnitude of abnormal insider returns. Their analysis reveals that high abnormal insider returns occur for those firms that exhibit the highest idiosyncratic risk (Dickgiesser and Kaserer 2010).

Cai et al. (2007) investigate risk changes around price sensitive announcements, such as earnings announcements and insider trading reports, on the basis of a model from Kim and Verrecchia (1991). They suggest that changes in the quality of information that is available on a market will result in risk changes (Cai et al. 2007; Kim and Verrecchia

1991). They demonstrate that systematic risk increases subsequent to an announcement event, which improves information quality (Cai et al. 2007). Furthermore, their results indicate that the increase in systematic risk is greater, when preannouncement information quality is lower. Hence, systematic risk increases more after insider transactions than after earnings announcements (Cai et al. 2007).

Clayton, Hartzell, and Rosenberg (2005) provide arguments that explain both an increase and a decrease in risk after the appearance of a particular value relevant signal. On the one hand, such a signal could be associated with high uncertainty, when the value implications are hard to assess, and risk will increase (Clayton, Hartzell, and Rosenberg 2005). On the other hand, a signal could demonstrate that the firm's outlook is better than expected. Such a signal could be an argument for a decrease in volatility, because investors update their expectations (Clayton, Hartzell, and Rosenberg 2005). In an insider trading context, both explanations are plausible. In general, insider purchase signals are associated with a positive outcome. However, the true nature of the signal is unknown and therefore not easy to interpret.

In summary, there are different mechanisms that can be responsible for changes in risk subsequent to a value relevant signal or announcement. On the one hand, insider trading reports might improve information quality, and thus result in higher systematic risk. Furthermore, insiders might trade on the basis of mispricing that affects the whole market or in highly idiosyncratic stocks. On the other hand, insiders might trade on cash flow implications of assets in place and on the future potential associated with these assets or on information related to the capital structure of a firm.

As a consequence, it is not easy to make propositions about the risk implications subsequent to marketing and finance insiders' purchase transactions. Thus, this study investigates this relationship rather exploratory.

4.3 Methodology and Data

I use a methodological approach that was proposed by Tuli and Bharadwaj (2009), who analyze the impact of customer satisfaction on stock returns risk. Several other marketing studies that focus on the implications of marketing metrics or marketing strategies

on the risk of stock returns, employ a similar approach (e.g., McAlister, Srinivasan, and Kim 2007; Luo and Bhattacharya 2009).

To compute measures for systematic and idiosyncratic risk, I use the Carhart four-factor model (Carhart 1997), as illustrated in Equation 4.1:

$$R_{i,t} - R_{F,t} = \alpha_i + \beta_{m,i}(R_{M,t} - R_{F,t}) + \beta_{SMB,i}SMB_t + \beta_{HML,i}HML_t$$
$$+ \beta_{UMD,i}UMD_t + \varepsilon_{i,t},$$

where

$R_{i,t}$ = actual return for firm i at time t,

$R_{F,t}$ = risk free rate of return at time t,

$R_{M,t}$ = market return at time t,

α_i = constant for firm i,

$\beta_{m,i}$ = parameter of the market risk factor,

$\beta_{SMB,i}$ = parameter of the size risk factor,

$\beta_{HML,i}$ = parameter of the value risk factor,   (4.1)

$\beta_{UMD,i}$ = parameter of the momentum factor,

SMB_t = the difference in returns between small and big stocks

at time t,

HML_t = the difference in returns between high book-to-market value

stocks and low book-to-market value stocks,

UMD_t = the difference in returns between high prior return stocks

and low prior return stocks,

$\varepsilon_{i,t}$ = regression residual,

t = time index.

For each firm in the sample dataset, I estimate Equation 4.1 using daily observations covering 30 and 252 trading days before an insider transaction and covering 30 and 252 days following an insider purchase transaction, respectively. Multiple transactions performed by the same insider on a particular day are aggregated to a single event. In Equation 4.1, $\beta_{m,i}$ represents a firm's systematic risk. A firm's idiosyncratic risk (IR) is

measured as the standard deviation of the model's residuals (Ang et al. 2006).

Actual daily returns are measured using the following equation that includes dividend payments:

$$R_{i,t} = \frac{P_{i,t} + D_{i,t}}{P_{i,t-1}} - 1,$$

$$\text{(4.2)}$$

where $D_{i,t}$ is the dividend payment of firm i in period t.

Downside systematic risk $\beta_{dm,i}$ is calculated from Equation 4.3, using only observations, where excess market returns are negative (e.g., Ang, Chen, and Xing 2006, p. 1214):

$$R_{i,t} - R_{F,t} = \alpha_{d,i} + \beta_{dm,i}(R_{M,t} - R_{F,t}) + \beta_{dSMB,i}SMB_t + \beta_{dHML,i}HML_t$$
$$+ \beta_{dUMD,i}UMD_t\varepsilon_{d,i,t},$$
$$\text{where}$$
$$(R_{M,t} - R_{F,t}) < 0.$$

$$\text{(4.3)}$$

Downside idiosyncratic risk (DIR) is calculated as the residuals' standard deviation from the model in Equation 4.4, using only observations, where excess firm returns are negative (Ang et al. 2006).

$$R_{i,t} - R_{F,t} = \alpha_{dr,i} + \beta_{drm,i}(R_{M,t} - R_{F,t}) + \beta_{drSMB,i}SMB_t + \beta_{drHML,i}HML_t$$
$$+ \beta_{drUMD,i}UMD_t + \varepsilon_{dr,i,t},$$
$$\text{where}$$
$$(R_{i,t} - R_{F,t}) < 0.$$

$$\text{(4.4)}$$

I use similar datasets to those that are described in Section 3.2.2 of *Project I*. Insider transaction data was obtained from *www.secform4.com* and prepared in the same way as before. Stock return data was obtained from *Thomson Reuters* pricing and performance database, and firm-level accounting data was obtained from *Thomson Reuters Worldscope*. The variables for the Carhart model (Carhart 1997) were obtained from Kenneth French's Data Library, and the datasets were matched using the same procedure as illustrated in Section 3.2.2.

Moreover, I collected a set of additional control variables that are displayed in Table 4.1. Previous work in both marketing and finance suggests to include these variables in the context of risk analysis (e.g., Beaver, Kettler, and Scholes 1970; Gaspar and Massa 2006; Luo and Bhattacharya 2009; Tuli and Bharadwaj 2009).[42]

Table 4.1: Control Variables – Definitions and Prior Work

Variable	Definition	Sources
Return on assets (ROA)	The ratio of operating income to total assets	Luo and Bhattacharya (2009); Tuli and Bharadwaj (2009)
Total assets (AT)	The logged value of total assets of a firm	Beaver, Kettler, and Scholes (1970); Ben-Zion and Shalit (1975)
Leverage ratio (LEV)	The ratio of total long-term debt to the sum of long-term debt and the market value of equity of a firm	Beaver, Kettler, and Scholes (1970); Hong and Sarkar (2007); Luo and Bhattacharya (2009)
Liquidity (LIQ)	The current ratio of a firm	Beaver, Kettler, and Scholes (1970); Gibson and Mougeot (2004)
Competitive intensity (HHI)	The SIC four-digit Herfindahl concentration index of firm revenues	Gaspar and Massa (2006); Hou and Robinson (2006)

Return on assets. Profitability provides valuable information about a firm's future financial performance (Luo and Bhattacharya 2009). Thus, higher return on assets can reduce risk by lowering concerns about future earnings (Tuli and Bharadwaj 2009).

Total assets. Larger firms are perceived to being exposed to lower risk (Beaver, Kettler, and Scholes 1970). Often used arguments include that larger firms are more diversified, exhibit lower risk for bankruptcy and can realize higher economies of scale (Ben-Zion and Shalit 1975).

Leverage ratio. Debt can lead to higher risk for investors, because future cash flows might decrease as a consequence of interest payments (Beaver, Kettler, and Scholes 1970; Luo and Bhattacharya 2009). Thus, the leverage ratio "can be used as a measure of the risk induced by the capital structure" (Beaver, Kettler, and Scholes 1970, p.661). Empirical evidence demonstrates that systematic risk is positively associated with firms' leverage ratio, which constitutes a fundamental factor (Hong and Sarkar 2007).

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[42]   Due to data availability, I was not able to add additional often used variables, e.g., dividend payout or R&D investments.

Liquidity. Risk from asset returns decreases with liquidity (Beaver, Kettler, and Scholes 1970). Turning securities into cash is associated with both less time and lower cost when liquidity is high (Gibson and Mougeot 2004).

Competitive intensity. Hou and Robinson (2006) demonstrate that firms in highly competitive industries exhibit lower risk. They explain that this effect either stems from entry barriers, or firms in industries with high concentration levels are less innovative and thus, have lower return expectations (Hou and Robinson 2006). Furthermore, Gaspar and Massa (2006) argue that market power can enable firms to provide investors with more and better information, which decreases return volatility. Moreover, competitive power "works as a hedging instrument that smoothes out idiosyncratic fluctuations" Gaspar and Massa (2006, p. 3125).

Furthermore, to account for the insiders functional affiliation, I included a insider group dummy variable that was already used in *Study 1* and *Study 2*.

Table 4.2 displays descriptive statistics and correlations for the variables described above for the 252 days windows.

To determine whether marketing and finance insiders trade in securities that exhibit different changes in risk around the transaction, the following models are estimated using standard OLS regressions. To capture the short-term effects around the transaction, the four risk measures are determined for a 30 days pre- and post-event window. To capture the long-term effects, a 252 days pre- and post-event window is used.

Table 4.2: Correlations and Descriptive Statistics – Changes in Variables (252 Days Pre- and Post-Event Windows)

Variable	N	1	2	3	4	5	6	7	8	9
1. $\Delta\beta_m$	833	1								
2. $\Delta\beta_{dm}$	833	.668***	1							
3. ΔIR	833	.012	.003	1						
4. ΔDIR	833	.037	.009	.882***	1					
5. ΔAT	833	−.026	−.070**	−.171***	−.032	1				
6. ΔROA	833	.127***	.089**	−.025	.061*	.123***	1			
7. ΔLEV	833	−.147***	−.019	.250***	.242***	−.233***	.172***	1		
8. ΔLIQ	833	−.028	.029	−.035	−.007	.040	.082**	.031	1	
9. ΔHHI	833	.140***	.103***	.137***	.171***	.070**	.159***	−.061*	.043	1
M		.006	.005	−.001	−.001	.008	.140	−.027	−.077	.004
SD		.442	.891	.013	.011	.170	.291	.172	1.084	.072

*** $p < .01$, ** $p < .05$, * $p < .1$

4.3.1 Systematic Risk Model

$$\Delta\beta_{m,iT} = \gamma_{m1} + \gamma_{m2}MKT_i + \gamma_{m3}(\Delta AT_{iT}) + \gamma_{m4}(\Delta ROA_{iT}) + \gamma_{m5}(\Delta LEV_{iT})$$
$$+ \gamma_{m6}(\Delta LIQ_{iT}) + \gamma_{m7}(\Delta HHI_{iT}) + \zeta_{iT},$$

where

$\Delta\beta_{m,iT} = \beta_{m,iT} - \beta_{m,iT-1}$

$\beta_{m,iT} =$ systematic risk of transaction i's firm in period T,

$MKT_i =$ corporate insider group dummy; value of 1 if transaction i was

performed by a marketing insider, (4.5)

$AT_{iT} =$ ln of assets for transaction i's firm in period T,

$ROA_{iT} =$ return on assets for transaction i's firm,

$LEV_{iT} =$ financial leverage of transaction i's firm in period T,

$LIQ_{iT} =$ liquidity of transaction i's firm in period T,

$HHI_{iT} =$ concentration index of transaction i's firm in Period T,

$\zeta_{iT} =$ regression residual.

Downside systematic risk:

$$\Delta\beta_{dm,iT} = \gamma_{dm1} + \gamma_{dm2}MKT_i + \gamma_{dm3}(\Delta AT_{iT}) + \gamma_{dm4}(\Delta ROA_{iT}) + \gamma_{dm5}(\Delta LEV_{iT})$$
$$+ \gamma_{dm6}(\Delta LIQ_{iT}) + \gamma_{dm7}(\Delta HHI_{iT}) + \eta_{iT},$$

where

$\Delta\beta_{dm,iT} = \beta_{dm,iT} - \beta_{dm,iT-1}$ (4.6)

$\beta_{dm,iT} =$ downside systematic risk of transaction i's firm in period T,

$\eta_{iT} =$ regression residual,

all other variables are defined as before.

4.3.2 Idiosyncratic Risk Model

$$\Delta IR_{iT} = \gamma_1 + \gamma_2 MKT_i + \gamma_3(\Delta AT_{iT}) + \gamma_4(\Delta ROA_{iT}) + \gamma_5(\Delta LEV_{iT}) + \gamma_6(\Delta LIQ_{iT})$$
$$+ \gamma_7(\Delta HHI_{iT}) + \lambda_{iT},$$

where

$$\Delta IR_{iT} = IR_{iT} - IR_{iT-1}, \tag{4.7}$$

IR_{iT} = idiosyncratic risk of transaction i's firm in period T,

λ_{iT} = regression residual,

all other variables are defined as before.

Downside idiosyncratic risk:

$$\Delta DIR_{iT} = \gamma_{d1} + \gamma_{d2} MKT_i + \gamma_{d3}(\Delta AT_{iT}) + \gamma_{d4}(\Delta ROA_{iT}) + \gamma_{d5}(\Delta LEV_{iT})$$
$$+ \gamma_{d6}(\Delta LIQ_{iT}) + \gamma_{d7}(\Delta HHI_{iT}) + \theta_{iT},$$

where

$$\Delta DIR_{iT} = DIR_{iT} - DIR_{iT-1}$$

DIR_{iT} = downside idiosyncratic risk of transaction i's firm $\tag{4.8}$

in period T,

θ_{iT} = regression residual,

all other variables are defined as before.

4.4 Results

Table 4.3 displays descriptive statistics and non-parametric tests for the 30 and 252 days windows. The results for the 30 days window in *Panel A* exhibit that if risk changes in the two insider groups appear to be significant, they are related to risk reductions. While both idiosyncratic and downside idiosyncratic risk decrease significantly subsequent to marketing and finance insider purchases, the effect on systematic risk appears significant only for the marketing insider sample. However, there aren't any significant differences in risk changes between the two insider groups. Thus, in the present event window there is no indication for differences between marketing and finance transactions.

Table 4.3: Risk Measures – Non-Parametric Tests

Panel A Insider Group	30 Days	$\Delta\beta_m$	$\Delta\beta_{dm}$	ΔIR	ΔDIR
Marketing (1)	**M**	−.180	−.111	−.004	−.004
	SD	1.493	3.523	.011	.013
	signed-rank test S^a	−1.035*	−.255	−2.352***	−2.054***
Finance (2)	**M**	−.019	−.152	−.003	−.004
	SD	1.391	3.074	.012	.013
	signed-rank test S^a	−2.590	−5.078	−35.961***	−35.932***
Diff (1) – (2)	**Kruskal–Wallis** χ^2	2.45	.00	.47	.06
	Wilcoxon rank-sum Z	−1.57	−.05	−.69	−.25

continued Risk Measures – Non-Parametric Tests

Panel B	252 Days		$\Delta\beta_m$	$\Delta\beta_{dm}$	ΔIR	ΔDIR
Insider Group						
Marketing (1)	**M**		.026	.162	.001	.001
	SD		.449	.949	.015	.011
	signed-rank test S^a		.599	1.304**	−.0007	−.160
Finance (2)	**M**		.001	−.030	−.001	−.001
	SD		.441	.874	.013	.011
	signed-rank test S^a		3.977	−1.340	−25.440***	−21.157***
Diff (1) − (2)	**Kruskal–Wallis** χ^2		.44	5.69**	3.55*	2.20
	Wilcoxon rank-sum Z		.66	2.38**	1.89*	1.48

Notes: All tests are two-sided; ^{a}: in thousands
***$p < .01$, **$p < .05$, *$p < .1$

Panel B of Table 4.3 shows the results for risk changes that occur when comparing a period of 252 days before and after the insider trading events. Significant differences between marketing and finance transactions exist for downside systematic risk and downside idiosyncratic risk. While downside systematic risk after marketing trades exhibits a significant increase, downside systematic risk for stocks traded by finance insiders remains unchanged. Moreover, both idiosyncratic and downside idiosyncratic risk decreases subsequent to finance induced transactions. For marketing related trades a change in the two idiosyncratic risk measures is not observable.

There seem to be various drivers that are responsible for changes in the different risk measures. Thus, additional analyses that take into account the aforementioned control variables are conducted for the 252 days window.

Table 4.4 presents the results of the four risk models that are all highly significant ($p < .01$). The downside systematic risk model exhibits the lowest R-squared with 3%. The best variance explanation is obtained in the idiosyncratic risk model with an R-squared of 11%. Examining variance inflation factors indicates that multicollinearity is not an issue. All VIFs are below 1.13, and thus, clearly below the recommended threshold of 10 (Hair et al. 1998).

In the systematic risk model, except for liquidity and the insider trading dummy, all variables exhibit a significant effect. The significant intercept ($\gamma = -.0517$; $p < .01$) suggests that ceteris paribus, an overall decrease in systematic risk occurs, when comparing the pre-event and post-event values. Thus, without considering other effects, systematic risk decreases around marketing and finance insiders purchases. The insignificant insider group dummy demonstrates that differences between the two functions cannot be observed. Furthermore, systematic risk increases along with ROA ($\gamma = .2380$; $p < .01$) and industry concentration ($\gamma = .6846$; $p < .01$) but decreases along with firm size ($\gamma = -.2539$; $p < .01$) as well as leverage ($\gamma = -.4989$; $p < .01$).

The downside systematic risk model exhibits almost the same effects. However, the insider group dummy is significantly positive associated with changes in the risk measure ($\gamma = .2108$; $p < .01$). Thus, even though the significant intercept demonstrates that ceteris paribus, downside systematic risk decreases around insider purchases ($\gamma = -.0819$; $p < .01$), for marketing induced transactions, this effect is overcompensated. Hence,

downside systematic risk increases around marketing trades.

Table 4.4: Risk Analysis – 252 Days Pre- and Post-Event Windows

Variables	$\Delta\beta_m$	$\Delta\beta_{dm}$	ΔIR	ΔDIR
Intercept	−.0517***	−.0819**	−.0001	−.0006
	(.0193)	(.0385)	(.0006)	(.0006)
MKT	.0465	.2108***	.0015	.0007
	(.0376)	(.0805)	(.0012)	(.0009)
ΔAT	−.2539*	−.5603**	−.0090**	.0011
	(.1344)	(.2592)	(.0045)	(.0031)
ΔROA	.2380***	.2920*	−.0035	−.0005
	(.0685)	(.1535)	(.0023)	(.0018)
ΔLEV	−.4989***	−.3430*	.0186***	.0160***
	(.0896)	(.2054)	(.0037)	(.0029)
ΔLIQ	−.0142	.0220	−.0005	−.0002
	(.0151)	(.0257)	(.0003)	(.0003)
ΔHHI	.6846***	1.1009**	.0318***	.0280***
	(.2173)	(.4910)	(.0091)	(.0084)
R^2	7%	3%	11%	9%
F-Value	10.12***	4.97***	17.16***	14.44***

Notes: Standard errors are in parentheses. $N_{Marketing}$ = 154, $N_{Finance}$ = 679,
$VIF_{average}$ = 1.06, VIF_{max}=1.13
***$p < .01$, **$p < .05$, *$p < .1$

The two idiosyncratic risk models do not reveal significant effects that can be attributed to the insider trading itself. Neither the constant nor the insider group dummy is significant. Solely the control variables exhibit significant influences. First, idiosyncratic risk decreases with an increase in firm size (γ = -.009; $p < .05$). Furthermore, both idiosyncratic risk measures exhibit significant changes along with leverage (IR γ = .0186; $p < .01$; DIR γ = .0160; $p < .01$) and industry concentration (IR γ = .0318; $p < .01$; DIR γ = .0280; $p < .01$). The remaining variables do not show significant effects.

4.5 Summary and Discussion of Findings

In summary, this project demonstrates that insider trading signals from marketing and finance managers indicate changes in a firm's systematic and idiosyncratic risk. While in

the short run, insider trading from both functions comes along with downward changes in idiosyncratic risk measures. The results for the long run are mixed. After accounting for common control variables, differences in idiosyncratic risk measures disappear. However, downside systematic risk significantly decreases for firms that experience finance induced insider trading, whereas this risk measure moves upwards for marketing related transactions. Furthermore, systematic risk does not exhibit any function-specific differences.

Overall, this project is the first to empirically analyze the stock returns risk implications of insider purchases from a function-specific perspective. The findings demonstrate that risk changes around insider transactions should not be investigated without considering the functional affiliation of the insider who trades.

In contrast to previous evidence, the findings of this project do not indicate that the disclosure of insider trading signals results in an increase in systematic risk, in general. In particular in the short run, systematic risk rather decreases, if there is any significant effect at all. Furthermore, the obtained results do not indicate that the type of insider transactions that are examined in this thesis, are associated with an increase in idiosyncratic risk. This outcome is not completely in line with previous research. Dickgiesser and Kaserer (2010) report that insider returns are higher when idiosyncratic risk is high. The results obtained here, demonstrate that idiosyncratic risk decreases after insider trading occurs. However, the present project did not test the level of risk prior and after a trade, but only focused on differences between pre-event and post-event periods. Moreover, it did not take into consideration the relationship between insider returns and the associated risk. However, the findings obtained here, only apply to the two corporate functions that are examined in this thesis. Whether insider transactions related to other corporate functions or hierarchy levels generate other results, cannot be answered at this point.

Moreover, the findings from this project suggest that marketing and finance insiders may trade on information that has different implications depending on whether looking at short-term or long-term effects. In the short run, insiders' private information seems the be relevant for idiosyncratic effects, whereas in the long run, rather market wide risk factors matter. When finance insiders trade the stocks of their own corporation, a firm's

risk associated with economy wide factors decreases. However, firms that experience marketing insider purchases exhibit an increase in downside systematic risk.

Unfortunately, the design of this project cannot provide further insight into the underlying mechanisms that cause these results. A possible explanation could be that marketing and finance insiders trade on information, which is associated with different levels of uncertainty. As a consequence, downward price adjustments could be stronger, when the effects of economy wide changes are less clear for investors.

4.6 Project II: Contributions and Outlook

4.6.1 Contributions and Implications

Findings of this project have various implications for both research and practice. First, this project advances the scarce literature that examines the risk implications of reported insider trading. The present project introduces a function-specific perspective and advances prior research that either treats insiders as a homogenous group or merely focuses on hierarchical differences. By combining findings in marketing, which indicate that market-based assets can affect the risk in firms' stock returns (e.g., McAlister, Srinivasan, and Kim 2007; Tuli and Bharadwaj 2009), and prior research in finance (e.g., Cai et al. 2007; Dickgiesser and Kaserer 2010; Seyhun 1988), this project introduces a new way of evaluating the risk implications associated with marketing information disclosures. Hence, this project responds to the recent call by Tuli and Bharadwaj (2009), who emphasize that research, which investigates the relationships between marketing information and stock market performance, should take into account various dimensions of risk. Furthermore, it demonstrates the importance of considering not only hierarchical differences in insider transactions and in particular not to treat insiders as a homogenous group. Otherwise, function-specific differences are neglected.

Second, previous work in marketing emphasized the need for a more profound understanding of "the effects of different types of information", and "the effects of the medium of marketing information disclosures"(Srinivasan and Sihi 2012, p. 121). However, previous research solely focused on marketing information that is either based on ob-

servable marketing metrics or marketing strategies. In contrast, this project focuses on signals that are based on actual behavior, which is based on corporate insiders' privately held information. Furthermore, insider trading signals represent forward looking information. Thus, the findings of this project advances previous work in marketing by providing empirical evidence on the risk implications of marketing related insider trading, which represents a medium that signals forward looking information.

From a practical perspective, investors should have a closer look at the timing of insiders' purchases. These signals seem to carry risk relevant information, and in the short run, investors can expect idiosyncratic risk to decrease. This finding is particularly important for those investors that do not hold fully diversified portfolios, which enable them to eliminate idiosyncratic risk. Furthermore, observing finance agents' insider transactions could assist investors by identifying stocks that exhibit a long-term decrease in systematic risk. Overall, investors could use insider trading signals as one aspect in their investment decisions.

As Tuli and Bharadwaj (2009) note, idiosyncratic risk is crucial for a firm's future survival. Thus, managers could use the findings of this project as a starting point for identifying and evaluating the risk implications of corporate strategies and events. Moreover, management could employ insider trading – in addition to other instruments – as an alternative to communicate risk relevant information to capital markets.

4.6.2 Limitations and Future Research

This project is subject to a number of limitations that provide opportunities for future research. First, this project examines the stock returns risk implications of insider purchases without taking into account other events that would affect a firm's stock risk. Even though this project controls for commonly used variables, this limitation cannot be eliminated. Furthermore, the true nature of risk relevant information that insiders trade on remains unclear as well. Therefore, future research could integrate previous research in finance and marketing with the results that were obtained here to investigate the type of information insiders use for their trades, and whether this information is conveyed through other channels, too.

Second, this project examines only changes in the four risk measures. Therefore, the results of this project do not provide further insight into the role of risk levels before and after an insider transaction. Future research could advance prior research in finance by investigating whether insiders from different functional areas trade in securities that vary in risk levels prior to the transactions. Furthermore, future work in this area could take into account insiders' risk awareness. It could be possible that some insiders are risk avers, whereas others invest in stocks with greater expected volatility but also higher return expectations.

Third, this project did not examine whether there is a relationship between the abnormal return an insider realizes with a particular transaction and the risk associated with the securities that are traded. Thus, future research could combine the results from both Project I and Project II of this dissertation to gain further insight into this relationship.

Finally, this study represents only a basic examination of the risk implications associated with insider trading from different functional areas. In particular, this project focuses solely on marketing and finance related insider purchases. However, previous research in finance suggests that the outcome of insider trading also could depend on hierarchical differences between insiders. Furthermore, despite the unclear motivations for insider sales, future research could investigate whether insider sales are associated with changes in stock returns risk, too. Thus, future research should expand the focus of this project by examining the whole population of insider transactions. Furthermore, future research should consider additional variables and in particular interaction effects, when investigating the risk implications of insider trading signals.

5 General Discussion, Conclusions, and Future Outlook

The overarching goal of this dissertation is to deliver an improved insight into the capital market outcomes of marketing information disclosures, and to enhance research on corporate insider trading by introducing a function-specific perspective. By using publicly available stock market data, firm accounting data and SEC Form 4 filings, this dissertation analyzes how US stock markets respond to the disclosure of stock purchases made by corporate insiders affiliated to marketing and finance.

Using insider trading reports as a means of marketing information disclosure, constitutes a new approach in marketing research. Existing research in marketing that investigates the usefulness and implications of marketing information for capital markets, has mostly focused on the value and risk implications of established marketing figures or common marketing strategies. Moreover, existing research in finance has largely neglected that the implications of corporate insiders' trading signals may differ across signals from various functional affiliations.

From a theoretical perspective, it is important to understand if insider trading can be used as a means for conveying value relevant marketing information. Furthermore, knowing if the information content of insider trading signals depends on an insider's functional affiliation and the information environment of a particular firm, will result in a better understanding of capital market response to marketing information disclosures. From a practical perspective, managers seek for ways to communicate value relevant information without disclosing company-internal secrets. Moreover, the identification and reduction of information asymmetries between managers and investors is of importance for both authorities and accounting standard setters. Thus, the present dissertation provides valuable theoretical and practical implications, by examining the capital market outcomes of information disclosures related to forward looking signals, which are

based on observable actual behavior of corporate managers.

5.1 Summary of Key Findings

The results of this dissertation demonstrate that 1) at least in the short run, capital markets respond differently to marketing and finance insiders' purchase signals, and 2) that the informativeness of a firm's financial statements moderates this effect. Furthermore, the findings of this thesis show that 3) the information conveyed through marketing insider trading signals also comprises information about the risk associated with a firm's stock returns.

Project I: The Information Content of Marketing Induced Insider Trading

Study 1 serves as a first attempt to examine stock market reactions subsequent to marketing and finance related insider buying signals, without taking into account additional explanatory variables. The study investigates whether a function-specific perspective provides additional insight, when analyzing the capital market outcomes of insider trading both in the short run and in the long run. In line with signaling theory and upper echelons theory, the results of this study demonstrate that capital markets respond differently to marketing and finance related trading signals. The results for the immediate market reaction indicate that stock markets rapidly adjust after the disclosure of insider purchase transactions. The price adjustment following to finance transactions starts when the insider transaction report is disclosed and it seems to be completed on the subsequent day. The immediate price adjustment following marketing transactions begins and is completed on the first day after the event. The results for the immediate market reactions demonstrate that differences in abnormal returns between marketing and finance occur only on the day subsequent to the event. On this particular day, marketing related abnormal returns are significantly higher than finance related abnormal returns.

The long-term effects are mixed. While the results indicate that significant calendar-time portfolio returns disappear after three months following marketing insider transactions, finance induced insider trading exhibits significant abnormal returns for up to six months following a transaction. However, the results also demonstrate that significant

differences between calendar-time portfolio returns for marketing and finance insider groups do not exist.

Study 2 examines how a firm's information environment and the insider signals' credibility influence the observed market reaction. The study uses firm size and financial statement informativeness as proxies for a firm's information environment. The monetary value of a particular insider transactions is used as a measure of signal credibility. The results of the study demonstrate that significant differences in short-term cumulative abnormal returns between marketing and finance induced transactions exist. These differences occur as a consequence of the underlying information environment of the firms that experience insider trading. Moreover, signal credibility is positively associated with insiders' excess returns. Both attributes that are used as proxies for information asymmetries between management and investors, and the transactions' signal credibility have a significant influence on the abnormal price reaction in the short run. In line with previous findings in finance and accounting, larger firms exhibit lower levels of information asymmetry and thus, firm size has a negative influence on cumulative abnormal returns. Moreover, the study demonstrates that capital market response is stronger, if value relevant information provided in traditional financial statements is limited. Additional analyses reveal that these findings are robust when low-priced stocks are removed from the sample.

In the long run, the calendar-time portfolios for the marketing insider group exhibit significant positive abnormal returns during a six months post-event period, when financial statement informativeness is low. In the same setting, the finance insider portfolio returns are not significantly different from zero. Furthermore, differences between marketing and finance calendar-time portfolio returns do not show significant differences. When financial statement informativeness is high, the results indicate that finance insiders can realize positive abnormal returns up to 24 months following a transaction. In contrast, the marketing insider portfolios exhibit significant abnormal returns during a three months period after a transaction. However, the significant abnormal returns disappear when observing six and twelve months post event time horizons, but increase to a significant level again, when examining the 24 months post event window.

Project II: Stock Returns Risk Implications of Marketing Induced Insider Trading

The second project of the present dissertation examines whether marketing and finance related insider purchase transactions have implications for a firm's stock returns risk. For this purpose, the project analyzes changes in systematic and idiosyncratic risk around insider transactions. Short-term effects are examined by focusing on a 30 days pre- and post event time period. Long-term effects are examined over a 252 days pre- and post-event period. The results of the project demonstrate that in contrast to previous research, systematic risk subsequent to marketing insider transactions decreases when focusing on risk changes between the 30 days pre- and post-event windows. Furthermore, for both marketing and finance insider transactions, idiosyncratic and downside idiosyncratic risk decrease, when comparing these two periods. Downside systematic risk is not affected in the short run. However, significant differences in risk changes between the two insider groups do not exist.

While finance related insider transactions are associated with significant downward changes in both idiosyncratic and downside idiosyncratic risk in the long run, subsequent to marketing insider purchases, downside systematic risk exhibits a significant increase. Comparing the two insider groups further reveals significant differences in downside systematic risk changes and idiosyncratic risk changes.

After taking into account additional variables to control for firm size, profitability, a firms capital structure, liquidity and competitive intensity, multivariate analyses show that significant differences between marketing and finance induced insider purchases only exist for downside systematic risk. The results demonstrate that downside systematic risk exhibits a significant increase subsequent to a marketing related transactions, when comparing 252 days pre-event and post-event windows.

5.2 General Discussion

5.2.1 Contributions for Theory and Research

This thesis makes a number of important contributions to existing literature in marketing and finance, and adds to theoretical knowledge in several ways.

Primarily and most importantly, the results of this dissertation have implications for research at the intersection of marketing and finance. The two projects of this thesis introduce a new way for analyzing the capital market outcomes of marketing information disclosures. The unique approach of this dissertation is to use insider trading signals to examine the value and risk implications related to marketing information. Marketing academics are still seeking new ways for evaluating and conveying the value of marketing strategies and investments (Marketing Science Institute 2014). However, previous work in this field elaborates on the mispricing of marketing information and demonstrates that marketing activities are associated with unexpected stock price movements and changes in a firm's stock returns risk, but these studies are not able to compare the capital market outcomes of marketing information disclosures to a direct finance related counterpart. Moreover, by focusing on insider trading signals, this dissertation is the first study that examines how stock markets respond to the disclosure of forward looking marketing information, which is based upon the evaluation of privately held information, and corporate agents' actual behavior. Thus, this dissertation contributes to the current discussion about the importance of marketing information for capital markets, and it demonstrates that marketing related signals can provide a greater information content than signals from finance.

Furthermore, the two projects of this dissertation improve previous knowledge in finance and show that insiders should not be treated as a homogenous group. The findings of this thesis advance our understanding of the capital market outcomes of insider trading by demonstrating that a function-specific perspective provides further insight into the information content and the risk implications associated with marketing and finance induced insider purchases. Although recent findings in finance suggest that insiders are heterogenous (Knewtson and Nofsinger 2014; Wang, Shin, and Francis 2012), they still neglect that differences within this group not only emerge from hierarchical levels, but also from their functional affiliation. Both projects show that corporate agents from marketing and finance departments trade on different privately held information, and capital markets are aware of these differences.

This dissertation does not only advance our understanding if capital market response to insider trading signals from different corporate functions varies. Moreover, it demonstrates why capital market response subsequent to marketing and finance induced insider

purchases differs. In fact, the results of this thesis show that investors apparently differ-entiate between the nature of the information an insider trades on. As the findings sug-gest, investors expect that marketing insiders possess more value relevant information about market-based off-balance sheet assets, whose value implications can hardly be disclosed through traditional financial statements. Capital markets consider marketing insider's private information both as an enhancement of and a substitute for traditional financial statement information. Thus, this thesis also contributes to research in finan-cial accounting by demonstrating that marketing information could be used to reduce information asymmetries that arise from limitations of current GAAP in demonstrating the future value implications of intangibles.

The findings of the present thesis also emphasize the importance of a firm's marketing function. Even though, as previous research suggests, stock markets occasionally fail to fully incorporate the value implications of marketing disclosures, investors obviously recognize that the members of a firm's marketing department have certain capabilities that enable them to understand and predict the future options that arise from a firm's market based assets. Hence, these findings could be used to demonstrate the importance of marketing's knowledge for firms that have to evaluate the potential future outcomes of alternative strategies that largely depend on investments in intangible assets. Without taking into account marketing's expertise, value relevant information that cannot be expressed in a traditional finance related manner, possibly would be neglected or be considered only insufficiently. Thus, this project contributes to previous research in marketing that analyzed the value implications of marketing in a firm's top management teams (e.g., Boyd, Chandy, and Cunha 2010; Nath and Mahajan 2008).

In summary, this dissertations contributes to previous research in marketing, finance and accounting. The results demonstrate that marketing information, which is presented in a standardized fashion that can be evaluated with a commonly used framework, provides a greater information content than finance related information, which is presented in the same way. Furthermore, the findings advance previous knowledge in finance and accounting, by showing that the information content of insider trading largely depends on an insider's functional affiliation. Moreover, information asymmetries that stem from traditional financial statements limitations in providing value relevant information about intangible assets, can be resolved by disclosing privately held information, when the

insider who trades is particularly more involved with a firm's intangibles. Finally, The results of the two projects contribute to the still scarce literature on insider trading in the post-SOX reporting regime, by investigating not only the information content of insider trading from a function-specific perspective, but also whether function-specific insider trading signals provide valuable information about a firms stock returns risk.

5.2.2 Contributions for Practice

The results of this thesis have important implications for current practice in management and for authorities.

In general, both managers and authorities should reconsider the way in which value relevant information is publicly disclosed. As highlighted by many others before (e.g., Healy and Palepu 2001; Lev and Zarowin 1999), as a result of new trends in the economy as well as new and innovative business models, firms more and more create value from intangible market-based assets. However, traditional financial reports are not capable of demonstrating the value implications associated with these investments. In this regard, the results of this thesis suggest that putting these implications into numbers may not be the appropriate way. One way of interpreting the present findings could be that trading signals from marketing insiders are perceived as some sort of standardized forward looking disclosure that is rather easy to interpret. The results further indicate that private information from marketing insiders' trading signals is less important, as long as assets and earnings provide a sufficient level of information. Under the current accounting regime, it is difficult to demonstrate how investments in market-based assets translate into future earnings. As Booker, Heitger, and Schultz (2010) demonstrate, investors have difficulties in evaluating nonfinancial measures, when they do not understand the underlying mechanisms. Thus, financial disclosure should be improved by demonstrating not only how intangible investments translate into future earnings, but also by explaining the relevant mechanisms. However, whether carrying this out should be assigned to firm management or accounting standard setters needs further investigation and discussion.

Apparently, capital markets seek private information from marketing related sources, when traditional financial information is insufficient. Thus, when planning mergers and

takeovers, managers should put more emphasis on exploring the value implications of market-based assets. Moreover, there might be additional demand for experts with a marketing background that have the capabilities to perform such a task well. Therefore, the results of this study may increase the value of marketing capabilities within firms and also the group of financial analysts. Furthermore, the findings of this dissertation could provide new arguments for the importance of marketing in the C-Suite. If marketing is the function that is perceived to be aware of the value and future options of intangibles, then every firm that builds its business on market-based assets should have a marketer in its top management team.

As suggested by Carlton and Fischel (1983), insider trading can be used as a tool for financial disclosure. The results of this dissertation demonstrate that such a mechanism seems to be particularly useful in situations where traditional financial statements can provide only a vague idea about the value implications of a firm's assets and earnings. In such situations, insider trading signals could be employed by management to disclose value relevant information without bearing the risk of damaging their competitive advantage by disclosing corporate secrets. Smaller firms that often exhibit lower liquidity and higher information asymmetry can use insider trading signals to improve the communication with investors. Furthermore, together with other measures and metrics for financial statement informativeness, insider trading could be used to assess the degree of information asymmetry that is caused by different marketing events. For instance, it could be used to assess, which marketing related strategies pose difficulties for financial markets to evaluate their impact on future performance. From the perspective of corporate disclosure and investor relations, this might provide useful insights into areas that need improvements in terms of voluntary disclosure.

In summary, the results of this dissertation suggest that a better understanding of the value implications associated with market-based assets could be advantageous for managers and investors alike. Furthermore, managers and investors should emphasize on the capabilities of marketing personnel.

5.3 Conclusion and Future Outlook

Research at the intersection of marketing and finance still is of growing importance, and this dissertation makes a substantial contribution to this field by introducing a new way to investigate the effects of marketing information disclosures and demonstrating their significance. The results of this thesis suggest that capital markets distinguish between marketing and finance related signals, when evaluating corporate insiders' privately held information. Furthermore, stock markets perceive marketing related signals more important when traditional financial statements provide only limited information about a firm's prospects. In summary, this thesis recommends that both managers and accounting standard setters should put more emphasis on providing standardized disclosures that capture the value and risk implications of off-balance sheet assets. However, this dissertation is also subject to a number of limitations that could be addressed in future research.

One central limitation of this dissertation stems from the underlying dataset and the methodology that is used. In *Project I* only the short-term abnormal returns could be analyzed in a multivariate setting. The calendar-time portfolio approach that was chosen for investigating long-term effects, appears not to be capable of explaining the complex structure of the data set. In retrospect, a method that delivers long-term abnormal return measures for each individual transaction may provide more opportunities to conduct additional analyzes. However, alternative methods are subject to other limitations, but future research could employ other long-term measures, such as BHAR. In *Project II*, additional explanatory variables are only available for the long-term perspective. However, accounting data is not continuously available. Thus, future work could try to find other ways to account for changes in factors that affect firms' stock returns risk in the short-term.

Further limitations might stem from the insider trading sample. On the one hand, this study employed post-SOX data, only. Thus, at the time when the data was collected, the available sample period was rather short. On the other hand, extracting marketing and finance insider trades from the population of insider transactions revealed that transactions from insiders of both functions are responsible only for a small proportion of total insider transactions. In particular, marketing insider trades are a rather rare

phenomenon. One explanation might be that marketing insiders trade very selectively, and only if they are rather sure to possess valuable private information. This could be another explanation for the strong market reaction that follows marketing related purchases. However, future studies should focus on an extended time frame, which is available nowadays.

As also Veenman (2012) suggests, future research could investigate, whether financial analysts and institutional investors take insider trading reports into consideration when making their recommendations and decisions. In light of the results of this dissertation, future research in this area should also take into account whether these finance professionals distinguish between insider reports from different functional areas, and account for the information quality of a firm's financial statements.

This thesis extensively discusses how the existence of market-based assets might affect the informativeness of traditional financial statements, and thus, tries to explain the moderating role of financial statement informativeness for marketing induced insider purchases. However, the true nature of the private information that insiders trade on is unknown. To address this issue, future research could conduct surveys among corporate insiders to identify their underlying motives and their set of private information, and match these data to observed post-event abnormal returns. Such data would also help to get a better understanding of informational differences between functional areas within an organization. Moreover, future studies could investigate how value relevant information is processed, aggregated and transmitted between corporate functions within the firm. This could answer the question, whether private information that an insider trades on, stems from unique capabilities that only exist in individual corporate functions. Furthermore, it would be of high interest for multiple disciplines to discover which corporate actions and strategies are particularly disclosed through insider transactions.

Due to the vague motivations behind insider sales, this dissertation focused solely on insider purchases. However, even though the information content of insider sales is often questioned in finance literature, future research could include insider sales to expand the focus of this thesis. If the motivation for observed insider sales could be narrowed down, marketing insider selling could be used to gain further insight into negative corporate

events related to market-based assets. This may include failures in product development, unsuccessful advertising campaigns or poor customer relationship management.

Furthermore, this thesis employs only a general measure for financial statement informativeness to examine its moderating role on the information content of insider purchases. However, there might be more specific sources of information asymmetries. Therefore, future research could investigate how changes in a firm's business model, such as the transition from product orientation to service orientation, affects the level of information asymmetry between management and investors, and how insider trading helps to reduce this information asymmetry. Such events may introduce uncertainty into the market that might be associated with either mispricing or higher risk in stock returns.

Another limitation of the studies conducted in this dissertation might stem from omitted variable bias. In general, models that use risk measures or stock returns as dependent variable exhibit low R-squares. However, the models presented in this study use only a limited set of explanatory variables. There might be additional variables that could be added when analyzing the drivers of abnormal stock returns. However, the major goal of this dissertation was not to identify a set of variables that explains the size of abnormal stock returns. This dissertation wants to demonstrate that stock markets consider marketing insider trading signals as valuable information that stimulates an update of investors' expectations. However, future research could take into account additional variables that characterize either the insider, who trades (e.g., the background) or other firm and industry characteristics. For instance, if there are differences between manufacturing firms and service firms or whether particular personal characteristics affect the credibility of trading signals.

Future research could also advance the examination of insider trading in the post-SOX regime. Since the enactment of SOX the world's economy experienced both a global crisis and a significant upturn. The level of traditional disclosures may differ across economic cycles. Thus, stock market response to insider trading signals may also vary. Moreover, future research could investigate, if stock prices of firms that exhibit marketing insider purchases are less severely affected by market wide turbulences.

Finally, this dissertation examined only one particular type of information disclosure.

Thus, future research could examine whether information asymmetries that arise from the implementation of marketing strategies can be resolved faster when using traditional disclosure channels or in the presence of marketing induced insider trading.

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Appendix

A Insider Trading Report

Transaction & Date	Reported Date	Company	Symbol	Insider Relationship	Shares Traded	Average Price	Total Amount	Shares Ownership	Filing
2013-11-05 Purchase	2013-11-06 3:59 pm	FORD MOTOR CO	F	LECHLEITER JOHN C (Director)	2,500	$17.06	$42,642	2,500 (Direct)	View
2013-10-31-05:00 Purchase	2013-11-06 3:57 pm	mLight Tech, Inc.	MLGT	Sudeck Todd (Pres/CEO/CFO/Sec Director 10% owner)	2,500,000	$0.0099	$24,750	182,500,000 (Direct)	View
2013-11-04 Purchase	2013-11-06 3:56 pm	FreightCar America, Inc.	RAIL	AVERY CHARLES F JR (VP Finance, CFO and Treasurer)	1,500	$22.66	$33,990	11,500 (Direct)	View
2013-11-05 Purchase	2013-11-06 3:44 pm	Pershing Gold Corp.	PGLC	Honig Barry C (Director 10% owner)	209,462	$0.359	$75,197	8,036,174 (Indirect)	View
2013-11-05 Purchase	2013-11-06 3:04 pm	CYNOSURE INC	CYNO	Hatsopoulos Marina (Director)	3,000	$22.6	$67,800	3,000 (Direct)	View
2013-10-31 Purchase	2013-11-06 1:59 pm	DYNAMICS RESEARCH CORP	DRCO	KELEHER DAVID (SVP, CFO and Treasurer)	108	$7.03	$760	95,501 (Direct)	View
2013-11-04 Purchase	2013-11-06 1:35 pm	BAR HARBOR BANKSHARES	BHB	DODGE PETER (Director)	1,000	$37	$37,000	6,738 (Direct)	View
2013-11-05 Purchase	2013-11-06 1:09 pm	LAKELAND FINANCIAL CORP	LKFN	NIEMIER CHARLES E (Director)	502	$35.51	$17,827	8,625 (Direct Indirect)	View
2013-11-04 Purchase	2013-11-06 12:25 pm	State Auto Financial CORP	STFC	STATE AUTOMOBILE MUTUAL INSURANCE CO (10% owner)	6,100	$19.96	$121,756	25,316,763 (Direct)	View
2013-11-04- -2013-11-06 Purchase	2013-11-06 12:21 pm	KEYW HOLDING CORP	KEYW	Krobath John Erwin II (CFO/Treasurer)	5,000	$11.37	$56,850	105,212 (Direct)	View

Figure A.1: Insider Trading Report
Source: www.secform4.com

B Robustness Test

Table B.1: Price per Share - Dependent Variable = CAR (event to day+3)

Variables	PPS $\geq$ \$2 Coefficients	PPS $\geq$ \$5 Coefficients
Intercept	.0023	.0018
	(.0081)	(.0085)
MKT	.0122***	.0159***
	(.0043)	(.0051)
INF	.0006	.0025
	(.0030)	(.0031)
MCAP	$-$.0009**	$-$.0010**
	(.0004)	(.0004)
TRAN	.0026***	.0026***
	(.0003)	(.0004)
MKT x INF	$-$.0267***	$-$.0275***
	(.0086)	(.0098)
$\text{VIF}_{\text{average}}$	1.71	1.84
VIF_{max}	2.75	3.10
R^2	2.51%	2.66%
F-Value	13.63***	12.98***
$N_{\text{Marketing}}$	250	215
N_{Finance}	2405	2163

Notes: Standard errors are in parentheses.
***$p < .01$, **$p < .05$, *$p < .1$