

Essays on management transactions – Evidence from Switzerland

DISSERTATION
of the University of St.Gallen,
School of Management,
Economics, Law, Social Sciences
and International Affairs
to obtain the title of
Doctor of Philosophy in Management

submitted by

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Dissertation no. 4147

Difo-Druck GmbH, Bamberg 2013

The University of St.Gallen, School of Management, Economics, Law, Social Sciences and International Affairs hereby consents to the printing of the present dissertation, without hereby expressing any opinion on the views herein expressed.

St.Gallen, May 17, 2013

President:

Prof. Dr. Thomas Bieger

Acknowledgement

Foremost, I would like to express my greatest gratitude to my supervisor Prof. Dr. Andreas Grüner, who gave me the opportunity to develop these essays on management transactions. I am greatly indebted for his patience, valuable guidance and openness when I was choosing my area of research. Along the way of this dissertation, the discussions with him broadened my horizon and greatly encouraged my research motivation. The periodic open conversations provided a fruitful fundament in achieving academic merits and to scrutinize and improve constantly my research outcome.

In addition, I would like to thank my co-supervisor Prof. Dr. Dr. h.c. Klaus Spremann for his prudent comments. Those remarkably helped me to stay focused on the topic. Moreover, the so-called *Bastelstunde* gave me the inspiring feedback to tap the immense knowledge in my field of research.

I want to thank Lucia Ehn, Felix Schneider and Adrian Peller, all Ph.D. fellows, who shared their knowledge and ideas, and constantly supported me on the way to achieve the desired outcome. This was vital for the success of the project. I am grateful for their constant support and help. Moreover, I thank my roommates Leonard Wilhelmi and Alexander Ingelheim for the lively time in St.Gallen as well as Frances Zichanowicz for her restless dedication and her abundance of patience to improve constantly the language skills of this work.

This dissertation would not have been possible without the everlasting assistance of my beloved parents, Albert and Gerdi, my sister Lea, and my girlfriend Nicole, who supported me during the entire process of my dissertation project. They inspired and encouraged me with their best wishes during the ups and downs of the research process and motivated me in the final stage of my writing. I am extremely grateful for their understanding, endless patience and encouragement when it was most appropriated. I dedicate this dissertation to them for their unwavering support, care and love.

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Abstract

This dissertation comprises three essays which analyze different financial, corporate and legal facets of management transactions in Switzerland. An introductory section (*Part I*) and a conclusion and implications section (*Part V*) frame this dissertation.

The first essay (*Part II*) examines management transactions and poses the question as to how the Swiss regulation on management transactions performs in relation to that of other developed capital markets. I construct an integrated insider trading law index (IITI) in order to determine and compare the toughness of the predominant forms of regulation on insider trading. I find deficiencies in the European system in general and even more pronounced ones in the Swiss regime in particular, whereby the weakness is greatest with regard to disclosure-based factors. Moreover, I find clear evidence that tougher insider trading law positively correlates with stock market turnover and negatively correlates with insider ownership.

The second essay (*Part III*) contributes to the scarce literature on management transactions on the Swiss stock market and examines the effects of stock price momentum and corporate announcements on abnormal market reactions. The findings suggest that both effects substantially impact the abnormal returns. A positive (negative) stock price momentum around purchase (sale) transactions generates unexpectedly high abnormal market reactions. Moreover, purchase (sale) transactions prior to Good-News (Bad-News) announcements trigger stronger abnormal returns. Accordingly, when both effects are combined, this study reveals unforeseen, strongly abnormal, market reactions previously undocumented by other studies to this date. This study provides evidence that only a small portion of the abnormal returns observed can be attributed to the management transaction itself.

The third essay (*Part IV*) questions to what extent outside investors are able to profit from insider information. Therefore, a more practically-oriented 4-step research approach has now been taken to determine the best portfolio for a strategy of mimicking insider transactions on the Swiss stock market. The findings suggest that a combination of corporate governance factors and the industrial affiliation of the companies in question show the best risk-return performance. Substantial excess market returns are particularly possible for investors when it comes to companies from the *Technology* sector, even if accompanied by a respective downside risk.

Abstract (German)

Diese Dissertation befasst sich im Rahmen von drei Aufsätzen mit finanzmarktorientierten, unternehmensspezifischen und rechtlichen Gesichtspunkten von Management-Transaktionen in der Schweiz. Eine Einleitung zur Thematik (*Part I*) sowie eine Zusammenfassung der Kernthesen (*Part V*) runden diese Arbeit ab.

Der erste Aufsatz (*Part II*) befasst sich mit der internationalen Auslegung von Insiderhandelsgesetzen und vergleicht hierfür acht Länder/Regionen. Um die Härte des jeweiligen Insiderhandelsgesetzes zu bestimmen, wird ein Insiderhandelsgesetzindex konstruiert. Die Ergebnisse verdeutlichen, dass das Insiderhandelsgesetz der Europäischen Union und insbesondere das Schweizer Insiderhandelsgesetz, bei der Kategorie Transparenz von Insiderhandelsinformationen, deutliche Defizite im Ländervergleich aufweisen. Darüber hinaus impliziert ein strikteres Gesetz eine höhere Aktienpreisliquidität und eine niedrigere Konzentration an Insidereigentümern im Unternehmen.

Der zweite Aufsatz (*Part III*) untersucht die abnormalen Renditen von Management-Transaktionen am Schweizer Aktienmarkt. Hierbei wird explizit der Einfluss von weiteren Unternehmensnachrichten und dem Aktienpreismomentum berücksichtigt. Die Ergebnisse zeigen, dass beide Effekte die abnormalen Renditen von Management-Transaktionen erheblich beeinflussen. Ein positives (negatives) Momentum um einen Insiderkauf (-verkauf) herum verursacht signifikant höhere abnormale Marktreaktionen. Darüber hinaus generieren Insiderkäufe (-verkäufe) vor positiven (negativen) Unternehmensnachrichten höhere abnormale Renditen. Die Kombination beider Effekte offenbart unerwartet, bis heute undokumentiert, hohe abnormale Marktreaktionen.

Der dritte Aufsatz (*Part IV*) greift die Thematik der vorhergehenden Aufsätze auf, befasst sich jedoch mit einer möglichen Handelsstrategie für Investoren, welche die zeitnahe Veröffentlichung von Management-Transaktionen zu ihrem Vorteil nutzen. Die zentrale Herausforderung dieser auf 4-Stufen basierenden investor-orientierten Strategie besteht darin, nur diejenigen Transaktionen nachzuzahlen, welche die grössten Investitionspotentiale zum Zeitpunkt der Veröffentlichung aufweisen. Die Ergebnisse zeigen, dass das erfolgreichste Portfolio mit Hilfe von Corporate Governance Faktoren und der Industriezugehörigkeit erstellt werden kann. Das beste Rendite-Risiko Verhältnis weisen hierbei Unternehmen aus dem Technologiesektor auf. Eine Simulationsanalyse unterstreicht die Aussagekraft dieser neugestalteten Handelsstrategie.

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List of abbreviations

AMF	Autorités des Marchés Financiers
ASIC	Australian Securities and Investments Commission
BaFin	Federal Financial Services Supervisory Authority
CAAR	Cumulative average abnormal returns
DMT	Directive on the Disclosure of Management Transactions
ER	Excess market return
EU	European Union
FMA	Financial Market Authority
FSMA	Financial Services and Markets Act
FuW	Finanz und Wirtschaft
HHI	Herfindahl index
IITI	Integrated insider trading law index
LR	Listing Rules
LSE	London Stock Exchange
MAD	Market Abuse Directive
MAS	Monetary Authority of Singapore
MMT	Market Misconduct Tribunal
NASDAQ	National Association of Securities Dealers Automated Quotations
NYSE	New York Stock Exchange
OLS	Ordinary-Least-Squares
OSC	Ontario Securities Commission
SCC	Swiss Criminal Code
SEC	U.S. Securities and Exchange Commission
SFA	Securities and Futures Act 2001
SFO	Securities and Futures Ordinance
SIA	Securities Industry Act
SMI	Swiss Market Index
SPI	Swiss Performance Index
TD	Transparency Directive
U.K.	United Kingdom
U.S.	United States
USD	US Dollar

Part I: Introduction

1. Introduction and research motivation

Insider trading is a well-known phenomenon on today's capital markets, which most people instinctively perceive as unethical or unfair. For several decades now, researchers and practitioners have, however, been indulging in lively debate, attempting to understand and make empirical measure of the intuitive impact and consequences of insider trading from different angles. Insider trading is a constant occurrence for capital market participants. The probability of market makers, analysts and investors having to trade against an informed trader is substantial. Nevertheless, the effective downside of such unbalanced transactions is inexplicit to the uninformed party.

On the one hand, opponents of unregulated insider trading argue that 'outsiders' are less willing to participate in the capital market and execute their transactions against insiders (Brudney, 1979). Henry Manne on the other hand, a pioneer and strong supporter of unregulated insider trading, has helped shape a more liberal attitude. He and his fellows support the argument that these transactions convey additional information about the true fundamental value of the company and hence foster stock price precision (Manne, 1966; Carlton and Fischel, 1982). Besides these two prevailing and well-defined positions in this broad area of research, several other niche scholars have advanced their own claims to legitimation.

In order to abandon a widely-held misinterpretation impeding the clear understanding of insider trading, I would initially like to emphasize the conceptual difference between illegal and legal insider trading. Even though the legal definition of insider trading diverges among countries, a predominant consensus exists. The negative connotations associated with the term insider trading have originated from the common perception of these trades as illegal activities on the stock exchange. This prejudice is, however, both naïve and imprecise.

In a broader sense, insider trading describes the purchase or sale of publicly traded financial instruments based on non-public information with the likelihood to have an effect on the stock price (Oberender and Daumann, 1992, p. 256). Three main aspects contribute to a comprehensive understanding of insider trading: The definition of an *insider*, the underlying *financial instrument* and what constitutes *inside information*.

An insider is a person who receives or produces information about a publicly listed company prior to other market participants such as shareholders or investors (Ballwieser, 1976, p. 231). A more up-to-date classification comes from Meyer, Heidorn and Pietrowiak (2004, p. 7), who group insiders as to whether they are primary and secondary. *Primary insiders* are defined as corporate insiders such as members of the management or supervisory board or other significant shareholders working in a close relationship to the company. *Secondary insiders* receive inside information for reasons other than having a straight relation to the company. This implies its coming from either closely related persons such as spouses, children and parents, the primary insider's domestic environment or from the consultants or attorneys of the company. The second aspect of insider trading - the underlying *financial instrument* - refers to any security such as equity or similar shares in an issuer, conversion, purchase or sale of rights that provides for or permits actual delivery with rights, or a financial instrument that provides for or permits a cash settlement and other contracts (Rau, 2004, p. 9). Lastly, *inside information* has three main characteristics: It is precise and specific, has not been made public and is likely to adjust the stock price significantly (Meyer et al., 2004, p. 8). The first two aspects (*insider* and *financial instrument*) can be associated with both legal and illegal insider trading. The last aspect is, however, crucial for the difference in formal interpretation.

In most countries insider trading regulation or the criminal code clearly distinguishes between legal and illegal insider trading. In the U.S. for example, SEC Rule 10(b)-5-1 states that illegal insider trading refers to purchase and sale activity in breach of fiduciary duty or any other relationship of trust while in possession of material non-public information about the company. The Swiss Criminal Code, for instance, defines illegal insider trading as the 'exploitation of knowledge of confidential facts'¹. Hence, insider trading becomes illegal, as soon as the insider systematically abuses precise, non-public information which eventually impacts the stock price significantly. To better differentiate between the wording with regard to legal and illegal insider trading, the terms 'directors' dealings' (U.K.) and 'management transactions' (Switzerland) have come to be referred to under their more widely known synonym, 'legal insider trading' in the recent past. For the purpose of this dissertation these three terms have

¹ Art. 161 para. 1 SCC.

been applied interchangeably, although ‘insider trading’ has tended to be used more often as a technical term or in an international context.

Despite these public misconceptions on insider trading and the controversial debate on the normative critical aspects of privileged insiders instigated by Henry Manne's journal article ‘In defense of insider trading’ (1966), practitioners have nevertheless become aware of the highly useful information contained in these particular trades. Under section 16 of the Securities Exchange Act of 1934 (the first insider trading law), thirteen directors of the Texas Gulf Sulphur company were sued for violation of the anti-fraud provision in Rule 10(b)-5². This incident can be regarded as the first recorded law case where corporate insiders were charged with taking advantage of material non-public information and which thus brought insider trading into the limelight. Following this publicity, Wu (1968) discusses the economic impact of insider regulation in terms of its fairness and protection of other investors and concludes that ‘insider trading is theoretically beneficial’ (p. 269). A huge research community, mostly from the U.S., has attempted to empirically determine the impact and consequences of insider trading on the capital market. The focus of most extant studies concentrates on the degree of profitability (e.g. Jaffe, 1974; Finnerty, 1976; Seyhun, 1986; Pope, Morris and Peel, 1990), on corporate- and firm-specific aspects (e.g. Gregory, Matatko, Tonks and Purkis, 1994; Wong, Cheung and Wu, 2000; Fidrmuc, Goergen and Renneboog, 2006; Dymke and Walter, 2008; Dardas and Güttler, 2011) as well as on the regulatory impact (e.g. Beny, 2005; Gilbert and Tourani-Rad, 2008).

In the U.S., both researchers and regulators have been dealing with this issue for several decades now, and many different facets have been examined. However, Asian and European countries did not start to have a care and enforce legal actions in order to counteract the growing interest in insider trading activities until the early 1990s. The lack of a proper legal framework to regulate the disclosure of inside information is one of the prime reasons for the relatively shallow amount of international, empirical research work. Non-existent or deficient regulation is often an indicator of a less transparent information environment and reduces the probability of empirical analysis. Although most developed countries have caught up with introducing at least a minimum standard of fair trading conditions for all market participants the discrepancies between the various, country-specific manifestations are abundantly clear.

² 17 C.F.R. §240.10b-5.

Besides these efforts, several illegal insider trading cases have hit the headlines. To name but a few prominent U.S. scandals, in 1986 Ivan Boesky, the so-called ‘arbitrage king’, earned over USD 50 million by trading upon illegal insider information about upcoming mergers. In 2009 Raj Rajaratnam, the head of the former Galleon hedge fund, was found guilty of the systematic abuse of insider information and was sentenced to 11 years in jail. In 2010, the Wyly brothers were charged for an alleged, 13-year insider trading conspiracy that earned them over USD 550 million. All these cases underline that, although the U.S. insider trading regime is supposed to be the toughest, with disproportionately high criminal penalties and imprisonment, and even though all these insiders were strikingly wealthy before their illegal trading activities, the exploitation of superior private knowledge still appears to be an intrinsic motivation for insiders.

The introductory discussion on the terminology, the development and the perception of insider trading is vital to understanding my research motivation. The need to examine the characteristics of management transactions has principally arisen from the constantly growing public and political interest in this phenomenon, as well as the atmosphere of conspiracy that somehow always surrounds this specific trading phenomenon. Even though the extant literature has been proven to find evidence of the impact of management transactions on capital markets, the results are highly dependent on the applications as well as the research design, and hence leave room for further analysis.

From a geographical point of view, Switzerland provides a unique setting and a highly interesting business landscape in which to investigate the behavior and occurrence of management transactions activities. On the one hand, an abnormally high number of publicly listed Swiss companies operate in the financial industry. On the other hand, most companies which are owned by a majority shareholder are either manager- or family-controlled companies. The lack of profound academic studies in the Swiss context makes this dissertation an interesting contribution towards closing further aspects of the empirical gap in this thrilling field of research. Since the enactment of Swiss regulation on management transactions in July 2005, several parties have been debating the true credibility of legal insider trading. As previously mentioned, legal insider trading, which is frequently disclosed to the SIX Exchange Regulation is also known as *management transactions*. This dissertation will be seen to contribute to the lively

discussion by providing a sound empirical foundation for researchers, investors and regulators.

2. Research objective and questions

To conduct a comprehensive empirical analysis of management transactions in Switzerland is challenging. The biggest handicap here is the lack of transparency in the data that is available on management transactions. The web-based access to the insider trading information on the SIX Exchange Regulation prevents any convenient handling on the part of interested parties. The data is embedded in a continuous text and so had to be especially hand-collected for the purpose of this dissertation. Moreover, the regulator deletes information on insider trading after one year of storage and therefore hinders access to a solid and sustainable database.³ The *Finanz und Wirtschaft (FuW)* disseminates management transactions data over a longer period. Hence, data from 2005 until April 2011 has been extracted from this secondary database. After one year of data collection, the raw data sample now consists of 13'320 management transactions from August 2005 to December 2011.

This dissertation is composed of three self-contained, but consecutive, empirical studies which treat different facets within the insider trading context. Its empirical findings contribute to the extant knowledge of investors, regulators and academics on the interdependencies of insider trading. The latest regulatory amendments on insider trading, together with both the unparalleled corporate governance of the company and capital market characteristics, offer a profitable occasion to analyze and interpret the insider trading phenomenon in a dynamic and transformational business context.

The first paper compares predominant forms of international, insider trading regulation in developed countries. On the basis of Beny (2005) an integrated insider trading law index (IITI) has been constructed to determine the toughness of regulation in eight countries/regions. The index comprises sanction-, legal- as well as disclosure-based elements and ranks the countries according to their scored points. In addition, I consider market- and corporate-specific factors such as the ownership structure of the companies, two liquidity measures, as well as insider ownership and insider activity in order to evaluate the degree of the toughness of the insider trading regulations with

³ In April 2011, the SIX Exchange Regulation decided to store the data for three years.

these factors. The analysis concentrates on the explicit characteristics of Swiss regulation of management transactions and puts its current regulatory manifestations into an international context. Therefore, I pose the three following research questions:

Research questions

Does insider trading regulation vary between predominant, well-developed international capital markets?

How to measure and compare the difference in toughness of the imposed insider trading regulation?

To what extent does insider trading law interrelate with corporate- as well as market-specific factors?

The second topic examines the immediate abnormal market reactions around management transactions in Switzerland. The distinct advantage of non-public information leads to the question whether insiders abuse their intimate knowledge about their company to generate profits when trading with less informed market participants. Although an extant literature stream, mostly from the U.S., has examined this conceptual relationship, the restrictive exchange disclosure policy prevents profound empirical analysis on the Swiss capital market. So far, only two studies have investigated the degree of profitability of insider trading in Switzerland, Ammann and Kessler (2004) and Zingg, Lang and Wytenbach (2007). Both studies determine how insider trading appears and whether it is profitable on the capital market. Ammann and Kessler (2004) do not uncover a systematic abuse of insider trading before the disclosure of corporate announcements. Likewise, Zingg et al. (2007) conclude that only insider purchase transactions from small-cap firms can yield significant abnormal returns in the 30 days after the management transaction. Both studies, however, make only limited contributions to the research community as their findings are influenced by the lack of a strict reporting law on management transactions in the case of the former study and the relatively short observation period in the case of the latter one. The second paper of the dissertation pursues the two aforementioned studies and questions the underlying drivers of these observed abnormal market reactions by applying a hand-collected data sample covering a period of more than six years. Inspired by Givoly and Palmon (1985), I analyze comprehensively to what extent corporate announcements affect the abnormal returns by classifying them into Pre-News, Post-News and No-News transactions. In addition, Elliott, Morse and Richardson (1984) break down the information

content into Good-News and Bad-News to determine if the market reacts differently around the disclosure of corporate news. Interestingly, Givoly and Palmon (1985) as well as Noe (1999) admit that a stock price momentum in the expected direction affects the abnormal returns. Hence, I classify the management transaction according to their pre-event abnormal returns to find evidence of the occurrence of a stable long-term stock price trend over the entire event window. To examine the abnormal market reactions surrounding management transactions, I state the following research questions:

Research questions

Management transaction effect

Do management transactions trigger significant abnormal market reactions on the Swiss stock market?

Stock price momentum effect

Does the stock price momentum impact the abnormal returns around management transactions?

Corporate announcement effect

To what extent do corporate announcements affect abnormal market reactions around management transactions?

All three effects

How do the stock price momentum effect, the corporate announcement effect and the management transaction effect together impact the abnormal market reactions?

The last paper of this dissertation examines to what extent the disclosed insider information can be employed for potential investment purposes. A niche literature stream on insider trading has been dealing with this issue for several years. All studies apply a rather theoretical event study approach, change the event date of the transaction to the announcement day and investigate how many abnormal returns outside investors (mimickers) can generate subsequent to the insider announcement date (e.g. Jaffe, 1974; Bettis, Vickrey and Vickrey, 1997; Zingg et al., 2007).

I prefer to employ an innovative, more investor-oriented approach in order to close the gap between profoundly theoretical research applications and capital market-based trading strategies. Therefore, I use short-term stock price sentiment, trading-specific, performance-related and corporate-based factors as well as the industrial affiliation of the company to show which variables are able to explain the excess market returns up to 500 trading days. In addition to the pure performance, I consider the average ex-

pected loss and the probability of loss of the respective portfolios to determine the ones with the best risk-return structure. Hence, I state the following research question:

Research question

Taking a comprehensive analysis of management transactions in Switzerland as a basis, which insider trading activities then imply the best entry or exit signals for investment purposes?

Overall, the purpose of this dissertation is to provide a comprehensive analysis of the relative state of development of Swiss regulation on management transactions in an international context. Moreover, the impact and the consequences of the occurrence of management transactions on the capital market will be examined from various different financial perspectives in order to understand fully to what extent and on what score abnormal market reactions occur around management transactions. The empirical findings further provide sound and conclusive facts and hence contribute to the partially unsubstantiated and ongoing political debate on the true implications of management transactions. Furthermore, this dissertation contributes in helping to guard against the misconception that insider trading per se is something wrong or illegal.

3. Structure of the dissertation

Table 1 presents an overview of the five elements of this dissertation. A number of bullet points highlight the key aspects of each part. In addition, the individual applied research methodologies for the different essays, as well as the current status of the paper's disclosure process, are mentioned in the right-hand section of the table. The remainder of this dissertation is structured as follows:

Part II overviews and compares the predominant forms of international regulation on insider trading to assess the status quo of Swiss regulation relative to that of other well-developed countries. An integrated insider trading law index has been constructed in order to do this. The analysis explicitly focuses on the comparative results in Switzerland. In this essay, descriptive statistics indicate averaged market-specific numbers from the country's leading indices as well as averaged, insider-related information. A correlation analysis has been employed to find any correlation of the applied variables from the descriptive summary. The paper has been published in September 2012 by *Corporate Finance law*.

Part III examines the insider trading phenomenon from the perspective of both the financial market and that of corporate governance and provides a comprehensive picture of the true market perception of management transactions in Switzerland. Therefore, an event study determines the abnormal market reactions in the period around the insider events. Two statistic tests (T-test and Corrado rank test) indicate whether the results are significantly different from zero or not. In addition, the analysis of the disclosure of corporate announcements immediately around management transactions contributes to understanding the true impact of these abnormal market reactions. Likewise, a stock price momentum around management transactions appears to impact the post-trading abnormal returns. Finally, a set of trading-specific, corporate- and market-related factors is able to describe these abnormal market reactions more precisely. Based on profound, empirical literature on insider trading, this paper makes further interesting contributions to the appreciation of abnormal market reactions around management transactions. The paper is currently being reviewed by *Financial Markets and Portfolio Management*.

Part IV analyzes to what extent outside investors are able to profit from the prompt disclosure of management transactions on the Swiss capital market. This paper is regarded as a continuative, empirical study further to *Part II* and *III* and outlines a strategy of mimicking insider trading activities. The purpose of this paper is to provide evidence that outside investors are capable of benefiting substantially when considering the information environment around management transactions. Besides the pure excess market performance up to a 500 trading day holding period, the average expected loss and the probability of loss are considered in order to establish the portfolio with the best risk-return structure. The crucial question for potential investors to answer is which of the management transactions serve as an entry or an exit trigger to mimicking insider trading strategy. Moreover, a simulation analysis puts emphasis on the robustness of the results. The paper has been published in March 2013 by *Corporate Finance biz*.

Part V summarizes the main theses and key findings of the dissertation and derives its theoretical and practical implications for the aforementioned relevant stakeholders.

Table 1: Structure of dissertation, research methodology and current disclosure status of the paper

Part I: Introduction	Research methodology	Status
a. Research motivation b. Research objective and research questions c. Structure of the dissertation		
<hr/>		
Part II: An international comparison of predominant insider trading regulation		
a. Theoretical framework: Capital market, classical and misappropriation theory b. Comparison of international insider trading law c. Construction of integrated insider trading law index (IITI) d. Correlation analysis of cross-country corporate and capital-market characteristics	Descriptive analysis Correlation analysis	Published <i>Corporate Finance law</i> (September 2012) Edition 6, 297-312
<hr/>		
Part III: An examination of abnormal market reactions around management transactions		
a. Hand-collected data sample to examine the abnormal market reactions around management transactions b. A stock price momentum is observed around management transactions c. Management transactions around corporate announcements are of high interest d. Multivariate regression of trading-specific, corporate- and market-related factors	Event study analysis - Standardized T-test - Corrado rank test - Welch test Multivariate regression analysis	Under Review <i>Financial Markets and Portfolio Management</i>
<hr/>		
Part IV: A strategy of mimicking insider trading - Evidence from Switzerland		
a. 4-step investor-oriented approach closing the gap between profoundly theoretical research applications and capital market-based trading strategies b. Investigation of insider trading activities to find transactions with the greatest prospective potential for investment purposes c. Evaluation of the optimal holding period while considering the average expected loss and the probability of loss for the best performing portfolios d. Simulation analysis to underline the robustness of the results	Event study analysis - Standardized T-test Cross-sectional regression analysis Simulation analysis	Published <i>Corporate Finance biz</i> (March 2013) Edition 2, 68-83.
<hr/>		
Part V: Conclusion and implications		
a. Summary of results and concluding remarks b. Theoretical and practical implications		

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Part II: An international comparison of the predominant forms of insider trading regulation

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Corporate Finance law, Vol. 6, pp. 297-312

Abstract

This paper examines predominant forms of insider trading regulation and identifies significant corporate- as well as market-specific characteristics. I construct a modified integrated insider trading law index in order to determine the toughness of international laws on insider trading and find deficiencies in the European regime that are even more pronounced in the Swiss one. Countries with a common law system are found to have the strictest regulatory framework. Moreover, I find clear evidence that tougher insider trading law positively correlates with stock market turnover and negatively correlates with insider ownership. The results, however, are highly sensitive to the composition of the country portfolio. When Asian countries are excluded, there are indications of a strong correlation between ownership concentration, insider activity, equity float and the bid-ask spread with the toughness of the insider trading law. The developed index is further tested for its validity against the anti-self-dealing index.

Keywords: Insider Trading Law, Integrated Insider Trading Law Index, Stock Price Liquidity, Ownership Structure, Misappropriation Theory, Classical Theory.

JEL Classification: G38

1. Introduction

The degree of development in insider trading law has often been discussed in leading international legal and economic literature. One of the key objectives in this debate is to scrutinize why some countries protect investors and market participants from the self-serving trading patterns of insiders and others do not? According to Kerner and Kucik (2010), the enforcement and modification of insider trading law in order to produce better regulated regimes originates an internationally competitive environment favoring an investor-friendly regulatory framework in order to attract international investors. A discussion of the interrelation between insider trading and the forms of regulation, stock market development and corporate structure characteristics appears even more rewarding in this respect. The debate touches on two prevalent modes of thought. At corporate level, one of these concerns the conflict of interests between corporate insiders and shareholder. Jensen and Meckling (1976) opine that the information asymmetry between the two parties produces agency costs. The extent of these costs is, however, determined both by the self-serving attitude of corporate insiders and the voting and monitoring power of the equity owners. Carlton and Fischel (1982) argue that insider trading serves as an efficient compensation mechanism to reduce agency costs and to diminish the asymmetric information environment at corporate level. Hence, insider trading regulation would counteract this perceived mechanism. Opponents (e.g. Manove, 1989) argue that insider trading discourages corporate investments at the expense of the shareholders and efficient regulation would tend to increase value-enhancing investments.

At market level, insider trading undoubtedly affects the stock price liquidity and thus the information content conveyed in stock prices. Whether unregulated insider trading deters other market participants from trading (Brudney, 1979), or whether insider trading is 'victimless' as the trading intention of outside investors is motivated by liquidity reasons rather than insider trading activity (Carney, 1987), is still unclear.

This paper examines both aforementioned lines of investigation and poses three research questions. First, does insider trading regulation differ in leading, international capital markets? Second, how can we best measure and compare the level of toughness of the insider trading regulations imposed? And last, how does insider trading law interrelate to corporate- and market-specific factors?

The contribution of this study to the existing literature is threefold. I apply an insider trading law index initially constructed by Beny (2005) and augment this approach with disclosure-oriented and sanction-based variables in order to receive a more comprehensive idea of how the predominant forms of insider trading law are implemented. Moreover, I test the validity of my insider trading law index against a further investor protection index. Second, I consider market- and corporate-specific elements such as the ownership structure, liquidity as well as insider ownership and activity measures to determine the degree of their correlation with the toughness of insider trading law on an international basis. And last, I particularly focus and explicate on the findings on Swiss insider trading law. The ongoing public and political debate about the properties of recently adopted Swiss insider trading regulation challenges their degree of efficacy. Hence, an international comparison of prevailing insider trading regulation helps to classify, frame and interpret its implications on a global scale.

When cross-sectional legal data from eight countries/regions is used, the integrated insider trading law index (IITI) clearly indicates that Switzerland scores the worst. The deficiency is greatest in the newly augmented disclosure-based elements. As expected, the United States has the toughest insider trading law and scores best (14), closely followed by the U.K. (12), Canada (12), Singapore (12), Hong Kong (11), and Australia (11). The European Union's Directive is second to last (7) and Switzerland ranks last (5). In addition to the date of the exchanges establishment and the initial enactment of the insider trading law, disclosure- and sanction-based determinants prove to be crucial. When tested against the anti-self-dealing index constructed by Djankov, La Porta, Lopez-de-Silanes and Shleifer (2008) my IITI is proved to be robust.

Furthermore, tougher insider trading regulation implies higher stock market liquidity and less insider ownership. The exclusion of certain countries from the sample, however, considerably impacts the outcome of the correlation analysis.

The remainder of the article is organized as follows: Section 2 briefly summarizes economic and capital market theories and defines two insider trading law theories. Section 3 provides an overview of international insider trading regulation, followed by the literature review in section 4. Section 5 presents the construction of the integrated insider trading law index and tests for its robustness. Section 6 presents the cross-country corporate- and market-specific characteristics and examines the correlation analysis. Finally, section 7 concludes the paper.

2. Theoretical frameworks

The outcome of several insider trading lawsuits in the U.S. helps characterize the constant change and improvement of insider trading regulation over time. The developments are regarded as an ideal, pioneering step for the design of other international insider trading laws. This transformational process towards better regulation can best be illustrated by examining two consecutive insider trading theories which ultimately became used to strengthen international laws on insider trading. Moreover, economic theories on insider trading pose the question as to what extent insider trading impacts market efficiency and simultaneously collaborates with managerial self-interests.

2.1 Capital market theories on insider trading

Henry Manne (1966) was the first to contradict the prevailing and mainstream opinion which argued that insider trading should be prohibited. His work shows instead that material non-public information helps to allocate resources economically within the capital market. In addition, he states that, although not the only instrument, insider trading is probably the most efficient one, in compensating managerial activities and hence reducing the principal-agent conflict of interests between managers and shareholder. Similarly, Jensen and Meckling (1976) emphasize the occurrence of agency costs caused by the separation of ownership and control, which eventually diminishes the value of the company. Since it is impossible for shareholders to monitor their managers' activities completely, the latter have incentives to act in opportunistic, self-serving ways which would tend to reduce overall shareholder value. Supporters of the economic theory, however, view insider trading as an efficient mechanism to reduce agency costs and prevent constant compensation renegotiation and agreements with their managers (Carlton and Fischel, 1982).

Opponents argue that insider trading creates a moral-hazard problem due to the option-like characteristic of insider trading. The ability to trade on privileged information encourages and intensifies the inclination to undertake risky, value-reducing corporate business projects in order to profit most from one's own trading activities (Manove, 1989; Klock, 1994). This again would lead to an increase in the shareholder's monitoring activities and thus agency costs (Kraakman, 1991).

Several studies from the microstructure research field contribute to the understanding of the implications of insider trading to equity market liquidity. Carlton and Fischel (1982) for example support the argumentation that insider trading principally fosters market efficiency. The disclosure of the material, non-public information conveyed in insider transactions enhances the accuracy and precision of stock prices, thus shifting the stock more closely to the true value of the company. The disclosure mechanism is cost-effective compared to the traditional forms of corporate announcements and leads to a more efficient allocation of knowledge among market participants. In addition, Carney (1987) argues that unregulated insider trading is victimless as outside investors conduct their trading decisions in response to liquidity needs rather than to the market existence of active insiders.

Opponents of unregulated insider trading argue that insider trading does not only increase agency costs, but also diminishes the overall degree of stock price efficiency. Brudney (1979) on the one hand states that insider trading scales down the willingness of outsiders to participate in the capital market and to trade against insiders. Ausubel (1990) on the other hand formulates the concept of investor confidence and highlights the relevance of the so-called 'disclose or abstain' rule in increasing market fairness as well as the confidence of outside market participants instead of adopting a dismissive attitude towards unregulated insider trading.

One microstructure research stream addresses Akerlof's (1970) concept of asymmetric information to capital market theory and exhibits that the degree of information asymmetry directly impacts stock market liquidity. Hence, an asymmetric stock price information environment indicates higher transactions costs and implies lower stock price liquidity. Copeland and Galai (1983) find evidence that market makers and dealers are at a disadvantage when trading against informed insiders. Therefore, these market participants charge an intrinsic transaction fee (bid-ask spread) in order to be compensated for the occurred loss. The extent of information asymmetry determines the spread between the bid and the ask price (Stoll, 1989). Following this assumption, more frequent insider trading cause higher transactions costs (higher bid-ask spread) and consequently lower the overall stock price liquidity (Georgakopoulos, 1993). Cornell and Sirri (1992), however, argue that market makers are not able to predict when trading against informed traders and do not widen the bid-ask spread.

2.2 Classical theory

According to the provisions of Section 10(b) of the Securities of Exchange Act of 1934, the first U.S. insider trading law, ‘insider trading is any manipulative or deceptive device in connection with the purchase and sale of any security’. With the increasing relevance of the stock markets since the 1960s, however, a growing number of illegal insider trading activities have emerged which hamper the effective interpretation of these antifraud provisions. In line with the common law system, as practiced in the U.S. court members have been forced to interpret and define these activities through lawsuits. Under the classical theory, a corporate insider working permanently (e.g. officer or director) or temporarily (e.g. consultant or attorney) for a company breaches his or her fiduciary duty to the company’s shareholders when trading either without disclosing his or her intent to trade or not abstaining from trading, until the information is publicly available (Thomsen, February 19, 2008). The person receiving the privileged information (tippee) assumes that the corporate insider (tipper) owes a fiduciary duty to the corporate shareholders not to trade or commit to non-public information for personal gains. Two Supreme Court decisions, *Chiarella*⁴ and *Dirk*⁵, gave proof of the lack of effectiveness of the classical theory in the early 1980s.

The accused in the *Chiarella* case worked for a financial printing company, collected confidential non-public information about takeover bids, and finally purchased stocks in the acquired companies just prior to the deal announcement. Even though the Lower Court emphasized the ‘disclose or abstain’ duty to all in possession of private information, the Supreme Court reserved the conviction arguing that ‘trading non-public information itself was not enough to trigger liability under the antifraud provisions’ (Newkirk, September 19, 1998). The court argued that no fiduciary duty existed between the accused and the shareholders of the acquired company and the fact of trading on superior knowledge alone did not constitute ‘a fraud under the securities laws’.⁶ In the *Dirks* case, a stock analyst received information from a former officer about the alleged fraudulent activities at his company and forwarded it to his clients.⁷ In spite of the tippee’s tendency to believe that the tipper was infringing against his or her fiduciary duty in giving him insider information, the Supreme Court ruled that the tipper had

⁴ *Chiarella v. U.S.*, 445 U.S. 222 (1980).

⁵ *Dirks v. SEC*, 463 U.S. 646 (1983).

⁶ *Chiarella*, 445 at 235.

⁷ *Dirks*, 463 U.S. at 648-49.

to have personally benefited from his actions in order to be liable. The exposure of the fraud appeared to be altruistic instead and ‘not for personal gain’ (Newkirk, September 19, 1998) and hence did not breach any fiduciary duty.

Both cases clearly underline the lack of effectiveness of the classical theory and raise the question as to how to deal with further insider trading cases as well as how to define the direct or derivative duty of tippees and tippers.

2.3 Misappropriation theory

To answer this question, a complementary misappropriation theory has been adopted to widen the scope of inappropriate insider trading. Under Rule 10(b)-5 the duty of relationship has now been shifted from the issuer or corporate shareholder to the source of the non-public information and fairly widens the extent of the duty. Hence, this misappropriation theory also covers insiders ‘who are not corporate insiders, but who seek to profit by stealing sensitive information from those with whom they share’ (Thomsen, February 19, 2008). Even though several federal courts diverged in their interpretation of the new rule, the superior and ultimate range of application of the theory, however, found its proof in the *O’Hagan* case in the late 1990s.⁸ O’Hagan was an employee at a lawyer’s office, representing a client who was considering making a tender offer from the Pillsbury Company. O’Hagan abused his inside knowledge to purchase call options on the Pillsbury Company. After the disclosure of the deal, prices jumped up generating a profit of around USD 4 million. O’Hagan argued that neither he nor his company owed any fiduciary duty to Pillsbury and that he had thus not committed any fraud based on material, private information. The Supreme Court, however, upheld O’Hagan’s guilty and argued as follows:

‘The *misappropriation theory* holds that a person commits fraud ‘in connection with’ a securities transaction, and thereby violates 10(b) and Rule 10(b)-5, when he misappropriates confidential information for securities trading purposes, in breach of a duty owed to the source of the information. Under this theory, a fiduciary’s undisclosed, self-serving use of a principal’s information to purchase or sell securities, in breach of a

⁸ 117 S. Ct. 2199 (1997).

duty of loyalty and confidentiality, defrauds the principal of the exclusive use of the information.’⁹

The Supreme Court noted that rather than relying on a duty to another party, as it is the case in the classical theory, the misappropriation of insider information in breach of a fiduciary duty owed to the source of the information is an efficient and reliable instrument to construe the scope of Rule 10(b)-5.

3. Comparison of international insider trading regulation

Although all insider trading regulations strive towards the goal of preventing systematic market abuse, prohibiting illegal insider trading and simultaneously fostering an environment of market fairness and integrity, they have come in different historical forms and have had different country-specific legal origins. The following section provides a brief overview of the predominant forms of insider trading regulations.

3.1 U.S. insider trading regime

The U.S. Congress passed the Securities Exchange Act of 1934 into force after the stock market crash in the late 1920s in order to check any potential market abuse through the illegal exploitation of private information. According to the U.S. common law system, three distinct forms of insider liability have evolved from the scope of previous Supreme Court decisions. Section 10(b) is key to preventing any lawless insider transactions based on material non-public information. More precisely, Rule 10(b)-5 extends the ‘disclose or abstain’ rule to those constructive as well as temporary insiders taking advantage of material facts. They should either immediately disclose their superior knowledge or abstain from trading until the publication of the information. This particular ruling on liability derived from the *Texas Gulf Sulfur* case and was modified by the aforementioned *Chiarella* case. This liability also applies to tippees as seen in the *Dirk* case. Second and according to Rule 14(e)-3, insiders are prohibited from conducting any trading activities if they or any related person ‘has taken a substantial step or steps to commence, or has commenced, a tender offer’. And third, the above-mentioned *O’Hagan* case exemplifies and confirms the liability under Rule 10(b)-5-2 that the misappropriation of insider knowledge in breach of a fiduciary duty is owed to the source of the information rather than the issuer. Several other law-

⁹ 117 S. Ct. at 2207 (1997).

suits and court decisions (e.g. *U.S. v. Winans*, *SEC v. Sonia Anticevic*, *SEC v. Ahlstrom*) have refined and improved the elasticity as well as spotlighted the supremacy of U.S. insider trading regulation over the last decades. A number of revisions such as in August 2000 (adoption of Rules 10(b)-5-1 and 10(b)-5-2)¹⁰ or in February 2012 (insider trading law applies to members of the congress)¹¹ accentuate the need for ongoing development in the rules of the Securities Exchange Commission in order to allow it to adapt to modern trading behavior.

3.2 Australian Corporations Act 2001

The regulation of insider trading was introduced in the early 1970s in order to improve the market fairness of the Australian capital market. Several legislative reviews were undertaken to strengthen prohibitions on insider trading. Currently, Division 3 of Part 7.10 of the Corporations Act 2001 contains the regulatory framework and provisions preventing illegal insider trading in Australia. Interestingly, the Australian Securities and Investments Commission (ASIC) has the ultimate power to debar insiders from their managerial position in their company when convicted of illegal insider trading. The subsequent punishments for violating insider trading under section 1042 or 1043 of the Corporations Act are either criminal penalties, civil remedies or civil penalties. Hence, the ASIC has a wide set of applicable tools to penalise any violation of current insider trading regulation. The Mayne Report (2011)¹² highlights the achievements of the ASIC since 1996. Several insiders were found guilty and were either sentenced to jail (e.g. *ASIC v. Adler* (1999); *ASIC v. Frawley* (2005); *ASIC v. O'Reilly* (2010)) or fined up to \$4 million to the ASIC. Nonetheless, opponents of Australian insider trading regulation emphasize its inefficiency and its meagre gains when compared to the strenuous efforts of the regulators.

3.3 Canadian insider reporting requirements

Canadian insider trading law was first implemented in the 1970s as part of the Canada Business Corporations Act, and so Canada can be regarded as one of the first countries (beyond the U.S.) to introduce proper insider trading regulation. The Act contains three main components that are still valid today: civil liability for insider trading, civil

¹⁰ Selective disclosure and insider trading. Available at <http://www.sec.gov/rules/final/33-7881.htm>

¹¹ The Economist (10th December 2011).

¹² Available at <http://www.maynereport.com/articles/2007/07/17-2354-2207.html>

liability for tipping, and speculative trading offences. However, it was not until November 2009 that the first criminal conviction for illegal insider trading on the Canadian stock market occurred (*OSC v. Grmovsek*). Nonetheless, a modernized, legal insider reporting catalogue entered into force in April 2010 (National Instrument 55-104 Insider Reporting Requirement and Exemptions) in order to harmonize differences in the fragmented insider reporting standards across Canada. The scope of this provision has been to reduce the number of people required to file insider reports and at the same time widen the reporting obligation to people not belonging to the category of primary insiders. Moreover, the disclosure period has been shortened from ten to five trading days to comply with prevailing, international regulations.

3.4 European legislative

Most European countries did not start to enforce insider trading laws until the 1990s (Gersbach and Nedwed, 1991). An initial step towards meeting the challenge of unifying the inconsistent and fragmented regulations among European countries was made upon the implementation of Council Directive 89/592/ECC in 1992. Its adoption, however, still left a wide range of possible interpretation to the members of the European Union, so Market Abuse Directive 2003/6/EC was introduced to replace this lax directive and raise the standard of proper insider trading regulation in Europe. Directive 2003/6/EC set basic rules and a code of conduct to secure a minimum standard of capital market fairness among the market participants. Subsequently, the national authorities such as the *Authorités des Marchés Financiers* (AMF) in France, the *Financial Market Authority* (FMA) in Austria or the *Federal Financial Services Supervisory Authority* (BaFin) in Germany of the member states implemented and transposed its legal requirements into their legislative process and ensured conformity with their national laws within one year. The impact on each member, however, substantially diverged as countries with well-established insider trading provisions (e.g. England or Ireland) had to make few amendments, whereas other European countries (e.g. Germany or France) had to fundamentally change their legal insider-trading framework. Several modifications such as the *Transparency Directive* 2004/109/EG (2007/14/EG), the *Directive* 2008/26/EC, and the *Directive* 2010/78/EU followed to harmonize and strengthen national reporting standards concerning insider trading. The way the European Commission Directives are applied does not implicitly indicate the same extent of regulation for all members. The European Parliament intends to establish a legal

catalogue of minimum requirements which can be regarded as a valid and representative benchmark for all member countries. Nevertheless, insider trading regulation in the U.K. will be analysed separately as it offers an application of insider trading law in its most-pronounced form.

In the U.K., the EU Market Abuse Directive finally entered into force in 2005 in order to strengthen pre-existing regulation. The 1977 Model Code of the London Stock Exchange (LSE) and the 1985 Companies Act were the first to deal with and monitor insider transactions on the U.K. stock market and can thus be regarded as the first European laws on insider trading. Moreover, in 2000, the Financial Services and Markets Act (FSMA) defined price manipulation as an offense beyond the existing criminal regime for market abuse. In a comparison of insider trading regulations, Fidrmuc, Georgen and Renneboog (2006) identify substantial differences in terms of the definition of an insider, the bans of disclosure as well as the essence of the regulation between the U.K. and the U.S. regimes. Although both countries exhibit a high standard of regulation on insider trading, the U.K. favors blackout periods as well as insider definitions in a narrower sense, whereas the U.S. regulators construe a broader scope for their insider trading legislation.

The present insider trading regulations in the countries of the European Union are governed by the Market Abuse Directive 2003/6/EC (MAD) enacted in October 2004 and the consecutive amendment Transparency Directive 2004/109/EC (TD). Therefore, their national implementation and jurisdictions should be regarded as equivalent in all European countries. A selection of eight European countries (including U.K.) in *Table 2* provides a thorough overview of the enforcement of the European legislations (MAD and TD), the regulatory authority of each country as well as the respective national regulating provisions. Interestingly, only the common law countries (U.K. and Ireland) already assessed insider trading as a criminal offense already prior to the MAD announcement.

Overall, the enforcement of the two directives improved the framework of pan-European insider trading regulation in most cases. European legislation is attempting to catch up on prevailing insider trading law in the U.K., and even more so on the U.S. directives. Whether it is already on par with these regimes will be discussed later on.

Table 2: European legislative on insider trading

Country (legal origin)	MAD	TD	Criminal offense before MAD	Regulatory authority	Regulating provisions
Austria (German)	Jan 05	Apr 07	No	Financial Market Authority (FMA)	§48 d Abs. 4 BörseG/ §82 Abs. 8 BörseG
France (French)	Jul 05	Dec 07	No	Autorité des marchés financiers (AMF)	Article 621-18-2 Code monétaire et financier/ Article 223-22 - 223-26 du règlement général de l'AMF
Germany (German)	Oct 04	Jan 07	No	Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)	15a WpHG
Ireland (English)	Oct 05	Jun 07	Yes	Irish Financial Services Regulatory Authority (Financial Regulator)	Companies Act (1990) - Part IV
Italy (French)	May 05	Dec 08	No	Commissione Nazionale per le Società e la Borsa (CONSOB)	Article 114 and article 193 Testo Unico della Finanza e gli / Article 152-sexies e seguenti del Regolamento Emittenti Consob
Netherlands (French)	Oct 05	Jan 07	No	Autoriteit Financiële Markten (AMF)	Wte 1995 - Art. 47a
Sweden (Scandinavian)	Jul 05	Jul 07	No	Finansinspektionen (FI)	Market Abuse Penal Act (2003:377) / Swedish Companies Act (2005:551)
U.K. (English)	Jul 05	Jan 07	Yes	Financial Services Authority (FSA)	Company Securities Act 1985 / Financial Services and Markets Act 2000

The table provides an overview of the enforcement of the Market Abuse Directive 2003/6/EC (MAD) and of the Transparency Directive 2004/109/EC (TD) in eight European countries. Information has been obtained from La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998), Dardas and Güttler (2011), together with the implementation status of the MAD (2006).

3.5 Directive on Swiss management transactions

Since the Admission Board of the SIX Exchange Regulation adopted Art. 74a para. 8 Listing Rules (LR) in September 2004, the members of the board of directors as well as senior management of publicly listed companies have had to disclose their transactions in the company's own securities.¹³ The code sets basic principles to secure that all dealings undertaken by directors are conducted with a minimum standard of good practice. The enactment of the Directive on the Disclosure of Management Transactions (DMT) in July 2005 was concurrent with the enactment of the Market Abuse Directive in other European countries. Up to the tightening of Art. 161 Swiss Criminal Code (SCC) in October 2008, insider trading based on material confidential facts tended to be treated as a civil offense and penalized only in relation to the issue of new participation rights or around merger and acquisition activities. The annulment (without substitution) of sub-section 3 widens the scope to all inside information. In October 2010 the LR as well as the DMT were revised and entered into force on the 1st April 2011 with the purpose of strengthening market integrity as well as the confidence of all market participants. The relevant insider trading regulation can now be found under Art. 56 LR. The primary incentive of the DMT is to promote the allocation of information to investors and to contribute to the prevention and prosecution of

¹³ Admission Board Communiqué No. 2/2005.

market abuse.¹⁴ Despite these efforts, as implemented, insider trading law in Switzerland is still held to be deficient, especially in terms of transparency and accountability.¹⁵

3.6 Asian insider trading regulation

The legal systems in some Asian countries still bear the stamp of their origins in the British, common law system. Consequently, insider trading regulation is deeply rooted in national legislation. Many efforts have been made in order to develop and improve the legal guidelines regarding the duties and liabilities of insiders. Hong Kong as well as Singaporean principles of integrity are considered exemplary in this context. The insider trading law in both former British colonies have been shaped by the strong territorial influence of the Britain's common law system.

In Hong Kong, the disclosure obligations concerning insider trading are stated in Part XV of the Securities and Futures Ordinance (SFO) (Cap. 571). The legal restrictions and standards against 'which the directors must measure their conduct regarding dealings in securities of their listed companies' is set in the Model Code for Securities Transactions by Directors of Listed Issuers (Appendix 10, Basic Principles 1). Moreover, this Model Code determines absolute trading prohibitions as well as disclosure rules and restrictions. The Market Misconduct Tribunal (MMT) is empowered to handle civil as well as criminal offenses and serves regulatory fines in respect of any breach of the aforementioned Model Codes. The high regulatory standards are also reflected in the issuer's obligation to disclose any non-compliant behavior of directors in their interim and annual reports. Furthermore, a director is not allowed to trade 'without first notifying in writing the chairman or a designated director for the specific purpose' (Appendix 10, B. Notification 8) of his explicit trading intention.

Singaporean insider trading law can be traced back to the enactment of Section 103 of the Securities Industry Act (SIA) in 1986. One of the major shortcomings of this provision was in respect of its narrow-minded 'person-connected' approach, which has been dispelled by the enactment of the Securities and Futures Act 2001 (SFA). The fundamental shift to the 'information-connected' approach found its appearance in

¹⁴ Art. 56 para. 1 LR.

¹⁵ c.f. Tagesanzeiger (2nd September 2011); Handelszeitung (2nd September 2011); NZZ (27th April 2012).

Section 218 and 219 of the SFA. Based on the Australian and American (*misappropriation theory*) role models, this modified approach relates the insiders' fiduciary duty to the possession of the price-sensitive information rather than the relationship to the company. The Monetary Authority of Singapore (MAS) can impose for a breach of insider trading regulation (Section 221 SFA). Nevertheless, the MAS prefers to undertake civil actions (Section 232 SFA) if necessary, as there are less stringent rules for the admissibility of legal actions and the requirement of burden of proof are lower and more transparent. Following practices established by U.S. insider trading law, civil claims provide a unique setting allowing 'trading victims' to seek an order for adequate compensation from the contravening insider (Section 234 SFA).

Overall, both Asian countries indicate a comprehensive legal understanding of advanced insider trading regulation and thus put strong emphasis on the exposure of insider trading.

3.7 Cross-country comparison of insider trading regulation

According to the preceding overview of the predominant forms of regulation, several distinctions characterize the legal framework of the national as well as supranational insider trading guidelines of the observed countries. *Table 3* summarizes the major elements of the forms and extent of insider trading regulation. In addition to these questions of legal origin, statutes, and the length of time these exchanges and insider trading laws have been in establishment, a variety of additional components must be used to determine the severity of international insider trading regulation. Some of the variables have been taken from Beny (2005) and have been updated to come in line with current legislation (if necessary).¹⁶

The variable *Tippee* indicates whether secondary insiders (persons outside the corporation) are officially considered as insiders and hence fall under the same legal restrictions as primary insiders. The variable *Tipping* is when a primary insider is not only liable when trading on private information, but also when passing on this information (*tipping*) to third parties. The variable *Damage* contains two elements and reflects whether the potential monetary expenses of illegal market abuse (if caught) are proportional to or even outweigh the benefits from insider trading. In addition, the question arises whether the subsequent fine applies either to *Individual* (insider) and/or

¹⁶ Beny's variables are: Tippee, Tipping, Damage: Individual, Private Right, and Criminal Sanction.

the *Company* (issuer). The variable *Private Right* exercises the option to sue insiders for appropriate monetary compensation for the trading losses incurred when trading against informed insiders. The last coefficient *Criminal Action* indicates whether insider trading is a crime or ‘just’ a trivial offense. In particular, the coefficient *Private Right* seems not to be implemented in most countries.

Table 3: Cross-country comparison of insider trading regulation

Country	Legal Origin	Statute	Exchange Establishment	IT Law Establishment	Tippee Tipping	Damage		Private Right	Criminal Action
						Individual	Company		
United States	Common law	Rule 10(b)-5 Rule 14(e)-3	1792	1934	Yes	Yes	Yes	Yes	Yes
Canada	Common law	NI 55-104	1878	1966	Yes	Yes	Yes	Yes	No
Australia	Common law	Section 1042 and 1043 Corporations Act 2001	1859	1991	Yes	Yes	Yes	Yes	No
United Kingdom	Common law	Financial Services and Markets Act 2000	1773	1980	Yes	Yes	Yes	Yes	No
European Union	Civil law*	Directive 2003/6/EC Directive 2004/109/EG	1864**	1991***	Yes	Yes	Yes	Yes	No
Switzerland	Civil law	Art. 56 Listing Rules DMT	1938	1988	Yes	Yes	No	Yes	No
Hong Kong	Common law	Cap. 571 SFO Model Code App. 10	1891	1991	Yes	Yes	Yes	Yes	No
Singapore	Common law	218 / 219 / 232 / 234 SFA	1930	1986	Yes	Yes	Yes	Yes	Yes

* Out of the 27 members, only Ireland adheres to common law system. The U.K. has been excluded and treated separately.

** Averaged national exchange establishment of 23 EU countries.

*** Averaged national IT law establishment of 23 EU countries before the enactment of the Market Abuse Directive.

The six variables plus the additional regulatory elements provide a thorough overview of insider trading law, which can be applied to establish the toughness of the respective regulations in relation to those in other countries. The summary of country-specific characteristics is a first step towards adequately weighting the formal interpretation of insider trading regulation. Nonetheless, *Table 3* indicates that the current forms of regulations appear to be rather homogenous when taking Beny’s (2005) variables as a benchmark.

4. Related literature

Most international research on insider trading analyzes the immediate market response around insider transactions and concludes that insiders possess material non-public information, which significantly affects the underlying stock price of the company (Lorie and Niederhoffer, 1968; Seyhun, 1986; Hamill, McIlkenny and Opong, 2002; Zingg, Lang and Wytttenbach, 2007).

Although a wide range of legal, social and cultural aspects are key indicators in shaping the legal environment of a country, only a small group of researchers are engaged

in the comparison of international insider trading laws. Language barriers or the lack of legislative expertise could be two reasons for the relatively untapped area of research. Bhattacharya and Daouk (2002) examine the existence and initial enforcement of insider trading laws in 103 countries and pose the research question as to how the introduction of insider trading prohibitions affects stock markets. Insider trading laws have been enacted in four out of five countries, but most enforcement has been lax and spotty. Only in one out of three countries has a prosecution taken place. Beny (2005) extends the framework of Bhattacharya and Daouk and empirically investigates differences in insider trading laws from a cross-section of 33 countries. In doing so, she constructs an ‘index of the toughness of insider trading laws based on the written law in each country’ (p. 152) inspired by previous studies from Gaillard (1992) and Stamp and Welsh (1996). A selection of the elements of a country’s insider trading law has already been applied in the cross-country comparison (*Table 3*). Moreover, Beny (2005) ranks the countries according to the actual performance and questions how insider trading regulation impacts the ownership structure as well as stock price informativeness and finds out that more prohibitive regulation leads to more dispersed ownership, more informative stock prices and hence more stock market liquidity. In line with Bhattacharya and Daouk (2002), Beny (2005) argues that the pure intention to enforce does not lead to efficient laws. Even more importance is attributed to the question of the accuracy and the scope of the regulation. Both studies conclude that criminal sanctions tend to be an efficient deterrent element to help to achieve an optimal degree of formal law. Moreover, Polinsky and Shavell (2000) add that even a low probability of prosecution might be fairly efficient if the criminal sanctions are adequately large. The offender weighs the intended offense according to the difference between the expected trading gains and the potential monetary loss. In the case of criminal sanctions, however, the formula gains an additional dimension, which makes it more difficult to quantify and weigh up (Becker, 1968).

On lines similar to Bhattacharya and Daouk (2002) a further international study investigates the relationship between the enforcement of insider trading law and stock price informativeness, based on a comprehensive data sample from 48 countries from 1980 to 2003 (Fernandes and Ferreira, 2009). The authors conclude that the effect of enforcement improves the overall information content conveyed in stock prices as measured by their variation in price. However, they only find a concentrated effect in developed countries.

Rather than following the premises of existing literature on insider trading enforcement, I will contribute by examining the predominant forms of insider trading law presently current in a selection of developed countries. Moreover, some aspects of prevailing market theory such as stock price liquidity and ownership concentration shall form part of this analysis. Based on and concentrating the findings of the rare literature in this emerging field of research, I create an integrated insider trading law index for a selection of eight countries/regions to determine and compare the intensity of insider trading regulation in a cross-country context. As most aforementioned studies concentrate on the legal premises of the insider trading law index, I will add a variety of disclosure-, sanction- and system-based elements to Beny's (2005) index to further emphasize the transparency aspect of insider transactions.

The first two hypotheses are associated with the legal origins and the transparency policy of the country in question. According to La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998) common law countries exhibit tougher investor protection-oriented regulation than civil law countries. Moreover, a minimum set of disclosure information is requisite in order for outside investors and market analysts to interpret the information content of the underlying trading motives of insiders adequately. Hence, I state two conditional hypotheses:

H1a: Common law countries exhibit tougher insider trading regulation than civil law ones.

H1b: Tougher insider trading regulation is characterized by more transparent disclosure mechanisms.

Regardless of whether insider trading is profitable or not, there are two reasons why a lax insider trading regime might be negatively correlated with ownership concentration (Beny, 2005). First, outside investors ultimately abstain from trading when lax insider regulation is in place, which is detrimental to having a more dispersed ownership environment (Brudney, 1979). Second, shareholders owning larger stakes in a company act as a controlling device, but must be compensated for their efforts. Hence, permitting insider trading could be one potential compensation opportunity for dominant shareholders and even increase their large stakes, whereas regulated insider trading could have the reverse effect (Demsetz, 1986). As a consequence, countries with tougher insider trading regulation encourage outside investors to trade more actively, which leads to a more dispersed ownership structure.

H2: Tougher insider trading regulation is associated with more ownership dispersion.

Capital market theories address the ability of market makers to charge transaction fees in order to be compensated for the incurred trading losses against insiders (Copeland and Galai, 1983). The greater trading costs, however, inevitably imply lower stock price liquidity (Fishman and Hagerty, 1992). In contrast, I assume that stricter regulation counteracts this effect and state the following testable hypothesis:

H3: Tougher insider trading regulation is associated with more stock price liquidity.

5. Insider trading law index

The following insider trading law index is on the lines of Beny's (2005), but extended and refined in some ways. Besides the above-mentioned variables, the index has been extended by introducing additional disclosure-, sanction- and system-based elements to provide a more comprehensive picture of the toughness of the insider trading regulation.

5.1 Sanction-based variables

The six sanction-based elements in the index have already been addressed in section 3.7. Nonetheless, here is a brief explanation highlighting the importance of each variable for a well-established insider trading regime. For the construction of the insider trading law index, the respective country obtains one point if the element exists and zero otherwise.

The fact that *Tippees* are officially regarded as secondary insiders, attest to the progressiveness of the regulation and further underlines its more profoundly 'information-connected' philosophy. Not considering *Tipping* as an offense would be to neglect a major contributor to the abuse of relevant price-sensitive information. Brudney (1979) states that insider activities are not always information-driven, but are sometimes conducted for different motives (e.g. cash, prestige or other things). Hence, advanced legal insider trading bans do not allow insiders to tip outside investors. The variable *Damage* weighs the potential trading income to be made against the monetary penalties for *Individuals* as well as *Companies*. In this connection, the probability of prosecution is noteworthy, as a low probability of detection must be offset by higher monetary penalties in order to achieve an optimal deterrent effect and vice versa (Dooley, 1980; Po-

linsky and Shavell, 2000). As all observed countries are assumed to have well-functioning capital markets and to implement at least a minimum standard of insider trading law, the probability of detection is held to be constant for this purpose. The coefficient *Private Right* indicates whether trading victims are granted a private right to sue legal actions against insiders. This right would extend the enforcement of the insider trading law to all capital market participants and not just to the exchange authorities, thus increasing the reliability of and confidence in the capital market.¹⁷ Denouncing insider trading as a criminal offense (*Criminal*) stresses the relevance of the regulatory regime and signals a clear statement towards potential offenders (e.g. Becker, 1968; Polinsky and Shavell, 2000).

5.2 Disclosure-based variables

The disclosure-based variables are a good indicator towards receiving a comprehensive impression of the effective implementation of the insider trading law. According to Manne (1966) as well as Carlton and Fischel (1982), insider trading is efficient and laws can only lead to an undesired outcome. However, their opponents argue that insider trading is a value-reducing phenomenon and needs regulatory support such as prohibitions and restrictions (Manove, 1989; Kraakman, 1991). A third position argues that insider trading can be efficient if the costs of the company's individual private contracts exceed the overall regulatory expense. In addition, detrimental insider trading simply disappears if a dominant shareholder exists to hinder such trade (Haddock and Macey, 1987; Epstein, 2004). Taking the following elements into consideration, I present an advanced view of Manne (1966) as well as Carlton and Fischel (1982). Inspired by Manove (1989) and Kraakman (1991) and empirically supported by Bhattacharya and Daouk (2002) and Beny (2005), I argue that insider trading provides material price-sensitive information, which needs an adequate regulatory framework to tap its full informational potential. In order to do so, I measure the effectiveness of these disclosure-based elements in the legal framework by using the following five variables.

Legal Disclosure Period measures the trading days between the transaction date and the maximum time to disclose the trading information. The average disclosure period in the countries in the sample indicates the threshold. The coefficient is one if the dis-

¹⁷ Opponents against granting private rights may address the potential abuse of such regulation (Beny, 2005). This discussion, however, goes beyond the scope of this paper.

closure period is below and zero above this threshold. The U.S. has a maximum legal disclosure period of two trading days, whereas the U.K., Australia, Canada, Europe and Switzerland give a limit of five trading days. Singapore and Hong Kong are in between. A faster disclosure time equals a stricter regulation. The variable *Blackout Period* equals one if there are legal insider trading bans around other corporate announcements. The Model Code in the U.K., for example, specifies closing periods of up to 60 days before preliminary statements or annual financial reports. These legal ban periods, however, do not apply to other countries. The disclosure of the *Announcement Date* helps to specify, whether the information has been announced on time or has rather been delayed. Betzer and Theissen (2010) argue in favor of regulation that requires an immediate disclosure procedure to improve the informational efficiency of stock prices. The term ‘entrenchment effect’ refers to the *Ownership Holding* of insiders and provides information about the managerial power of directors as a result of their equity holdings. According to Fidrmuc, et al. (2006) the market both reacts to changes in ownership holdings and perceives the initial insider ownership status as crucial. Countries which do not demand the disclosure of equity insider ownership encourage the abuse of insider information as transparency is restricted. The same principle applies to the disclosure of the *Insider’s Name*. The SIX Exchange Regulation in Switzerland, for example, only publishes three groups of insiders: executive or non-executive members of the board of directors, and since last year related parties (natural person or legal entity). The insider’s name or specific position within the firm would fairly contribute to more transparent insider trading laws. Overall, the implementation of the disclosure-oriented variables fosters stricter regulation and simultaneously contributes to a more transparent insider-trading environment.

5.3 System-based variables

The system-based elements have already been discussed in section 3.7. The three subsequent coefficients provide an overall impression of the individual stock exchange’s characteristics. Hence, *Legal Origin* explains the source of the country’s legal system. All of the countries analyzed (including the 23 observed European Union members) either adhere to the common or the civil law system. As consistent with La Porta et al. (1998) and Beny (2006), common law countries exhibit higher investor protection, greater enforcement of insider trading law, as well as more liquid stock prices as compared to civil law countries. Therefore, the variable equals one if the legal origin is

based on common law and zero for civil law.¹⁸ *Exchange Establishment* and *IT Law Establishment* are indicators of both the consistency and the economic and regulatory progress of the capital market. The information has been extracted from Bushmann, Piotroski and Smith (2005). The average date of 22 developed countries determines the threshold (median).¹⁹ The coefficient equals one if the exchange and IT law is older than the threshold and zero otherwise. A longer history implies a more extensive and firmly embedded regulatory framework, combined with a profound objective knowledge on the part of the authority.

5.4 Discussion of the integrated insider trading law index (IITI)

The fourteen elements are now combined and ranked in the integrated insider trading law index. The higher the achieved performance (max. 14 points), the tougher the country's insider trading regulation is. *Table 4* represents the score for each country.

Overall, the Swiss insider trading law considerably lags behind with a total score of five points. Second to last is the European insider trading directive. As expected, the United States (14) achieved the full score, closely followed by Canada (12), the United Kingdom (12), Singapore (12), Hong Kong (11) and Australia (11).

Switzerland shows a fairly good performance in the sanction-based section, but fails to score any points for the disclosure-oriented elements. Although the minimum regulatory standard required to secure market integrity and confidence is reached, the information content conveyed and disclosed in insider transactions is deficient and thus low-graded. The United States and Hong Kong regulatory systems are most proficient in this section. Although Switzerland has a well-developed and well-functioning capital market, insider-trading law, especially on the disclosure policy, is lacking in information distribution compared to other leading capital markets. Moreover, the system-based elements indicate that even though the Swiss as well as Asian IT laws are rather young, Hong Kong and Singapore perform high in the disclosure-based section. These findings provide interesting cross-country exchange transparency policies. When compared to Beny's rather rudimentary index (2005), this integrated insider trading index is found to come to likewise conclusions, but to emphasize the regulatory discrepancies in the predominant forms of international insider trading law even more.

¹⁸ Although this approach appears to bias hypothesis 1 (H1), the impact of one variable on the IITI is marginal (7.1%).

¹⁹ See appendix Part A. for the list of all 22 countries.

Table 4: Integrated insider trading law index (IITI)

Elements	United States	Canada	Australia	United Kingdom	European Union	Switzerland	Hong Kong	Singapore
<i>Sanction-based</i>								
Tippee	1	1	1	1	1	1	1	1
Tipping	1	1	1	1	1	1	1	1
Damage: Individual	1	1	1	1	1	0	1	1
Damage: Company	1	1	1	1	1	1	1	1
Private Right	1	1	0	0	0	0	0	1
Criminal Action	1	1	1	1	1	1	1	1
Total	6	6	5	5	5	4	5	6
<i>Disclosure-based</i>								
Legal Disclosure Period	1	0	0	0	0	0	1	1
Blackout Period	1	1	1	1	0	0	1	0
Announcement Date	1	1	1	1	1	0	1	1
Ownership Holdings	1	1	1	1	0	0	1	1
Insider's Name	1	1	1	1	1	0	1	1
Total	5	4	4	4	2	0	5	4
<i>System-based</i>								
Legal Origin	1	1	1	1	0	0	1	1
Exchange Establishment	1	0	0	1	0	0	0	0
IT Law Establishment	1	1	1	1	0	1	0	1
Total	3	2	2	3	0	1	1	2
Integrated IT law index	14	12	11	12	7	5	11	12

5.5 The IITI's robustness test

Taking Beny's approach (2005) as its basis, this integrated insider trading law index is a more advanced feature, to measure and compare the toughness of international insider trading law. In order to determine the performance as well as credibility of the IITI, the anti-self-dealing index constructed by Djankov, et al. (2008) serves as a representative benchmark. They evaluate the legal protection of minority shareholder against the misuse and abuse of material information by insiders. Three equally weighted dimensions measure the strength of the *Investor protection index*: the extent of the *Disclosure index*, the extent of the *Director liability index* and the ease of *Shareholder suits index*. The data comes from a questionnaire sent to attorneys by Lex Mundi, the world's leading association of independent law firms.

Table 5: Investor protection index vs. IITI**Panel A: Index score**

	United States	Canada	Australia	United Kingdom	European Union	Switzerland	Hong Kong	Singapore
Investor protection index	8.3	8.3	5.7	8.0	5.3	3.0	9.0	9.3
Disclosure index*	7	8	8	10	6	0	10	10
Director liability index**	9	9	2	7	4	5	8	9
Shareholder suits index***	9	8	7	7	6	4	9	9
IITI	14	12	11	12	7	5	11	12

Data has been extracted from the International Finance Corporation (IFC) website and collected by the 'Doing Business' project. The latest data sample was completed in June 2011. Available at <http://www.doingbusiness.org/data/exploretopics/protecting-investors>

* A higher value indicates more transparent information and greater disclosure.

** A higher value indicates the ability of shareholders to sue directly or derivatively and the availability of legal remedies.

*** A higher value indicates more shareholder rights (e.g. direct access to internal documents of the company) or the use of government inspection without filing suit in court.

Panel B: Correlation analysis

Correlation	Investor protection index	Disclosure index	Director liability index	Shareholder suits index
IITI with	0.862	0.797	0.581	0.868

Panel A of *Table 5* presents the score of the IITI and the investor protection index. For the latter, a higher value (0-10) implies a better investor protection against insider trading. When my IITI is compared to the investor protection index and its sub-elements, they are shown to exhibit similar amplitudes, even though the basis of calculation is fundamentally different.

The zero points Switzerland scores in the *Disclosure index* are exceptionally pure which goes in support of the results of my IITI. Although the index of Djankov et al. (2008) concentrates on a slightly different disclosure relationship (the case of the fictitious Mr. James, in his function as both owner and vendor of the acquisition in the posited M&A transaction scenario), Switzerland appears to be substantially lacking in legal disclosure policy mechanisms. *Panel B* underlines the score of the correlation analysis of the newly developed IITI and the investor protection index as well as the sub-indices. The strong correlation coefficients of up to 0.868 accentuate the congruency and the robustness of the IITI.

Both indices ultimately investigate the toughness of insider trading regulation and come to similar conclusions. Supporting hypothesis 1a (H1a), the collated findings imply that international insider trading regulation indeed is most pronounced in common law and rather weak in civil law countries. Moreover, stricter regulation indicates a more transparent disclosure policy, which corroborates hypothesis 1b (H1b).

6. Cross-country characteristics

The integrated insider trading law index indicates the degree of the country's regulation and hence how it deals with legal insider trading and prevents the systematic abuse of price-sensitive information. A number of other corporate- and market-specific characteristics help to give an impression and measure how the insider trading activities are perceived. Moreover, the following threefold association of insider trading, ownership structure as well as stock price liquidity has been observed.

6.1 Descriptive summary

To measure the cross-country characteristics, the constituents of the respective leading stock market index serve as a representative benchmark of the market capitalization of equity markets. For the purpose of this comparison, the applied indices are as follows:

Table 6: Sample overview

Country/Region	United States	Australia	Canada	United Kingdom	European Union	Switzerland	Hong Kong	Singapore
Index	S&P 100	ASX50	TSX60	FTSE 100	Euro Stoxx 50*	SMI	Hang Seng	Straits Times
Constituents	100	50	60	102	50	20	48	30
Observed	98	50	59	95	48	20	46	29
Market Cap of index (USD Billion)**	8'088	878	1'040	1'957	1'744	853	1'600	225
% of entire market capitalization	45%	63%	73%	81%	60%***	90%	60%	62%

* Represented countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain.

** Retrieved from Bloomberg on 4th May 2012.

*** Percentage of the free float market capitalization of the EURO STOXX Total Market Index, which in return covers 95% of the free float of the represented countries.

At least 93% of the constituents of each index are represented in the final sample. Incomplete data is the main reason for the exclusion of any company. The representativeness of the index to the total equity market capitalization is corroborated by the high coverage (on average 66.75%) and the reliability of the observed sample. The sub-section briefly summarizes and illustrates the cross-country characteristics.

6.1.1 Herfindahl Index

The Herfindahl index is a well-known concentration measurement named after Orris Herfindahl and Albert Hirschmann. For the purpose of this paper, it is a proxy for ownership concentration and according to Woerheide and Persson (1993) it is the best out of five measures.²⁰ The index is calculated as the sum of the squares of the top ten equity shareholdings of a company:

²⁰ Other studies used the Herfindahl index as a proxy as well (Hartzell and Starks, 2003; Lakhali, 2005).

$$H = \sum_{i=1}^n S_i^2,$$

where n are the top ten shareholders of the company; S is the percentage share owned by each of the top ten largest shareholders. The current ownership concentration has been extracted from *Thomson Financials* and has been averaged over each index. Each country has its own unique setting and thus it is important to note that these often culturally-based characteristics are crucial to understanding the different ownership structures. In East Asian countries, for example, about two-third of the firms are controlled by one shareholder (group), and of these 50% are family-controlled. Moreover, separation of ownership and control is rare (Claessens, Djankov and Lang, 2000). Another study on the ultimate ownership control examines Western European countries and concludes that firms are typically widely-held²¹ (Faccio and Lang, 2002). This finding also holds good for U.K. listed companies. In contrast to the mainstream perception, Holderness (2009) argues that ownership in the U.S. is similar to that of like-sized non-U.S. firms. Nonetheless, I have to admit that ownership concentration is negatively correlated with firm size. Consistent with pre-existing studies, leading indices principally contain a country's largest companies, which causes potential shortcomings in the definition and representation of the overall ownership structure of a country (Holderness, 2009). The objective of the study focuses on the cross-country comparison of the constituents of leading equity indices and hence legitimates this concern.

6.1.2 Liquidity measures

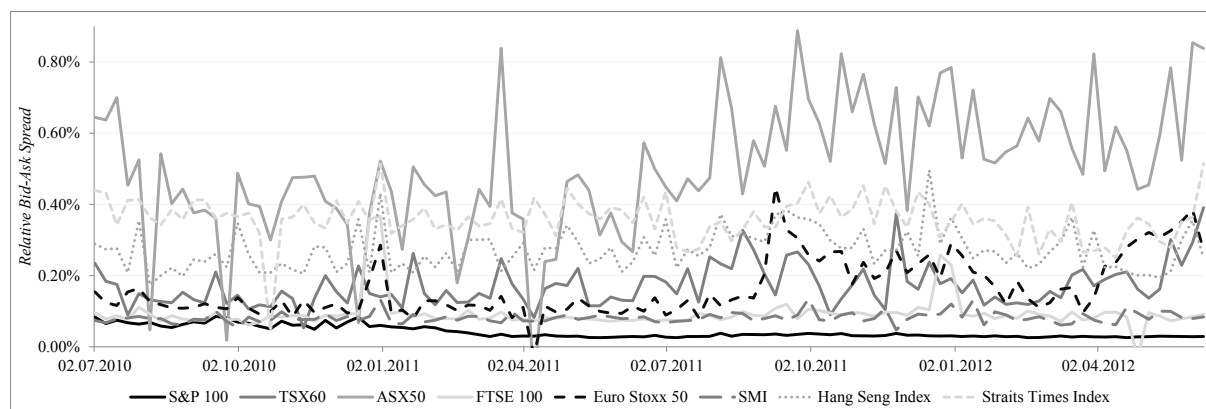
Two well-known liquidity measures indicate the degree of stock market liquidity. In conjunction with insider trading, stricter insider trading regulation implies greater stock price liquidity (e.g. Copeland and Galai, 1983; Beny, 2005).

The relative bid-ask spread is the first liquidity proxy and is defined as the difference between the ask price and the bid price, divided by the midpoint of the quotes. It is a common measure to determine the informativeness and hence the liquidity of stock prices (Lebedeva, Maug and Schneider, 2009). On the one hand, market makers and dealers widen their spreads in order to be compensated for trading losses incurred by trading against informed insiders. On the other hand, a small spread is a strong indicator of informative stock prices and high market liquidity. *Figure 1* presents the devel-

²¹ Family-controlled companies are well presented, too.

opment of the first liquidity proxy over a 100 week observation period from the 2nd July 2010 until the 9th June 2012.

Figure 1: Relative bid-ask spread



Singapore's Straits Times Index (average: 0.359%), Hong Kong's Hang Seng Index (average: 0.271%), and, to an even more pronounced extent, Australia's ASX50 (average: 0.501%), show the widest market spreads on average. As expected, the S&P 100 constituents have the smallest relative bid-ask spread (average: 0.043%), which is a clear evidence of the high stock market liquidity in the U.S. The second most liquid stock market is Switzerland with an average two-year relative bid-ask spread of 0.082%.

A second liquidity measure has been adopted from Du and Wei (2004). They measure the liquidity of the market by applying a ratio of the total value of shares traded divided by the average market capitalization over the period.²² This relative ratio measures how often stocks are turned over by market participants and provides a profound measure of market liquidity (Sarr and Lybek, 2002). A higher value of turnover denotes more liquidity.

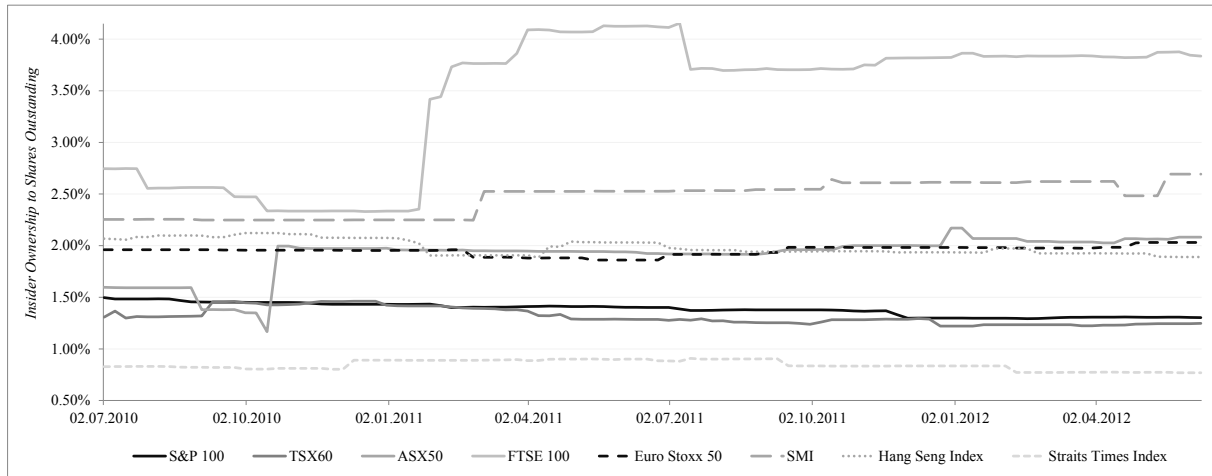
6.1.3 Insider ownership and activity

Information on insider ownership provides insights into the managerial power of corporate insiders. More substantial voting power implies a higher probability of exploiting material non-public information and at the same time reduces the threshold of justification to other directors or shareholders. In this regard, if insiders hold stakes in the company's equity, it fosters the probability of misbehavior and market abuse (Franks,

²² Data has been extracted from Standard & Poor's Global Stock Markets Factbook and supplemental S&P data. The data is averaged and hence only available on an annual basis.

Mayer and Renneboog, 2001). To improve the comparability between the countries and reduce the bias of firm size, I relate this figure to the shares outstanding. Thus, *Figure 2* presents the percentage of the outstanding shares currently held by corporate insiders.²³

Figure 2: Insider ownership to shares outstanding



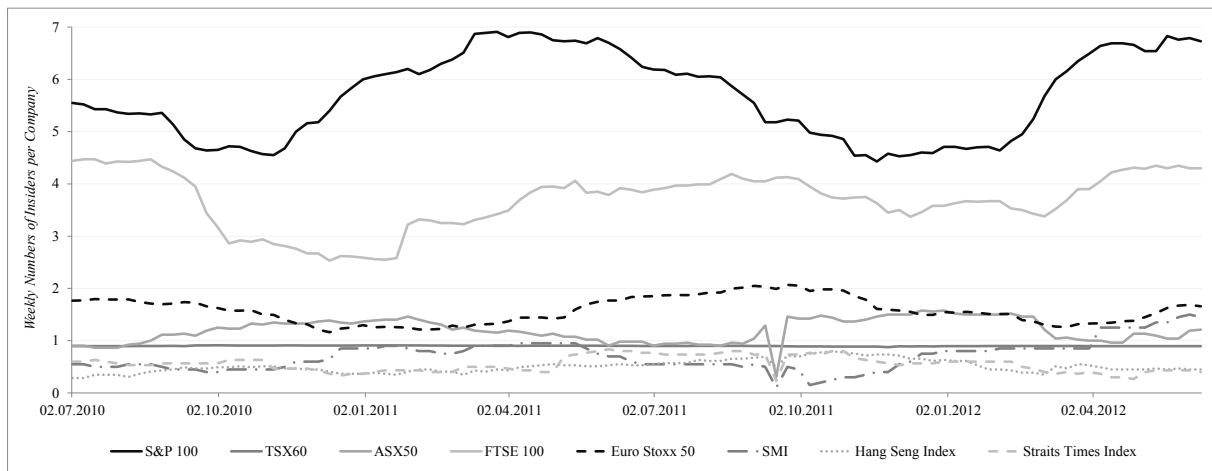
Constituents from the SMI (2.46%) and the FTSE 100 (3.44%) have disproportionately high insider ownership holdings compared to the other observed countries. Moreover, both countries have tended to show an increasing trend towards more insider holdings over the last two years (FTSE 100: +41%; SMI: +17%), contrary to the stable (decreasing) development of the other countries. In Switzerland as well as the U.K. the one-tier board, often called the principle of CEO-Duality, might be one possible reason for the higher insider ownership. The entrepreneurial power causes an environment of self-serving abuse of authority and fosters managerial freedom at the expense of the shareholders' interests in such a way that insiders keep on trading (Jensen and Meckling, 1976).

Insider activity is an indicator of the occurrence of insider transactions on the capital market. Therefore, insider activity measures the average number of insiders trading per week on each security. On the one hand, more insider trading implies more informative stock prices. On the other hand, it increases the probability of potential, systematic market abuse. The toughness of insider regulation and insider activity is assumed to be negatively correlated. Insider trading activity per week and company is highest in the U.S. and the U.K. On the Swiss, Singaporean and Hong Kong equity markets less than

²³ Data has been extracted from Bloomberg.

one insider per week and company has conducted insider transactions over the last two years. The question arises if regulation actually affects the trading frequency of insiders as not all transactions are information-driven. *Figure 3* indicates a first impression that companies with tougher insider regulations also have more insider activity.

Figure 3: Number of insiders trading per week and company



6.1.4 Equity float

The float of equity measures the number of shares that are available to the public. Hence, the figure does not include shares held by long-term shareholders or other corporate investors (e.g. employee pension trust). I relate the absolute number of public float to the shares outstanding, which is the total number of shares issued by a corporation in order to receive the pure percentage of the publicly available shares for trading. Stocks with a smaller equity float to shares outstanding are characterized by more volatile stock prices and higher price jumps as proportionally less transaction volume triggers stronger market response.

Figure 4: Equity float to shares outstanding

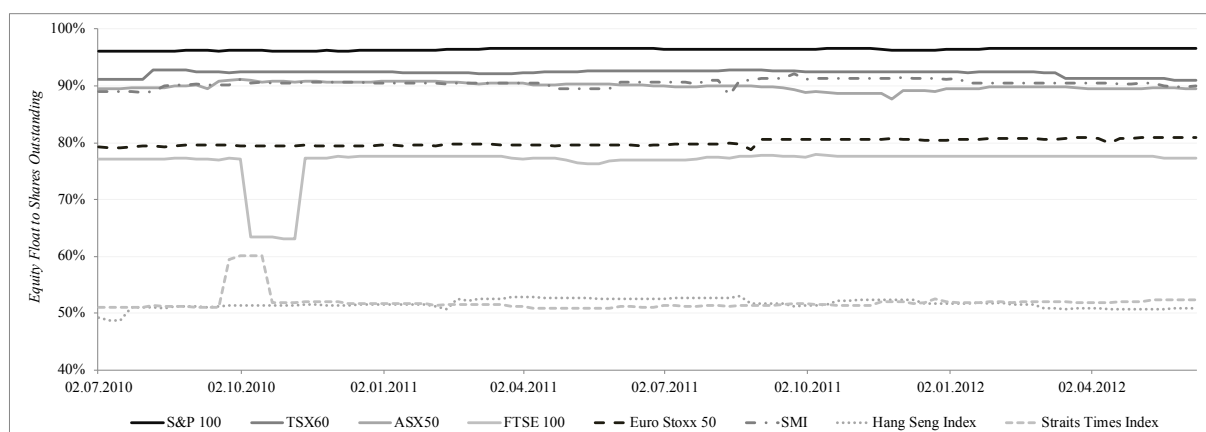


Figure 4 presents this ratio for the eight indices. The constituents of the S&P 100, the TSX 60 and the SMI denote the highest equity float, whereas both Asian countries signal only around 50% free float to shares outstanding. The results support the impression given by the previously analysed relative bid-ask spreads. The Hang Seng Index, the Straits Times Index and ASX50 have all presented highly volatile and wider bid-ask spreads over the last two years. It thus appears that the variation in stock prices is negatively associated with the relative equity float of the company.

6.1.5 Summary of variables

Table 7 illustrates the descriptives of the integrated insider trading law index (IITI) and the six financial stock market-specific and insider trading-related elements. The direct comparison of the different factors helps to distinguish the characteristic features of each country.

Table 7: Summary of descriptives²⁴

Country	IITI	HHI	Liquidity measures		Insider ownership	Insider activity	Equity float
			BA spread	Turnover			
United States	14	0.018	0.00043	128.730	0.014	5.6854	0.964
Canada	12	0.025	0.00171	79.419	0.013	0.8993	0.923
Australia	11	0.024	0.00511	87.610	0.019	1.1959	0.899
United Kingdom	12	0.037	0.00093	241.755	0.034	3.6823	0.767
European Union	7	0.065	0.00164	106.018	0.020	1.2725	0.800
Switzerland	5	0.062	0.00082	81.258	0.025	0.7108	0.905
Hong Kong	11	0.283	0.00271	86.831	0.020	0.5076	0.516
Singapore	12	0.215	0.00359	150.144	0.008	0.5546	0.519

On the one hand, the ownership structure measured by the Herfindahl Index of both Asian countries is concentrated and significantly higher compared to the other observed countries. On the other hand, both liquidity measures find evidence of highly liquid and informative stock prices for both the U.S. and the U.K. as well as the European Union countries. Switzerland exhibits one of the lowest stock turnover ratio in the sample, although the bid-ask spread is relatively small. These two liquidity measures tend to indicate different aspects of the same phenomenon. Moreover, Switzerland denotes one of the highest insider ownership holdings, after the U.K. Insider ownership is less pronounced in Singapore, the U.S. as well as Canada. Besides the relatively weak ownership holdings of U.S. insiders, the average weekly number of

²⁴ For the purpose of this summary, the time-series data has been averaged over a two-year period.

insiders trading in the same period is substantially higher compared to the other countries in the observation period. Last and as already mentioned, the stock market equity float is highest in the U.S., followed by Canada and Switzerland, and remarkable lower for the two Asian countries. The following correlation analysis sheds light on the interaction of the aforementioned elements.

6.2 Correlation analysis

The integrated insider trading law index (IITI) is the key element in the correlation analysis. This analysis defines a quantitative measure for the description of a linear relationship between two variables. The first column of *Table 8* presents the results of the relationship of the IITI to the six other factors. The correlation analysis is conducted on a weekly basis and provides a total of 648 observation points over a 2-year time period. It seems that only two variables correlate with IITI. As expected, the stock turnover ratio (0.608) is positively related and the insider ownership to shares outstanding (-0.617) is negatively related to the IITI. In line with Beny (2005) stricter insider trading law is found to increase stock market liquidity and incidentally reduce the equity proportion of insiders. The figures, however, tend to denote a semi-strong correlation. According to the prevailing view, a correlation coefficient above 0.6 is a strong indicator of high correlation.

Table 8: Correlation analysis

Variables (observations: 648)	IITI	HHI	Bid-ask spread	Stock turnover	Insider ownership	Insider activity	Equity float
IITI	1						
HHI	0.164	1					
Bid-ask spread	0.161	0.740	1				
Stock turnover	0.608	-0.079	-0.298	1			
Insider ownership	-0.617	-0.338	-0.429	-0.228	1		
Insider activity	0.505	-0.493	-0.375	0.680	-0.320	1	
Equity float	-0.221	-0.944	-0.755	0.213	0.411	0.567	1

Moreover, other conclusions can be drawn from *Table 8*. The Herfindahl Index is positively related to the bid-ask spread (0.740) and negatively related (-0.944) to equity float. The latter also accounts for the correlation between the bid-ask spread and the equity float (-0.755). Hence, a more concentrated ownership structure goes in line with less liquid (efficient) stock markets as well as a less publicly available number of stocks for trading. Similar, capital markets with less equity float are also less liquid. Finally, more stock turnover is shown to be positively related to the insider activity

(0.680). Stock turnover, as opposed to the bid-ask spread, appears to be a more adequate measure to value the impact of IITI. Unlike Beny (2005), I could not find any relationship between ownership structure and tougher insider trading law. Consequently, I cannot support hypothesis 2 (H2) and can only partially accept hypothesis 3 (H3). Only one liquidity measure indicates suitable results.

Interestingly, a different picture occurs if I exclude both Asian countries from the analysis (*Table 9*). Equally pronounced correlations are highlighted in the light grey boxes, whereas the dark grey boxes indicate additional significant coherences. In this case, the IITI is strongly negatively correlated to the HHI (-0.966) and to the relative bid-ask spread (-0.695). The unique make-up of the ownership landscape in Asia appears to substantially dilute the results of the previous analysis. Excluding both Asian countries changes the outcome, which now supports the findings of Bhattacharya and Daouk (2002) as well as Beny (2005). In addition, stock turnover (0.990) and insider ownership (-0.783) are still significant and in the expected direction. Finally, the IITI positively correlates with the insider activity (0.926) and the equity float (0.626). From the former it can be derived that tougher insider trading regulation does not reduce the trading frequency of insiders and from the latter that more regulation improves the overall equity float available and hence indirectly the liquidity of the stock market. Likewise, more concentrated ownership is negatively correlated with the insider activity (-0.927) and stock turnover (-0.956). As expected a concentrated ownership environment goes in line with both less frequent insider trading and less severe overall stock turnover activities.

Table 9: Correlation analysis excluding Hong Kong and Singapore

Variables (observations: 324)	IITI	HHI	Bid-ask spread	Stock turnover	Insider ownership	Insider activity	Equity float
IITI	1						
HHI	-0.966	1					
Bid-ask spread	-0.695	0.487	1				
Stock turnover	0.990	-0.956	-0.490	1			
Insider ownership	-0.783	0.599	0.376	-0.769	1		
Insider activity	0.926	-0.927	-0.507	0.915	-0.651	1	
Equity float	0.626	-0.806	-0.333	0.624	-0.015	0.680	1

Several corporate- and market-specific characteristics considerably influence the interrelationships between the different factors.²⁵ The cross-country correlation analysis provides a heterogeneous unit to explain the relationship of the insider trading law to other key elements. The toughness of the IITI doubtlessly depends on the aforementioned characteristics. Nevertheless, it must be stressed that the extent of this relationship is strongly connected to the countries chosen for these observations, especially when it comes to Asian ones. This finding also implies that cultural aspects such as the characteristics of the ownership structure, which has been found out to vary among Eastern and Western countries (Claessens, 2000; Faccio and Lang, 2002; Holderness, 2009), matter. If this fact is taken into account, I can support hypothesis 2 (H2) and 3 (H3).

7. Discussion and concluding remarks

The newly developed, integrated insider trading law index emphasizes the discrepancies in Swiss insider trading regulation compared to other well-established capital market regimes even more. I found clear evidence that its deficiencies are primarily a result of its disclosure policies, but also those of the European directives. The common law countries examined, such as the U.S., U.K., Hong Kong, Singapore, Canada and Australia, exhibit highly transparent disclosure mechanisms regarding insider transactions. This policy is a strong signal towards having an investor-friendly and investor-protected capital market, which fosters market integrity and at the same time implies an environment where information is freely and publicly available to all market participants. Though the anti-self-dealing index of Djankov et al. (2008) also addresses elements of the systematic abuse of superior knowledge from a fundamentally different angle, its findings show a high correlation with those of my IITI.

In accordance with capital market theory, the empirical findings of this paper advance the view that the toughness of insider trading regulation indeed relates to market-specific and insider trading-related elements. A higher score in the IITI implies more liquid stock prices as well as less insider ownership. In addition, stricter laws are partially associated with less ownership concentration in publicly listed companies. The results, however, are sensitive to the sample selection. The exclusion of individual countries from the sample causes significant changes in the analysis.

²⁵ Appendix Part B. shows further cross-country specific correlation analysis. The results, however, do not indicate additional findings.

The results of this study are, however, subject to several caveats. One of the limitations is inherent in the moderate sample size. Although all the predominant forms of insider trading regulations are broadly represented in the analysis, more detailed investigation of the individual regulatory differences in the European and Asian countries would both deepen and widen the results.

A second shortcoming concerns the selection of the elements of the IITI. The adoption of other or additional variables may alter the ranking scores. Nonetheless, the study contributes to and extends the scope of the existing literature on international insider trading law. It provides clear evidence of the disparity between Swiss and European insider trading law and opens the door to further analysis in this mostly untouched area of research.

In terms of the ongoing political debate on the credibility of insider trading in Switzerland, the paper emphasizes the soft spots, namely the disclosure policies under the current regulations and the potential backlog of demand concerning other regulatory requirements in respect of insider trading.

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Appendix

Part A.

Country	Code	Exchange Establishment	IT Law Establishment
Australia	AUS	1859	1991
Austria	AUT	1771	1993
Belgium	BEL	1801	1990
Canada	CAN	1878	1966
Denmark	DNK	1919	1991
Finland	FIN	1912	1989
France	FRA	1826	1967
Germany	DEU	1585	1994
Hong Kong	HKG	1891	1991
Ireland	IRL	1973	1990
Italy	ITA	1808	1991
Japan	JPN	1878	1988
Luxembourg	LUX	1929	1991
Netherlands	NLD	1600	1989
New Zealand	NZL	1870	1988
Norway	NOR	1819	1985
Singapore	SGP	1930	1973
Spain	ESP	1831	1994
Sweden	SWE	1863	1971
Switzerland	CHE	1938	1988
United Kingdom	GBR	1773	1980
United States	USA	1792	1934
Median		1861	1989

Data is extracted from Bushmann, Piotroski and Smith (2005).

Part B.Excluding U.S.

Variables (observations: 540)	IITI	HHI	Bid-ask spread	Stock turnover	Insider ownership	Insider activity	Equity float
IITI	1						
HHI	0.567	1					
Bid-ask spread	0.443	0.702	1				
Stock turnover	0.369	0.416	-0.084	1			
Insider ownership	-0.548	-0.598	-0.621	0.025	1		
Insider activity	-0.146	-0.595	-0.471	0.045	0.035	1	
Equity float	-0.765	-0.932	-0.728	-0.331	0.775	0.432	1

Excluding U.K.

Variables (observations: 540)	IITI	HHI	Bid-ask spread	Stock turnover	Insider ownership	Insider activity	Equity float
IITI	1						
HHI	0.242	1					
Bid-ask spread	0.257	0.726	1				
Stock turnover	0.635	-0.079	-0.311	1			
Insider ownership	-0.808	-0.284	-0.374	-0.295	1		
Insider activity	0.572	-0.554	-0.448	0.702	-0.294	1	
Equity float	-0.246	-0.963	-0.779	0.212	0.426	0.586	1

Excluding Europe

Variables (observations: 540)	IITI	HHI	Bid-ask spread	Stock turnover	Insider ownership	Insider activity	Equity float
IITI	1						
HHI	0.059	1					
Bid-ask spread	0.076	0.731	1				
Stock turnover	0.600	-0.133	-0.356	1			
Insider ownership	-0.770	-0.389	-0.478	-0.262	1		
Insider activity	0.509	-0.544	-0.416	0.678	-0.343	1	
Equity float	-0.178	-0.948	-0.755	0.246	0.439	0.594	1

Excluding Switzerland

Variables (observations: 540)	IITI	HHI	Bid-ask spread	Stock turnover	Insider ownership	Insider activity	Equity float
IITI	1						
HHI	-0.045	1					
Bid-ask spread	0.037	0.735	1				
Stock turnover	0.462	-0.227	-0.437	1			
Insider ownership	-0.135	-0.224	-0.457	0.184	1		
Insider activity	0.521	-0.585	-0.437	0.668	-0.245	1	
Equity float	0.131	-0.951	-0.764	0.485	0.171	0.738	1

Part III: An examination of abnormal market reactions around management transactions

ALBERT KARL GEBHARDT

Abstract

This paper contributes to the scarce literature on management transactions on the Swiss stock market. Its comprehensive analysis examines the effects of stock price momentum and corporate announcements on abnormal market reactions around management transactions. The findings suggest that both effects substantially impact the abnormal returns. A positive (negative) stock price momentum around purchase (sale) transactions generates unexpectedly high abnormal market reactions. Moreover, purchase (sale) transactions prior to Good-News (Bad-News) announcements trigger stronger abnormal returns. Accordingly, when both effects are combined and examined together, this examination reveals unforeseen, strongly abnormal, market reactions previously undocumented by other studies to this date.

A multivariate regression verifies the relationship of these effects to abnormal returns. This study provides evidence that only a small portion of the abnormal returns observed can be attributed to the management transaction itself.

Keywords: Management Transactions, Insider Trading, Stock Price Momentum, Abnormal Market Reaction, Swiss Stock Market, Corporate Announcement.

JEL Classification: G19, G140

1. Introduction

Several international studies discuss whether insiders abuse their superior knowledge about their company to profit when trading with less informed market participants. Due to the stricter regulation of insider trading and the transparent disclosure policies in those countries, this topic has already been receiving major attention in the U.S. and the U.K. for several decades (e.g. Lorie and Niederhoffer, 1968; Jaffe, 1974; Huddart and Ke, 2007). Likewise, Seyhun (1986) finds evidence that insiders can predict excess future market returns, purchasing prior to price up-swings and selling before downward stock price movements. Fidrmuc, Goergen and Renneboog (2006) analyze the U.K. stock market and show similar, but even more pronounced, abnormal market patterns compared to the studies from the U.S. They consider the differences they discovered to be the result of the speedier disclosure policy with regard to management transactions in the U.K. at that time. Moreover, Dardas and Güttler (2011) conduct a cross-country analysis of eight European markets and document significant announcement effects for most of the countries. Accordingly, most of the academic works on management transactions tend to corroborate the fact that insiders show abnormal returns after the disclosure of the transaction.

The subject of insider trading on the Swiss capital market has not received any major attention from academics up till now. The restrictive disclosure policy of the Swiss Exchange Regulation and the accompanying lack of long-term historical data have tended to hamper reliable empirical research on the capital market in this country. However, Ammann and Kessler (2004) as well Zingg, Lang and Wytttenbach, (2007) did perform the first, groundbreaking investigations into the market reaction to management transactions on the Swiss stock exchange. Interestingly, even though Switzerland has an established capital market, insider trading legislation is still considered to be lax, lagging behind the EU Directives or U.S. legislation (Zingg et al., 2007). Unlike the U.K. or U.S. regulation, the Swiss regulator, for example, tolerates trading in times of higher information asymmetry immediately prior to corporate announcements (no trading ban period). Hence, self-serving insiders may yield higher profits by trading on their inside information without running a major risk of prosecution. Both Swiss studies apply an event study approach detecting, however, no systematic abuse of inside information prior to corporate announcements.

This paper addresses the question of the underlying drivers of these observed abnormal market reactions. Pursuant to a literature stream (e.g. Givoly and Palmon, 1985; Sey-

hun, 1986; Dymke and Walter, 2008), which has already addressed this phenomenon, this study makes its own, individual contribution by analyzing whether these abnormal returns are actually triggered by the announcement of management transactions on the Swiss stock market. Two further possible factors which may account for this irregular market pattern are corporate announcements and the stock price momentum immediately around the management transactions. This study thus examines these factors to see how far they pertain. To the best of my knowledge, it uncovers previously unknown facts in establishing that only a small portion of the observed abnormal returns can be attributed to the management transaction itself.

First, this study investigates to what extent management transactions cause abnormal market reactions on the Swiss capital market. To this end, an extensive, long-term, insider trading sample of more than six years has been hand-collected. Interestingly, the event study indicates relatively extenuated abnormal returns when compared to other leading, international research findings, but these still lie in the expected direction. In order to obtain further details about the true market reaction with regard to management transactions, a set of corporate announcements has been used to divide transactions into Pre-News, Post-News and No-News groups. In addition, the information content of the corporate announcement (Good-News and Bad-News) shows further evidence of the extent to which insiders systematically abuse their information advantage by purchasing (selling) prior to Good-News (Bad-News) or waiting until after of the corporate release. Second, management transactions have been clustered in accordance with the pre-event abnormal returns in order to analyze whether any stock price momentum determines post-trading abnormal market reactions. The stock price momentum reveals a strong and stable trend over the entire 61-day event window; positive for purchase and negative for sale transactions. Consequently, the strongest abnormal market reactions can be observed for purchase (sale) transactions prior to Good-News (Bad-News) announcements if the *positive (negative) momentum* is intact. Moreover, remarkable abnormal returns can be observed after Bad-News announcements. A multivariate regression verifies that these abnormal returns can well be explained by the stock price momentum and the information released by the corporate announcement. These findings reveal that only a small portion of abnormal returns are actually triggered by the management transaction itself. In line with Givoly and Palm-on (1985) and Noe (1999), this paper finds strong support for the fact that stock price momentum, and – in this case consistent with Sivakumar and Waymire (1994) and

Dymke and Walter (2008) – the consideration of corporate announcements are key factors to be addressed when examining abnormal returns around management transactions.

The remainder of this paper is structured as follows: The next chapter summarizes leading international research on management transactions and develops its underlying hypotheses. Section 3 discusses the data sample and the descriptive statistics. Sections 4 and 5 respectively present the empirical results of the event study analysis and the multivariate regression. Section 6 concludes the paper.

2. Literature and development of hypotheses

The announcement effect has been documented by capital market theorists in various contexts. The effect has been measured by examining the shift in stock prices in response to news announcements (John and Lang, 1991). Likewise, management transactions are typically based on private information and hence are assumed to cause an immediate market reaction once the information has been disclosed. The market signal is positive after purchase transactions indicating positive firm prospects and negative after sale transactions (Fidrmuc, Goergen and Renneboog, 2006). The signal sent by such activities is assumed to be significant since insider trading is associated with risk due to personal monetary expenditure and possible litigation risk involved. Several other studies examine other aspects of insider trading such as the relationship between the trading volume and the information content of the transaction (Jeng, Metrick and Zeckhauser, 2003; Fidrmuc, et al., 2006; Betzer and Theissen, 2009) and document higher abnormal profits for large volume transactions than smaller ones. Another literature stream investigates the position of the corporate insider within the company (e.g. Seyhun, 1986; Dardas and Güttler, 2011). According to the *Information Hierarchy Hypothesis*, executive directors - as opposed to non-executive directors - have continuous, monopolistic access to private- and company-based information and hence are more dedicated to the firm's prospective performance. Whilst most pioneering studies on management transactions have largely neglected the relation of firm size to insider trading, both Gregory, Matatko and Tonks (1997) and Wong, Cheung and Wu (2000) highlight that abnormal returns tend to be more concentrated in smaller firms as stocks are less screened by analysts or investors, which indicates a greater information gap.

I take these findings into consideration and examine the abnormal market reaction triggered by management transactions in more depth. In line with extant international

studies, I hypothesize that insiders are able to time their trades properly. Both Rozeff and Zaman (1988) and Lakonishok and Lee (2001) confirm that insiders are contrarian investors and buy after recent stock declines and sell after price run-ups. Furthermore, I compare my results with those of another Swiss study by Zingg et al. (2007) to highlight possible (dis-) similarities. In accordance with these prevailing assumptions, I state the following hypothesis:

H1: Management transactions trigger market reactions. Purchase (sale) transactions are accompanied by negative (positive) abnormal returns pre event and positive (negative) abnormal returns post event.

However, Givoly and Palmon (1985) provide evidence that some portion of the abnormal market reactions cannot be directly associated with the management transaction. They make an educated guess as to the fact that these abnormal returns on management transactions endure beyond the expected observation period. This long-term stock price development ‘is produced in the wake of the trades themselves’ (p. 85) and comes from (outside) investors who mimic insiders. Likewise, Noe (1999) admits that insiders do not tend to benefit from the short-term information asymmetry to investors, but rather profit from the favorable long-term stock price trend based on their profound insights into the company’s future prospects. Hence, the second hypothesis supposes – contrary to the first hypothesis – that, due to the stock price momentum, the abnormal returns in the days immediately prior to the management transaction are suitable in anticipating the post-event abnormal market reactions:

H2: Management transactions are surrounded by a certain stock price momentum. Positive (negative) pre-event abnormal returns before purchase (sale) transactions are an indicator of positive (negative) post-event abnormal market reactions.

Several studies, mostly from the U.S., examine the connection of insider trading and corporate announcements. Sivakumar and Waymire (1994) and Noe (1999) both find a link between insider trading and news disclosures, particularly earnings announcements, and conclude that insiders tend to take a conservative position and abstain from trading until after the disclosure of corporate announcements. In addition, they adjust for the information release (Good-News and Bad-News) conveyed in the corporate announcements. A systematic and active abuse of information is apparent if insiders

purchase (sell) stocks prior to positive (negative) corporate announcements. Insiders taking a speculative position after the news disclosure are assumed to demonstrate the reverse behavior. Dymke and Walter (2008) analyze the German market and conclude that insiders front-run corporate announcements and are able to generate remarkably higher abnormal returns compared to no-news transactions. In contrast, Elliott, Morse and Richardson (1984) and Givoly and Palmon (1986) for the U.S. market as well as Zingg, et al. (2007) for the Swiss market cannot confirm a systematic relationship between insider trading and corporate announcements. Although several studies investigate this specific field of research, the extant literature does not provide any clear statement on this highly controversial issue. This paper further contributes to the aforementioned works and hypothesizes that insiders trade around corporate announcements due to the relatively lax insider trading law in Switzerland (Gebhardt, 2012). Moreover, any abnormal market reactions are expected to be strongest prior to corporate announcements when compared to eventless²⁶ (no-news) transactions:

H3: The abnormal market reactions of management transactions around corporate announcements are stronger compared to no-news transactions. The effect is most pronounced when insiders purchase (sell) prior to Good-News (Bad-News).

Finally, the effects of stock price momentum and corporate announcements are both combined and examined together in order to afford a much deeper understanding of how they impact the market reaction around management transactions. Consequently, the last hypothesis questions as to how far stock price momentum, corporate announcements and the management transaction effect are responsible for the abnormal market reactions observed. Due to the uncertainty as to the magnitude of each effect, I conjecture that a positive (negative) stock price momentum for purchase (sale) transactions together with Good-News (Bad-News) releases cause the highest abnormal returns. The magnitude of the market reaction is expected to be most pronounced for transactions conducted immediately prior to corporate announcements (Pre-News):

H4: A positive (negative) stock price momentum around purchase (sale) transactions prior to Good-News (Bad-News) corporate announcements triggers the most pronounced abnormal market reactions.

²⁶ A 40-day period around the management transaction where no corporate announcement has been published.

3. Data and descriptive statistics

3.1 Data

The data source comes from a variety of sources. The management transaction data is based on the published notification in the management transactions section of the SIX Exchange Regulation. However, this data is only available to the public by a remote access mechanism for a period of just one year. It was thus necessary to obtain a secondary database from the Finanz und Wirtschaft (*FuW*) website. The management transaction data has been disclosed on a daily basis since July 2005. All the data has been hand-collected for the purpose of this paper. Transactions between August 2005 and March 2011 come from the *FuW* website, whereas more recent data from April 2011 until December 2011 has been retained directly from the SIX Exchange Regulation website. The original data sample was comprised of 13'320 insider events from 290 listed companies from August 2005 until December 2011. Insider events are prompted by different motives. For the purpose of this analysis, only stock trades have been considered. These transactions are assumed to be purely information-driven rather than driven by other circumstances such as compensation-based transactions. Several trades in the same company shares on the same day are netted to one accumulated transaction thus reducing the amount of trades to an interim sample of 5'584. In order to mitigate statistical bias from confounding events, trades within five trading days by the same company are eliminated in order to isolate the effect of an event from the effects of other events (McWilliams and Siegel, 1997). Daily stock price time series have been obtained from Datastream. Firm- and market-specific data have been extracted from Thomson Financial and Bloomberg. Due to insufficient data, the initial sample of 290 listed companies has been scaled down to a final sample of 165 firms carrying out 5'029 management transactions, 2'564 of which are purchase and 2'465 sale transactions. These transactions reflect a trading value of over CHF 3.6 billion, 32% of the transactions volume of which can be attributed to purchase and 68% to sale transactions. Information on ownership structure has been hand-collected from the annual reports from 2004 until 2011. In cases of greater changes in ownership structure within one year, the corresponding insider transactions within that year have been removed. Corporate announcements, namely quarterly, semi-annual and annual earnings releases, general meetings, M&A deals and CEO turnovers, have been extracted from Thomson One Banker.

3.2 Descriptive statistics

Table 10 presents the distribution of purchase and sale transactions. Panel A shows year-by-year descriptive statistics and indicates a remarkable increase in the respective frequency of management transactions up to the end of 2008 (purchase) and the end of 2007 (sale), followed by a strong decline in the subsequent years. Over the entire observation period sale transactions have higher prices and are twice as large as compared to purchase transactions on average. The median values of sale transactions, however, legitimate the high mean values and provide evidence that some outliers drive the average transactions price.

Table 10: Descriptive statistics of management transactions sample

<i>Panel A: Year-by-year</i>										
	PURCHASE TRANSACTIONS					SALE TRANSACTIONS				
	No.	Mean	Median	Min	Max	No.	Mean	Median	Min	Max
2005*	93	282'710	88'112	120	1'961'850	125	742'520	226'382	1580	15'900'000
2006	324	534'757	100'263	120	18'590'340	511	811'754	160'435	140	54'445'921
2007	451	669'850	109'560	39	49'999'961	620	1'016'137	173'629	141	126'500'000
2008	666	450'236	119'050	40	31'234'040	312	793'362	276'750	674	16'297'200
2009	341	219'435	63'899	155	10'307'400	300	1'139'324	193'735	858	26'385'750
2010	394	195'380	42'557	550	6'528'686	352	817'236	206'195	425	75'336'000
2011	295	706'903	173'693	988	22'000'000	245	1'977'734	209'568	449	107'470'000
Total/Mean	2'564	437'039	99'591	287	20'088'897	2'465	1'042'581	206'671	610	60'333'553

* First trade on 12.08.2005

<i>Panel B: By the position of the insider</i>										
	PURCHASE TRANSACTIONS					SALE TRANSACTIONS				
	No.	Mean	Median	Min	Max	No.	Mean	Median	Min	Max
Executive	1'636	296'912	68'500	39	31'234'040	1'769	937'471	163'741	140	126'500'000
Non-executive	928	728'566	139'990	40	49'999'961	696	1'208'013	289'706	174	75'336'000
Total/Mean	2'564	512'739	104'245	40	40'617'001	2'465	1'072'742	226'724	157	100'918'000

<i>Panel C: By the company size (listed index)</i>										
	PURCHASE TRANSACTIONS					SALE TRANSACTIONS				
	No.	Mean	Median	Min	Max	No.	Mean	Median	Min	Max
SPI-Small	1'861	350'830	57'900	39	49'999'961	1'246	409'817	114'880	140	73'238'661
SPI-Medium	490	612'637	197'455	1'171	14'350'500	834	1'497'408	265'912	141	126'500'000
SPI-Large	213	980'136	376'940	9'298	22'000'000	385	1'921'284	560'700	500	15'900'000
Total/Mean	2'564	647'868	210'765	3'503	28'783'487	2'465	1'276'170	313'831	260	71'879'554

<i>Panel D: By corporate news</i>										
	PURCHASE TRANSACTIONS					SALE TRANSACTIONS				
	No.	Mean	Median	Min	Max	No.	Mean	Median	Min	Max
No-News	1'958	393'204	84'848	39	49'999'961	1'824	941'055	179'987	141	107'470'000
Pre-News	168	737'068	172'350	40	29'322'500	185	1'037'407	241'600	140	28'828'125
Post-News	340	679'752	129'260	120	14'350'500	405	1'156'190	305'446	425	26'385'750
Total/Mean	2'466	603'341	128'819	66	31'224'320	2'414	1'044'884	242'345	235	54'227'958

Panel B emphasizes the difference between the two insider groups and shows that executives conduct considerably more transactions, but these are smaller in value compared to those by non-executives. This finding raises the concern of executives harbor-

ing possible stealth trading motives. According to Barclay and Warner (1993), stealth trading implies more sequences of smaller-sized, management transactions in order to conceal the ultimate trading intention and make them less conspicuous. Although the effect can be driven by outliers, the median values underline this assumption. *Panel C* indicates a decline in trading frequency and an increase in transaction prices from small- to large-cap companies for purchase and sale transactions. The results are also robust for the median. This is not surprising as companies from the SPI-Large represent only 8% of the entire sample, which implies proportionally fewer potential insider transactions. Zingg et al. (2007) also show ascending trading patterns when considering the listing index of the company (SPI-Small, -Medium and -Large). Likewise, larger companies have the highest transaction price. *Panel D* shows the statistical summary of transactions categorized in respect of news. No-News indicates those transactions occurring in an eventless, 40-day period without a corporate announcement. Both Pre-News and Post-News categories consider transactions occurring in the 20 days prior to or after the corporate announcement, respectively. Only 21.8% of all transactions are news transactions and within this sample 33.1% of purchase and 31.4% of sale transactions are conducted prior to the corporate announcement (Pre-News). In addition, the mean and median values indicate remarkably higher priced transactions around corporate announcements. Finally, the sample size in *Panel D* is slightly reduced due to the removal of several transactions belonging to both the Pre-News and Post-News group.

4. Event study analysis

4.1 Methodology

The event study methodology as first described by Fama, Fisher, Jensen and Roll (1969) and later by MacKinlay (1997) has been applied in order to analyze the abnormal returns caused by management transactions. The event window consists of 61 trading days: 20 pre-event days, the event date itself and 40 post-event days. The estimation window consists of 180 trading days. Other studies use the same estimation window (Fidrmuc et al., 2006; Dymke and Walter, 2008). The event equals the date of the transaction. The SIX Exchange Regulation does not disclose the announcement date of the transaction, a fact which has been explicitly analyzed by other studies (Fidrmuc et al., 2006; Betzer and Theissen, 2009). The following event study uses the

Swiss Performance Index (SPI) as a representative market benchmark.²⁷ Del Brio, Miguel and Perote (2002) apply an additional GARCH sensitivity model to account for other specific characteristics (e.g. volatility in intraday returns) and conclude that more sophisticated models do not contribute additional findings, but rather operate as a robustness test for the results. In line with several other insider trading studies (e.g. Fidrmuc et al., 2006; Zingg et al., 2007) a standardized parametric t-test based on the concept of Mickelson and Partch (1988) has been applied, although other studies (Hillier and Marshall, 2002; Dymke and Walter, 2008) use the standardized cross-sectional test devised by Boehmer, Musumeci and Poulsen (1991). Nonetheless, and in accordance with Boehmer and Loeffler (1999), both significance tests lead to comparable qualitative results. In addition, a non-parametric rank test has been employed in accordance with Corrado (1989). In a second stage, I adjust the abnormal returns for corporate announcements immediately around management transactions and in terms of stock price momentum, which are hypothesized to influence the abnormal market reaction to the trade. This approach clarifies where the market reactions observed around management transactions eventually come from.

4.2 All transactions

The event study can now be applied to show the imminent market reaction surrounding the disclosed management transactions. Therefore, the sample has been classified into a purchase and sale transaction group. *Table 11* provides the cumulative average abnormal returns (CAAR) for purchase (*Panel A*) and sale (*Panel B*) transactions over the entire 61-day event window as well as various sub-periods. $t=0$ indicates the date of the management transaction. Beyond that, the standardized t-test and the non-parametric Corrado rank test have been applied. Both the purchase and sale transaction groups exhibit pre-event market reactions in the 20 trading days prior to the management transaction which are economically significant. Insiders tend to purchase after a slight decline in abnormal returns of -1.05%, which, however, lacks significance for the Corrado test. The market reaction after the transaction is significant and in the expected direction, but below a notable 1% threshold. Insiders wait to sell until the share price peaks (0.48%). A strong decrease of -2.72% is shown in the 40-day post-trading period. The returns are significant for most of the observed sub-periods. Hence, purchase as well as sale management transactions appear to affect the abnormal returns in

²⁷ I also applied the Swiss Market Index (SMI) without any changes in results.

stock price, which inevitably makes these transactions profitable, if on a small-scale. The results confirm hypothesis 1 (H1) for both purchase and sale transactions. On the date of the transaction ($t=0$), both statistic tests indicate significant, if marginally small, abnormal returns.

Table 11: CAAR of management transactions over different event windows

Panel A shows the CAAR of purchase transactions over several event windows. Panel B shows the CAAR of sale transactions over several event windows. All transactions are considered. The standardised T-test and the Corrado rank test denote the significance of the results. *** 1% Significance level; ** 5% Significance level; * 10% Significance level.

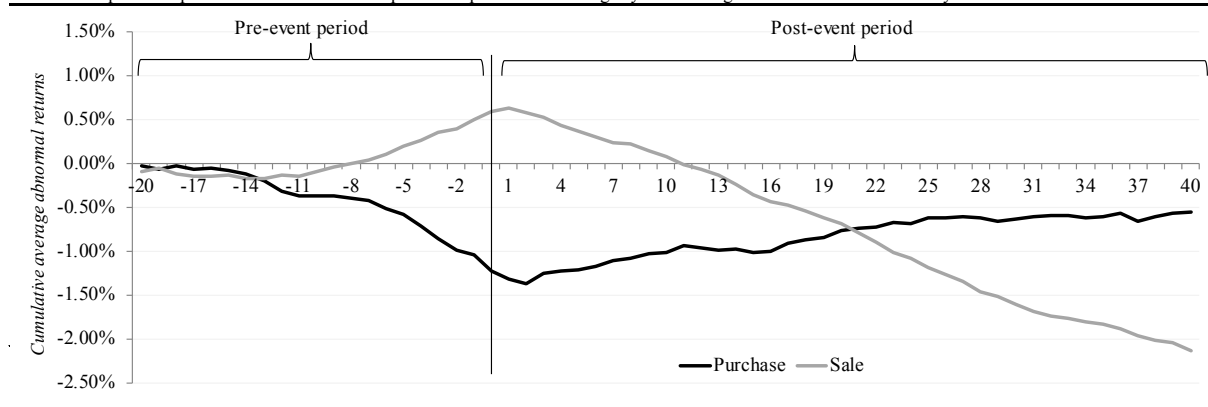
Panel A: Purchase transactions									
CAAR (%)	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
All (n=2'564)									
CAAR	-0.60%	-1.05%	-0.67%	-0.19%	0.02%	0.21%	0.25%	0.56%	0.64%
T-test	(-1.46)	(-4.88) ***	(-4.85) ***	(-4.19) ***	0.20	1.72 *	1.34	2.41 **	2.22 **
Rank test	1.18	(-0.44)	(-1.27)	(-3.43) ***	1.57	2.56 **	2.84 ***	2.27 **	2.09 **

Panel B: Sale transactions									
CAAR (%)	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
All (n=2'465)									
CAAR	-2.14%	0.48%	0.62%	0.09%	-0.22%	-0.52%	-1.19%	-2.20%	-2.72%
T-test	(-6.19) ***	2.71 ***	5.40 ***	2.37 **	(-2.61) ***	(-4.39) ***	(-6.88) ***	(-10.24) ***	(-10.59) ***
Rank test	1.03	4.06 ***	5.22 ***	2.80 ***	0.34	0.29	(-0.86)	(-1.65) *	(-1.87) *

Figure 5 illustrates that the reversal of the stock price pattern is slightly delayed and that the abnormal returns in the first days after the transaction are inconsiderably small. The abnormal market reactions tend to be economically insignificant until the official announcement (day 4 or 5) of the transactions. Unfortunately, since the Swiss regulator does not publish the exact announcement date of the transaction, one can only guess from the abnormal market reactions in Figure 5 that most insiders report their trading intention between day 1-3 after the transaction has been conducted.

Figure 5: CAAR for purchase and sale transactions over 61 trading days

The figure shows the cumulative average abnormal returns (CAAR) of purchase (black line) and sale (grey line) management transactions over the entire 61-day event window. The pre-event period consists of 20 and the post-event period of 40 trading days. The management transaction occurs at day 0.



4.3 Comparison of results

The study of Zingg et al. (2007) can be regarded as most suitable for comparison purposes as they apply a similar research design to the Swiss stock market. They document higher abnormal returns for purchase (1.59%) and lower (also insignificant) returns for sale transactions (-0.23%) in the 30 days after the insider event. However, their pre-event returns [-10;-1] are more pronounced and highly significant. The discrepancy between the two studies disappears when I mimic the research approach of Zingg et al. (2007) and use my own data for a similar observation period (August 2005 – December 2006). *Panel A* of *Table 12* presents the key findings of this comparison and shows evidence of conformity between the two studies. Only the pre-event market reaction for purchase transactions deviates from Zingg et al. (2007). This together with smaller abnormal returns indicated prior to sale transactions (1.17%), can, however, be explained by the differences in the selection of the data sample. The smaller number of transactions in the data sample for a similar observation period supports this assumption. Unlike Zingg et al. (2007), this paper's data selection process takes confounding insider events into account and hence isolates transactions from the same company within a 5-day trading window. This approach allows for statistical interference with regard to the observed event by other externalities and improves the information content of the abnormal returns (McWilliams and Siegel, 1997; Del Brio, et al., 2002). Overall, these empirical results indicate a market reaction effect surrounding management transactions in line with other research from Switzerland. These findings imply that insider trading is to some extent profitable when properly timed.

Panel B summarizes the market reaction effect documented by other leading international studies. Although the observation periods among the studies vary between 2 and 12 years and different capital markets have been analyzed, the abnormal market reactions appear to be stable in magnitude. Purchase transactions show abnormal reactions ranging from -0.70% and -4.53% pre event, and effects ranging from 0.58% to 4.38% post event, which is significant and in the predicted direction. Only the Dardas and Güttler (2011) sample examining France exhibits positive abnormal pre-event returns (1.37%). Sale transactions indicate price run-ups of up to 8.64% prior to the insider event, followed by a downward price movement between -0.90% and -4.14% over 20 trading days. The results are all significant at an at least 95% confidence level and in the expected direction. Despite the fact that all of the aforementioned studies apply the

market model to determine the abnormal returns, the results of the Swiss studies tend to be on the lower scale of market reactions registered for both purchase and sale transactions.

Table 12: Comparison of leading insider trading studies

Panel A presents a comparison of the event study results of a period similar to the one applied in the study of Zingg et al. (2007) for two event windows $[-10;-1]$ and $[+1;+30]$. *** 1% Significance level; ** 5% Significance level; * 10% Significance level. *Panel B* shows the event study results of further international insider trading studies. All results are significant to an at least 95% confidence level.

<i>Panel A: Comparison of CAAR with Zingg et al. (2007) for selected period</i>									
Samples	Market	Period	PURCHASE TRANSACTIONS			SALE TRANSACTIONS			
			$[-10;-1]$	$[+1;+30]$	Observations	$[-10;-1]$	$[+1;+30]$	Observations	
Own data	Switzerland	Aug 2005 - Dec 2006	-0.14%	1.68%***	417	1.17%***	-0.61%***	736	
Zingg et al. (2007)	Switzerland	July 2005 - Dec 2006	-1.21%***	1.59%***	463	1.69%***	-0.23%	961	

<i>Panel B: Comparison of CAAR of leading international studies</i>										
Authors (year)	Market	Period	PURCHASE TRANSACTIONS				SALE TRANSACTIONS			
			$[-20;-1]$	$[-10;-1]$	$[+1;+10]$	$[+1;+20]$	$[-20;-1]$	$[-10;-1]$	$[+1;+10]$	$[+1;+20]$
Seyhun (1986)	U.S.	1975 -1981	-0.70%			1.70%	1.10%		-0.90%	
Hillier & Marshall (2002)	U.S.	1991 - 1997	-3.78%			2.90%	2.54%		-1.37%	
Cheuk, Fan & So (2006)	Hong Kong	1993 - 1998	-3.11%		0.43%	0.58%	2.58%		-2.28% -4.14%	
Dymke & Walter (2008)	Germany	2002 - 2005	-0.75%		2.66%	4.38%	8.64%		-0.84% -1.47%	
Betzer & Theissen (2009)	Germany	2002 - 2004	-1.83%	-1.52%	1.85%	3.18%	4.69%	3.63%	-2.06% -3.30%	
Gregory, Tharyan & Tonks (2009)	U.K.	1994 - 2006	-2.48%	-1.52%	1.20%	1.55%	2.17%	1.28%	-0.73% -1.19%	
Dardas & Güttler (2011)	France	2003 - 2009	1.37%			1.34%	1.55%		-1.37%	
	Germany	2003 - 2009	-3.74%			2.39%	2.39%		-3.22%	
	Italy	2003 - 2009	-2.84%			1.05%	2.28%		-2.00%	
	Sweden	2003 - 2009	-1.44%			0.83%	1.48%		-2.60%	
	U.K.	2003 - 2009	-4.53%			3.89%	2.49%		-2.31%	

When the total transaction costs of about 2-3% are taken into consideration (as others have assumed) the profits reach close to zero. Nonetheless, the capital market perceives management transactions as valuable and hence causes market reactions in the expected direction. On the one hand, this trading pattern supports the framework documented by John and Lang (1991) and on the other hand corroborates hypothesis 1 (H1) once again.

4.4 Stock price momentum around management transactions

According to the previous analysis and in line with most other studies on insider trading, there are negative (positive) abnormal returns pre event, followed by positive (negative) abnormal returns post event when it comes to purchase (sale) transactions. According to the results of the previously mentioned studies, this change in abnormal return pattern is caused by the management transaction and shows clear evidence of the contrarian investment behavior of insiders mentioned in hypothesis 1 (H1). Nonetheless, Givoly and Palmon (1985) and Noe (1999) conclude that a stock price momentum, a stable long-term stock price trend around the management transaction, triggers the abnormal returns (hypothesis H2). *Table 13* classifies the management transac-

tion according to the pre-event abnormal returns in order to find further evidence of this long-term stock price pattern. Hence, the *positive momentum* and the *negative momentum* groups respectively summarize the transactions generating positive and negative abnormal returns for purchase and sale transactions in the CAAR[-20;-1] period.²⁸

Table 13: Stock price momentum

The table shows the CAAR for purchase (*Panel A*) and sale (*Panel B*) transactions. Both panels indicate abnormal returns for the entire event window [-20;+40] and over several event windows. The sample is sorted according to the CAAR in the 20 days prior to the transaction [-20;-1]. *Positive (negative) momentum* group the transactions which have positive (negative) abnormal returns prior to the transaction. *** 1% Significance level; ** 5% Significance level; * 10% Significance level.

<i>Panel A: Purchase transactions</i>									
CAAR (%)	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
<i>Positive momentum</i> (n=1'253)									
CAAR	10.26%	5.98%	2.73%	-0.04%	0.55%	1.23%	2.25%	3.38%	4.32%
T-test	20.54 ***	28.05 ***	17.53 ***	(-0.73)	4.74 ***	7.58 ***	9.08 ***	10.99 ***	11.66 ***
Rank test	7.29 ***	9.43 ***	8.31 ***	(-1.17)	3.69 ***	4.75 ***	5.33 ***	4.83 ***	4.77 **
<i>Negative momentum</i> (n=1'311)									
CAAR	-10.89%	-7.75%	-3.92%	-0.32%	-0.49%	-0.75%	-1.62%	-2.08%	-2.81%
T-test	(-21.88) ***	(-30.62) ***	(-21.17) ***	(-4.48) ***	(-3.85) ***	(-4.28) ***	(-5.94) ***	(-6.26) ***	(-6.77) ***
Rank test	(-5.55) ***	(-9.01) ***	(-8.47) ***	(-3.35) ***	(-1.37)	(-1.16)	(-1.42)	(-1.62)	(-1.80) *
<i>Panel B: Sale transactions</i>									
CAAR (%)	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
<i>Positive momentum</i> (n=1'329)									
CAAR	5.08%	5.72%	3.18%	0.11%	-0.19%	-0.16%	-0.30%	-0.75%	-0.74%
T-test	13.71 ***	38.05 ***	23.59 ***	2.11 **	(-1.96) **	(-0.94)	(-1.27)	(-2.71) ***	(-2.29) **
Rank test	5.88 ***	9.79 ***	9.67 ***	2.24 **	0.60	1.78 *	1.48	1.02	1.31
<i>Negative momentum</i> (n=1'136)									
CAAR	-10.57%	-5.65%	-2.38%	0.08%	-0.24%	-0.92%	-2.20%	-3.86%	-5.01%
T-test	(-20.79) ***	(-23.94) ***	(-16.10) ***	1.36	(-1.71) *	(-5.82) ***	(-9.01) ***	(-11.84) ***	(-12.68) ***
Rank test	(-4.86) ***	(-7.35) ***	(-5.93) ***	1.51	(-0.09)	(-1.43)	(-2.61) ***	(-3.13) ***	(-2.94) ***

In *Panel A*, the abnormal returns of 5.98% in the *positive momentum* group are stable and achieve significant, post-event, market reactions of 4.32%. The abnormal market reactions (-7.75%) in the *negative momentum* group surprisingly continue to yield negative returns of an additional -2.81% in the post-event period. This pattern clearly indicates that a certain stock price momentum surrounds the purchase transaction and not a reversal in the pattern of abnormal returns as previously assumed. The market reactions take a breather immediately around the time of the management transaction before continuing their trend. This short-term consolidation of market reactions probably reflects the time elapsing up to the disclosure of the management transaction. Hence, pre-event abnormal market reactions are able to anticipate post-event returns, a momentum indicating the stock price strength. A similar market pattern can be observed for sale transactions in *Panel B*. The *positive momentum* of 5.72% starts to decline in the post-event period down to -0.74% (partially significant). Similar to the

²⁸ The same approach has been applied to the CAAR[-10;-1] and CAAR[-5;-1] period, without any remarkable changes in outcome.

positive momentum of purchase transactions, there seems to be a negative long-term price trend around sale transactions. Thus, about half of the *negative momentum* abnormal returns (-5.65%) occur prior to the transaction, followed by an additional -5.01% post-event market reaction.

It must, however, be conceded that this strong, pre-event, abnormal market reaction evolves to some extent from the research design. Nonetheless, the stock price momentum clearly provides evidence that not all transactions trigger similar market reactions. Purchase transactions after pre-event price run-ups (*positive momentum*) and sale transactions after pre-event price declines (*negative momentum*) seem to be an indicator of abnormal market reactions and hence support hypothesis 2 (H2). This pattern, however, runs contrary to most of the aforementioned studies and partially refutes hypothesis 1. The explanatory power of abnormal returns inevitably changes when the stock price momentum effect is considered and this appears to be crucial in understanding market reactions in the wake of management transactions.

4.5 Management transactions and corporate announcements

Several international studies are devoted to investigating the association between management transactions and (voluntary) corporate announcements and attempt to describe the extent of the market reactions effectively caused by such management transactions (e.g. Elliott, et al., 1984; Dymke and Walter, 2008). A set of corporate announcements has been analyzed in order to estimate the extent of the previously observed market reactions surrounding management transactions. For this purpose an event study measures the short-term market effects (CAAR[0,+3]) of 2'764 corporate announcements in the observed sample and indicates the implications of the disclosure to the capital market. Givoly and Palmon (1985) apply a similar approach in their study. *Table 14* presents the abnormal returns of a set of six major corporate events and classifies them into Good-News and Bad-News according to the respective positive or negative abnormal market reaction. The disclosure of corporate information is assumed to be relevant for the following events; quarterly, semi-annual and annual earnings release, shareholder meeting, M&A transaction and CEO turnover. The data sample contains those announcements occurring 20 days prior to or after the insider event and thus describes a circumstance where the corporate announcement inevitably affects the market reaction to the management transaction.

Table 14: CAAR of corporate announcements

The table shows the CAAR of different types of corporate announcements. Earnings releases are published on a quarterly, half-year and full-year basis. In addition, the general meeting, M&A deals and CEO turnover are considered as major corporate events. The announcement is clustered according to the positive and negative information release measured by the abnormal returns in the three days after the announcement (CAAR[0;+3]). *** 1% Significance level; ** 5% Significance level; * 10% Significance level.

	Quarterly	Half-year	Full-year	General meeting	M&A	CEO turnover	Average
Good-News Announcements	3.54% *** 354	3.24% *** 365	3.92% *** 323	2.77% *** 304	3.12% *** 44	4.04% ** 4	3.36% *** 1'394
Bad-News Announcements	-3.78% *** 339	-3.81% *** 373	-3.65% *** 270	-2.46% *** 356	-2.86% *** 29	-3.34% *** 3	-3.40% *** 1'370

Interestingly, all corporate announcements trigger similar market reactions, on average about 3.36% for Good-News and -3.40% for Bad-News events. About 75% of the Good-News and 72% of the Bad-News reactions can be attributed to earnings releases disclosed in the quarterly, semi-annual or annual report. This event study provides evidence that the information released by corporate announcements indeed helps to generate these abnormal returns and hence significantly affects the market reactions around management transactions. In addition, the management transactions sample has accordingly been clustered into Pre-News, Post-News and No-News management transactions.²⁹ If a transaction has been conducted in the 20 trading days prior to or after a corporate announcement it belongs to the Pre-News and Post-News group, respectively. Otherwise the transaction belongs to the No-News group.

Table 15 shows the market reaction to purchase transactions and provides clear evidence of differences in abnormal returns among the news groups. The findings suggest that the news groups show insignificant pre-event and significant post-event abnormal market reactions for only two of the four groups. The abnormal returns (CAAR[+1;+40]) amount to 6.27% for Pre-News transactions when the corporate announcement implies Good-News (*Panel A*) and 3.50% for the Post-News transactions when the corporate announcement negatively affects the abnormal returns (*Panel B*). Hence, insiders who front-run corporate announcements trigger stronger abnormal returns compared to those who wait until after the corporate release. Similar, but even more pronounced, market reactions with regard to Pre-News transactions have been documented in the study by Dymke and Walter (2008). Thus, insiders frequently front-run corporate announcements and generate a handsome profit due to their information advantage. The significance of abnormal market reactions fully disappears if purchase transactions front-run Bad-News announcements, if Good-News precedes purchase transactions and if there are no corporate releases at all (*Panel C*). These results attest that the market values the transaction solely if the trading intention is strengthened and

²⁹ Dymke and Walter (2008) also classify their sample according to news announcements, but only tend to observe front-running trading activities (Pre-News).

confirmed by the information content of the corporate announcement. On the one hand, insiders conduct purchase transactions prior to Good-News releases to profit from the subsequent stock price-run. On the other hand, as Noe also established (1999), insiders wait until after the disclosure of Bad-News, which enables them to enter at a lower price level.

Table 15: Purchase transactions and corporate announcements

The table presents the CAAR of purchase transactions according to their occurrence around corporate events. *Panel A* shows Pre-News transactions occurring in the 20 days prior to the corporate announcement. The sample is classified into Good- and Bad-News depending on the immediate market reaction to the information release (positive = Good-News; negative = Bad-News) of the corporate event. *Panel B* shows the same for Post-News transactions. *Panel C* presents the eventless purchase transactions which are not surrounded by other corporate events. *** 1% Significance level; ** 5% Significance level; * 10% Significance level.

<i>Panel A: Pre-News purchase transactions</i>									
	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
Good-News (n=102)									
CAAR	6.45%	0.57%	0.21%	-0.39%	1.46%	2.58%	4.64%	5.06%	6.27%
T-test	2.10 **	0.33	0.17	(-1.34)	2.26 **	2.88 ***	3.35 ***	3.04 ***	3.33 ***
Rank test	1.68 *	0.61	(-0.11)	(-2.80) ***	2.36 **	2.54 **	2.69 ***	2.21 **	2.26 **
Bad-News (n=66)									
CAAR	-2.65%	-1.58%	-0.41%	-0.25%	-0.05%	0.06%	1.46%	0.41%	-0.82%
T-test	(-0.99)	(-1.14)	(-0.33)	(-0.58)	(-0.10)	0.05	0.83	0.24	(-0.45)
Rank test	(-0.16)	(-0.13)	(-0.45)	(-0.72)	0.08	0.48	0.60	0.08	(-0.07)
<i>Panel B: Post-News purchase transactions</i>									
	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
Good-News (n=178)									
CAAR	-0.38%	-1.16%	-0.65%	-0.29%	0.29%	0.65%	0.32%	0.99%	1.07%
T-test	(-0.42)	(-1.59)	(-1.22)	(-1.94) *	1.13	1.98 **	0.72	1.80 *	1.45
Rank test	1.09	0.07	0.19	(-1.94) *	1.24	1.86 *	1.35	1.34	1.22
Bad-News (n=162)									
CAAR	6.37%	2.64%	1.91%	0.23%	1.71%	2.67%	3.07%	3.21%	3.50%
T-test	2.22 **	1.59	2.06 **	1.00	3.54 ***	3.71 ***	2.63 ***	1.99 **	1.99 **
Rank test	1.27	1.01	1.05	1.13	2.79 ***	2.35 **	1.43	1.97 **	1.98 **
<i>Panel C: No-News purchase transactions</i>									
	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
No-News (n=1'958)									
CAAR	-1.10%	-1.18%	-0.77%	-0.17%	-0.15%	-0.03%	-0.08%	0.19%	0.25%
T-test	(-2.40) **	(-5.26) ***	(-5.70) ***	(-3.34) ***	(-1.60)	(-0.24)	(-0.36)	0.74	0.76
Rank test	0.24	(-0.98)	(-1.72) *	(-2.84) ***	0.38	1.26	1.79 *	1.37	1.18

Interestingly, transactions conducted in times of no other corporate announcements indicate a stock price decline of -1.18% (partially significant) prior to the management transaction. Other extant studies also reveal similar findings and interpret this phenomenon as proper market timing on the part of the insider (buying low) (e.g. Zingg et al., 2007; Betzer and Theissen, 2009). In this case, however, the news groups should exhibit similar patterns. One reason for these significant, pre-event, abnormal returns in the period CAAR[-20;-1] is the fact that the size of the No-News group is similar to the original purchase transactions sample. *Table 16* presents the same relationship in respect of sale management transactions. The findings change if we assume profitable trading patterns by insiders means that they should sell before Bad-News or after

Good-News information releases. Sale transactions before Bad-News (*Panel A*) consequently show significantly strong, abnormal market reactions of -4.80%, and, surprisingly, selling after Bad-News triggers even stronger abnormal returns of -6.10% (*Panel B*) in the 40-day post-trading period. Therefore, regardless of the timing of the news disclosure (prior to or after the management transaction), selling activities, together with Bad-News information releases, significantly affect stock price patterns. In addition, No-News sale transactions also trigger abnormal returns of -2.61% (*Panel C*), these are, however, less pronounced. From this it can be assumed that the market reaction to selling activities and Good-News releases cancel each other out.

Table 16: Sale transactions and corporate announcements

The table presents the CAAR of sale transactions according to their occurrence around corporate events. *Panel A* shows Pre-News transactions occurring in the 20 days prior to the corporate announcement. The sample is classified into Good- and Bad-News depending on the immediate market reaction to the information release (positive = Good-News; negative = Bad-News) of the corporate event. *Panel B* shows the same for Post-News transactions. *Panel C* presents the eventless purchase transactions which are not surrounded by other corporate events. *** 1% Significance level; ** 5% Significance level; * 10% Significance level.

<i>Panel A: Pre-News sale transactions</i>									
	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
Good-News (n=88)									
CAAR	2.97%	2.95%	1.40%	0.37%	-0.03%	0.59%	3.23%	1.87%	-0.35%
T-test	1.50	2.32 **	1.74 *	1.08	(-0.06)	0.76	2.51 **	1.33	(-0.24)
Rank test	0.87	1.66 *	1.38	0.33	0.09	0.54	1.26	0.82	0.40
Bad-News (n=97)									
CAAR	-1.34%	2.99%	1.98%	0.47%	-0.24%	-0.65%	-1.46%	-3.65%	-4.80%
T-test	(-0.99)	4.48 ***	4.05 ***	2.20 **	(-0.72)	(-1.55)	(-2.12) **	(-4.32) ***	(-4.52) ***
Rank test	0.77	2.35 **	2.57 **	1.53	(-0.18)	(-0.17)	(-1.49)	(-1.75) *	(-1.71) *
<i>Panel B: Post-News sale transactions</i>									
	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
Good-News (n=207)									
CAAR	-0.30%	1.07%	0.68%	0.15%	-0.44%	-0.23%	-0.07%	-1.01%	-1.51%
T-test	(-0.36)	2.38 **	2.23 **	1.39	(-2.67) ***	(-0.88)	(-0.19)	(-1.02)	(-1.29)
Rank test	1.10	2.42 **	2.64 ***	2.80 ***	(-0.25)	0.56	0.51	(-0.01)	(-0.21)
Bad-News (n=198)									
CAAR	-6.82%	-0.83%	0.00%	0.11%	-1.01%	-1.60%	-3.07%	-5.61%	-6.10%
T-test	(-4.35)	(-0.81)	(-0.01)	0.52	(-2.14) **	(-2.57) **	(-3.55) ***	(-5.30) ***	(-5.00) ***
Rank test	(-0.54)	0.00	0.61	0.61	(-0.91)	(-1.56)	(-2.01) **	(-2.43) **	(-2.01) **
<i>Panel C: No-News sale transactions</i>									
	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
No-News (n=1'824)									
CAAR	-2.46%	0.10%	0.48%	0.06%	-0.15%	-0.55%	-1.40%	-2.17%	-2.61%
T-test	(-5.96) ***	0.49	3.59 ***	1.26	(-1.52)	(-3.83) ***	(-6.70) ***	(-8.63) ***	(-8.79) ***
Rank test	0.09	2.27 **	3.44 ***	1.72 *	0.51	(-1.08)	(-2.00) **	(-2.58) ***	(-2.21) **

These findings are mostly in line with Dymke and Walter (2008) as they also establish significantly strong abnormal returns for the Pre-News group and remarkable market reactions for the No-News transactions as well. However, they do not adjust for Post-News transactions. On the contrary, Noe (1999) reveals a more 'wait-until-after-earnings-forecast' trading mentality, whereas Elliott et al. (1984) conclude that man-

agement transactions surrounding corporate announcements are ‘often insignificantly different from insider trading at other times’ (p.535).

Overall, the event study provides clear evidence that buying (selling) prior to Good-News (Bad-News) causes strong abnormal market reactions of 6.27% (-4.80%). These results truly confirm the findings of Dymke and Walter (2008). In addition, I can support Noe (1999) in the way that insiders purchase after Bad-News and trigger strong abnormal returns of 3.50% and cause even more pronounced reactions when selling after Bad-News. The former indicates rather passive, insider trading behavior, whereas the latter appears to reflect a common ‘outside investor’ trading pattern. The negative effect of both the Bad-News information release and the sale transaction triggers abnormal returns of -6.10%. Moreover, selling activities per se (no-news transactions) appear to be a strong signal to the market, a result which cannot be attributed to purchase transactions.

The comparison of different studies in this field of research has to be treated carefully as several countries such as the U.S., U.K. or Hong Kong have implemented legal trading bans (blackout periods) prior to corporate announcements. Such close-up periods are not implemented in Switzerland, at least not on a compulsory, legal basis. Nonetheless, internal corporate governance rules may restrain insiders from trading around corporate announcements. The relatively low number of purchase (168) and sale (185) transactions prior to corporate announcements seem to indicate this concern. These factors inevitably affect the research approach and hence the outcome of the analysis. Accordingly, the findings support hypothesis 3 (H3) in maintaining that news transactions trigger stronger abnormal returns compared to eventless ones, a phenomenon which is most pronounced when insiders purchase (sell) prior to Good-News (Bad-News) or sell after Bad-news.

4.6 Stock price momentum and corporate announcements

The following analysis examines how the observed effects (management transaction, stock price momentum and corporate announcement) determine the abnormal returns around management transactions. One has to keep in mind that the pre-event abnormal returns are primarily a result of the research design regarding stock price momentum and hence provide but a limited contribution to the question. They can be rather inter-

preted as a momentary reflection of the current stock price sentiment, which may be the underlying reason why insiders conduct their transactions.

4.6.1 The analysis of purchase transactions

Table 17 summarizes the results in respect of the stock price momentum together with the occurrence of the corporate announcement around the management transaction (Pre-News, Post-News and No-News) and the information release (Good-News and Bad-News). *Panel A* shows the findings of Pre-News purchase transactions and indicates that Good-News releases together with a *positive momentum* cause an economically remarkable abnormal price run-up of 13.53% over 40 trading days after the transaction; an overall 25.49% abnormal stock price run-up. Interestingly, post-trading abnormal returns disappear (consolidate), when there is strongly *negative momentum* for Good-News (1.18%). The same patterns can be observed for Bad-News releases for both the *positive* (-0.23%) and *negative momentum* (0.40%) groups. These findings are strong evidence that both the corporate announcement and the stock price momentum effect combined are key factors in determining the abnormal returns of Pre-News transactions. Dymke and Walter (2008) document abnormal returns of 7.38% for Pre-News transactions. However, they neglect the information (Good-News and Bad-News) released in corporate announcements. Mimicking their approach causes post-trading market reactions of 6.12% over a 20-day period, a result thoroughly comparable with their findings. Overall, the abnormal market reactions with regard to Pre-News transactions are triggered by the positive stock price momentum and the disclosed information contained in the Good-News release. In the case of *negative momentum* or a Bad-News release no significant abnormal returns after purchase transactions can be observed. Although most of the pre-event abnormal returns can be attributed to the stock price momentum, it seems that the corporate announcement effect partially impacts these returns as well. The *positive momentum* group shows less pronounced pre-event returns of 4.23% if Bad-News, and substantially more (12.50%), if Good-News follows. Not considering the corporate announcement effect leads to positive pre-event abnormal returns of 5.98% (see *Table 13 Panel A*). Hence, the release of Good-News affects the pre-event abnormal returns to some extent. No effect can be observed for the *negative momentum* group.

Panel B summarizes the abnormal returns for purchase management transactions occurring immediately after corporate announcements (Post-News). This finding sug-

gests that purchase transactions subsequent to Bad-News announcements cause post-event abnormal market reactions.

Table 17: Purchase transactions according to the stock price momentum and corporate announcement effect

This table shows the CAAR of Pre-News (*Panel A*), Post-News (*Panel B*) and No-News (*Panel C*) purchase transactions. The panels further indicate whether the transactions occur around Good-News and Bad-News releases and categorize them according to the positive and negative stock price momentum. *** 1% Significance level; ** 5% Significance level; * 10% Significance level.

<i>Panel A: Pre-News purchase transactions</i>									
CAAR (%)	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
Good-News									
<i>Positive momentum (n=48)</i>									
CAAR	25.49%	12.50%	6.66%	-0.54%	2.84%	5.50%	7.78%	11.17%	13.53%
T-Test	4.53 ***	4.86 ***	3.58 ***	(-1.05)	2.36 **	3.33 ***	2.95 ***	3.66 ***	4.09 ***
Rank test	1.63	2.55 **	2.66 ***	(-0.40)	0.67	1.06	1.28	2.09 **	2.04 **
<i>Negative momentum (n=54)</i>									
CAAR	-8.27%	-9.15%	-4.89%	-0.30%	0.31%	0.12%	2.16%	0.46%	1.18%
T-Test	(-3.93) ***	(-5.68) ***	(-3.35) ***	(-0.85)	0.44	0.13	1.54	0.27	0.58
Rank test	(-1.57)	(-3.19) ***	(-3.17) ***	(-1.34)	(-0.03)	0.25	0.05	(-0.39)	(-0.25)
Bad-News									
<i>Positive momentum (n=32)</i>									
CAAR	3.70%	4.23%	2.15%	-0.30%	0.41%	1.97%	2.67%	1.95%	-0.23%
T-Test	1.29	5.87 ***	2.13 **	(-0.68)	0.63	1.55	1.47	1.00	(-0.09)
Rank test	0.71	2.43 **	2.49 **	(-1.64)	0.61	(-0.29)	(-0.13)	(-0.34)	(-0.39)
<i>Negative momentum (n=34)</i>									
CAAR	-8.89%	-8.92%	-3.68%	-0.37%	0.03%	0.11%	2.28%	0.66%	0.40%
T-Test	(-4.08) ***	(-6.41) ***	(-2.46) **	(-0.86)	0.05	0.11	1.42	0.38	0.19
Rank test	(-1.03)	(-2.94) ***	(-2.32) **	0.43	0.29	0.69	0.99	0.71	0.53
<i>Panel B: Post-News purchase transactions</i>									
CAAR (%)	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
Good-News									
<i>Positive momentum (n=75)</i>									
CAAR	6.77%	7.10%	3.90%	-0.40%	0.13%	0.28%	-0.38%	0.35%	0.07%
T-Test	5.59 ***	11.41 ***	7.16 ***	(-1.75) *	0.34	0.66	(-0.67)	0.54	0.08
Rank test	2.75 ***	4.54 ***	3.13 ***	(-1.92) *	0.13	0.48	0.56	1.00	1.09
<i>Negative momentum (n=103)</i>									
CAAR	-6.74%	-8.02%	-4.42%	-0.19%	0.32%	0.82%	0.74%	1.34%	1.47%
T-Test	(-6.15) ***	(-10.61) ***	(-6.49) ***	(-0.95)	0.95	1.75 *	1.15	1.60	1.46
Rank test	(-2.55) **	(-5.17) ***	(-4.69) ***	(-3.32) ***	(-0.58)	(-0.71)	0.01	(-0.08)	(-0.02)
Bad-News									
<i>Positive momentum (n=90)</i>									
CAAR	10.98%	8.94%	5.36%	-0.17%	0.68%	1.23%	1.28%	2.07%	2.21%
T-Test	6.89 ***	10.52 ***	8.78 ***	(-0.98)	1.78 *	2.75 ***	1.96 **	2.38 **	2.09 **
Rank test	2.70 ***	4.83 ***	3.23 ***	(-2.29) **	0.83	0.96	1.10	1.14	1.02
<i>Negative momentum (n=72)</i>									
CAAR	-5.25%	-7.62%	-3.60%	-0.01%	1.36%	1.90%	1.91%	1.89%	2.38%
T-Test	(-4.13) ***	(-9.24) ***	(-5.69) ***	(-0.06)	3.91 ***	3.68 ***	2.72 ***	1.92 *	2.08 **
Rank test	(-2.39) **	(-5.29) ***	(-5.36) ***	(-1.83) *	(-0.12)	0.30	0.28	0.07	0.07
<i>Panel C: No-News purchase transactions</i>									
CAAR (%)	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
<i>Positive momentum (n=956)</i>									
CAAR	10.14%	5.44%	2.26%	0.03%	0.49%	1.16%	2.36%	3.48%	4.67%
T-Test	20.38 ***	26.56 ***	16.11 ***	0.61	4.16 ***	6.91 ***	9.19 ***	10.82 ***	12.02 ***
Rank test	6.75 ***	8.65 ***	7.54 ***	(-0.22)	3.81 ***	4.88 ***	5.32 ***	4.74 ***	4.67 ***
<i>Negative momentum (n=1'002)</i>									
CAAR	-11.93%	-7.63%	-3.79%	-0.37%	-0.76%	-1.14%	-2.41%	-2.93%	-3.94%
T-Test	(-20.45) ***	(-28.22) ***	(-20.35) ***	(-4.47) ***	(-5.31) ***	(-5.84) ***	(-7.80) ***	(-7.71) ***	(-8.27) ***
Rank test	(-5.42) ***	(-8.49) ***	(-7.81) ***	(-2.37) **	(-1.53)	(-1.60)	(-2.12) **	(-2.21) **	(-2.41) **

In this case, the stock price momentum does not affect the outcome of the results as the *positive momentum* triggers 2.21% and the *negative momentum* causes 2.38% ab-

normal returns. Interestingly, purchase transactions following Good-News events do not show significant post-trading abnormal returns, whereas Bad-News releases drive the positive market reaction in the post-event period. Noe (1999) also observes increasingly profitable purchase transaction activities after Bad-News management forecasts. Although the results indicate, similar to Noe (1999), that insiders wait until after the Bad-News announcement to buy at a lower price level, both the significantly negative pre-event abnormal returns (-7.62%) and particularly the positive pre-event abnormal returns (8.94%) question Noe's prediction. Consequently, purchase transactions after Good-News do not contain material information as yet undisclosed in the announcement, whereas purchasing after Bad-News appears to trigger stronger signals. This implies that in the Bad-News scenario the pre-event price run-up does not anticipate post-event abnormal returns. Hence, purchasing after a Bad-News announcement (regardless of the stock price momentum) is a strong indicator of further positive abnormal market reactions.

Finally, *Panel C* presents the CAAR of transactions not associated with news announcements. The results are fairly stable compared to those of *Table 13*. No-News transactions show abnormal returns of 4.67% and -3.94% for *positive momentum* and *negative momentum* transactions, respectively. This is evidence that stock price momentum indeed drives the post-event abnormal returns regardless of the occurrence of other corporate announcements. These findings indicate that the consideration of both effects provides as yet undisclosed facts as to the true drivers behind abnormal returns.

4.6.2 The analysis of sale transactions

Table 18 presents the findings of sale transactions. As in the case of purchase transactions, a breakdown of the two effects provides interesting insights into the true market reaction to management transactions. *Panel A* summarizes the Pre-News sale transactions and shows that selling prior to Good-News announcements does not trigger any significant abnormal reactions, regardless of the stock price momentum. The effects cancel each other out. Sale transactions prior to Bad-News, however, cause strong abnormal market reactions of -2.68% for the *positive momentum* group and generate abnormal returns of -8.94% when there is a *negative momentum*. Likewise, these results put emphasis on the importance of taking the different effects into consideration. Consequently, a negative stock price momentum together with Pre-News sale transactions indicates remarkable abnormal returns of -13.04% over the entire 61-day event win-

dow. Selling before Bad-News information is a clear signal of negative future prospects for the company, a constellation which drives abnormal market reaction. From this it can be deduced that both the stock price momentum and the Bad-News release determine the abnormal returns to a similar degree.

Table 18: Sale transactions according to the stock price momentum and corporate announcement effect

This table shows the CAAR of Pre-News (Panel A), Post-News (Panel B) and No-News (Panel C) sale transactions. The panels further indicate whether the transactions occur around Good-News and Bad-News releases and categorize them according to the positive and negative stock price momentum. *** 1% Significance level; ** 5% Significance level; * 10% Significance level.

Panel A: Pre-News sale transactions									
CAAR (%)	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
Good-News									
<i>Positivemomentum</i> (n=40)									
CAAR	6.03%	7.18%	4.34%	0.28%	-0.73%	-0.23%	-0.13%	-1.18%	-1.43%
T-Test	4.82 ***	11.78 ***	8.44 ***	1.29	(-1.87) *	(-0.47)	(-0.17)	(-1.52)	(-1.45)
Rank test	(-0.03)	(-0.01)	(-0.91)	1.54	0.61	(-0.03)	(-0.55)	(-0.68)	(-0.45)
<i>Negative momentum</i> (n=48)									
CAAR	-6.39%	-5.05%	-2.55%	0.04%	-0.53%	-0.38%	-0.58%	-1.20%	-1.38%
T-Test	(-5.42) ***	(-11.25) ***	(-7.24) ***	0.28	(-2.21) **	(-0.90)	(-1.04)	(-1.45)	(-1.52)
Rank test	(-1.09)	(-2.36) **	(-1.74) *	1.27	(-0.24)	0.04	(-0.36)	(-0.33)	(-0.52)
Bad-News									
<i>Positive momentum</i> (n=56)									
CAAR	4.66%	6.98%	4.35%	0.36%	-1.01%	-0.44%	0.64%	-0.87%	-2.68%
T-Test	4.12 ***	14.09 ***	9.15 ***	1.85 *	(-2.78) ***	(-0.88)	0.82	(-0.99)	(-2.83) ***
Rank test	1.96 **	4.22 ***	5.43 ***	0.83	(-0.14)	0.44	0.54	0.80	0.40
<i>Negative momentum</i> (n=41)									
CAAR	-13.04%	-4.85%	-2.46%	0.75%	0.78%	-0.84%	-3.22%	-7.23%	-8.94%
T-Test	(-6.05) ***	(-7.50) ***	(-3.99) ***	1.69 *	1.25	(-1.12)	(-2.39) **	(-4.08) ***	(-4.46) ***
Rank test	(-1.86) *	(-2.18) **	(-2.15) **	0.64	0.44	0.35	(-1.07)	(-1.09)	(-1.23)
Panel B: Post-News sale transactions									
CAAR (%)	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
Good-News									
<i>Positive momentum</i> (n=113)									
CAAR	5.23%	5.98%	3.27%	0.23%	-0.38%	-0.11%	0.34%	-0.85%	-0.98%
T-Test	5.91 ***	13.10 ***	8.95 ***	1.53	(-1.63)	(-0.34)	0.67	(-1.40)	(-1.38)
Rank test	2.07 **	5.09 ***	5.03 ***	(-0.11)	0.24	0.07	(-0.09)	(-0.10)	0.07
<i>Negative momentum</i> (n=94)									
CAAR	-6.71%	-5.00%	-2.48%	0.05%	-0.53%	-0.42%	-0.50%	-1.13%	-1.76%
T-Test	(-5.38) ***	(-11.12) ***	(-7.13) ***	0.36	(-2.20) **	(-1.00)	(-0.89)	(-1.35)	(-1.56)
Rank test	(-2.55) **	(-5.17) ***	(-4.69) ***	(-3.32) ***	(-0.58)	(-0.71)	0.01	(-0.08)	(-0.02)
Bad-News									
<i>Positive momentum</i> (n=105)									
CAAR	4.11%	6.36%	3.35%	0.02%	-0.74%	-0.53%	-0.77%	-1.87%	-2.27%
T-Test	4.33 ***	11.85 ***	8.54 ***	0.13	(-2.89) ***	(-1.40)	(-1.35)	(-2.64) ***	(-2.74) ***
Rank test	2.08 **	5.13 ***	5.10 ***	(-0.42)	0.60	0.33	0.18	0.23	0.15
<i>Negative momentum</i> (n=93)									
CAAR	-7.79%	-5.55%	-2.70%	0.10%	-0.44%	-0.68%	-1.33%	-2.12%	-2.34%
T-Test	(-6.96) ***	(-13.25) ***	(-8.04) ***	0.74	(-1.58)	(-1.66) *	(-2.31) **	(-2.80) ***	(-2.41) **
Rank test	(-1.51)	(-2.72) ***	(-1.99) **	(-0.61)	(-0.01)	0.22	(-0.34)	(-0.53)	(-0.85)
Panel C: No-News sale transactions									
CAAR (%)	[-20;+40]	[-20;-1]	[-10;-1]	[0]	[+1;+5]	[+1;+10]	[+1;+20]	[+1;+30]	[+1;+40]
<i>Positive momentum</i> (n=963)									
CAAR	5.09%	5.38%	2.98%	0.07%	-0.09%	-0.13%	-0.47%	-0.57%	-0.35%
T-Test	11.25 ***	32.23 ***	18.83 ***	1.16	(-0.76)	(-0.61)	(-1.57)	(-1.62)	(-0.89)
Rank test	4.75 ***	8.52 ***	8.20 ***	2.25 **	0.52	1.48	1.12	0.69	1.02
<i>Negative momentum</i> (n=861)									
CAAR	-10.84%	-5.77%	-2.30%	0.05%	-0.24%	-1.01%	-2.42%	-3.92%	-5.11%
T-Test	(-18.38) ***	(-19.70) ***	(-13.03) ***	0.67	(-1.36)	(-5.50) ***	(-8.49) ***	(-10.91) ***	(-11.88) ***
Rank test	(-4.64) ***	(-6.82) ***	(-5.58) ***	1.39	(-0.24)	(-1.71) *	(-2.66) ***	(-3.12) ***	(-2.86) ***

Panel B presents the results for Post-News transactions. Similar to purchase transactions, it is only in the wake of Bad-News releases that significant abnormal market reactions can be observed. Likewise, both Bad-News groups trigger similar abnormal returns of -2.27% (*positive momentum*) and -2.34% (*negative momentum*) in the 40 post-trading days, regardless of the stock price momentum. Interestingly, the findings are in line with the trading behavior of Post-News purchase transactions, even though the returns are negative. In both cases the disclosure of negative, corporate-based information tends to be wholly responsible for the magnitude of abnormal market reaction, whereas the trading intention itself (purchase or sale) dictates whether the result will be positive or negative.

Panel C indicates insignificant post-event abnormal returns for *positive momentum* transactions and significant abnormal returns of up to -5.11% if the negative stock price momentum is intact. Accordingly, these results confirm the findings of *Table 13 Panel B* as roughly 75% of all sale transactions are conducted in times when there are no corporate announcements (*No-News*).

Overall, the observation of these different effects provides previously unknown facts about imminent abnormal market reactions to management transactions in Switzerland. The analysis of management transactions themselves shows moderate market reactions in line with the extant insider trading literature. A more profound analysis of the market reactions, however, provides evidence that these transactions do indeed trigger market reactions or at least are surrounded by them. Thus, when the effect of the stock price momentum is considered, there seems to be a long-term abnormal stock price trend which anticipates the post-event market reactions. Moreover, when corporate announcements are taken into account in this way the findings reveal that the abnormal returns observed around management transactions need to be carefully analyzed as only some portion of them can be attributed to the trading itself. Consequently, Pre-News transactions are strongest when both observed effects drive each other – *positive (negative) momentum* and Good-News (Bad-News) for purchase (sale) transactions. The results truly support hypothesis 4 (H4) and contribute to the existing literature. Although Sivakumar and Waymire (1994), Noe (1999) or Dymke and Walter (2008) have found a link between insider trading and corporate announcements, and Givoly and Palmon (1985) conclude that abnormal returns around management transactions are somehow driven by stock price momentum, an assumption also supported,

but not verified, by Noe (1999), their conclusions are limited to either the one or the other effect. The results of this paper illustrate the importance of considering both effects together when examining these abnormal returns.

5. Multivariate regression analysis

To test for the robustness of the event study results, a multivariate regression has been employed. The purpose of this analysis is to clarify whether the abnormal returns after management transactions are indeed determined by both the stock price momentum and the information released in the corporate announcement (Good-News and Bad-News). The abnormal market reactions have been captured by the CAAR[+1;+20] and the CAAR[+1;+40] subsequent to the management transaction.³⁰ Table 19 and Table 20 summarize the outcome of models (1), (3), (5), (7), (9) and (11), which take the first as the basis, and models (2), (4), (6), (8), (10) and (12) which employ the second as the dependent variable. The regressions are based on whether the transactions occur prior to (Pre-News), after (Post-News) or in times of no (No-News) corporate announcement. The CAAR of sale transactions have been multiplied by -1. This allows for a better comparison and interpretation of the abnormal returns of purchase and sale transactions. Moreover, a wide set of trading-specific, corporate- and market-related control variables have been regressed. This proceeding generates the following regression:

$$\begin{aligned} CAAR[+1;+20]_{i,t} \text{ or } CAAR[+1;+40]_{i,t} = & \beta_0 + \beta_1 Momentum_{i,t} + \beta_2 Information\ Release_{i,t} + \beta_3 Position_{i,t} \\ & + \beta_4 Accumulated_{i,t} + \beta_5 Ln(Price)_{i,t} + \beta_6 Large\ Trades_{i,t} + \beta_7 Ln(MarketCap)_{i,t} + \beta_8 ROE_{i,t} + \beta_9 Ln(Pre_BA)_{i,t} \\ & + \beta_{10} Ln(Post_BA)_{i,t} + \beta_{11} Market / Book_{i,t} + \beta_{12} Widely - held_{i,t} + \beta_{13} Family \& Manager_{i,t} + \beta_{14} Financials_{i,t} \\ & + \beta_{15} LegalChange_{i,t} + \varepsilon_{i,t} \end{aligned}$$

The key independent variables are *Momentum* and *Information Release*. Both dummy variables have been factors in examining the abnormal returns in the event study analysis. The former variable measures the cumulative average abnormal returns in the 20 days prior to the management transaction (CAAR[-20;-1]) and equals one if the transaction precedes positive (negative) pre-event abnormal returns for purchase (sale) transactions and zero otherwise. On the one hand, Seyhun (1986) documents a negative relation between pre-event and post-event abnormal market reactions, on the other

³⁰ The CAAR[+1;+10] has also been employed, causing similar but less pronounced results.

hand Givoly and Palmon (1985) show that insider profits are driven by long-term stock price trends. The event study results support the mode of thoughts of Givoly and Palmon (1985) and indicate a *positive (negative) momentum* for purchase (sale) transactions. The variable *Information Release* classifies the corporate announcement into Good- and Bad-News according to the immediate abnormal market reaction in the three days after the announcement (see *Table 14*). The dummy variable equals one for Good-News and zero for Bad-News releases. Hence, whether there are more active purchasing (selling) activities prior to Good-News (Bad-News) or more passive selling (purchasing) activities after Good-News (Bad-News) is of substantial interest (Elliott et al., 1984). According to the previous analysis, buying (selling) prior to Good-News (Bad-News) strongly impacts the post-trading abnormal returns in respect of management transactions. Moreover, Bad-News releases appear to economically impact both purchase and sale transactions after corporate announcements.

Position is a dummy variable that equals one if the trade is executed by an executive member of the board of directors and member of the executive committee, and zero if the trade is done by a non-executive member of the board of directors. The *Information Hierarchy Hypothesis* implies stronger market reactions triggered by executive directors, as they are closer to the operations of the company and distribute more valuable information (Jeng et al., 2003). *Accumulated* is an indicator variable that equals one if there are several trades (of one or more insiders) on a single day for the same company and zero, if there is a single, one-off trade per day and company. Several studies from the U.K. argue (Friedrich, Gregory, Matatko and Tonks, 2002; Hillier and Marshall, 2002) that accumulated transactions yield higher abnormal returns. $\ln(\text{Price})$ is the natural logarithm of the total transaction price paid by the insider. In addition, *Large Trades* are transactions exceeding 0.5% of the daily market capitalization (see also Dardas and Güttler, 2011). I cannot employ the common size measure 'relative transaction volume' due to the inconsistent data available on the daily trading volume of small-cap companies and on insider trading volume. Nonetheless, both measures are able to establish a similar relationship and reveal that higher prices indicate stronger market reactions (Fidrmuc et al., 2006; Betzer and Theissen, 2009). The effect of the firm's size is measured on a daily basis by the coefficient $\ln(\text{MarketCap})$. According to Wong, et al. (2000) and Zingg et al. (2007) abnormal returns tend to be more concentrated in smaller firms. This is due to the fact that these stocks are less screened by analysts or investors, which establishes the basis for greater information

asymmetry. *ROE*, the return on equity, is a firm-specific control variable which provides a rough approximation of the firm's performance and is measured at the beginning of the month. The coefficient is expected to be negative for purchase transactions as market movements tend to be stronger in respect of less profitable companies (Betzler and Theissen, 2009) and positive for sale transactions as insiders tend to sell when performance peaks out as long as this value-investing strategy is in play. $\ln(\text{Pre_BA})$ and $\ln(\text{Post_BA})$ are the natural logarithms of the relative bid-ask spread averaged over the one month before and after the insider event. The spread is calculated as the difference between the daily ask and bid price divided by the mid-point price. The bid-ask spread proxies the overall level of information asymmetry (Muller and Riedl, 2002). The former is predicted to be negative as insiders are inclined to trade on their information in times of a less asymmetric information environment (smaller bid-ask spread) (Noe, 1999). Moreover, market makers are not able to predict when trading against informed traders and do not widen the bid-ask spread (Cornell and Sirri, 1992). The latter coefficient is predicted to be positive as market makers respond to trading against insiders and widen their bid-ask spread to offset the incurred losses by profiting from subsequent transactions with uninformed traders (Seyhun, 1986). *Market/Book* is the daily market-to-book ratio averaged over the 1-month prior to the event. It is an essential figure for analysts as well as insiders in judging whether a company's stock price is under- or overvalued. If the company is incorrectly priced, insiders might be better able to interpret this disequilibrium, and manifest a trading intention which reveals the mispricing and triggers a trading signal to be mimicked. This circumstance in turn could be evidence of the previously mentioned stock price momentum and not the short-term abuse of specific private information. Two dummy variables measure the impact of the ownership structure on the abnormal returns. *Widely-held* is a dummy that equals one if there is no shareholder owning more than ten percent of the voting rights of the company and zero otherwise. This figure constitutes an important threshold in the Swiss Code of Obligations (OR). Even though Art. 663c para. 2 (OR) defines a significant shareholder as a shareholder or a shareholder group holding a stake of at least five percent of the voting rights, most of the motions such as the reporting of a special consolidated financial statement (Art. 663e para. 3 OR), the rejection of a motion at the general meeting (Art. 697b para. 2 OR) or the convening of a general meeting (Art. 699 II para. 1(3) OR) need at least ten percent of the voting rights. The coefficient *Family & Manager* equals one if the largest share-

holder is a manager or a family (member) and at least one member is represented on the board of directors with a stake exceeding ten percent and zero otherwise. This group represents about 64% of all observed majority-controlled companies in Switzerland. In the case where several owners hold more than 10% of the company, the largest stakeholder indicates the dominant group. Several studies show evidence that dominant shareholders manifest their voting power by intervening in the operating business in order to increase the firm's value (Admati, Pfleiderer and Zechner, 1994). Corporate insiders in widely-held companies are shown to be less supervised and capitalize on their economic freedom by indulging in self-serving insider trading activities. If the company is controlled by a dominant manager or a family (member) this freedom disappears and lower abnormal returns are observed (Goergen and Renneboog, 1999). The coefficient *Financials* equals one if the transaction can be assigned to a company from the financial industry and zero otherwise. On the one hand, this sector dominates the company landscape in Switzerland; on the other hand, the strong regulatory boundaries (Solvency II or Basel III) in the financial sector rub off on the regulation of (corporate) insider trading and thus reduce the overall profitability of management transactions. *Legal Change* is a dummy that equals one if the insider transaction occurs after the modification of the Swiss law on insider trading on April 1st, 2011, and zero otherwise. According to Gilbert and Tourani-Rad (2008), if the new law fulfills its intention, abnormal returns should be diminished.

Table 19 shows that both key variables indicate a positive relation to the abnormal returns of Pre-News transactions. This result supports the previous findings that a positive stock price momentum, supported by Good-News information releases, strongly impacts the post-trading, abnormal market reactions. The effect is significant to an at least 95% confidence level for models (1) and (2). In line with the event study results, the Bad-News effect appears to be more relevant to Post-News transactions, although only for model (3). Beyond that, the *Momentum* effect is further relevant to the No-News group, a positive, linear relationship which underlines the importance of considering the stock price momentum. Moreover, abnormal market reactions in respect of No-News transactions are significantly higher when conducted by smaller-cap, widely-held companies which operate in the financial industry (not significant for model (6)), all factors which cannot be attributed to news transactions. Interestingly, models (1) and (2) indicate that a smaller bid-ask spread prior to and a larger spread immediately

after the transaction is related to stronger abnormal market reactions in respect of Pre-News and No-News (only model (6)) management transactions. In line with Cornell and Sirri (1992) market makers are not able to predict when trading against informed traders and do not widen the bid-ask spread prior to the transaction. Moreover, insiders are inclined to trade on their information in times of a less asymmetric information environment (smaller bid-ask spread) (Noe, 1999). Seyhun (1986) further underlines that market makers respond to trading against insiders and widen their bid-ask spread to offset the incurred losses by profiting from subsequent transactions with uninformed traders. The above results confirm these assumptions. In addition, the bid-ask spread does not explain the Post-News abnormal returns and this is probably due to the fact that material private information has already been disclosed in the corporate announcement and thus reduces the overall information uncertainty afterwards. Moreover, an increase in the market-to-book ratio reduces the abnormal returns of Pre-News transactions. According to Capaul, Rowley and Sharpe (1993) stocks with a low market-to-book ratio, also called *value stocks*, provide risk-adjusted performance superior to stocks with a high market-to-book ratio, a trading strategy which is in line with Benjamin Graham's value-investing philosophy. In addition, there is a tendency for Pre-News transactions not to be conducted by insiders in the financial industry, which, however, lacks significance for model (2). The outcome of the multivariate regression provides strong evidence for the importance of both the *Momentum* and the *Information Release* effect. On the one hand, the adjusted R-squared of 43.91% and 46.15% for models (1) and (2) show that almost half the abnormal returns after management transactions can be described by the variables of this multivariate approach. The considerably lower explanatory power (but still high value) of model (3) (16.44%) and model (4) (9.50%) is not surprising, as the smaller abnormal market reactions of the Post-News transactions observed (see *Table 17 Panel B*) derive from the insignificance of the stock price momentum in this particular case. In addition, the No-News control group indicates a strong positive relation between the *Momentum* and the abnormal returns.

The lower adjusted R-squared of 6.24% of model (5) and 8.40% of model (6) implies, however, that abnormal market reactions in respect of No-News transactions can be less explained by the applied variables due to the lack of an *Information Release* effect. Consequently, these findings suggest that strong abnormal returns can well be

attributed to the applied variables, especially when both active purchasing activities prior to corporate announcements and a *positive momentum* effect are intact.

Table 19: Multivariate regression of purchase transactions

The table presents the results of the multivariate regression for the categorization of purchase transactions into Pre-News, Post-News and No-News transactions. The dependent variables are the CAAR[+1;+20] and CAAR[+1;+40] and measure the post-event cumulative average abnormal returns over 20 and 40 trading days. Models (1), (3), (5), (7), (9) and (11) represent the CAAR[+1;+20] and models (2), (4), (6), (8), (10) and (12) represent the CAAR[+1;+40]. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% Significance level, respectively. The multivariate regression applies the *root mean square error* (Stata uses the term 'Root MSE').

	PURCHASE TRANSACTIONS					
	Pre-News		Post-News		No-News	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Intercept</i>	0.098	0.012	-0.048	-0.061	-0.037	-0.032
	0.66	0.07	(-0.67)	(-0.56)	(-1.62)	(-0.95)
<i>Momentum</i>	0.229 ***	0.341 ***	-0.089	0.017	0.168 ***	0.341 ***
	2.61	3.08	(-1.14)	0.14	6.90	9.34
<i>Information Release</i>	0.060 **	0.101 ***	-0.039 **	-0.027		
	2.12	2.82	(-2.40)	(-1.10)		
<i>Position</i>	-0.017	-0.062	0.029	0.016	-0.002	0.004
	(-0.51)	(-1.47)	1.46	0.53	(-0.35)	0.45
<i>Accumulated</i>	0.093	0.031	0.012	0.018	-0.005	0.002
	1.58	0.50	0.46	0.46	(-0.50)	0.14
<i>Ln(Price)</i>	0.011	0.020	0.003	0.003	0.003	0.002
	0.88	1.20	0.55	0.31	1.57	0.77
<i>Large Trades</i>	-0.069	-0.140	-0.032	-0.046	-0.028	0.011
	(-0.95)	(-1.53)	(-1.04)	(-1.00)	(-1.56)	0.42
<i>Ln(MarketCap)</i>	0.025	0.023	0.015	0.021	-0.010 ***	-0.016 ***
	1.38	0.99	1.50	1.37	(-3.22)	(-3.38)
<i>ROE</i>	-0.009	-0.011	-0.010	0.007	0.002	-0.002
	(-0.58)	(-0.58)	(-0.89)	0.40	0.57	(-0.34)
<i>Ln(Pre_BA)</i>	-0.156 *	-0.176 *	0.011	-0.048	-0.024	-0.071 ***
	(-1.86)	(-1.66)	0.25	(-0.71)	(-1.53)	(-3.04)
<i>Ln(Post_BA)</i>	0.209 **	0.220 **	0.002	0.071	0.017	0.052 **
	2.52	2.10	0.05	1.03	1.07	2.20
<i>Market/Book</i>	-0.025 ***	-0.036 ***	0.005	-0.007	0.002	0.002
	(-3.53)	(-4.01)	0.98	(-0.86)	1.09	0.98
<i>Widely-held</i>	-0.001	-0.017	-0.035	0.020	0.037 ***	0.032 **
	(-0.01)	(-0.29)	(-1.27)	0.49	3.81	2.23
<i>Family & Manager</i>	-0.020	-0.041	0.022	0.044	0.013	0.013
	(-0.48)	(-0.80)	1.00	1.33	1.51	1.24
<i>Financials</i>	-0.095 *	-0.090	0.021	0.016	0.017 ***	0.001
	(-1.92)	(-1.43)	0.77	0.40	2.56	0.09
<i>Legal Change</i>	-0.047	-0.013	0.012	0.020	0.012	0.001
	(-1.22)	(-0.26)	0.52	0.57	1.31	0.06
<i>Adjusted R-squared</i>	43.91%	46.15%	16.44%	9.50%	6.24%	8.40%
<i>Observations</i>	87	87	131	131	1'244	1'244

Table 20 summarizes the results of the multivariate regressions for sale transactions. The abnormal returns of sale transactions have therefore been multiplied by -1. The *Momentum* variable does not show significant results for models (7) – (10). Nonetheless, valid findings can be found for No-News transactions (models (11) and (12)), which show a strong positive relationship between pre-event and post-event abnormal

returns. As with purchase transactions, this is evidence of the negative stock price momentum. Interestingly, there is a remarkable difference in abnormal returns between the *positive* (-2.68%) and *negative momentum* (-8.94%) prior to Bad-News releases (*Table 18 Panel A*), which the regression would seem to indicate (models (7) and (8)), but does not actually statistically confirm. Nonetheless, the negative relationship between the abnormal returns and the Pre-News and Post-News transactions strongly supports the *Information Release* effect which has already been observed in the event study. Hence, sale transactions prior to and after Bad-News afford an explanation for the higher (negative) abnormal returns. Further empirical findings can be attributed to transactions before the revision of the law on insider trading in April 2011. This holds true for all models. Hence, changing from a lax to a stricter regulatory environment hinders the generation of high abnormal returns. A reduction in the profitability of insider trading has also been documented by the study of Gilbert and Tourani-Rad (2008) analyzing the efficacy of the changes in law in New Zealand. In line with Betzer and Theissen (2009) the higher trading prices of No-News transactions reduce their impact on abnormal returns.

As with No-News purchase transactions, larger, pre-trading, bid-ask spreads cause lower abnormal returns and wider, post-trading, bid-ask spreads are related to greater abnormal market reactions with regard to sale transactions. Again, a higher market-to-book ratio reduces the abnormal returns of all models. Value investors avail themselves of the opportunity to profit from misconceptions as to the true company value. Finally, Post-News transactions conducted by companies controlled by managers or families reduce the abnormal returns, a result which supports the findings of Goergen and Renneboog (1999).

The overall explanatory power of the abnormal returns on sale transactions is still remarkably high. Hence, the applied variables are able to explain up to 20.80% of the abnormal returns observed (model (7)). The multivariate regressions of sale transactions clearly indicate that the *Information Release* effect, or more precisely the Bad-News announcement, impacts the abnormal market reactions observed in respect of news transactions. In the case of No-News transactions the stock price momentum appears to explain the abnormal returns of sale transactions. Regardless of the transaction, the market-to-book ratio and the regulatory change in April 2011 are further key drivers in explaining differences in abnormal returns.

Table 20: Multivariate regression of sale transactions

The table presents the results of the multivariate regression for the categorization of sale transactions into Pre-News, Post-News and No-News transactions. The dependent variables are the CAAR[+1;+20] and CAAR[+1;+40] and measure the post-event cumulative average abnormal returns over 20 and 40 trading days. The CAAR have been multiplied by -1. Models (1), (3), (5), (7), (9) and (11) represent the CAAR[+1;+20] and models (2), (4), (6), (8), (10) and (12) represent the CAAR[+1;+40]. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% Significance level, respectively. The multivariate regression applies the *root mean square error* (Stata uses the term 'Root MSE').

	SALE TRANSACTIONS					
	Pre-News		Post-News		No-News	
	(7)	(8)	(9)	(10)	(11)	(12)
<i>Intercept</i>	0.191	0.035	-0.081 *	-0.135 **	-0.036	-0.025
	1.52	0.19	(-1.74)	(-1.96)	(-1.59)	(-0.76)
<i>Momentum</i>	0.199	0.036	-0.003	0.007	0.139 ***	0.389 ***
	1.31	1.63	(-0.33)	0.62	4.59	8.75
<i>Information Release</i>	-0.035 **	-0.001 **	-0.020 **	-0.041 ***		
	(-2.25)	(-2.07)	(-2.17)	(-3.05)		
<i>Position</i>	-0.019	-0.022	-0.001	-0.017	-0.001	0.005
	(-0.83)	(-0.68)	(-0.11)	(-1.37)	(-0.23)	0.69
<i>Accumulated</i>	-0.017	0.003	0.008	-0.006	0.006	-0.004
	(-0.58)	0.07	0.73	(-0.34)	0.78	(-0.36)
<i>Ln(Price)</i>	-0.009	-0.005	0.005	0.000	-0.004 **	-0.006 **
	(-1.06)	(-0.39)	1.61	0.08	(-2.23)	(-2.27)
<i>Large Trades</i>	0.070	0.038	-0.023	0.017	0.004	0.006
	0.81	0.31	(-0.70)	0.35	0.28	0.26
<i>Ln(MarketCap)</i>	-0.004	-0.005	-0.005	-0.011	0.001	0.006
	(-0.37)	(-0.29)	(-1.29)	(-1.00)	0.39	1.45
<i>ROE</i>	0.019	0.058	0.013 **	0.027 ***	0.008	0.007
	0.84	1.54	2.11	3.01	1.57	1.16
<i>Ln(Pre_BA)</i>	-0.047	-0.081	-0.036	-0.037	-0.053 ***	-0.051 **
	(-0.84)	(-0.99)	(-1.38)	(-0.97)	(-3.69)	(-2.40)
<i>Ln(Post_BA)</i>	0.049	0.086	0.029	0.014	0.045 ***	0.049 **
	0.84	1.01	1.09	0.36	3.10	2.28
<i>Market/Book</i>	-0.009 *	-0.014 **	-0.008 ***	-0.007 **	-0.003 ***	-0.005 ***
	(-1.74)	(-1.97)	(-3.31)	(-2.09)	(-2.99)	(-3.11)
<i>Widely-held</i>	-0.038	0.005	0.017	0.013	0.003	0.009
	(-1.01)	0.08	1.50	0.78	0.33	0.74
<i>Family & Manager</i>	0.007	0.009	-0.028 ***	-0.046 ***	0.000	0.001
	0.28	0.26	(-2.60)	(-2.94)	0.00	0.06
<i>Financials</i>	0.001	-0.015	-0.011	0.002	0.007	0.001
	0.02	(-0.35)	(-1.08)	0.13	1.12	0.07
<i>Legal Change</i>	-0.077 **	-0.081 *	-0.033 **	-0.062 ***	-0.027 ***	-0.054 ***
	(-2.24)	(-1.65)	(-2.23)	(-2.85)	(-3.51)	(-4.66)
<i>Adjusted R-squared</i>	20.80%	13.06%	15.66%	16.77%	6.28%	11.08%
<i>Observations</i>	141	141	333	333	1'165	1'165

Overall, the multivariate regression is not only suitable in describing the abnormal returns triggered by the *Momentum* and *Information Release*, but also highlights the necessity of including other trading-specific, corporate-based and market-related elements in order to examine abnormal market reactions after management transactions. More precisely, the market-to-book ratio, the bid-ask spread and the regulatory changes in Swiss laws on insider trading (if only with regard to sale transactions) are additional factors affecting these abnormal returns.

6. Conclusion

This paper examines the abnormal market reactions around management transactions in Switzerland. It shows that the stock price momentum and the corporate announcement effects strongly determine these market reactions. Although the true impact of these two factors cannot be estimated with absolute accuracy, the findings suggest that the combination of both effects significantly changes the outcome. This can be seen by the fact that, when both these effects are neglected, this leads to similar abnormal return patterns to those already documented by most of the extant literature. On the other hand, when both factors are included and combined together, as in the comprehensive analysis of this study, more pronounced abnormal market reactions are detected than those previously documented by any other studies on insider trading. The combination of Good-News (Bad-News) corporate announcements subsequent to purchase (sale) transactions drives the abnormal returns in the 40-day post-event trading period up to 13.53% (-8.94%), as long as the positive (negative) stock price momentum is intact. A positive (negative) momentum implies a positive (negative) abnormal reaction already prior to purchase (sale) transactions. These findings contribute to the diverging research results of the aforementioned leading literature in this field and reveal two main implications. First, Swiss law on insider trading permits investors to trade freely without specific blackout periods. These blackout periods are implemented in several countries such as the U.S. or U.K, in order to ban insiders from trading prior to other corporate announcements. In line with the recommendations of Dymke and Walter (2008) for the Federal Financial Supervisory Authority in Germany, the results of this paper indicate strong abnormal market reactions after these transactions which should prompt the Swiss regulators of insider trading to scrutinize their current legal framework, to intensify governmental supervision or to even impose stronger sanctions. Although the results indicate that insiders do not systematically abuse specific private information, their superior knowledge about their companies' future prospects induces insiders to conduct transactions that are often suspiciously profitable. Second, the stock price momentum appears to be a crucial factor in determining the market reaction after management transactions. The observed stock price momentum has also been addressed by Givoly and Palmon (1985) and Noe (1999), but does not seem to have otherwise received great attention within the literature on insider trading. Even though this study establishes that some portion of the abnormal returns can be attribut-

ed to the stock price momentum, it still leaves definite room for further, intriguing, applied research on the subject.

Finally, I have to admit that the disclosure of the precise announcement dates of management transactions would substantially contribute to the accuracy of the findings of this paper. The lack of data on management transactions is a general concern which should be urgently addressed by the Swiss regulators of insider trading.

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Part IV: The strategy of mimicking insider trading – Evidence from Switzerland

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Corporate Finance biz, Vol. 2, pp. 68-83

Abstract

This paper analyzes to what extent outside investors are able to profit from insider information once it is disclosed to the public. Although based on previous studies on this phenomenon, a more practically-oriented investor approach has now been taken in order to identify the potential of insider information leading to excess market returns up to a 500-day holding period on the Swiss stock market. The findings suggest that a combination of short-term stock price sentiment, trading-specific or corporate-based factors and the industrial affiliation of the companies in question most probably provides the best risk-return portfolios when mimicking insider trading. Substantial excess market returns are particularly possible for investors when it comes to companies from the *Technology* sector, even if accompanied by a respective downside risk. Finally, a simulation analysis supports the validity of the performance and sensitivity analysis results.

Keywords: Insider Trading, Outside Investors, Simulation Analysis, Trading Strategy, Swiss Stock Market, Excess Market Return

JEL Classification: G110, G170

1. Introduction and literature review

Insider trading is a widely-known phenomenon in today's capital markets. The public perception of these activities often appears to identify it as unethical or even illegal. Indeed, the abuse of material non-public information creates an environment of asymmetric information where some market participants have superior knowledge over others. Proper legal disclosure mechanisms, however, help to legitimate an organized and convenient exploitation of this information and mitigate the information gap between different types of market participants. In most developed countries, directors or managers are obliged to disclose their legal insider trading activities promptly. This disclosure period indicates the trading days between the transaction and the announcement of the insider event. The U.S., for example, has a maximum legal disclosure period of two days, whereas Switzerland and Europe implement a 5-day disclosure limit (Gebhardt, 2012).

According to capital market theory, the exploitation of sensitive private information is beneficial as more information improves overall market efficiency and thus stock prices converge more closely in line with their true fundamental value (Carlton and Fischel, 1982). Consequently, stock price accuracy improves due to the disclosure of non-public information, reducing agency costs and simultaneously leading to informed investment decisions (Leland, 1992). In contrast, Brudney (1979) argues that outsiders are less willing to participate in the capital market and to trade against insiders if insider trading occurs. Despite this opposing research by scholars the exploitation of private price-sensitive information still provides an interesting phenomenon for further research analysis as in this paper.

Several studies address the fact that the inside information disclosed is valuable to outside investors. Jaffe (1974) applies a two-parameter Sharpe-Lintner model and analyzes whether outsiders are able to profit from the insider information disclosed. His findings suggest that returns after transactions costs are about 2-3 per cent. Another prominent academic study published in the U.S. by Nejat Seyhun builds on this to provide further insights into the market mechanisms around insider events. Seyhun (1986) examines about 60'000 transactions and concludes that outsiders who mimic insider transactions once they become publicly available on the Securities and Exchange Commission (SEC) are still able to yield abnormal returns. When adjusted for the net of the bid-ask spread plus the commission fee, however, the abnormal profits from

outsiders are non-positive. A similar approach was undertaken by Rozeff and Zaman (1988), measuring the effects of insider trading as well as outsiders' mimicking these trades over a ten year observation period (1973-1982). Like most of the aforementioned studies, Rozeff and Zaman apply market model estimations in order to test for abnormal returns around directors' dealings. Inspired by Finnerty (1976), they additionally test their portfolio against size and earnings/price ratio effects to overcome statistical bias and miscalculation of abnormal returns. After transaction costs of 2 per cent are imposed for the round-trip (as others have assumed), outsiders' profits fully disappear.

Bettis, Vickrey and Vickrey (1997) analyze around 5.000 large insider transactions (at least 10.000 shares per trade) from the New York stock exchange and indicate that outsiders can earn significant abnormal returns by mimicking insider transactions. When a 52-week holding period is considered, outsiders are found to generate about 5 and 7 per cent annualized returns after transaction costs for purchase and sell transactions respectively.

Another study from the Hong Kong stock market by Wong, Cheung and Wu (2000) combines both effects - firm size and relative trading volume - for a sample of 260 listed corporations from 1991 to 1993 and concludes that only insider purchase transactions from the group with the smallest firm size and the largest relative trading volume can yield a significant abnormal performance. The same goes for outsiders mimicking the insider activities once they have been disclosed on the Hong Kong stock exchange website.

Likewise, Cheuk, Fan and So (2006) apply a standard event study approach with a 20 trading day event window after the insider transaction. A sample of more than 23'000 insider transactions provides evidence that outsiders following insiders at small-cap firms yield the highest abnormal returns. In addition, outsiders should mimic insider purchase transactions from companies showing a large book-to-market ratio. However, selling activities involving a relatively small book-to-market ratio are most likely to generate abnormal returns. Moreover, larger transaction volumes appear to be a strong indicator for outsiders to mimic selling activities.

Zingg, Lang and Wytttenbach (2007) conclude that outsiders mimicking insider transactions are not able to earn significant abnormal returns after transactions costs. Nonetheless, like Cheuk et al. (2006) and Wong et al. (2000), their findings suggest that

abnormal returns are most pronounced when insider transactions from small-cap companies are mimicked. In contrast to Wong et al. (2000), Zingg et al. (2007) argue that, whilst mimicking small volume transactions may well yield significant abnormal returns, transaction costs reduce the attractiveness of this trading strategy. *Table 21* presents a synopsis of the predominant journal articles in this research area.

Table 21: Literature review summary

Author (year) Journal	Title of the paper	Data information	Research methodology	Profitability	
				Insider	Outsider
Jaffe (1974) <i>Journal of Business</i>	Special information and insider trading	United States 1962-68 952 insider trades	Sharpe - Lintner model Event window up to 15 months	YES Abnormal returns up to 4.9%	YES Abnormal returns up to 2-3%
Seyhun (1986) <i>Journal of Financial Economics</i>	Insiders' profits, cost of trading, and market efficiency	United States 1975-81 59'148 insider trades	Market model Event window -200 to +300 days	YES Abnormal returns up to 3.7%	NO Returns are non-positive after transaction costs
Rozeff & Zaman (1988) <i>The Journal of Business</i>	Market efficiency and insider trading: New evidence	United States 1973-82 722 insider trades	Modified market model Event window up to 12 months	YES Abnormal returns up to 3.0%	NO Profits disappear after transaction costs
Bettis, Vickrey & Vickrey (1997) <i>Financial Analysts Journal</i>	Mimickers of corporate insiders who make large-volume trades	United States 1985-90 5'022 insider trades	Market model Event window up to 52 weeks	YES Abnormal returns up to 11.7%	YES Abnormal returns up to 7.0%
Wong, Cheung & Wu (2000) <i>Asia-Pacific Financial Markets</i>	Insider trading in the Hong Kong stock exchange	Hong Kong 1991-93 3'685 insider trades	Market model Event window +/- 15 days	YES Abnormal returns up to 5.6%	YES Abnormal returns up to 1.9%
Cheuk, Fan & So (2006) <i>Pacific-Basin Financial Journal</i>	Insider trading in Hong Kong: Some stylized facts	Hong Kong 1993-98 23'795 insider trades	Market model Event window +/- 20 days	YES Abnormal returns up to 6.9%	YES Abnormal returns (but not specified)
Zingg, Lang & Wytenbach (2007) <i>Swiss Journal of Economics and Statistics</i>	Insider trading in the Swiss stock market	Switzerland 2005-06 1'424 insider trades	Market model Event window +/-30 days	YES Abnormal returns up to 2.8%	YES Abnormal returns up to 2.1%

All the aforementioned studies have in common that they apply a rather scientific-based research approach. In particular, these studies find evidence of the implicit abnormal market reaction of insider announcements on the adjusted stock prices. This holds also true for the notional transactions conducted by outside investors. This approach helps to explain how the capital market assimilates the arrival of published information and provides evidence as to the degree of capital market efficiency. The perception of significant market movements around insider transactions documented in all the above studies implies that security prices do not 'fully reflect all available in-

formation' (Fama, 1970, p. 383) and hence are only semi-strong in effect. Although the returns are remarkably smaller compared to insider transactions, most of the studies indicate profitable trading for outside investors. These findings, however seem to contradict this semi-strong form of market efficiency. Overall, almost all studies document abnormal returns and provide evidence as to the efficiency of stock prices.³¹

Accordingly, insider trading information appears to be highly valuable and hence several commercial providers assess and supply comprehensive insider trading databases. These professional insider trading data providers such as *2iQ Research*, *Insider Alarm*, *Form4Oracle*, *Insider Cow*, or *Insider Monkey* offer trading tools for investors in order to make informed investment decisions on insider information. Their strategies are customized for 'Hedge Fund Managers, Quantitative Investment Managers, Algorithm Traders, Equity Researchers or Investment Managers with a focused stock universe' (2iQ, Website)³². In general, the products offered are applicable to all types of private, strategic or institutional, interested parties. When it comes to the implementation and the reliability of their trading philosophies, I prefer to employ an innovative, more investor-oriented approach in order to close the gap between profoundly theoretical research applications and capital market-based trading strategies. Therefore, my research objective is based on a comprehensive 4-step due diligence on management transactions in Switzerland to determine which insider trading activities imply greater prospective potential for investment purposes.

The findings suggest that a combination of short-term stock price sentiment, trading-specific or corporate-based aspects together with the company's industrial affiliation provides portfolios with interesting investment signals at the time of the insider announcement encouraging outside investors to mimic these insider trading patterns. Overall, the best risk-return performance can be achieved if outsiders follow insiders within companies from the Technology sector. Moreover, profitability can be increased when company size (*MarketCap*) and company valuation (*Market/Book*) are considered, when the company addresses the issue of insider trading in their annual reports (*Word-Count*), and when insiders conduct relatively small transactions (*Rela-*

³¹ Although the papers manifest to the degree of market efficiency, the statistical biases of bad model selection (*Joint Problem Hypothesis*) has not been addressed.

³² Retrieved 1st October, 2012, from <http://www.inside-analytics.com/en/products/>

tive). Most of the results have proved to be robust against any outlying values when a simulation analysis is employed.

The remainder of this paper is structured as follows: The next chapter describes the 4-step research design and shows the relevant descriptive statistics. Section 3 explains the process whereby the variables were selected and examines the empirical results provided by the performance and sensitivity analyses. Section 4 summarizes the results of the simulation analysis, followed by some concluding remarks (Section 5).

2. Research design and descriptive statistics

2.1 4-step research design

The research design is based on a set of different empirical methodologies. This intuitive, but elaborate, approach contains both well-tried empirical research analysis as well as innovative research aspects. A 4-step research approach reveals the complexity of information surrounding insider transactions. Therefore, instruments have been selected (*Selection*) and assessed (*Evaluation*) which have the potential to recognize those extraordinary elements in play at the time of the announcement which lead to long-term stock price trends. Third, the risk-return structure of the various transaction groups in the model identifies the portfolios which perform best with regard to the downside risk (*Analysis*). Finally, a simulation analysis (*Back-testing*) has been applied to test the robustness of this strategy of mimicking insider trading.

1. Selection

In a first step, a wide set of four variable groups – short-term stock price sentiment, trading-specific, performance-related and corporate-based – are regressed on the excess market returns ($ER_{i,t}$) over various holding periods. The excess market return equals the difference between the daily stock price ($r_{i,t}$) and the Swiss Performance Index (SPI) ($r_{m,t}$) return over a 20-, 40-, 60-, 80-, 100-, 150-, 200-, 250-, 300-, 350-, 400- and 500-day holding period

$$ER_{i,t} = r_{i,t} - r_{m,t} \quad (1)$$

The subsequent portfolios based on the variable selection are assumed to explain long-term stock price trends and hence serve as an indicator for investors to start mimicking insider trading strategy profitably right from the date of the announcement. Due to de-

ficient, Swiss, legal disclosure policy, the reporting date of the insider transaction is not published on the SIX Exchange Regulation website. Consistent with Zingg et al. (2007) and on the basis of the maximum legal disclosure period, I assume that insiders disclose their information on the fourth (prior to 1st April 2011) and fifth (after 1st April 2011) trading day after the transaction.³³

2. Evaluation

A cross-sectional regression analysis is suitable for finding significant relationships between the dependent and the independent variables. For each of the 12 holding periods (20, [...], 500 trading days) as well as for each of the four variable groups (short-term stock price sentiment, trading-specific, performance-related and corporate-based) a regression analysis has been conducted. A total of 48 cross-sectional regressions for both purchase and sale transactions have thus been employed. Each variable produces 12 coefficients, one for each holding period. If the independent variable is not a dummy variable per se, it becomes a binary digit. Therefore, the dummy equals 1 if the value is larger than, and zero if it is smaller than, the underlying total mean of this variable. In order to ensure the credibility of this rather intuitively chosen clustering approach and to reduce the probability of the results being strongly influenced by outliers, the median has been applied as a second threshold. This approach helps both to cluster the variables into two distinct groups and to better interpret the results for further analysis.

A variable of the cross-sectional regression is assumed to provide valuable information for further analysis if at least five of the 12 coefficients over the holding periods indicate a significant and stable sign. If the applied independent variables are ambiguous, not economically significant or surprisingly unexpected in their predicted signs, the elements are not part of the further analysis. The purpose of this selection is to reduce the information complexity of the 27 variables and to find significant coherences with the long-term stock price movements. Hence, the major task for outside investors consists of properly interpreting the extent of information (*Selection*) and of selectively choosing the most valuable information for a sustainable trading strategy (*Evaluation*).

³³ Art. 56 para. 1 LR, 2010.

3. Analysis

The analysis is comprised of both the performance and the sensitivity analysis. The former examines the overall excess market performance, the expected average loss and the probability of loss over the entire observation period of 500 trading days. The results provide evidence of the average performance of each selected portfolio (variable). Moreover, the latter analysis takes the time component into consideration and attempts to determine proper entry and exit strategies for outside investors. More precisely, what is the best timing for outside investors to enter (purchase) or exit (sale), or in general to mimic, the insider trading behavior.

4. Back-testing

Due to the innovative research design, a simulation analysis has been employed to test the results for their validity. Based on the actual excess market returns and the respective volatility of daily returns in all observed portfolios, each transaction has been simulated ten times. Two considerations induced me to conduct this robustness test. First, the simulation analysis reduces the probability that the results are distorted by several extreme transactions. And second, externalities (e.g. financial crisis) could heavily affect the empirical results in the observation period and hence mitigates the explanatory power of the trading strategy for prospective investment opportunities.

2.1.1 Short-term, stock price sentiment variables

Seven variables determine the impact the stock price information environment surrounding the insider transaction has on long-term stock price development.

$$ER_{i,t} = \beta_0 + \beta_1 Ln(BA_{10days})_{i,t} + \beta_2 Ln(BA_{20days})_{i,t} + \beta_3 Ln(STDRet_{10days})_{i,t} + \beta_4 Ln(STDRet_{20days})_{i,t} + \beta_5 Momentum_{i,t} + \beta_6 CAAR_{i,t} + \beta_7 M / B_{i,t} + \varepsilon_{i,t} \quad (2)$$

The excess market return ($ER_{i,t}$) is cumulated for each of the 12 holding periods. $Ln(BA_{10days})$ and $Ln(BA_{20days})$ are the natural logarithms of the relative bid-ask spreads averaged over 10 and 20 days prior to the trading event. The spread is calculated as the difference between the daily ask and bid price divided by the mid-point price. The bid-ask spread proxies the overall level of information asymmetry (Muller and Riedl, 2002). Cornell and Sirri (1992) argue that market makers and other relevant market participants are not able to predict when trading against insiders and hence do not widen the spread. Moreover, insiders abstain from trading in times of less market

liquidity in order to conceal their trading intention (Noe, 1999). Hence, the bid-ask spread might be able to provide signals for a profitable mimicking strategy. Two coefficients have been employed to identify any time-specific variations immediately prior to the insider transaction. $Ln(STDRet_{10days})$ and $Ln(STDRet_{20days})$ are the natural logarithms of the standard deviation of the daily stock returns averaged over 10 and 20 days prior to the insider event and proxies for the uncertainty of stock price returns (Leuz and Verrecchia, 2000). More volatile stock prices increase the uncertainty of returns and hence the risk of unexpected price movements. *Momentum* measures the cumulative average abnormal returns - employing an event study approach - in the 20 days prior to the insider trading date. According to Seyhun (1986) and Dymke and Walter (2008) insiders are contrarian investors and hence buy low and sell high. Hence, the coefficient *Momentum* measures if and how the market anticipates potentially upcoming insider trading already prior to the transaction date. *CAAR* measures the cumulative average abnormal returns four (prior to 1st April 2011) and five (after 1st April 2011) days after the insider transaction. This period measures the time span where the transaction has already been conducted but not disclosed. Betzer and Theissen (2010) argue that prices are distorted between the trading and announcement date, which is indicated by abnormal stock price patterns. *M/B* ratio measures the daily market-to-book ratio averaged over one month prior to the insider event and indicates whether a company's share price is currently under- or overvalued. On the one hand, a low market-to-book ratio ensures good purchase investment opportunities for value investors (Capaul, Rowley and Sharpe, 1993). On the other hand, Lakonishok and Lee (2001) found superior abnormal returns in 'small-glamour' companies with a high market-to-book ratio. Depending on the investors' trading strategy both strategies may lead to substantial profits.

2.1.2 Trading-specific variables

This variable group contains factors which can be directly attributed to the insider trading activity itself.

$$ER_{i,t} = \beta_0 + \beta_1 Accumulated_{i,t} + \beta_2 Multiple_{i,t} + \beta_3 Position_{i,t} + \beta_4 Relative_{i,t} + \beta_5 Ln(Price)_{i,t} + \varepsilon_{i,t}$$

(3)

Accumulated is a dummy variable that equals one if there are several trades on a single day for the same company and zero if there is a single, one-off trade per day and com-

pany. Several studies from the U.K. argue (Friederich, Gregory, Matatko and Tonks, 2002; Hillier and Marshall, 2002) that accumulated transactions yield higher abnormal returns as an intensive trading environment just provides more information. *Multiple* is a dummy and equals one if there is more than one insider transaction by the same company in one calendar month. Several insider transactions with the same trading intention (purchase or sale) underline the credibility of the trading behavior and the prospective company performance. *Position* is a dummy and equals one if the transaction is executed by an executive member of the board of directors and zero if the transaction is executed by a non-executive member of the board of directors. The *Information Hierarchy Hypothesis* implies more valuable insider information from executive directors as they are closer to the operations of the company (Jeng, Metrick and Zeckhauser, 2003). *Relative* exhibits the insider trading volume relative to the outstanding shares on the day of the event. On the one hand, Barclay and Warner (1993) state that large block trades are avoided to conceal the trading intention. On the other hand, Wong et al. (2000) argue that large-volume sale transactions are ‘valuable for the quasi-insiders to earn abnormal profits’ (p. 285). A second transaction size measure is the coefficient $\ln(\text{Price})$, which is the natural logarithm of the paid transaction price. Likewise, more expensive transactions trigger stronger market reactions and hence are an indicator of more profitable transactions (Dardas and Güttler, 2011).

2.1.3 Performance-related variables

This group of variables provides insights into the relationship between the financial performance of the company and stock price movements.

$$ER_{i,t} = \beta_0 + \beta_1 \text{Price-to-Cash}_{i,t} + \beta_2 \text{ROE}_{i,t} + \beta_3 \text{Income-to-Sales}_{i,t} + \beta_4 \text{Payout}_{i,t} + \varepsilon_{i,t}$$

(4)

The coefficient *Price-to-Cash* (P/C) divides the share price by the cash flow per share and is a liquidity ratio and an interesting substitute for the price-to-earnings (P/E) ratio. In order to judge the company’s value many analysts even prefer the P/C ratio as it does not artificially skew the P/E ratio due to the outlays of depreciation and amortization (Little, 2012). *ROE* measures the rate of return on the shareholders’ equity and indicates how much of the invested equity generates additional earnings and hence can be regarded as an efficiency ratio of the company. The *Income-to-Sales* ratio (also net income margin) is a profitability measure and shows how much profit the company

earns for each dollar in sales. A higher margin indicates a better cost control culture and hence an interesting investment opportunity. The coefficient *Payout* shows how much of the earnings the company pays out to its shareholders as dividends. Again, this ratio serves as a measure to identify value and growth companies as a higher payout ratio generally goes in line with fewer growth opportunities and vice versa (Little, 2012).

2.1.4 Corporate-based variables

Eleven corporate-based variables denote how various corporate-based aspects associated with the insider trading phenomenon impact the long-term stock price performance.

$$\begin{aligned}
 ER_{i,t} = & \beta_0 + \beta_1 \ln(\text{MarketCap})_{i,t} + \beta_2 \text{Word-Count}_{i,t} + \beta_3 \text{Crosslisting}_{i,t} + \beta_4 \text{AccStandard}_{i,t} \\
 & + \beta_5 \text{Widely}_{i,t} + \beta_6 \text{Manager}_{i,t} + \beta_7 \text{Family}_{i,t} + \beta_8 \text{Other}_{i,t} + \beta_9 \text{Duality}_{i,t} + \beta_{10} \ln(\text{Hits})_{i,t} \\
 & + \beta_{11} \text{IndustryAwareness}_{i,t} + \varepsilon_{i,t}
 \end{aligned} \tag{5}$$

$\ln(\text{MarketCap})$ is the natural logarithm of the daily market capitalization and depicts the size of the firm on the day of the event. The variable addresses the information asymmetry between listed companies and market analysts. Several studies provide evidence that the quality of information incorporated in insider transactions is more valuable in smaller companies as they are less screened by market analysts (Wong et al., 2000; Hamill, McIlkenny and Opong, 2002). *Word-Count* is a dummy that equals one if the company's annual report in the last six years specifies the word 'insider' or 'management transaction' in any relevant context and zero otherwise. The social intelligence to deal with this issue and communicate the respective company's policy to investors indicates a high level of corporate social responsibility. These companies tend to allow management transactions by distributing non-public information in a responsible and reliable way in order to foster stock price efficiency.

Crosslisting is a dummy and equals one if the company is also listed on the NYSE or the NASDAQ and zero otherwise. The underlying *Bonding Hypothesis* argues that foreign companies signal positive desires to fulfill high investor protection standards when 'bonding' with the regulatory security regime. U.S. exchanges exhibit high legal requirements including strict insider trading regulations, which tend to reduce self-serving insider transaction behavior (Durnev and Nain, 2007).

AccStandard equals one if the company prepares its consolidated financial statement in accordance with the US-GAAP or the IFRS and zero otherwise (Swiss-GAAP). Companies applying the international accounting standard are under tight supervision and are bound by stricter regulation (similar to the coefficient *Crosslisting*).

Four dummy variables measure the impact of the ownership structure. *Widely* is a dummy that equals one if there is no shareholder owning more than ten percent of the voting rights of the firm and zero otherwise. The dummy *Manager* equals one if the largest shareholder of the firm is a manager (e.g. founder) in the board of directors with a stake exceeding ten percent and zero otherwise. The dummy *Family* equals one if the largest shareholder is a family and one family member is represented in the board of directors with a stake exceeding ten percent and otherwise zero. The coefficient *Other* equals one if there are other controlling shareholders with a stake exceeding ten percent such as financial institutions, strategic investors, affiliates or companies from the same industry or government controlled and zero otherwise. *Duality* equals one if the CEO of the company also fulfills the task of being chairman of the board of directors and zero otherwise. Entrepreneurial power causes an environment of self-serving abuse of authority and fosters managerial freedom at the expense of the shareholders' interests in such a way that insiders tend to exploit their information (Jensen and Meckling, 1976). $\ln(Hits)$ is the natural logarithm of the number of Google hits of a company and proxies for its overall popularity. A negative correlation indicates transactions conducted by insiders of relatively unknown companies. *IndustryAwareness* equals one if the company belongs either to the category of Consumer Goods, Consumer Services, or Technology. Companies belonging to these industries are assumed to be better known due to their product or brand awareness.

2.2 Data sources

The insider trading data is extracted from the *Finanz und Wirtschaft (FuW)* website from September 2005 to March 2011. More recent data from April 2011 to the end of December 2011 has been retained directly from the SIX Exchange Regulation website. All data has been hand-collected for the purpose of this paper. I draw several sample tests for the times where data is available in both databases in order to prove for the reliability of the secondary dissemination of the *FuW* data. The final sample consists of 4'779 insider transactions, of which 2'354 are purchase and 2'425 sale transactions from 156 publicly listed companies in Switzerland. Moreover, this sample is adjusted

for transactions such as (stock) options, convertibles and other option-liked transaction types which are assumed to have other than purely information-driven trading intentions. In line with the research design of Lakonishok and Lee (2001), trivial trades smaller than CHF 10'000 are removed due to their limited impact on long-term stock price movements. Different data sources are used to extract the independent variables. Stock price-, company-specific and performance-related data are obtained from *Datastream*. *Bloomberg* records relevant cross-listing information about the companies. The accounting standard information is obtained from *Worldscope*. The information on corporate governance such as the ownership structure, the exposure of ‘insiders’ and ‘management-transactions’ as well as the principle of CEO-Duality has been hand-collected and comes directly from the annual reports from 2005 to 2011. Google hits have been gathered from Google Trend.

2.3 Descriptive statistics

Table 22 reports summarized statistics for the applied sample. *Panel A* and *Panel B* show a descriptive summary in which the companies in question are first clustered according to their industrial affiliation and then examined in terms of Swiss francs paid and the relative trading volume of the transaction. *Panel A* records the transaction price in absolute terms, whereas *Panel B* measures the trading volume relative to the outstanding shares on the day of the insider transaction. Moreover, *Panel C* summarizes selected corporate governance related aspects of the underlying companies and provides insights into the corporate ownership structure, the principle of the CEO-Duality and the company awareness/popularity on Google, again categorized by their industrial affiliation. More than 60% of all companies belong either to the financial or industrial sectors and only a couple of trades can be attributed to the *Oil & Gas* and the *Utilities* industry. In addition, about 70% of the purchase and about 68% of the sale transactions can be related to either of the former groups (*Financials* or *Industrials*). Despite this, the transaction price and the relative trading volume are about equal or even smaller when compared with the other industries. Furthermore, financial companies can be characterized by a proportionally high number of widely-held companies, where the principle of CEO-Duality is in place and which have a sizeable amount of hits by Google. The mean transaction price and the relative trading volume for both purchase and sale transactions are strongly determined by several outliers as the medi-

an descriptive shows significantly smaller figures. The same effect can be observed for sale transactions of companies from the *Technology* sector.

Table 22: Descriptive summary

	PURCHASE TRANSACTIONS						SALE TRANSACTIONS					
	Companies	N	Mean	Median	Min	Max	Companies	N	Mean	Median	Min	Max
	All	151	2'354	544'846	116'763	10'000	54'400'000	152	2'425	1'064'315	209'568	10'000
Basic Materials	7	105	468'521	123'207	10'368	13'700'000	7	35	135'154	101'015	31'640	741'760
Consumer Goods & Services	21	227	956'849	269'250	12'800	50'000'000	24	358	1'112'609	322'617	11'160	17'900'000
Financials	52	1'140	413'471	74'499	10'000	54'400'000	46	964	772'839	132'563	10'000	64'800'000
Health Care	15	291	572'233	146'250	10'050	71'82'000	16	261	1'670'708	539'500	10'000	73'200'000
Industrials	46	512	670'908	141'075	10'208	22'000'000	46	674	980'682	230'100	11'328	107'000'000
Oil & Gas							1	17	523'099	478'400	31'353	1'437'600
Technology	8	73	471'372	229'250	10'000	3'570'000	10	100	3'251'058	288'606	12'413	127'000'000
Utilities	2	6	62'654	37'250	22'410	17'6215	2	16	116'827	118'806	13'320	246'000

	PURCHASE TRANSACTIONS						SALE TRANSACTIONS					
	Companies	N	Mean	Median	Min	Max	Companies	N	Mean	Median	Min	Max
	All	135	2'056	0.114%	0.022%	0.0000%	12.42%	154	2'421	0.129%	0.019%	0.0000%
Basic Materials	7	98	0.169%	0.098%	0.0002%	4.63%	7	35	0.059%	0.025%	0.0003%	0.65%
Consumer Goods & Services	17	213	0.081%	0.030%	0.0000%	3.29%	25	358	0.128%	0.019%	0.0001%	11.05%
Financials	42	948	0.137%	0.023%	0.0001%	12.42%	45	960	0.117%	0.023%	0.0003%	6.50%
Health Care	15	286	0.086%	0.011%	0.0001%	10.00%	16	261	0.054%	0.009%	0.0000%	0.89%
Industrials	45	462	0.091%	0.023%	0.0002%	7.89%	47	674	0.131%	0.017%	0.0001%	6.34%
Oil & Gas							1	17	0.033%	0.029%	0.0022%	0.09%
Technology	6	43	0.063%	0.045%	0.0056%	0.28%	10	100	0.484%	0.051%	0.0009%	9.58%
Utilities	3	6	0.002%	0.002%	0.0011%	0.00%	3	16	0.002%	0.002%	0.0003%	0.00%

	PURCHASE TRANSACTIONS						SALE TRANSACTIONS					
	Widely	Manager	Family	Other	CEO-Duality	Google Hits	Widely	Manager	Family	Other	CEO-Duality	Google Hits
	All	17%	48%	16%	19%	35%	906'739	30%	39%	10%	20%	39%
Basic Materials	21%	60%	0%	19%	0%	478'313	14%	17%	0%	69%	11%	1'089'381
Consumer Goods & Services	30%	22%	35%	12%	46%	4'193'558	13%	31%	34%	23%	41%	3'087'833
Financials	41%	38%	3%	18%	51%	1'997'047	47%	36%	1%	16%	47%	1'839'198
Health Care	13%	80%	0%	7%	62%	668'761	27%	47%	0%	26%	28%	620'754
Industrials	35%	34%	16%	14%	20%	862'327	15%	50%	18%	17%	27%	1'445'940
Oil & Gas							82%	0%	0%	18%	0%	985'003
Technology	51%	12%	5%	32%	62%	1'718'857	37%	35%	0%	28%	74%	1'274'303
Utilities	0%	0%	0%	100%	0%	800'298	0%	0%	0%	100%	0%	616'183

Panel A: By industry (in CHF)

Panel B: By industry (in relative trading volume)

Panel C: By corporate governance variables

Transactions conducted by insiders from the *Basic Materials* and the *Utilities* industry appear to be rather stable in size as well as in relative trading volume. Unfortunately, no purchase transactions which can be attributed to the sample selection criteria could be found for the *Oil & Gas* industry. The most prominent companies in this sample operate in the *Consumer Goods & Services* industry (4'193'558 hits for purchase and 3'087'833 hits for sale transactions), at least when measured by the number of Google hits. These companies are mostly controlled by families, where at least one family member actively works in the company. Manager-controlled companies basically operate in the *Health Care* sector (80% purchase and 47% sale transaction group). These companies are also characterized by the principle of CEO-Duality whereby the CEO also doubles as chairman of the board of directors. When the purchase transaction group is considered, companies from the *Technology* sector are found to be either widely-held or controlled by another outside stakeholder. The sale transaction group is characterized either by a widely-held ownership structure or controlled by a manager. Moreover, companies from the *Technology* sector were shown to exhibit the principle of CEO-Duality most strongly (62% and 74% for purchase and sale transaction group, respectively).

Overall, the industrial classification provides valuable information as to how the insider transaction price and the relative trading volume varies depending on the affiliation of the company to one or another industry. Hence insider trading per se is not only dependent on the micro-structure perspective mostly determined by the corporate governance structure, but also by the industry's characteristics. In addition the small set of corporate governance variables in *Panel C* presents evidence as to the extent to which companies can be well categorized when it comes to insider trading.

3. Empirical results

3.1 Summary of cross-sectional regression analysis

The cross-sectional regression analysis determines how the applied variables explain the long-term stock performance and hence provides information as to what extent outsiders are able to take advantage of this information. *Table 23* presents a descriptive summary of the most relevant results of the analysis. All 27 independent variables, which have been transformed into dummy variables, have been considered in order to

establish which of these are most relevant for further analysis. On the one hand, column (1) and (5) of the following table equals zero if the corresponding variable indicates significantly negative results for at least five out of the 12 holding periods. On the other hand, column (2) and (6) equals one if the variable shows a significantly positive relationship to the excess market return in most of the holding periods. The dummy variable of the cross-sectional regression is one if the underlying value (if not already a dummy variable) of the variable exceeds the mean value of the entire sample and zero otherwise. The same approach has been applied to column (3) and (7) as well as (4) and (8) with the exception that the threshold determining the dummy equals the median value. If the variable is not statistically significant at a 1%, 5% or 10% significance level over at least five holding periods, the variable will be dropped.³⁴ This is indicated by a dash in the following table.

For purchase transactions the corporate-based variables indicate similar significant relationships for both mean and median thresholds. The same holds true for the variables *Price/Cash* (performance-related), *Ln(Price)* (trading-specific), *Market/Book* and *Ln(STD_Return)* (short-term stock price sentiment), although the observation period over which the variable has been measured (10 vs. 20 days) varies for the latter. In addition, the rather conservative median threshold indicates further significant results for the variables *CAAR*, *Accumulated* and *ROE*, whereas the mean threshold finds additional support for the variables *Relative Trading Volume* (trading-specific) and *Net Income/Sales* (performance-related). Although most of the cross-sectional regressions between the mean and median threshold identify similar findings, the distinction provides additional valuable information which has to be considered when mimicking insider trading strategy. Due to the fact that the independent variables are all dummy variables the result of these regressions provides clear evidence of the impact and hence relationship of each dummy variable to the long-term stock price performance. These findings are crucial to clustering the groups according to their achieved performance as investors need to understand to what extent the information environment helps to explain potential investment opportunities right from the beginning of the insider announcement.

³⁴ I have also conducted the same procedure if at least 6, 7 and 8 of the 12 holding periods are as expected, however, without significant changes in results.

Table 23: Summary of cross-sectional regression analysis of purchase and sale transactions

	PURCHASE TRANSACTIONS				SALE TRANSACTIONS			
	Mean threshold		Median threshold		Mean threshold		Median threshold	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Short-term stock price sentiment								
<i>Ln(BA_10d)</i>	-	-	-	-	-	-	-	-
<i>Ln(BA_20d)</i>	-	-	-	-	-	-	-	-
<i>Ln(STD_Return10d)</i>	-	-	0	-	-	-	-	-
<i>Ln(STD_Return20d)</i>	0	-	-	-	-	-	-	-
<i>Momentum</i>	-	-	-	-	-	1	-	-
<i>CAAR</i>	-	-	-	1	-	-	-	1
<i>Market-to-Book</i>	-	1	-	1	0	-	0	-
Trading-specific								
<i>Accumulated</i>	-	-	0	-	-	-	-	-
<i>Position</i>	-	-	-	-	-	-	-	1
<i>Multiple</i>	-	-	-	-	-	-	-	-
<i>Relative Trading Volume</i>	0	-	-	-	-	-	0	-
<i>Ln(Price)</i>	0	-	0	-	0	-	-	-
Performance-related								
<i>Price-to-Cash</i>	-	1	-	1	0	-	-	-
<i>ROE</i>	-	-	-	1	-	-	-	1
<i>Net Income-to-Sales</i>	-	1	-	-	-	1	-	-
<i>Payout Ratio</i>	-	-	-	-	-	1	0	-
Corporate-based								
<i>Ln(MarketCap)</i>	-	-	-	-	0	-	0	-
<i>Word-Count</i>	-	1	-	1	-	-	-	1
<i>Crosslisting</i>	-	-	-	-	-	-	0	-
<i>AccStandard</i>	-	1	-	1	-	-	-	-
<i>Widely-held</i>	-	-	-	-	-	1	-	-
<i>Manager-controlled</i>	-	-	-	-	-	1	-	-
<i>Family-controlled</i>	0	-	0	-	-	-	-	-
<i>Controlled-by-other</i>	-	-	-	-	-	-	-	-
<i>CEO-Duality</i>	0	-	0	-	-	-	-	1
<i>Ln(Hits)</i>	-	1	-	1	-	1	-	1
<i>IndustryAwareness</i>	-	-	-	-	0	-	-	-

The dependent variable of the cross-sectional regression is the cumulative excess market return (daily stock minus SPI index return) measured for each of the 12 holding periods (HP). The independent variables belong to the short-term stock price sentiment, trading-specific, performance-related or corporate-based variable group. All variables are translated into dummy variables. The threshold to determine the binary dummy is the mean or the median value of the entire sample of each variable. Column (1), (3), (5) and (7) equals zero for each variable if the cross-sectional regression indicate a significantly negative relationship to the excess return over most of the 12 holdings periods. Hence, column (2), (4), (6) and (8) equals one if most of the 12 holding periods show a significantly positive relationship to the excess return. If the algebraic sign changes or significance is lacking over several holding periods, the variable is assumed to be irrelevant (-) for further analysis.

The comparison of the mean and the median threshold for sale transactions indicates differing results. Only the variables *Market/Book*, *Ln(MarketCap)* and *Ln(Hits)* show similar findings for both thresholds. On the one hand, when a mean threshold is applied several significant variables such as *Momentum* (short-term stock price sentiment), *Ln(Price)* (trading-specific), *Price/Cash*, *Net Income/Sales*, the two ownership control variables *Widely-held* and *Manager-controlled* as well as the *IndustryAwareness* (corporate-based) appear to be influenced by outliers, since their importance is diluted when a median threshold is applied instead. On the other hand, the variables *CAAR* (short-term stock price sentiment), *Position* and *Relative Trading Volume* (trading-specific), *ROE* (performance-related) as well as *Word-Count*, *Crosslisting* and *CEO-Duality* (corporate-based) show statistically significant results only for the median threshold. Moreover, the performance-related coefficient *Payout Ratio* indicates

puzzling results as it is positively related (1) when applying the mean and negatively related (0) for the median threshold. In this unique case the different threshold concept considerably changes the outcome of the regression. Likewise, dashes indicate no statistically significant results over several holding periods. These results will be dropped. Although the results for sale transactions diverge between the two thresholds and appear to be rather ambiguous, the cross-sectional regression fulfills the basic objective of identifying a pertinent set of key variables. This approach aims at filtering the amount of information for outside investors in order to select the most valuable information upon which to mimic insider trading strategy (*Selection*). According to the findings of the cross-sectional regression, the following analysis maintains both thresholds – mean and median value – in order to test for the robustness of the empirical results and to understand the impact of different thresholds on the outcome of this strategy of mimicking insider trading (*Evaluation*).

3.2 Description of the adjusted performance analysis

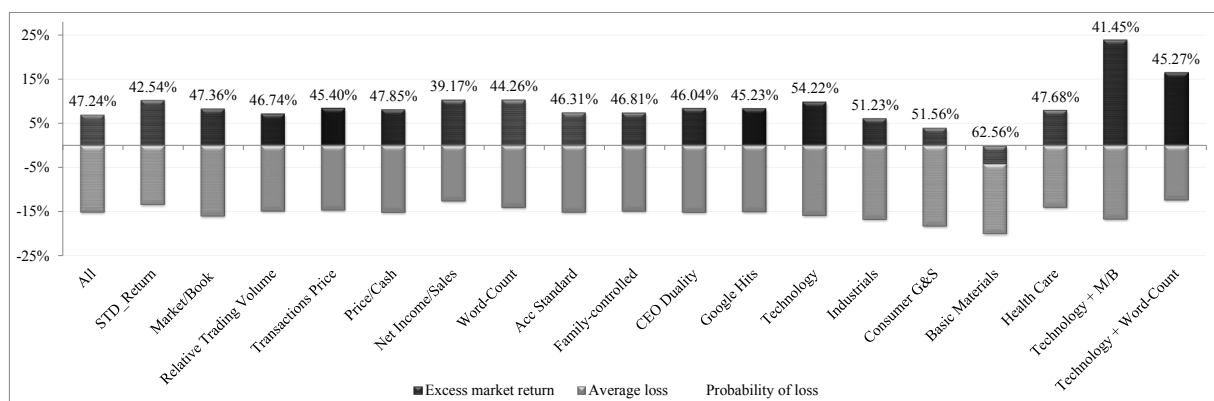
The adjusted performance analysis is the third step of this trading strategy. After selecting the appropriate variables (which are now called portfolios) and identifying their ultimate impact on long-term stock price trend, investors need to know about their true performance. For the purpose of the performance analysis, the averaged excess market return over the entire holding period for each portfolio provides key information to potential investors. Nonetheless, most investors do not only care about pure returns, but also the underlying risk associated with a trading strategy. Therefore, this mimicking trading strategy also considers the average loss as well as the probability of loss when following insider trading patterns. Besides the previously selected portfolios, additional portfolios are based on the industrial affiliation of the insider's company. Moreover, descriptive statistics on the number of insider transactions and the number of underlying companies in each portfolio determine the extent and indirectly the possibility and frequency of the occurrence of insider transactions over the last years.

3.3 Performance analysis of selected portfolios for purchase transactions

The applied data sample discloses the profitability and the risk of each portfolio considered relevant. *Figure 6* summarizes how each of the selected portfolios perform in terms of the average excess market return, the expected loss associated when consider-

ing this portfolio, and the probability that the expected loss will occur. Without any specific sample selection, the overall performance of the all insider transactions is 7.02%, with an expected loss to the amount of -14.95% and a 47.24% probability of default. When only corporate governance portfolios are considered, companies from the *Word-Count* portfolio and from the *Net Income/Sales* portfolio generate the highest returns of 10.42% and 10.38% respectively over the entire holding period. Nonetheless, the latter portfolio has a slightly lower probability of loss (39.17%) compared to the former one (44.26%). The performance is shown to be worst when outsiders mimic relatively small volume insider transactions (*Relative Trading Volume*). The average excess market return is 7.29% in connection with an average loss of -14.70% and a 46.74% probability of loss. Considering sector-specific aspects contributes additional findings. On the one hand, the industrial affiliation indicates that companies from the *Basic Materials* sector show an average excess market return of -4.08% with a 62.56% probability of loss. On the other hand, companies from the *Technology* sector which have either a high *Market/Book (M/B)* ratio or belong to the *Word-Count* portfolio generate on average 23.91% and 16.57% excess market returns, a -16.52% and -12.24% average loss and a 41.45% and 45.27% probability of loss occurrence, respectively. Both portfolios yield significantly high excess market returns in line with a fairly good risk structure over the entire holding period.

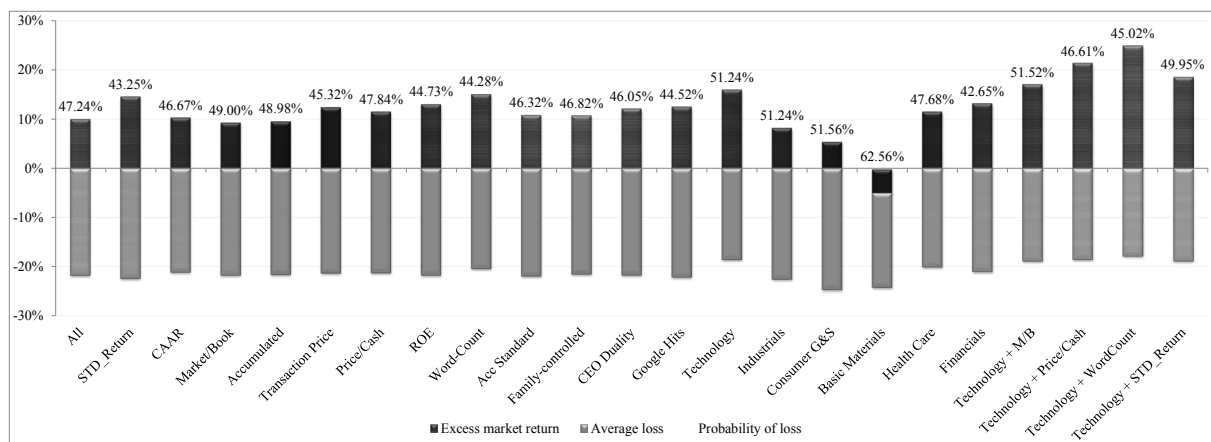
Figure 6: Performance analysis for purchase transactions (mean threshold)



A performance analysis has also been conducted for the sample applying the median threshold (Figure 7). The unadjusted portfolio *All* shows the same results. Likewise, all the ‘original’ dummy portfolios (e.g. *Word-Count*, *Acc Standard* and industrial affiliation) show almost similar results as the different thresholds do not substantially affect the clustering approach. The portfolio $\ln(STD_Return)$ shows a similar performance (10.05%) when compared to the mean threshold, although the average loss (-15.23%)

and the probability of loss occurrence (43.25%) is slightly more pronounced. The new portfolios not included in the previous analysis do not show any further valuable findings. Hence, the best performing corporate-based portfolio remains *Word-Count*. All other reused corporate governance portfolios indicate robust numbers. Hence, the results of the mean threshold are not affected by any outlying values. In addition it has to be said that the pure industrial affiliation thresholds do not vary between the mean and median and thus the companies from the *Basic Material* sector are again the portfolio which performs worst of the selected portfolios (-4.08%; -15.73%; 62.56%)³⁵.

Figure 7: Performance analysis for purchase transactions (median threshold)



Likewise, the combination of the industrial affiliation and the corporate governance portfolios show highly interesting investment portfolios. The portfolio *Technology* together with *Market/Book* (13.77%; -15.06%; 51.52%) and *Word-Count* (19.57%; -13.92%; 45.02%) provides profitable investment opportunities, whereas the former portfolio has considerably lower excess market returns compared to the mean threshold. Hence, in several transactions the performance of this portfolio (*Technology+Market/Book*) appears to be affected by spike values. Finally, the median threshold identifies another portfolio with a fairly good risk-return structure. The portfolio *Technology+Price/Cash* indicates stable returns of 16.62% with a manageable average loss of -14.28% and a probability of loss occurrence of 46.61%.

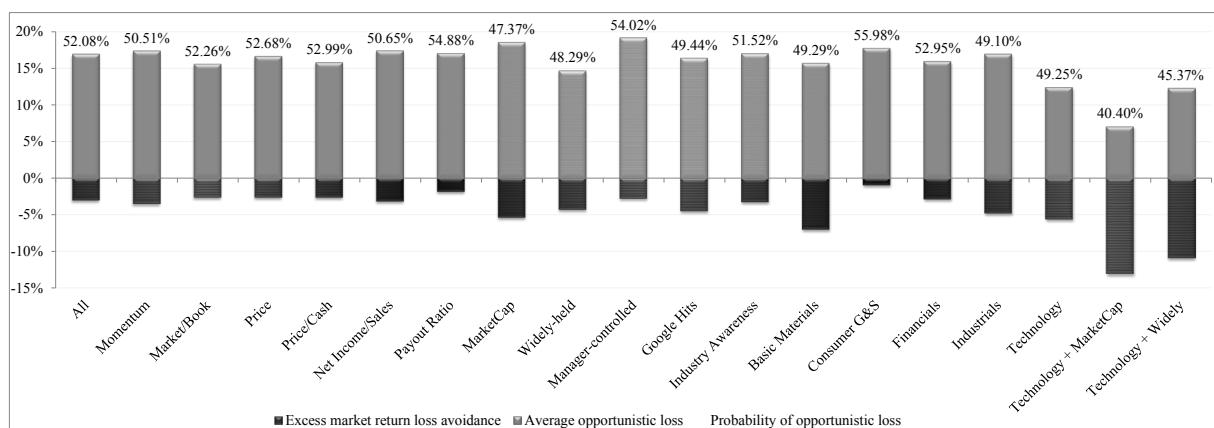
Overall, the application of two thresholds provides evidence that the results of the mean threshold are mostly robust and not affected by individual transaction effects. Nonetheless, the median threshold provides further interesting portfolios and portfolio combinations for potential investors.

3.4 Performance analysis of selected portfolios for sale transactions

³⁵ (Excess market return; Average loss, Probability of loss).

Figure 8 presents the results for sale transactions when the mean threshold is applied. In this case, however, the figures denote the excess market loss avoidance which is the negative return an outsider saves when selling prior to a price downward movement, the average opportunistic loss which shows an assumed loss due to the fact that the stock price continued to rise even after the outsider sold its shares, and the probability that this opportunistic loss occurs. For the entire sample the excess market return loss avoidance is -3.08% with a 16.98% opportunistic loss due to further stock price increases and a 52.08% probability of default. The highest excess market return loss avoidance (-5.40%) can be attributed to insiders from small-cap companies (*MarketCap*) with an average opportunistic loss of 18.57% and probability of loss occurrence of 47.37% as well as to more popular companies (*Google Hits*) with a slightly lower excess market loss avoidance of -4.54%, but a smaller opportunistic loss (16.42%) and probability of default of 49.44%. When the industrial affiliation is considered, transactions conducted by insiders from companies of the *Basic Materials* sector can be regarded as good market timing signals for outsiders (-7.03%; 15.73%; 49.29%)³⁶ to avoid trading losses. The portfolio *Technology* (-5.66%; 12.46%; 49.25%) shows slightly lower excess loss avoidance, but this is in line with a smaller opportunistic loss.

Figure 8: Performance analysis for sale transactions (mean threshold)



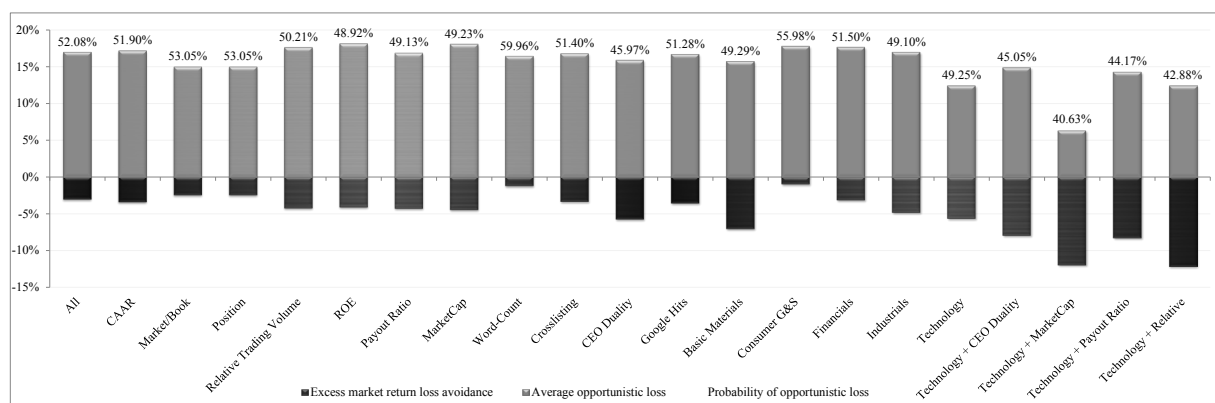
Likewise, the combination of a corporate governance portfolio and the industrial affiliation appears to provide a fairly good risk-return investment structure. Small-cap companies from the *Technology* sector (*Technology+MarketCap*) manifest the best loss avoiding performance (-13.03%) in line with a low opportunistic loss (7.12%) and the smallest probability of default (40.40%). This appears to be the best signal for mimick-

³⁶ (Excess market loss avoidance; Average opportunistic loss; Probability of opportunistic loss)

ing insider selling activities. In addition, widely-held technological companies (*Technology+Widely*) show an interesting risk-return structure (-10.88%; 12.33%; 45.37%).

The portfolio *MarketCap* appears to be only marginally affected by outliers. The median threshold in *Figure 9* indicates excess market return loss avoidance of -4.47%, an average opportunistic loss of 18.05% and a 49.23% probability of opportunistic loss for this portfolio. In addition, a second corporate governance portfolio, namely the *CEO-Duality* portfolio, shows an even better risk-adjusted performance (-5.75%; 15.89%; 45.97%). All other portfolios which have also been applied for the mean threshold show robust results. Additional corporate governance portfolios such as the *Position*, *Relative Trading Volume*, *ROE*, *Word-Count*, and *Crosslisting* provide an interesting risk-return structure, which is, however, inferior in magnitude when compared to the one previously discussed. Obviously, the pure industrial affiliation portfolios show the same findings when compared to the mean threshold. Moreover, the combination of companies from the *Technology* sector and relatively small trading volumes (*Technology+Relative*) shows an interesting loss avoidance (-12.10%), a low opportunistic loss (12.46%) and a 42.88% probability of loss. Nonetheless, the combined portfolio *Technology+MarketCap* appears to be robust against outliers and performs comparably well (-11.89%; 6.37%; 40.63%) when the median threshold is applied. The previously mentioned *Technology+Widely* portfolio is not considered to perform well.

Figure 9: Performance analysis for sale transactions (median threshold)



Overall, both thresholds identify a number of corporate governance portfolios as possible mimicking signals for outside investors. Although the portfolios vary between the two thresholds, the rather conservative median value serves as a robustness test in order to avoid interference from outliers. The best risk-return performance over the en-

tire observation period can be achieved by mimicking purchase transactions within *Technology* together with a high *Market/Book*, and also taking *Word-Count* and a high *Price/Cash* (median threshold) into account. On the other hand, outsiders should mimic insider selling activities from small-cap technology companies (*Technology+MarketCap*) as well smaller transactions (*Technology+Relative*) from the same companies (median threshold). This is the case, irrespective of the risk-aversion of the investor and the applied threshold.³⁷

3.5 Sensitivity analysis of selected portfolios for purchase transactions

Although the performance analysis provides clear evidence for the strategy of mimicking insider trading, the observation period has been held constant, i.e. performance has been averaged and analyzed over the entire 500 trading days. Hence the investor is uninformed as to the rolling performance within this time period. A sensitivity analysis has been applied to provide detailed information as to the perfect market timing to mimic insiders or, to be even more precise, the concrete entry and exit strategy for each of the relevant portfolios. Two performance ratios are used to find the best risk-return structure. They compare the findings of all applied portfolios in the performance analysis over the 12 holding periods:

$$\text{Loss-adjusted Performance Ratio (LPR)} = \frac{\text{Excess market return}}{\text{Average loss}}$$

$$\text{Probability of loss-adjusted Performance Ratio (PPR)} = \frac{\text{Excess market return}}{\text{Probability of loss}}$$

Moreover, this sensitivity analysis finds suitable strategies for mimicking insider trading for investors with a short-term trading intention of up to four months and for investors with a longer investment horizon of up to 20 months.

Table 24 summarizes the outcome of the sensitivity analysis for short-term investors after purchase transactions when the mean threshold is applied. Out of 228 (19 portfolios times 12 holding periods) possible measurements, the eight best-performing portfolios have been selected. The corporate governance portfolios *STD_Return*, *Transaction Price*, *Net Income/Sales*, *AccStandard* and *Google Hits* provide risk-return per-

³⁷ Various other corporate governance variables, industrial affiliations and the combination of both variable types have been conducted. Due to the lack of a remarkable risk-return performance and to keep the focus on the best performing portfolios, the findings have been dropped from the figures and tables.

formance in equal measures. Hence, outsiders should mimic insider purchase transactions when the stock volatility is rather low, the insider transaction price is small, the Net Income/Sales ratio is high, the companies apply international accounting standard or the company is rather popular when measured by Google Hits. Moreover, both the number of transactions and companies in these samples are relatively high, which allows continuous investment opportunities to mimic insider trading strategy over time. After a holding period of 20 trading days, outsiders yield between 5.66-6.80% excess market return, with an expected average loss between -4.09 and -4.93% and with a probability of loss between 42.19-49.30%. Although, the portfolio *Industrials* performs slightly better compared to the aforementioned corporate governance portfolios, short-term investors should mimic transactions by companies in the *Technology* sector which have a high *Market/Book* ratio. Despite the fact that outside investors can earn an average of 16.45% excess market return when a proportionally low expected loss of -7.88% (probability of loss: 46.88%) after 40 trading days is taken into consideration, the occurrence of this constellation to account for this portfolio is limited to 32 observations. Nonetheless, both the LPR (-2.09) and PPR (0.35) ratio perform best. A slightly lower performance can be achieved following insider purchase transactions by companies in the *Technology* sector which consider insider trading as relevant and engage with this phenomenon in their annual reports (*Word-Count*: 11.80%; -8.31%; 47.73%).

The median threshold indicates stable results for the portfolio *Transaction Price* and *Industrials*. In addition, the portfolios *ROE* and the *Financials* deserve mention due to their fairly good risk-return structure, even though their performance is slightly lower. The *Technology+M/B* portfolio which provides the best performance for the mean threshold seems to be affected by outlying values (not under the best-performing portfolios), whereas transactions from the *Technology+Word-Count* portfolio (11.80%; -8.31%; 47.73%) perform similarly over 40 trading days for both thresholds. More precisely, the choice of threshold is irrelevant to the investment purpose. Hence, a short-term investor who is rather risk-averse should follow smaller trading price transactions, whereas risk-seeking investors should mimic insider trading based on the *Technology+Word-Count* portfolio.

Table 24: Sensitivity analysis for short-term investors after purchase transactions (mean threshold)

SHORT-TERM INVESTOR								
	STD_Return	Transaction Price	Net Income/Sales	Acc Standard	Google Hits	Industrials	Technology + M/B	Technology + Word-Count
Holding period	20	20	20	20	20	20	40	40
Excess market return	5.80%	6.38%	6.80%	5.68%	5.66%	7.95%	16.45%	11.80%
Average loss	-4.47%	-4.82%	-4.09%	-4.93%	-4.79%	-6.14%	-7.88%	-8.31%
Probability of loss	46.64%	49.30%	42.19%	48.37%	47.80%	51.33%	46.88%	47.73%
# of transactions	1072	1217	647	913	1385	487	32	44
# of companies	75	127	29	150	69	46	4	3
LPR	-1.30	-1.32	-1.66	-1.15	-1.18	-1.29	-2.09	-1.40
PPR	0.12	0.13	0.16	0.12	0.12	0.15	0.35	0.25

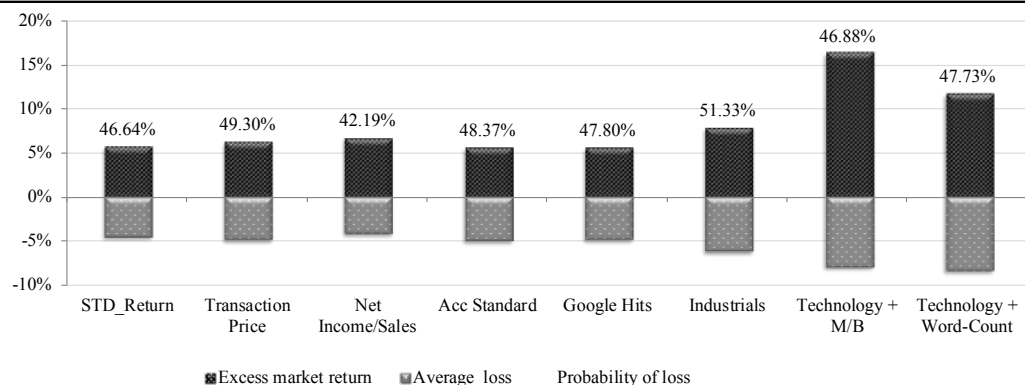
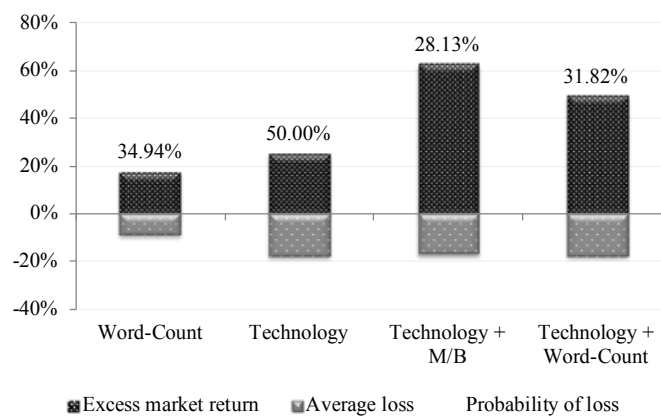


Table 25 summarizes the sensitivity analysis for investors with a longer investment horizon from 80 up to 500 trading days. Outsiders following the portfolio *Word-Count* can generate 17.93% with a fairly good expected average loss of -8.59% and a 34.94% probability of loss after 100 trading days. If investors follow the portfolio *Technology* (25.43%; -17.25%; 50.00%) or the combined portfolio *Technology+M/B* (62.77%; -16.52%; 28.13%) over ten months, this strategy yields a considerable profit in line with a limited risk, especially when considering the probability of loss for the latter one. Although the latter portfolio performs extremely well, it has to be said that the portfolio *Technology+M/B* needs to be treated carefully. Accordingly, when the median threshold is applied, the results emphasize that only the portfolio *Technology+Word-Count* is robust for both thresholds with a fairly good risk-return performance (49.65%; -17.18%; 31.82%) over 200 trading days. The portfolio *Technology+M/B* is irrelevant in this case. In addition, the median threshold originates two additional portfolios *Technology+Price/Cash* (44.36%; -14.66%; 35.42%) and *Technology+STD_Ret* (39.79%; -16.10%; 40.91%) with a slightly lower return and expected average loss in line with a higher probability of loss.

Table 25: Sensitivity analysis for long-term investors after purchase transactions (mean threshold)

	LONG-TERM INVESTOR			
	Word-Count	Technology	Technology + M/B	Technology + Word-Count
Holding period	100	200	200	200
Excess market return	17.93%	25.34%	62.77%	49.65%
Average loss	-8.59%	-17.25%	-16.52%	-17.18%
Probability of loss	34.94%	50.00%	28.13%	31.82%
# of transactions	166	74	32	44
# of companies	13	10	4	3
LPR	-2.09	-1.47	-3.80	-2.12
PPR	0.51	0.51	2.23	1.56



Overall, the application of both thresholds in the sensitivity analysis provides valuable information to outside investors. First, not all portfolios initially selected by the mean threshold perform well for the median threshold concept. The results are partially interfered with by outliers and hence are not subject to pronounced mimicking strategies. Second, the expected average loss and the probability of loss are important factors which outside investors must take into account when calculating their overall risk. And last, the findings of the sensitivity analysis indeed provide clear evidence that both the information disclosed by insider purchase transactions and the information environment surrounding these events are a good entry signal for short- as well as long-term investors.

Nonetheless, it has to be said that transaction costs will reduce the profitability of the trading strategy especially for shorter investment horizons. Thus, Seyhun (1986), Rozeff and Zaman (1988) as well as Zingg et al. (2007) show that when transactions costs of 2% are applied, returns for outside investors disappear. In this case, this strategy of mimicking insider trading generates excess market returns in the range of about 3.60-14.50% (mean threshold) and 1.98-9.80% (median threshold) for short-term investors depending on the observed portfolio. Due to remarkably higher returns of long-term holding periods, the importance of transaction costs is rather small.

3.6 Sensitivity analysis of selected portfolios for sale transactions

Table 26 summarizes the sensitivity analysis of the portfolios which perform best after sale transactions when the mean threshold is applied for both short- and long-term investors.

Table 26: Sensitivity analysis for short- & long-term investors after sale transactions (mean threshold)

SHORT-TERM INVESTOR				LONG-TERM INVESTOR			
	Technology + MarketCap				Basic Materials	Technology + MarketCap	
Holding period	20	40	60	Holding period	400	400	500
Excess market return loss avoidance	-8.95%	-10.50%	-9.29%	Excess market return loss avoidance	-25.39%	-19.58%	-13.03%
Average opportunistic loss	3.33%	4.22%	5.07%	Average opportunistic loss	14.06%	8.54%	7.12%
Probability of opportunistic loss	28.81%	25.42%	30.51%	Probability of opportunistic loss	37.14%	44.07%	40.40%
# of transactions	59	59	59	# of transactions	35	59	59
# of companies	9	9	9	# of companies	7	9	9
LPR	-2.69	-2.48	-1.83	LPR	-1.81	-2.29	-1.83
PPR	-0.31	-0.41	-0.30	PPR	-0.68	-0.44	-0.32

For short-term investors only the *Technology+MarketCap* portfolio provides valuable signals for mimicking selling activities. Outside investors are well advised to sell their shares if insiders from small-cap, technological companies get rid of their own shares. This strategy reduces the overall loss caused by a plummet in share price to -10.50% with an expected average opportunistic loss due a possible share price increase (after selling) of 4.22% and a 25.42% probability of this occurring. The figures are based on a 40-day holding period after the selling announcement. When a long-term perspective is considered, the average price fall after insider selling cumulates to -19.58% after 400 (8.45%; 44.07%)³⁸ and -13.03% (7.12%; 40.40%) after 500 trading days. In addition, the average loss avoidance following insider selling activities from the *Basic Materials* sector is -25.39% (14.06%; 37.14%) over a holding period of 400 trading days.

When applying the median threshold, short-term investors should mimic either the portfolio *Technology+Relative* or *Technology+MarketCap* to avoid losses of -9.42% and -11.08%, over 20 and 40 days, respectively. For the latter portfolio, the results are robust when compared to the mean threshold. The same goes for longer investment horizons. All three applied portfolios are back-tested in terms of their excess market

³⁸ (Average opportunistic loss; Probability of opportunistic loss).

return loss avoidance, their expected opportunistic loss and the probability of loss. In addition, the portfolio *Technology+Relative* shows average values of -12.10%, 12.46% and 42.88% over 500 trading days after insiders have sold their shares. For both investment horizons, the portfolio *Technology+MarketCap* performs best in terms of the LPR and PPR ratio. It has the lowest LPR and PPR over 40 trading days (-2.48; -0.41) and over 400 trading days (-2.29; -0.44) compared to the other well-performing portfolios.

Although the median threshold provides additional explanatory power, most of the results of the mean threshold are valid against any outliers. Insider selling patterns are important exit signals for outside investors to mimic in order to avoid remarkable trading losses. Moreover, the expected average opportunistic loss occurring if one sells even prior to a price peak is economically justifiable in terms of pure loss avoidance.

4. Simulation analysis

The performance and sensitivity analyses provide clear evidence that the strategy of mimicking insider trading generates a handsome profit after purchase transactions and avoids significant losses after selling transactions in line with a limited risk. In addition, the second median threshold emphasizes that the results are robust against potential outliers which might have diluted the risk-return performance of the portfolios.

Due to the fact that the strategy of mimicking insider trading is a new approach to taking advantage of the insider information disclosed, the following simulation serves as an additional robustness test (*Back-testing*). It also has to be admitted that this study is subject to a one-period bias. One of the key limitations of the previous analysis is that the market sentiment over the last seven years may have been unique. Hence, stock (market) price movements may have been characterized and driven by one-off effects (e.g. financial crisis) not reflecting the ‘general’ market environment. In order to overcome this drawback a simulation analysis based on an assumption of the normal distribution of returns has been applied to both the performance and the sensitivity analysis. The expected return values and the standard deviations from the above portfolios serve as a benchmark. For the purpose of this analysis each transaction has been simulated ten times, i.e. for the entire purchase sample of 2’354 transactions, the simulation for the purchase group ‘All’, for example, provides 23’540 observations.

The comparison of the actual data with the simulated results indicates matching results for the excess market return and the probability of loss for purchase transactions when

the mean threshold is applied. The expected average loss, however, is considerably stronger in magnitude for the simulated data (on average -24.71% compared to -14.95% for the actual data). A similar picture can be drawn from sale transactions. Both the excess market return loss avoidance and the probability of opportunistic losses are rather stable, whereas the average opportunistic loss is remarkably stronger for the simulated data. Applying the median threshold in the simulation analysis, however, weakens the results of the excess market return (purchase) and excess market return loss avoidance (sale). Likewise, the results appear to be more pronounced for the average loss (purchase) and the average opportunistic loss (sale), and are rather stable for the probability of loss (purchase) and the probability of opportunistic loss (sale).

The comparison of purchase transactions between the actual and simulated sensitivity analysis indicates that the excess market return is stable for all, except the portfolio *Technology+Word-Count*, for the short-term investors. Moreover, the probability of loss is slightly lower, whereas the downside risk (average loss) is more notably pronounced when applying the simulation analysis (mean threshold). For long-term investors, the returns and the average loss are considerably eased. For sale transactions, the excess loss avoidance is of about the same magnitude, whereas the average opportunistic loss is expected to be higher for both short- and long-term investors. In addition, the probability of opportunistic loss is fairly stable or even lower for the sensitivity analysis. Hence, only the portfolio *Technology+M/B* generates interesting performance accompanied by a hefty average expected loss (40-days: 21.58%; -32.17%; 31.43% / 200-days: 54.34%; -31.73%; 17.14%)

The simulation of the median threshold indicates either no or fairly low excess market returns with a slightly higher average loss for purchase transactions. Only the *Technology+Word-Count* (40-days: 8.42%; -20.52%; 48.98%) and the *Technology+STD_Ret* (200-days: 21.83%; -43.12%; 44.44%) present an expedient risk-return performance.

For sale transactions the portfolios *Technology+MarketCap* (mean threshold) and *Technology+Relative* (median threshold) for both short- and long-term investors demonstrate fairly interesting results for trading purposes.

Overall, the simulation analysis provides additional support for the results of both the performance and the sensitivity analysis. Although some of the previously assumed results do not appear to hold true when the simulation is conducted, most of the applied portfolios have been proven to be robust in this simulated market environment.

These findings suggest that the previous concerns regarding one-off effects due to the limited observation period are only partially founded. In particular, this insider trading strategy appears to be profitable when mimicking the portfolio *Technology+M/B* (mean threshold) achieving the best LPR (actual: -2.09; simulated: -0.67) and PPR (0.35; 0.69) ratio among the selected portfolios, and the portfolio *Technology+Word-Count* (median threshold) achieving high LPR (-1.42; -0.41) and PPR (0.25; 0.17) values over a holding period of 40 trading days. According to the simulation analysis, however, the higher performance goes in line with a material downside risk. Long-term investors should rather follow the portfolio *Technology* or even better *Technology+M/B* (mean threshold) with a high LPR (-3.80; -1.71) and PPR (2.23; 3.17) and *Technology+STD_Ret* (median threshold) with a fairly good LPR (-2.47; -0.51) and PPR (0.97; 0.49) over a 200-day holding period. Regardless of the applied threshold and data sample (actual vs. simulated) mimicking purchase transactions by technology companies showing a high level of corporate social responsibility (*Word-Count*) – at least when it comes to insider trading – results in a balanced risk-return performance.

The results for sale transactions are ambiguous. The mean threshold shows strong support to sell immediately after insiders from small-cap technology companies reduce their stakes (*Technology+MarketCap*) for both the actual and simulated sensitivity analysis. The median threshold provides robust results for the portfolio *Technology+Relative* for both short- (20 days) as well as long-term (500 days) investors. Although insider transactions by companies in the technological sector indicate a high risk profile, their historical performance is not diluted by outliers or other unpredictable externalities. Mimicking these companies appears to be of highest interest when conducting a trading strategy based on insider information. In the descriptive statistics technology companies have already been seen to be characterized by a widely-held ownership structure and the principle of CEO-Duality, circumstances creating the managerial freedom to align personal interests with profit-maximising behaviour, while providing valuable information for outside investors.

5. Conclusion

This paper contributes in various degrees to establishing a possible trading strategy for outside investors based on the disclosure of insider information in Switzerland. Its clear 4-step research approach fills the gap between well-tried, scientific-based re-

search analysis and a more practically-oriented exploitation of this sensitive data. Although several researchers have found evidence that outsiders are still able to profit when mimicking insider trading patterns, their rather theoretical research designs restrict their findings' implementation in the real market environment. Thus, this paper attempts to find innovative ways of identifying concrete investment opportunities.

I suggest that a profitable strategy of mimicking insider trading is based on the insider information serving as an entry or exit investment trigger and the information environment consisting of the short-term stock price sentiment, trading-specific, performance-related and corporate-based elements. In addition, the industrial affiliation appears to matter. When outsiders base their decisions on a highly informative risk-return performance structure and a probability of loss valuation, their transactions involving companies in the *Technology* sector are shown to be highly lucrative both in terms of generating handsome profits when they follow insider purchase transactions as well as avoiding losses when they mimic selling activities. In addition, a high market-to-book ratio of companies belonging to the *Technology* sector indicates strong buying signals, though the results are not supported when applying the median threshold. Companies which manifest high social intelligence in dealing with insider trading in their annual reports (*Word-Count*), however, are found to achieve fairly good investment opportunities.

Notable selling signals for both short- and long-term investors come from both small-cap companies (when the mean threshold is applied) and from relatively small trading volumes (median threshold) in the *Technology* sector. Likewise, Lakonishok and Lee (2001) stress that higher returns come from small-cap technology stocks. These stocks are assumed to be both hard to value correctly – due to a high proportion of intangible assets – and are rarely monitored by market analysts. This constellation provides a strong information edge for insiders to other market participants and makes their transactions more valuable.

In addition, all data has been checked for validity in a simulated trading environment. Although some results are extenuated in the simulation analysis, the strategy of mimicking insider trading appears to be robust in respect of the applied thresholds and observed time periods. I have to admit that the underlying assumption of normally distributed daily stock returns in the simulation analysis is tenderly. According to Fama (1965) daily stock returns show fat-tailed distribution, with more outliers than expected under normal distribution. The comparison of the results of the mean and medi-

an threshold in effect supports the impact of outlying values. Nevertheless, the simulation analysis provides clear indication of the risk-return behavior of stock prices and discloses only marginally deviating portfolio performance, even if the approach disregards irregular market patterns.

Moreover, one has to bear in mind that the results of the 4-step research approach are heavily determined by the selection of the variables. Even though a wide set of possible predictive variables have been applied, additional factors might provide further interesting contributions. The lack of continuous time series, especially for smaller Swiss companies however, hindered me to employ further qualified variables.

Although transaction costs for the round-trip reduces the excess market return for outside investors as already mentioned in section 3.5, the empirical findings in the most lucrative portfolios still show remarkable profits. Other professional insider trading data providers come to similar conclusions regarding the trading performance, though not revealing their actual trading strategies. The fruitful findings of this paper indicate that further research efforts should still be made to test whether the strategy of mimicking insider trading can be applied on an international scale. A regulatory framework fostering the disclosure policy of insider information would undoubtedly contribute to achieving a more accurate evaluation of past management transactions, and hence improve the performance of this strategy of mimicking insider trading.

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Part V: Conclusion and implications

1. Conclusion of empirical analysis

This last chapter summarizes and highlights the key findings of this dissertation and derives both valid theoretical implications for the academic community and practical implications for regulators, investors and other market participants.

The first paper deals with the construction of an integrated insider trading law index based on Beny's article (2005). She attempts to fill the research gap in the ongoing insider trading debate as to the extent of the restrictions on insider trading in a comparative international context. I modify her idea by adding disclosure- and sanction-based elements to the index to receive a broader picture of the implementation of the prevailing law on insider trading.

I found clear evidence that the deficiencies in Swiss regulation compared to that of other developed capital markets is greatest for the newly augmented elements. As expected, the U.S. has the toughest insider trading law and gets full marks, closely followed by the U.K., Canada, Singapore, Hong Kong and Australia. The index shows its robustness when compared with another well-known anti-self-dealing index constructed by Djankov, La Porta, Lopez-de-Silanes and Shleifer (2008). Moreover, I conclude that tougher insider trading law implies higher stock market liquidity and less insider ownership. The findings, however, change remarkably when the two Asian countries (Singapore and Hong Kong) are excluded. Moreover, the results show that Switzerland is still deficient in its disclosure policy on management transactions when compared to other well-developed capital markets.

In accordance with the previous findings, the second paper analyzes the management transactions landscape in Switzerland. Although management transactions appear to have different motives, the primary trading intention comes from holding superior knowledge. *Part III* of this dissertation applies a classic event study approach and finds in line with the prevailing view that management transactions trigger abnormal returns in the expected direction. The results are similar when compared to Ammann and Kessler (2004) and Zingg et al. (2007), two other insider trading studies, but rela-

tively less pronounced on an international scale. Although the findings indicate abnormal returns, the occurrence of management transactions around corporate announcements is of high relevance and strongly augments the results. To analyze this association more closely, corporate announcements are classified into Good-News and Bad-News depending on the immediate abnormal return after the information release. Moreover, management transactions are clustered into Pre-News, Post-News and No-News according to their occurrence around corporate events. The findings suggest that Pre-News purchase (sale) transactions prior to Good-News (Bad-News) generate the strongest abnormal market reactions.

In line with Givoly and Palmon (1985), a stock price momentum around the management transaction can be observed. More precisely, classifying the pre-event abnormal returns of management transactions facilitates in anticipating the post-event abnormal market reactions. Consequently, the results suggest that abnormal returns of the aforementioned Pre-News management transactions are most pronounced when the stock price momentum – positive for purchase and negative for sale transactions – is intact over the 61-day event window. Moreover, remarkable abnormal returns can be observed after Bad-News announcements. A multivariate regression analysis strongly supports the effect of the information release and the stock price momentum on the abnormal returns of management transactions. These findings reveal that only a small portion of abnormal returns are actually triggered by the management transaction itself. In line with Givoly and Palmon (1985) and Noe (1999), this paper finds strong support for the fact that stock price momentum, and – in this case consistent with Sivakumar and Waymire (1994) and Dymke and Walter (2008) – the consideration of corporate announcements are key factors to be addressed when examining abnormal returns around management transactions. In addition, the market-to-book ratio, the bid-ask spread and the regulatory change of the Swiss insider trading law (only for sale transactions) are additional factors which affect the abnormal returns.

Part IV of this dissertation describes how the insider information disclosed can be capitalized on by outside investors in order to generate handsome trading profits. Therefore, the management transactions serve as an entry or exit trigger to mimicking insider trading patterns. The consideration of expected trading losses as well as the probability of loss occurrence provides clear evidence for the best risk-return structure amongst the observed portfolios. Interestingly, portfolios considering both corporate

governance factors as well as the industrial affiliation of the company achieve the best performance with a respective risk structure. In particular, outsiders following companies from the *Technology* sector are shown to achieve highly lucrative results, both in terms of generating remarkable profits when they follow insider purchase transactions and avoiding losses when they mimic selling activities. Moreover, a high market-to-book ratio of companies belonging to the *Technology* sector supports the buying signal. This is not surprising as companies operating in the technology sector have relatively few physical assets (compared to companies with high inventory or production facilities), are newer and expected to have higher growth opportunities and hence investors have higher expectations for future earnings or cash flows. In addition, these companies, which manifest high social intelligence in dealing with insider trading in their annual reports (*Word-Count*), are assumed to be of substantial interest. Notable selling activities come both from small-cap companies (when the mean threshold is applied) and from relatively small trading volumes (median threshold) of companies from the *Technology* sector. Finally, all data has been tested for validity in a simulated trading environment. Although some results are extenuated in the simulation analysis, the strategy of mimicking insider trading appears to be robust in respect of the applied thresholds and the observed time periods.

Overall, I find clear evidence that Switzerland has substantial, backlog demand in its disclosure policy on management transactions. The restricted or conservative attitude towards more transparent insider trading is in some respects an indicator that insiders conduct their transactions in highly suspicious times, prior to the disclosure of other corporate announcements, and hence trigger the strongest ex-post abnormal market reactions. Nonetheless, I have to admit that the observed stock price momentum facilitates in anticipating the post-trading abnormal returns. This pattern provides evidence that insiders do not systematically abuse specific material private information when trading prior to corporate announcements in order to take advantage of their superior knowledge, but rather benefit from the better evaluation of the company's future prospects and the exploitation of market mispricing. Consequently, positive (negative) price run-ups followed by purchase (sale) transactions prior to corporate announcements provide a basis for strong abnormal market reactions in the expected direction. Finally, the comprehensive analysis of management transactions indicates the stock price potential after the disclosure of the inside information. Hence, it is not surprising

that several commercial insider trading data providers offer trading tools based on this highly sensitive information.

From the aforementioned findings of my dissertation I deduct several theoretical as well as practical implications for a bunch of stakeholders and aggrieved parties.

2. Theoretical implications

Four theoretical implications can be derived from the above-mentioned results.

According to the market efficiency hypothesis (Fama, 1970) in an efficient (ideal) capital market, stock prices ‘fully reflect all available information’ (p. 383). After 20 years of market efficiency research and performance analysis literature, Fama (1991) reiterated his hypothesis and verified empirically that it is false to assume any extreme version of strong-form efficiency. One of the main contributions here is that private information is not as initially presumed plentiful among investors, but rather a rare and valuable property. Nonetheless, Fama admits that event study analysis found clear evidence that stock prices immediately adjust to the arrival of private information and bestow corporate insiders abnormal market profits (Jaffe, 1974). My empirical research results support the assumption that management transactions convey valuable insights and cause significant stock price movements once the information is disclosed. Although the effect varies according to the underlying sample, the observation period and other externalities, I hypothesize that the Swiss capital market manifests a semi-strong form of market efficiency. This theoretical implication is in line with most other prevailing studies from the literature on insider trading (e.g. Seyhun, 1986; Rozeff and Zaman, 1988; Zingg et al., 2007). I have, however, to admit that testing for the market efficiency is disputable, a concern which has been addressed by Fama (1991) as well as Campbell, Lo and MacKinlay (1997). The *Joint Hypothesis Problem* implies that it is not possible to obtain absolute results as to capital market efficiency, because the applied tests themselves often contain an inherent bias. More precisely, the detection of abnormal returns per se could certainly be due to market inefficiency, but also due to the misapplication of the equilibrium model to determine the abnormal returns. To mitigate the latter case, the parametric and non-parametric statistic tests have been applied. Hence, testing for market inefficiency remains a controversial issue and the results need to be scrutinized carefully. I will thus treat this finding as a niche product of the empirical analysis and will not elaborate on it in more detail.

Second, I contribute to the understanding of the asymmetric information environment between insiders and other market participants. Although the *Principal-Agent Theory* (Jensen and Meckling, 1976) caters to determining the information gap between managers (agent) and shareholders (principal), I deduct a similar relationship for managers (insiders) and other market participants. The other market participants wish for a situation with fewer information asymmetries so as to avoid any kind of trading against informed traders. The smaller relative bid-ask spread immediately prior to purchase transactions provides evidence that both market makers are not able to anticipate trading against insiders and hence are not able to widen the bid-ask spread in order to get offset, and insiders trade in times of a less asymmetric information environment in order to conceal their trading intention. This pattern can be observed for Pre-News and No-News, but not for Post-News transactions. This thus supports the assumption that after the disclosure of corporate announcements, the management transaction is of less interest and therefore the bid-ask spread is not able to further explain abnormal market reactions. In line with Seyhun (1986) I can confirm that market makers widen their bid-ask spreads to be compensated for their trading losses subsequent to the management transactions. This provides further evidence that management transactions determine the liquidity of stock prices and, by the nature of things, take an asymmetric information environment as a given in order to tap the full potential.

Third, I cannot support the assumption that transactions conducted by insiders with superior knowledge (executives) trigger stronger abnormal market reactions compared to their non-executive fellows. The results are in line with various other international studies (e.g. Fidrmuc et al., 2008; Dymke and Walter, 2008; Betzer and Theissen, 2009), although Dardas and Güttler (2011) and Seyhun (1986) found evidence of the *Information Hierarchy Hypothesis*. Nonetheless, I have to confess that the Swiss Exchange Regulation only discloses two insider groups (since April 2011 three groups). The lack of information hinders any easy comparison of the impact of the insider's position on the abnormal market reactions on an international scale.

Finally, I present evidence on the existence of the *Announcement effect* in Switzerland. In line with John and Lang (1991), but based on a wide set of corporate announcements, the results suggest that management transactions prior to news announcements indicate a significantly stronger abnormal market reaction compared to other transac-

tions. The combined analysis of insider trading and corporate announcement emphasizes the ‘signalling activity’ of these transactions and provides an additional angle towards understanding the difference in the respective stock price patterns.

3. Practical implications

I found various interesting implications for several different stakeholders.

First, transactions conducted by the management have implications for the short-term induced market reaction. One inevitable reason is, of course, the information content conveyed in these transactions. Nonetheless, this dissertation found strong evidence that the observed abnormal market reactions around management transactions are also triggered by the corporate announcement and the stock price momentum effect. Beyond the assumptions made by the predominant literature stream on insider trading mentioned in *Part III* of this dissertation, I make further contributions to the studies of Sivakumar and Waymire (1994), Noe (1999) or Dymke and Walter (2008) and provide evidence of the association of management transactions and corporate announcements. Even though only a small portion of transactions (about 22%) are conducted promptly around corporate announcements, they appear to be of substantial interest, especially if the transaction prior to the corporate announcement is in line with the disclosed information content (Good-News and Bad-News). This finding highlights two weaknesses of the Swiss regulation on insider trading initially addressed in the discussion of the integrated insider trading law index in *Part II* of this dissertation. First, in contrast to most of the observed countries, Switzerland has not implemented legal blackout periods in order to prevent the abuse of insider information in the periods prior to other corporate announcements. Regardless of the stock price momentum effect, these transactions appear to be the ones which cause the most pronounced abnormal market reactions. Consequently, the SIX Exchange Regulation is well advised to introduce legal bans which restrain insiders from trading immediately prior to corporate announcements. A slightly tougher, legal framework with regard to insider trading would also contribute to mitigating the overall misconception of insider trading being illegal or unfair per se. Nonetheless, it has to be said that some companies have implemented internal corporate governance guidelines, or even rules, to hinder this behavior.

Second, the disclosure of the insider’s name would have several, simultaneous implications. On the one hand, it could be regarded as a deterrent to insiders, encouraging

them to conduct their transactions more carefully as their names would become known to the public in the case of misconduct. On the other hand, both market makers and potential outside investors would be better able to interpret the true trading intention of the transaction if they knew the insider's name and exact position within the company. In addition, this information would enable analysts to evaluate the precommitment of managers as each transaction would affect the insider's ownership. Insiders who already have substantial voting power already prior to the management transaction are perceived differently when compared to the ones where the level of insider ownership is at lower level (Jensen and Meckling, 1976). The disclosure of the managerial ownership not only contributes to interpreting the management transaction itself more accurately, but also to understanding to what extent the insiders align their interests with those of other dominant shareholders or rather exploit their voting power for private benefits. The disclosure of the insider's name as well as the insider's ownership improves the market transparency and is expected to enhance market integrity, which in turn fulfills the primary incentive of Art. 56 LR in contributing to the prevention and prosecution of market abuse.

Consequently, I recommend advancing and extending the disclosure policy on management transactions in Switzerland. The following information would be absolutely desirable: the insiders' name, the insider ownership at the time of the transactions, together with the change in ownership due to the transaction, and the announcement date of the transaction. This essential information is publicly available in most developed capital markets and contributes to understanding the trading intention, helps to improve market transparency and reduces the information gap between insiders and other market participants. These recommendations would simultaneously help to close the gap that remains with regard to other predominant forms of insider trading regulation. In addition, a faster disclosure period (less than 5 trading days) is preferable in order to support the aforementioned recommendations.

Moreover, the management transaction indicates a strong signal for outside investors to mimic purchase transactions in order to profit from the stock price run-up and to avoid losses when selling before price drops. Although the management transaction itself can be regarded as a trigger to enter or exit stock holdings, haphazardly following this approach is not advisable. Indeed, outside investors need to have a profound understanding of the information environment surrounding the management transac-

tion in order to choose the best portfolio. Interestingly, not only trading-specific, corporate- and market-related factors appear to matter, but also the industrial affiliation of the company is crucial in generating the highest excess market return with a moderate risk of an unexpected loss. The applied strategy of mimicking insider trading in *Part IV* of this dissertation is considered to be a potential product for banks, hedge funds or other financial institutions. The best risk-return portfolios of the strategy of mimicking insider trading could further be combined with chart technical analysis to improve the momentum of mimicking profitable insider trading. This approach, however, needs well-educated technical and analytical expertise in the field of advanced trading.

In addition, one has to bear in mind that *Part II* of this dissertation found strong evidence that the regulation on insider trading correlates with stock market-specific aspects such as stock price liquidity or equity float, with insider trading-specific behavior and with corporate ownership holdings. The economic impact on these elements should be evaluated by the Swiss authorities when considering any changes in the Swiss regulation of insider trading. Despite this, the aforementioned practical implications are assumed to positively affect this relationship.

Overall, a more transparent information environment for investors as well as society at large contributes to breaking down the public misconception of management transactions as always being suspicious and accentuates the exceptional advantages of this unique trading phenomenon. In addition, more information transparency, such as the disclosure of the insider's name, would probably deter insiders from systematically abusing their superior knowledge due the increasing probability of personal reputational damage through public exposure.

Ultimately, my dissertation provides a sound empirical analysis of the true impact and consequences of management transactions in Switzerland. I would now hope for more informed, public and political debates as to how to deal with the ever-increasing interest and importance of this subject, and it follows that further, practical and theoretical results would be fruitful in this controversial and dynamic area of research.

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