FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

ANALYSIS OF INSIDER TRADING IN BELGIUM

Debby VAN GEYT

Supervisor: Prof. dr. Philippe VAN CAUWENBERGE

Co-supervisor: Prof. dr. Heidi VANDER BAUWHEDE

Dissertation submitted to

the Faculty of Economics and Business Administration, Ghent University,

in fulfillment of the requirements for the degree of Doctor in Applied Economic Sciences

Ghent, February 2013

Research funded by the Ghent University Special Research Fund

PhD Series- Ghent University, February 2013
Faculty of Economics and Business Administration
http://www.feb.ugent.be

DOCTORAL JURY

Prof. dr. Marc De Clerq

(Ghent University, Dean)

Prof. dr. Patrick Van Kenhove

(Ghent University, Academic Secretary)

Prof. dr. Philippe Van Cauwenberge

(Ghent University, Supervisor)

Prof. dr. Heidi Vander Bauwhede

(Ghent University, Co-supervisor)

Prof. dr. Ignace De Beelde

(Ghent University)

Prof. dr. Johan Christiaens

(Ghent University)

Prof. dr. Walter Aerts

(University of Antwerp)

Prof. dr. Millicent Chang

(University of Western Australia)

ACKNOWLEDGEMENTS

I am sincerely grateful to many individuals and organizations who have contributed to this doctoral research and who have encouraged and supported me through the long journey that resulted in this dissertation. Although it is impossible to sum up all contributors, I would like to highlight my appreciation to some specific individuals.

First, I would like to thank my supervisor prof. Philippe Van Cauwenberge and co-supervisor prof. Heidi Vander Bauwhede. Philippe for giving me the opportunity to start a doctoral study and introducing me to the interesting topic of insider trading. Heidi, for agreeing to be co-supervisor of my doctoral dissertation and especially for her suggestion of the topic of corporate communication quality, which eventually also became the second paper of this dissertation. Without it, this dissertation would probably have been entitled otherwise. Of course, I would like to thank both of them for their time and effort put in this dissertation, for reading my papers, and especially introductions, over and over again, for their sharp minds and constructive comments and for being constantly available.

Second, I would like to express my gratitude to the members of my examination committee: prof. Walter Aerts, prof. Millicent Chang, prof. Ignace De Beelde and prof. Johan Christiaens. Prof. Aerts, for his willingness to evaluate this dissertation and his sincere interest in my doctoral research, for his rigorous and constructive feedback during the pre defense and his helpful suggestions for improving this dissertation. Prof. Chang, for her time and effort spent on reviewing my papers on several occasions and providing me with valuable suggestions. In addition, I was also privileged to have her visit our department. Her input as a renowned scholar in the area of insider trading considerably contributed to the improvement of my doctoral research. Ignace, for his interest in my research and moreover, as department head, for providing me a great workplace over the past years. Johan, for his constructive comments during the pre defense as well as on several prior occasions. His approach towards the topic of insider trading from a different research perspective often provided unexpected but interesting insights.

Further, I am sincerely thankful to the Financial Services and Markets Authority (FSMA). Without their co-operation, it would not have been possible to study such a large and representative dataset of insider trading in Belgium. In addition to providing us with a unique dataset on insider trading, the FSMA was also prepared to share the results on their study of dealing codes formulated by Belgian listed companies. Therefore I would like to thank the FSMA for their willingness to put both databases at our disposal, for providing us with several updates of the insider trading database and their willingness to answer any of our questions related to insider trading.

This research would also never have been possible without the financial support from the Special Research Fund (*Bijzonder Onderzoeksfonds*) of Ghent University and the Hercules-project.

Furthermore, I would warmly like to thank my friends and current and former colleagues, two categories which have come to overlap over the years. I would like to thank all of you for your shared laughter and advice and your support throughout this journey. In addition, special thanks goes out to my former and I would say current office mates but unfortunately all of them have left sooner than I did ☺. Thank you for sharing not only the pleasant but also the less pleasant moments of this journey. I really enjoyed sharing an office with you. So thank you Katrien, Caroline, Elke and Josefien. Of course, I would also like to thank Ine, Virginie, Katrien, Arnout, Sofie, Josefien and Elke for loads of amusing and relaxing lunch breaks. Our lunch breaks were times where we briefly shared our frustrations and then quickly moved on to our daily chit chat ☺. However, on some rare occasions, we even had some time left to discuss some truly academic issues. Furthermore, I would also especially like to thank Ine, Virginie and Evelien for their extra visits to my office when times were lonely ☺. Finally, I would like to thank our secretaries Sabine, Sonia and Leen for their help and advice in solving all my administrative problems and taking care of all administrative work during my stay at the department.

Furthermore, I am very thankful to my family and especially my parents. Without their support throughout my whole academic career, I would not have been able to successfully finish my doctoral study. They gave me the opportunity to undertake whichever studies I wanted and supported my every

decision. They were not only there to proudly join me when report cards had to be picked up, but also and especially during the tough weeks or even months preceding this moment. For me, they showed their support through little things like the cup of tea brought to me every morning by my dad and every evening by my mom accompanied with my favorite cookie ☺. In the category of "family" I would also like to thank my brother. Although he was less involved in my doctoral studies, he was my "help and stay" during my studies at high school and university. He had the amazing gift to calm me down when I was freaking out about all the thing I had left to do. Luckily, times when I needed his interventions were limited, but he was there when I needed him.

Of course, I would also like to thank my partner in life Peter. He has been stuck with me for about 10 years, so he has been an important person throughout my academic career. In his own special way he was always there for me and always pushed me to do even better. I remember when I had my first and only re-examination, he was the only one laughing at me. I guess he knew it would trigger my even more to prove them they were wrong. Peter, thank you for always helping me put things in perspective and regularly reminding me that there is more to life than reading "magazines" (as you would like to call academic journals ☺) and finding the gap in the literature.

Finally, I would like to thank one more special person. I think, by now, she is really wondering why she hasn't been mentioned yet. She also didn't believe me when I told her that my acknowledgements would probably not end with my partner in life like with most of my predecessors. However, I wanted to finish with the most important contributor to Ph.D. and, for me Bilitis, this was you. I could have just put you in my category of "friends and colleagues" and all the subcategories mentioned there, but this category could never have covered all the experiences we shared: conferences, holidays, rejections, publications, frustrations, stress, laughter, finding stars, finding no stars, boyfriend troubles, housing troubles, household troubles, becoming aunties, hellos, goodbyes, and so on and so on. So Bilitis, thank you for being my friend and moral and mental support throughout the entire journey. I could always come to you with all my academics and less academic problems and you always went out of your way to help me from the first day we met. When I think about it, I guess we were never really just "colleagues" ☺. We quickly evolved to being friends and even ended as best friends. It even

took our office mates several months to figure out that we weren't friends and hadn't even met each other before we started working as Ph.D. students. I don't know why, but I guess we just connected ☺. So although of course, I am filled with joy that I was (or better: hopefully will be ☺) able to obtain the degree of Ph.D., something I secretly always dreamt of, I will cherish our friendship that I got because of it even more. Bili, you are truly an amazing person and I could not have wished for a better colleague and friend. You put the fun in my Ph.D.! ☺ I really missed having my buddy around these last couple of months…

Debby Van Geyt

February 2013

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 4: CORPORATE INSIDER TRADING POLICIES: DETERMINANTS AND EFFECT ON INSIDER TRADING PROFITABILITY

CHAPTER 5: CONCLUSION

LIST OF FIGURES

CHAPTER 2: THE IMPACT OF THE FINANCIAL CRISIS ON INSIDER TRADING PROFITABILITY IN BELGIUM

EXECUTIVE SUMMARY

In essence, insider trading is the trading of securities by corporate insiders such as owners, managers and directors. As insiders often possess securities within their companies in exchange for their contributed capital or as part of their remuneration package, trading by insiders is common practice and happens on a day-to-day basis. Nonetheless, insider trading and more specifically the profitability of insider trading is one of the most heavily debated topics among economists, legal scholars and financial market regulators. On the one hand, insiders may just have a better understanding of their firm's economics which may also give them an informational benefit over other investors. Their in-depth knowledge of, for example, internal company processes, management practices and the industry in which their company operates, may help them to recognize mispricing by the market and improve the timing of their trades. However, on the other hand, insiders may also abuse their position within a company to get access to price-sensitive information, unknown to other investors. Accordingly, if insiders would trade on this superior prior knowledge, this would lead to unfair enrichment at the expense of other investors. This dissertation contributes to the understanding of insider trading and insider trading profitability by exploring a unique database on the trading activity of insiders from Belgian listed companies.

The first dissertation paper studies whether the profitability of insider trading was affected by the occurrence of the recent financial crisis. Such a financial crisis creates a chaotic financial environment in which investors react more nervously to news and experience more difficulties in ascertaining the fundamental value of companies. An interesting question is whether this uncertain and turbulent investment environment enlarged the opportunities of insiders to exploit their informational benefit. Our research results show that, while Belgian insiders were generally able to earn excess returns, the magnitude of their trading profits was substantially higher during the years of the financial crisis.

The second dissertation paper studies how the dissemination of higher-quality information by companies affects the informational benefit of insiders and in turn the profitability of their trades. If

companies are more timely, precise and transparent in their communication, this should improve the quality and quantity of information available to other investors. As a consequence, lower trading profits are earned by insiders in companies with higher-quality communication. Our results furthermore indicate that different forms of communication also differently affect the informational benefit of insiders. Comparing the relative effectiveness of disclosures through annual reports, press releases, websites and investor relation activities, our results show that investor relation activities, which are used to communicate timely and forward-looking information directly to the investor community, appear to be most effective in diminishing the informational benefit of insiders.

The third dissertation paper focuses on corporate insider trading policies. These policies are restrictions on insider trading imposed by the issuing companies themselves and fall within the scope of corporate governance mechanisms. In particular, we investigate whether the strictness of the policies differs across companies and which firm characteristics explain these differences. Results show that restrictions are more stringent in companies with more growth opportunities and that stringency also seems to depend on a company's board structure. In the second part of this study, we analyze the effectiveness of the company-specific trading policies by investigating their impact on the profitability of insiders' trades. Interestingly, results show that trading profits are not significantly lower in companies with more stringent insider trading restrictions.

NEDERLANDSTALIGE SAMENVATTING

In essentie is "*insider trading*" het handelen in aandelen en andere financiële instrumenten van de eigen onderneming door o.a. eigenaars, managers en bedrijfsleiders. Dit zijn de zogenoemde insiders. Dit verhandelen van aandelen van de eigen onderneming is veelvoorkomend aangezien insiders vaak aandelen verkrijgen in ruil voor hun kapitaalbijdrage of als onderdeel van hun verloningspakket. Toch is "*insider trading*" en de winstgevendheid hiervan één van de meest besproken onderwerpen onder economisten, juristen en toezichthouders van financiële markten. Aan de ene kant is het mogelijk dat insiders hun onderneming gewoon beter aanvoelen dan anderen waardoor ze een soort informatievoordeel verkrijgen. Ze zijn bijvoorbeeld beter vertrouwd met interne processen, met de organisatie van het management en met de industrie waartoe hun onderneming behoort. Als gevolg hiervan herkennen ze vaak sneller de over- of onderwaardering van de aandelen van hun onderneming door financiële markten en hebben ze vaak een nauwkeurigere timing wat betreft het uitvoeren van hun transacties. Hierdoor kunnen ze hun winsten te maximaliseren. Langs de andere kant is het echter ook mogelijk dat insiders van hun positie binnen de onderneming misbruik maken om zogenaamde voorkennis te verkrijgen. Dit is prijsgevoelige informatie die niet gekend is door andere marktdeelnemers. Bijgevolg, wanneer insiders transacties uitvoeren op basis van deze informatie, kunnen ze zich verrijken ten koste van andere marktdeelnemers. In dit doctoraat dragen we bij tot het beter begrijpen van "*insider trading*" en van de mechanismen die aan de grondslag liggen van de winsten behaald door insiders. We doen dit op basis van een unieke database die alle gerapporteerde transacties van insiders van Belgische beursgenoteerde ondernemingen bevat.

In de eerste doctoraatstudie bestuderen we of de winstgevendheid van "*insider trading*" beïnvloed werd door de recente financiële crisis. Een dergelijke crisis zorgt voor een turbulente financiële markt waarbij investeerders meer nerveus reageren op nieuwe informatie en waarbij ze meer moeilijkheden ondervinden in het bepalen van de juiste waarde van een onderneming. Een belangrijke vraag die zich hierbij stelt is of insiders voordeel kunnen halen uit dit onzeker en turbulent investeringsklimaat en of

ze in tijden van financiële crisis nog meer mogelijkheden hebben om winst te halen uit hun informatievoordeel. Onze resultaten tonen dat Belgische insiders over het algemeen reeds grotere winsten behaalden uit hun transacties dan andere investeerders maar dat dit voordeel zelfs nog meer uitgesproken was tijdens de financiële crisis.

In de tweede doctoraatstudie bekijken we hoe het verspreiden van betere informatie door de onderneming het informatievoordeel van insiders beïnvloed en bijgevolg de winstgevendheid van hun transacties. Wanneer ondernemingen preciezere informatie tijdig verspreiden en transparanter zijn in hun communicatie dan zou dit de kwaliteit en kwantiteit van de informatie die beschikbaar is voor marktdeelnemers moeten verbeteren. Als gevolg hiervan zijn de winsten behaald door insiders van ondernemingen die betere informatie verspreiden lager dan in andere ondernemingen. Bovendien tonen onze resultaten dat verschillende vormen van communicatie ook een verschillend effect hebben op de informatieasymmetrie tussen insiders en andere investeerders. Meerbepaald, wanneer de effectiviteit van communicatie met behulp van jaarverslagen, persberichten, websites en investor relations met elkaar vergeleken wordt, dan blijkt dat investor relations het meest effectief zijn in het reduceren van het informatievoordeel van insiders. Deze vorm van communicatie wordt voornamelijk gebruikt om rechtstreeks met geïnteresseerde investeerders te communiceren en bevat dan ook vaak informatie die betrekking heeft op de toekomstperspectieven van een onderneming.

De derde doctoraatstudie focust zich op zogenaamde "*insider trading policies*". Dit zijn regels en beperkingen die door de onderneming zelf worden opgelegd en maken deel uit van hun corporate governance beleid. We onderzoeken in deze studie meerbepaald hoe de strengheid van de regels verschilt tussen ondernemingen en waarom. Uit onze resultaten blijkt dat ondernemingen met meer groeiopportuniteiten doorgaans strengere regels opleggen en dat ook de samenstelling van de raad van bestuur een invloed heeft op de strengheid. In een tweede onderdeel van de studie bekijken we hoe effectief de regels zijn en of ze wel een invloed hebben op de winstgevendheid van "*insider trading*". Onze resultaten tonen echter dat de grootte van de winsten behaald door insiders onafhankelijk is van de strengheid van de opgelegde regels en beperkingen.

CHAPTER 1:

INTRODUCTION

In essence, insider trading is the trading of securities by corporate insiders such as owners, managers and directors. As insiders often possess securities within their companies in exchange for their contributed capital or as part of their remuneration package, trading by insiders is common practice and happens on a day-to-day basis. Nonetheless, insider trading and more specifically the profitability of insider trading is one of the most heavily debated topics among economists, legal scholars and financial market regulators. On the one hand, insiders may just have a better understanding of their firm's economics which may also give them an informational benefit over other investors. Their in-depth knowledge of, for example, internal company processes, management practices and the industry in which their company operates, may help them to recognize mispricing by the market and improve the timing of their trades. However, on the other hand, insiders may also abuse their position within a company to get access to price-sensitive information, unknown to other investors. Accordingly, if insiders would trade on this superior prior knowledge, this would lead to unfair enrichment at the expense of other investors. Regulators have suppressed this illegal form of insider trading for many decades (Bris, 2005).[1] However, in recent years, the further development and increasing internationalization of financial markets has compelled regulators to even intensify the combat against illicit insider trading (Economist, 2011). For example, responding to the internationalization of financial markets, regulators of emerging stock markets, like Brazil, are getting tougher on insider trading to make their markets more attractive to foreign investors (Economist, 2011). Also in Europe, regulatory reforms have been initiated to harmonize criminal sanctions across member states and prevent insiders from further abusing differences in legislation (European Commission, 2011a, b). Furthermore, in response to insiders' increasing use of new trading platforms and financial instruments, regulators have broadened their field of activity. Instead of mainly focusing

[1] An overview of when insider trading legislations were enforced in different countries is provided by Bris (2005).

on transactions in shares on regulated markets, regulators are now also monitoring transactions involving, for example, exchange-traded funds, credit-default swaps and trades on multilateral trading facilities (MTF), organized trading facilities (OTF) and over-the-counter transactions (OTC) (Economist, 2011; European Commission, 2011a).

Further adding to the attention paid by regulators to insider trading was the recent financial crisis. In particular, this financial crisis has revealed several shortcomings in financial supervision and has shown that markets were not as robust as they were presumed to be. A more vigorous approach towards white collar crimes such as illicit trading by insiders has become one of the keystones in restoring investor confidence and securing the integrity of financial markets (Strasburg and Albergotti, 2012). Accordingly, supervisory authorities have refined the definition of "inside information" such that is also applies to information that is not precise enough to fall under the obligation of disclosure but that could have a substantial impact on stock prices (European Commission, 2011a). In addition, they have not only strengthened the supervision of financial markets but they are also increasingly using more sophisticated techniques such as the screening of telephone and data traffic in the detection of insider trading (European Commission, 2011a; Economist, 2011). To further enhance the chances of detecting and prosecuting insider trading, regulators are also pleading to ameliorate the cooperation between judicial and supervisory authorities following the U.S. example (Scannell, 2012; De Morgen, 2012). At the level of the European Union, a new European Securities and Markets Authority (ESMA) was established in 2011 to help coordinate the supervision of financial markets across member states (European Commission, 2009).[2] In addition, to enhance the effectiveness of EU legislation on insider trading, minimum standards on administrative sanctions are being formulated and will have to be implemented by member states (European Commission, 2011a). In Belgium, the Financial Services and Markets Authority (FSMA) has already altered their procedure for the imposition of administrative fines in order to increase the efficiency of this procedure and enlarged the dissuasive effect of administrative sanctions (FSMA, 2012).

[2] The European Securities and Markets Authority (ESMA) has officially been established by European Regulation No 1095/2010 and is operative since 1 January 2011.

This large and even expanding attention of market regulators towards insider trading illustrates the gravity of the potential deteriorating effect of insider trading on financial market integrity. Obviously, the scope of this impact is directly related to the magnitude of the gains earned by insiders at the expense of other investors. As such, an important stream of academic insider trading literature has focuses improving the understanding of regulators and market participants into the mechanisms underlying insider trading gains by analyzing if and when insider trading is profitable. In particular, the profitability of insider trading has been examined in various countries including the U.S. (e.g. Seyhun, 1986; Lakonishok and Lee, 2001), Germany (Betzer and Theissen, 2009), Spain (Del Brio *et al.*, 2002), Poland (Wisniewski and Bohl, 2005) and the U.K. (Gregory *et al.*, 1994; Fidrmuc *et al.*, 2006). Furthermore, evidence has been provided, for example, on the profitability of insider trading around earnings announcements (e.g. Ke *et al.*, 2003; Cheng and Leung, 2008), on the effectiveness of regulatory reforms (e.g. Garfinkel, 1997; Brochet, 2010) and on the impact of institutional differences (Fidrmuc *et al.*, 2011). In this dissertation, I further contribute to the understanding of insider trading by examining the profitability of transactions by Belgian insiders. In the first dissertation paper I study whether the profitability of insider trading was affected by the occurrence of the recent financial crisis. Such a financial crisis creates a chaotic financial environment in which investors react more nervously to news and experience more difficulties in ascertaining the fundamental value of companies. During the period 2008-2009, the peak of the financial crisis in Belgium, a considerable higher number of market interventions by the FSMA were necessary to calm the market and restore investor confidence. These interventions included, among other things, trading suspensions, putting financial instruments under supervision and even enforcing temporary restrictions on short selling (FSMA, 2009; FSMA, 2010). An interesting question is whether this uncertain and turbulent investment environment enlarged the opportunities of insiders to exploit their informational benefits or whether the current legislation was able to prevent this.

In the second dissertation paper I study the effectiveness of efforts from companies and regulators to address the underlying cause of insider trading profitability, *i.e.* information asymmetry. From a regulator's point of view, it is important to suppress the information asymmetry between company

insiders and outside investors as this harms investor confidence. Investors become more careful and may even abstain from trading if the risk of trading against an informed counterparty is higher. This undermines the functioning of financial markets and decreases their liquidity. Also companies may benefit from minimizing the information asymmetry with their stakeholders for several reasons. Providers of equity and debt capital for example, expect a return premium to compensate for the higher level of uncertainty in the presence of information asymmetry. Accordingly, this raises the cost of equity and debt capital. One of the most commonly used resources to reduce information asymmetry is the enforcement of a high standard of quality on information disclosures (Bushman and Smith, 2001; Mallin, 2002; OECD, 2004). Information is regarded as high-quality if it is precise, transparent, timely and relevant (Brown and Hillegeist, 2007). As the minimization of information asymmetry is important to regulators as well as to companies, I not only investigate how insiders' trading profits are affected by the quality of mandatory disclosures but also look at the effect of voluntary disclosures through press releases, company websites and investor relation activities.

In the third dissertation paper I study the effectiveness of trading restrictions imposed by companies themselves.[3] For companies, allowing insider trading may have both advantages and disadvantages. On the one hand, it has been argued that attributing shares to insiders and allowing them to trade is an effective form of executive compensation when aligning the interests of insiders and shareholders (Manne, 1966). In addition, trading by insiders may provide a useful additional signaling channel to communicate complex news in a credible way as trades by insiders in line with this news enhance the credibility of the announcement and at the same time decrease disclosure costs (Engelen and Van Liedekerke, 2007). On the other hand, due to the fact that insiders are allowed to trade, providers of equity capital will take into account a higher risk premium to compensate for the risk of trading against informed counterparties. Consequently, this increases the cost of capital and lowers the liquidity of the company's stock (Leland, 1992). Furthermore, insider trading may also increase agency costs by adversely affecting the divergence between the interests of insiders and shareholders and the consequent need for shareholders to monitor insiders. For example, the prospect of high short-

[3] Examples of such restrictions are: restrictions on trading by insiders around the announcements of financial results, the prohibition to involve in speculative trading and the obligation to obtain *ex ante* approval of transactions by a compliance officer.

term returns may give insiders the incentive to invest in high-risk projects instead of projects aimed at long term maximization of shareholder value. In order to suppress these potential negative effects for companies and shareholders, companies may enforce their own restrictions on insider trading in addition to legal requirements. In addition, knowledge on whether or not restrictions outside the current legislation contribute to the mitigation of insiders' trading profits may be useful for regulators in future discussions on regulatory changes.

1.1. Insider trading in Belgium

1.1.1. Legal framework on insider trading in Belgium

Historical background

The Belgian legislation on insider trading has ensued from legal initiatives taken at the level of the European Union. A first European directive on insider trading was formulated in 1989, *i.e.* Directive 89/592/EEC. This directive was converted into Belgian legislation by the articles 181 until 189 of the Law of 4 December 1990 on financial transactions and financial markets. The main goal of the European directive was to harmonize the legislation of member states with regard to insider trading. Before the 1989 Directive came into effect, some member states did not have any regulation on insider trading, while the regulation operative in other member states was very divergent. The directive provided a uniform definition of "inside information" and formulated several prohibitions on the use of this information.

In 2003, in response to changes in financial markets and Community legislation since the release of the 1989 Directive, the European Union issued a new directive, *i.e.* Directive 2003/6/EC. This directive formulated new legislations on both insider trading and market manipulation, jointly referred to as "market abuse". This 2003 Directive is the foundation of the current Belgian legislation on insider trading. The most important novelty introduced by the 2003 Directive was the emphasis on the prevention of market abuse and the active involvement of market participants in this prevention. The preventive measures introduced with regard to insider trading are threefold: first, the directive states

that issuers of financial instruments should draw up a list of persons who have access to inside information. Second, the directive introduces the enforcement of a notification duty upon insiders. This measure requires insiders to report their transactions to a competent authority that in turn makes these transactions public. Finally, the directive posits that persons who professionally arrange transactions in financial instruments and who have a suspicion of illegal insider trading should be obliged to report this to a competent authority.

As previously mentioned, new legal initiatives are currently being taken at the level of the European Union in response to the recent financial crisis and the further development of financial markets (European Commission, 2011a, b). The aim of these initiatives is to replace and extend the existing legal framework incorporated in the 2003 Directive. On the one hand, a new directive is being developed which will introduce minimum standards on criminal sanctions for insider trading. Accordingly, the directive intends to harmonize the enforced criminal penalties in different member states and prevent that insiders take further advantage of differences in legislation by speculating on where it would be most advantageous to commit certain crimes. On the other hand, a European regulation[4] is being formulated which should provide a response to the increasing opportunities for market abuse due to the globalization of financial markets and the development of new trading platforms and technologies. The most important adjustment compared to the 2003 Directive will be the extension of the scope of application. In particular, the new regulation will not only be applicable to financial instruments admitted to trading on a regulated market but, also to financial instruments trading on a multilateral trading facility (MTF) or an organized trading facility (OTF) as well as to financial instruments traded over-the-counter (OTC). Furthermore, given that regulations prescribed by the European Union are directly applicable in member states and no translation into national legislation is needed as with European directives, the European Commission also hopes to increase the effectiveness of the market abuse legislation (European Commission, 2011a). In particular, an evaluation of the 2003 Directive by the European Commission has indicated that the numerous options

[4] The difference between a directive and a regulation issued by the European Union is that a regulation is directly and entirely applicable to member states. Accordingly, member states are not given the freedom to interpret the formulated regulation in a different way. Directives on the other hand, are only binding with regard to the result that should be achieved. Member states are given the choice of form and method and may adjust the legal text to national peculiarities.

offered to member states have led to an incoherent approach towards market abuse and the undermining of the effectiveness of the current directive.

Summary of the Belgian legislation

As a member of the European Union, Belgium has founded its current legislation on insider trading on the 2003 European Directive on insider trading and market manipulation (Directive 2003/6/EC). Legislation on insider trading is based on the central concept of "inside information". Information is regarded as "inside information" when several criteria are met. First, the information must be of a precise nature. This means that, on the one hand, the information has to relate to a situation that already exists or an event that has occurred or which can be reasonably expected to come into existence or occur. On the other hand, it also has to be specific enough so that a conclusion can be drawn on the possible effect of the situation or event on the price of the financial instrument in question. Second, the information may not have been made public. Accordingly, the information may not have been disclosed to the public by the issuing company or a third party through, for example, websites, newswire services, national or financial news services or any other method. If no sufficient time lag is respected (*i.e.* at least 24 hours) and the market as a whole did not have the opportunity to become aware of the information, then information is also regarded as non-public. A third characteristic of "inside information" is that it has to relate, in a direct or indirect manner, to one or more issuers of financial instruments or to one or more financial instruments. A final condition for information to be regarded as "inside information" is that it must be material and thus likely to have a significant effect on the price of the financial instrument(s) in question. Examples of such material information include news on potential mergers and acquisitions, on financial performance, on changes in the senior management and on significant labor disputes or negotiations.

Following the 2003 European Directive, the Belgian legislation formulates three prohibitions on the use of inside information (Law of 2 August 2002, art. 25 and art. 40). First, persons in possession of inside information who are aware, or should be aware that the information concerned is inside information are prohibited from trading. In particular, they may not use the information by acquiring

or disposing of financial instruments to which the information relates, or by trying to do so. Second, they may not communicate the inside information to third parties, except within the framework of the normal exercise of their job description. Finally, they must also refrain from making recommendations or inducing another person to acquire or dispose of the financial instrument(s) in question on the basis of inside information.

An offender of these legal prohibitions may face administrative sanctions imposed by the FSMA as well as criminal sanctions. The potential administrative sanctions are twofold: on the one hand, the FSMA may impose the payment of damages between 250 euros and 50,000 euros for each day an infringement on the insider trading regulations occurs. The total amount of payments may however not exceed 2,500,000 euros. On the other hand, the FSMA is also authorized to condemn an offender to the payment of an administrative fine between 2,500 euros and 2,500,000 euros. However, if a capital gain was obtained from illegal insider trading, the maximum fine is raised to twice this gain and, in the event of a repeat offence, to three times this gain (Law 2 August 2002, art. 36). With regard to the criminal sanctions, an offender may be condemned to a prison sentence between three months and one year, payment of a fine between 50 euros and 10,000 euros and/or payment of a criminal fine corresponding to a maximum of three times the gain earned, directly or indirectly, by illegal insider trading (Law 2 August 2002, art. 40). An important distinction between the administrative and criminal sanctions is that a causal link between the use of inside information and the suspect transaction has to be proven before any criminal sanction can be imposed. For administrative penalties no causal relation is required. As soon as a person possesses information of which he or she knows or should know that it concerns inside information, administrative penalties may be imposed when a transaction is executed, even if this particular transaction was not based on the inside information. Obviously, as it is quasi impossible to prove that inside information has been used, administrative sanctions are much more prevalent than criminal sanctions. To the best of my knowledge, only one judicial inquiry on insider trading in Belgium has led to a criminal prosecution up till now.

In order to prevent illegal trading by insiders, the Belgian legislation has also formulated several preventive measures in line with the 2003 European Directive. First, issuers of financial instruments

are obliged to reveal inside information immediately. In particular, this information should be published on the website of the financial market on which the financial instrument is listed (Law 2 August 2002, art. 10). Second, issuers must draw up a list of persons who have access to inside information (Law 2 August 2002, art. 25bis). This list must be kept at the disposal of the FSMA for a period of five years. The FSMA may then ask the issuer to submit this list when conducting an investigation on suspicious insider transactions. A third preventive measure is the obligation of persons who professionally arrange transactions in financial instruments to inform the FSMA about suspicious trades by insiders. Finally, persons who fulfill an executive function in the issuing company as well as persons closely related to them (e.g. spouses, partners, children and other relatives) are required to report their transactions to the FSMA. The transactions must be reported within five working days after their execution. However, as long as the total sum of the transactions during the current calendar year is below 5,000 euros, the reporting may be delayed until 31 January of the next calendar year (Law 2 August 2002, art. 25bis). In case of overrunning the limit 5,000 euros all transactions carried out so far have to be notified after at most five days following the latest transaction. Afterwards, everything is reset to zero and reporting of subsequent insider trades within the same calendar year may be postponed until the limit is reached again. The FSMA is responsible for publishing all reported insider transactions on its website. In case of non-compliance with the above preventive measure, the FSMA has the authority to impose administrative sanctions (Law of 2 August 2002, art. 36).

1.1.2. Facts and figures on insider trading in Belgium

The empirical analysis on insider trading in Belgium in this dissertation is based on transactions by insiders and persons closely related to them (e.g. spouses, partners and children) reported to the FSMA. Between May 2006 and April 2012, 6,497 notifications were recorded. These notifications were reported by 1,189 different insiders and related to financial instruments of 135 different companies. In total, 644 million financial instruments were traded for a total amount of 11 billion euros. As shown in Table 1.1. (Panel A), during the 2006-2012 period, most insider

Table 1.1. Descriptive statistics on reported insider transactions in Belgium

Panel A *Year-to-year evolution*

	2006 [a]	2007	2008	2009	2010	2011	2012 [a]	Total
Number of transactions	923	1,408	1,075	863	1,076	883	269	6,497
Number of transactions (%)	0.14	0.22	0.17	0.13	0.17	0.14	0.04	
Number of financial instr.	43,594,382	182,188,140	78,874,957	55,060,088	39,723,227	237,567,974	7,496,607	644,505,375
Trade value	636,247,698	4,773,460,300	2,259,675,347	1,209,895,231	698,278,225	1,287,148,790	96,348,922	10,961,054,514
Average delay	15	12	10	13	12	8	4	11

Panel B *Type of financial instrument*

	Shares	Options	Warrants	Strips	ADS	Convertible obligations	Subscription rights	Others
Number of transactions	4986	750	574	8	73	62	14	30
Number of transactions (%)	0.77	0.12	0.09	0.00	0.01	0.01	0.00	0.00
Number of financial instr.	563,966,886	36,912,789	9,297,317	15,441	285,681	26,835,109	2,574,502	4,617,650
Trade value	10,158,908,240	673,660,469	72,239,510	3,122	15,349,745	21,197,459	16,147,931	3,548,038
Average delay	12	5	9	6	13	19	7	10

[a] No full-year data are available for the years 2006 and 2012. Regarding the year 2006, insiders were only obliged to report their transactions since May of this year. Regarding the year 2012, the latest update of the FSMA-database was obtained in April 2012.

Table 1.1. (Continued) Descriptive statistics on reported insider transactions in Belgium

Panel C *Capacity of the insider*

	Executive	Member of a company organ	Person related to executive	Person related to member of a company organ	Person related to related person
Number of transactions	1,561	2,565	76	2,134	161
Number of transactions (%)	0.24	0.39	0.01	0.33	0.02
Number of financial instr.	15,109,380	164,093,035	5,423,470	457,942,683	1,936,807
Trade value	299,134,934	3,201,200,051	21,113,142	7,357,368,623	82,237,764
Average delay	8	14	11	11	5

Panel D *Industry*

	Basic Materials	Consumer Goods	Consumer Service	Financials	Healthcare
Number of transactions	660	730	912	1,840	560
Number of transactions (%)	0.10	0.11	0.14	0.28	0.09
Number of financial instr.	8,712,680.00	77,372,652.00	129,320,596.00	255,003,021.00	36,607,576.00
Trade value	199,992,452	2,350,041,034	3,150,273,074	2,325,279,398	407,495,532
Average delay	13	7	10	9	8
	Industrials	Oil & Gas	Technology	Telecommunications	Utilities
Number of transactions	1,010	3	692	69	21
Number of transactions (%)	0.16	0.00	0.11	0.01	0.00
Number of financial instr.	24,965,925.00	210.00	73,188,760.00	34,959,027	4,374,928
Trade value	531,879,068	504,596	299,226,413	1,675,116,019	21,246,924
Average delay	16	79	18	7	13

[a] No full-year data are available for the years 2006 and 2012. Regarding the year 2006, insiders were only obliged to report their transactions since May of this year. Regarding the year 2012, the latest update of the FSMA-database was obtained in April 2012.

transactions were executed in 2007. The distribution of the number of financial instruments traded over the sample period indicates that a considerable lower number of financial instruments was traded during the period 2008-2010 compared to 2007 and 2011. During this period, financial markets were disrupted by the occurrence of the financial crisis. The largest amount of financial instruments was traded in 2011. Comparing insiders' transactions in terms of value, the year 2011 is only ranked third. Panel A of Table 1.1. also displays the evolution of insiders' transactions in terms of the delay between the execution of a transaction and the notification thereof. On average, insiders reported their transactions 11 days after the execution. The largest average delay was recorded in 2006 when the notification duty was first imposed. Afterwards the delay declined gradually. Exceptions are the years 2009 and 2010 when insiders again seemed to have waited longer to report their trades. With regard to the year 2012, it must be noted that our sample period only covers the first quarter of 2012. Consequently, the average delay of four days may give a biased view as insiders may use the opportunity to postpone the notification of transactions during the calendar year as long as the total sum is below 5,000 euros.

In Panel B of Table 1.1., insiders' trades are divided into different categories of financial instruments. Apparently, the vast majority of the insiders' transactions was related to shares (77%). Other financial instruments frequently traded by insiders were options (12%) and warrants (9%). The remainder of the notifications (2%) involved American Depository Shares (ADR's), convertible obligations, strips and subscription rights.

In Table 1.2. (Panel A), an evolution of the number of purchases and sales of shares over the sample period is provided. This table shows that insiders predominantly purchased shares instead of selling them. This trading behavior is typical of insiders in companies with a concentrated ownership structure, which is common in Belgian listed companies (Faccio and Lang, 2002). These insiders purchase shares in order to obtain or maintain corporate control and generally refrain from selling unless they have unambiguous negative expectations about their company's future prospects (Cheuk *et al.*, 2006). Panel A of Table 1.2. also shows a rather stable distribution of the proportion of purchases and sales in most years. A notable exception, however, is the year 2008 in which more than 80% of the

share transactions were acquisitions. This significant increase was due to a rise in the number of purchases combined with a strong drop in the number of sales compared to other years. In the first quarter of 2012, insiders sold a significant larger proportion of shares. In particular, only 60 purchase transactions were reported compared to 116 sales. Regarding insider trades in options and warrants, more than 75% of the notifications for both categories are related to insiders exercising the right to buy or sell the underlying security (Table 1.2., Panel B). Buying and selling of options and warrants by insiders was much less common.

Table 1.2. Detail of transactions in shares, options and warrants

Panel A *Shares*

	2006 [a]	2007	2008	2009	2010	2011	2012 [a]	Total
Number of purchases	281	583	725	428	422	404	60	2,903
Number sales	407	419	161	305	391	284	116	2,083
Total	688	1002	886	733	813	688	176	4,986

Panel B *Options*

	2006 [a]	2007	2008	2009	2010	2011	2012 [a]	Total
Number of purchases	0	1	3	0	21	13	2	40
Number sales	4	7	15	3	36	45	29	139
Number of conversions	145	120	40	53	96	72	45	571
Total	149	128	58	56	153	130	76	750

Panel C *Warrants*

	2006 [a]	2007	2008	2009	2010	2011	2012 [a]	Total
Number of purchases	6	75	40	0	1	0	0	122
Number sales	5	1	8	0	3	12	0	29
Number of conversions	56	135	50	39	83	43	17	423
Total	67	211	98	39	87	55	17	574

[a] No full-year data are available for the years 2006 and 2012. Regarding the year 2006, insiders were only obliged to report their transactions since May of this year. Regarding the year 2012, the latest update of the FSMA-database was obtained in April 2012.

A closer inspection of the identity of the insiders who reported transactions indicates that the majority of the transactions were executed by "primary" insiders, *i.e.* executives or members of a company organ (e.g. the board of directors, the general meeting of shareholders and the supervisory board) (Table 1.1., Panel C). About 34% was executed by persons related to them, including spouses, children and partners. A small proportion of the transactions concerns trades by persons related to other related persons or corporations (e.g. partner of the insider's child, partner of the insider's brother or sister). In terms of the number of financial instruments traded as well as total trade value, the largest amount was traded by persons related to members of a company organ. Persons related to other related persons traded the least financial instruments, while persons related to executives traded the least in terms of value. A comparison of the average reporting delay over the different types of insiders indicates that the notification term of five days is most respected by persons related to other related persons. On the other hand, members of a company organ overrun this term on average by nine days.

In panel D of Table 1.1., insiders' trades are classified according to the industry of the issuing company. The table indicates that most transactions were reported by insiders of financial and industrial companies, while those of oil and gas and utility companies reported least. Most financial instruments were traded by insiders of financial companies. In terms of trade value, insiders of consumer service companies traded most. The average notification delay was highest in oil and gas companies, being 79 trading days.[5] Insiders of consumer goods and telecommunications companies on average reported their transactions with the smallest time lag.

1.2. Literature on insider trading

Insider trading is a widely investigated research topic and a broad range of research questions have been addressed by academics in the fields of law, economics, finance and accounting. For a detailed overview of insider trading studies see Doffou (2003) and Clacher *et al.* (2009). The literature on insider trading can be divided into three broad categories. A first category of studies focuses on the

[5] Two out of the three transactions in oil and gas companies were reported with a delay of almost 100 days. This explains the extremely large reporting delay.

trading behavior of insiders around specific information events. These studies examine whether insiders exploit their informational benefits by investigating the nature and timing of their trades in the period leading up to an event. Extensive evidence has been provided, for example, that the intensity of insider buy (sell) transactions increases before good (bad) news announcements like earnings increases (decreases) (e.g. Ke *et al.*, 2003; Cheng and Leung, 2008). Other examples of information events previously studied include announcements on mergers and acquisitions (Keown and Pinkerton, 1981), bankruptcies (Gosnell *et al.*, 1992; Seyhun and Bradley, 1997), accounting changes (Larcker *et al.*, 1983; Odaiyappa and Nainar, 1992), cash dividend payments (Fuller, 2003), sell-offs (Hirschey *et al.*,1990) and seasoned equity offerings (Lee, 1997; Clarke *et al.*, 2001).

A second stream of insider trading literature explores the effect of regulations on the behavior of insiders and the profitability of their transactions. These studies have investigated, for example, the impact of lax law enforcement (Wisniewski and Bohl, 2005), the implementation of new regulations (Garfinkel, 1997; Brochet 2010) and the effectiveness of current policies (Bettis *et al.*, 2000; Fernandes and Ferreira, 2009). While most studies focus on the impact of regulations imposed by independent, external bodies, some have also investigated the effectiveness of regulations imposed by companies themselves (e.g. Jagolinzer *et al.*, 2011; Chang, 2012).

A final category of studies focuses on the profitability of insider trading and its potential drivers (e.g. Jaffe, 1974; Seyhun, 1986; Lakonishok and Lee, 2001; Del Brio *et al.*, 2002; Cheuk *et al.*, 2006). Essentially, these studies test the theory of efficient markets developed by Fama (1970). According to this theory, markets are strongly efficient if all information, including inside information, is reflected into stock prices. Consequently, if the hypothesis of strongly efficient markets holds, insiders would be unable to gain any abnormal trading profits. By also testing whether the mimicking of insiders' transactions results in abnormal gains for outsiders, some studies have addressed the question whether markets are either inefficient or semi-strong efficient (e.g. Bettis *et al.*, 1997; Wisniewski and Bohl, 2005). Under the semi-strong efficiency hypothesis it would be unprofitable for outsiders to imitate trades reported by insiders as all publicly available information would be reflected into stock prices.

This dissertation on the profitability of insider trading in Belgium contributes to the latter stream of literature in several ways. First, it adds to the emerging literature on insider trading in Europe. Early studies investigating insider trading mainly focused on the U.S. stock market (e.g. Jaffe, 1974; Finnerty, 1976; Seyhun, 1986; Lin and Howe, 1990; Lakonishok and Lee, 2001; Jeng *et al.*, 2003). Later, this focus has shifted towards emerging Asian stock markets (e.g. Chiang *et al.*, 2004 (Taiwan), Wong *et al.*, 2010 (Malaysia); Cheuk *et al.*, 2006 (Hong Kong)), while European markets were largely left uncovered. Until recently, research on European markets was lagging behind as insider trading studies are generally based on databases of transactions reported to a supervisory authority. These reported transactions provide an abundance of data on the trading behavior of insiders. In the U.S., insiders have been obliged to report their trading activity to the Security and Exchange Commission (SEC) since 1934. A similar reporting duty was only imposed in Europe since 2003 by the introduction of the European Directive on insider trading and market manipulation (Directive 2003/6/EC). Nonetheless, despite the extensive research on insider trading in the U.S., studies on European markets may provide valuable new insights given the large institutional differences between both continents (La Porta *et al.*, 1997; La Porta *et al.*, 1998). Studies on the European stock market have been performed for Germany (Betzer and Theissen, 2009), Spain (Del Brio *et al.*, 2002), Poland (Wisniewski and Bohl, 2005), the U.K. (Gregory *et al.*, 1994; Fidrmuc *et al.*, 2006), Italy (Bajo and Petracci, 2006) and the Netherlands (Degryse *et al.*, 2009). To the best of my knowledge, no prior studies have focused on the Belgian stock market.

A second contribution of this dissertation is that is provides more insight into the drivers of insider trading profitability. While ample evidence exists on the effect of trade and company characteristics like transaction size, trading intensity, company size and market-to-book and leverage ratios, there is a lack of insight into the effects of economy-wide and corporate governance related characteristics. The first dissertation paper therefore focuses on the impact of the world-wide financial crisis on insider trading profits, while the second and third paper contribute to the emerging literature on the impact of corporate governance quality on insiders' profits.

Finally, the third dissertation paper also contributes to the second stream of insider trading literature by focusing on company-specific insider trading policies. These policies include the requirement of *ex ante* approval of insiders' transactions, restrictions on option trading, short selling, short-term trading and on trading around news announcements. Prior research on the effectiveness of these policies is limited. To the best of my knowledge only three papers have addressed this issue (Bettis *et al.*, 2000; Jagolinzer *et al.*, 2011; Petracci, 2011). In addition, no prior study has considered the combined impact of all insider trading policies imposed by companies on the magnitude of insider trading gains. Different policies may however complement each other or may be used as substitutes (Jagolinzer *et al.*, 2011). Accordingly, not taking into account the joint impact of all policies may give a biased view on the effectiveness of the trading policies.

1.3. Overview of dissertation papers

1.3.1. The impact of the financial crisis on insider trading profitability in Belgium

Principal topic

In 2007, the subprime mortgage crisis emerged in the U.S. and rapidly spread across the world-wide financial system. This global financial crisis was marked by the failure of several financial institutions and the fast decline of various stock market indices. The financial turmoil led to a chaotic environment in which it was difficult for market participants to determine the fundamental value of companies and their capability to withstand the financial crisis. An interesting research question against this background is whether the increased uncertainty surrounding the financial crisis enlarged the opportunities of insiders to exploit their informational benefits. The Belgian stock market provides a particularly interesting environment to test this hypothesis as it was especially vulnerable to the financial crisis given the importance financial institutions on the Belgian market.

Sample and method

In our study, we used a unique dataset on the trading activity of Belgian insiders obtained upon request from the FSMA. The database contains all transactions reported to the FSMA between May 2006 and August 2010. Consistent with prior studies we apply several filters in order to ensure the quality of our data and eliminate non-profit-driven transactions as much as possible.

In line with previous studies, we proxy the informational advantage of insiders by determining the profitability of their trades (e.g. Frankel and Li, 2004; Park and Shin, 2009). We apply event study methodology and measure trading profits as the cumulative average abnormal return after the trading event. A Dimson-correction for thin trading is applied to infrequently traded securities (Dimson, 1979).

We empirically assess the impact of the financial crisis by comparing the profitability of insider trading during crisis and non-crisis periods. In particular, we estimate an ordinary least squares regression. We include several control variables expected to influence the profitability of insider trading as well as a dummy variable for transactions carried out during 2008 and 2009, the peak of the financial crisis.

Findings

Our research results show that, while Belgian insiders were generally able to earn excess returns, the magnitude of their abnormal profits was substantially higher during the years of the financial crisis. Consequently, our findings suggest that the occurrence of the financial crisis further deteriorated the efficiency of the stock market and enlarged the informational benefits of insiders. In addition, given that the financial crisis originally harmed bank and insurance companies the most, we also addressed the question whether insiders of these companies proportionally benefited more than other insiders. However, we did not find evidence supporting this proposition.

Contribution

By evaluating this research question we contribute to the literature in several ways. First, we add to the emerging literature on the profitability of insider trading on European stock markets. To the best of our knowledge, no prior studies have focused on the Belgian stock market. Second, our study identifies crisis periods as an additional driver of insider trading profitability. Previous studies already documented that several firm and trade characteristics influence the information asymmetry between insiders and outside, uninformed investors. Research into the potential effect of economy-wide determinants is however limited. Finally, our results also contribute to the literature on the efficiency of stock markets during financial crises. Cheong *et al.* (2007) and Lim *et al.* (2008) provided evidence of increased inefficiency on several Asian stock markets during the 1997 financial crisis. We corroborate and generalize these findings by focusing on the highly developed Belgian stock market during another crisis period.

1.3.2. Does high-quality corporate communication reduce insider trading profitability?

Principal topic

This dissertation study examines whether high-quality communication is effective in reducing the profitability of insider trading. Previous research has documented that, despite regulations on insider trading, insiders still earn significant abnormal returns from trading on information asymmetries between insiders and outsiders. As suggested by analytical work on disclosure (e.g. Diamond 1985; Verrecchia, 2001), an important instrument to decrease this asymmetry could be the dissemination of high-quality information. We therefore hypothesize that high-quality corporate communication reduces insiders' abnormal returns.

In an additional analysis this study also examines whether the impact of disclosure quality differs between communications channels, *i.e.* annual reports, press releases, websites and investor relation activities. The different channels and information communicated through these channels have specific characteristics that might limit or enhance their ability to affect the level of information asymmetry.

Examples of such characteristics are timeliness of the disclosed information, time horizon (forward-looking versus backward-looking), need for external verification and voluntary versus mandatory disclosures. We therefore hypothesize that the impact of disclosure quality on insider trading profits and on information asymmetry in general, depends on the communication channel.

Sample and method

To measure the quality of corporate communication, we use a disclosure score granted by the Belgian Association of Financial Analysts (BVFA).[6] Each year, the BVFA invites its members to screen the communication of a number of companies and assign a disclosure rating. This rating evaluates several disclosure characteristics identified as important attributes of high-quality communication, *i.e.* preciseness, transparency, timeliness and scope (Brown and Hillegeist, 2007).

To measure the profitability of insider trading, we exploit a unique database on insider trading provided by the FSMA. This database contains all transactions reported by insiders between May 2006 and August 2010. We calculate the cumulative abnormal returns that insiders earn when trading in their own stock using event study methodology. Since the liquidity of some Belgian listed securities is rather low (Buysschaert *et al.*, 2004), the abnormal returns are estimated either using a standard market model (MacKinlay, 1997) or market model adjusted for thin trading (Dimson, 1979).

Findings

The results of our inquiry show that high-quality communication by companies reduces the profitability of insider trading. Furthermore, they indicate that the quality of annual reports, press releases and investor relation activities, is relatively more effective in reducing information asymmetry than the quality of corporate websites. Investor relation activities, which are used to communicate timely and forward-looking information directly to the investor community, appear to be most effective.

[6] BVFA stands for "*Belgische Vereniging van Financiële Analisten*".

Contribution

Our research contributes to two streams of literature. First, we add to the literature on insider trading profitability by examining the impact of high-quality communication, as proxied by a comprehensive measure of disclosure quality assigned by professional users of corporate communication. To our knowledge, there are only a handful of papers that investigate whether corporate communication quality influences insiders' informational benefits. We corroborate and generalize their findings by using a more direct and objective measure of corporate communication quality and by assessing the individual impact of different communication channels.

Second, our work contributes to the literature examining the relationship between disclosure and information asymmetry by using an alternative proxy for information asymmetry. Prior work examined this relation using, for example, bid-ask spreads and the probability of informed trading as proxies for information asymmetry (e.g. Welker, 1995; Brown and Hillegeist, 2007). By contrast, we proxy information asymmetry by the magnitude of insiders' abnormal returns. Furthermore, the majority of prior disclosure studies is based on U.S. data (Healy and Palepu, 2001). Re-examining the disclosure - information asymmetry relation for a sample of Belgian listed companies may provide valuable new insights as the Belgian institutional setting differs from the U.S.

1.3.3. Corporate insider trading policies: Determinants and effect on insider trading profitability

Principal topic

This dissertation study focuses on corporate insider trading policies. These policies are restrictions on insider trading imposed by companies and fall within the scope of corporate governance mechanisms. In particular, we investigate whether the strictness of the policies differs across companies and which firm characteristics explain these differences. Following the agency theory of the firm, previous studies have argued that incentives for company management to commit to more stringent or higher-quality corporate governance practices depend on the firm's contracting environment (Himmelberg *et*

al., 1999). Specifically, these incentives are driven by differences in private benefits available to insiders, the need for external funding and the cost of implementing corporate governance mechanisms (Anand *et al.*, 2006). In the second part of this study, we analyze the effectiveness of the company-specific trading policies by investigating their impact on the profitability of insiders' trades.

Sample and method

To address our research questions, we use data collected by the FSMA on insider trading restrictions included in the corporate governance charters of Belgian listed companies. The database includes information on all companies listed on the Belgian stock exchange and provides a unique and comprehensive overview of the insider trading restrictions imposed by each company.

To analyze which firm characteristics provoke differences in the stringency of corporate insider trading policies, we construct a company-specific stringency index. The regression model is estimated using an ordinary least squares regression as well as a Tobit regression as the stringency index is left- and right-censored.

To examine the effect of policy stringency on insider trading profits, we rely on a unique database on insider trades provided by the FSMA. This database includes transactions reported by insiders between January 2010 and April 2012. We use event-study methodology and calculate the cumulative abnormal returns by using a standard market model (MacKinlay, 1997) or a market model adjusted for thin trading (Dimson, 1979) as the liquidity of some Belgian securities is rather low.

Findings

Regression analysis of the stringency index shows that restrictions are more stringent in companies with more growth opportunities and in non-financial companies. Furthermore, the stringency also seems to depend on a company's board structure. Using hand-collected data on corporate governance, our results indicate that a higher representation of independent board members who act in the interest of minority groups instead of executives, has a positive impact on the strictness of insider trading policies.

Interestingly, results on the effectiveness of corporate insider trading policies show that, after controlling for several firm and trade characteristics, insiders' profits are not significantly lower in companies with more stringent insider trading restrictions.

Contribution

Our research contributes to two streams of literature. First, we add to the literature investigating firm-level differences in corporate governance practices. While the majority of prior studies have focused on how institutional differences result in a different approach towards corporate governance at country-level (e.g. Doidge *et al.*, 2007), research into the firm characteristics that lead to differences in corporate governance on the company-level is rather limited (e.g. Klapper and Love, 2004; Durnev and Kim, 2005). Moreover, to the best of our knowledge, only two studies have specifically analyzed how company characteristics affect corporate insider trading policies (*i.e.* Petracci, 2011; Jagolinzer *et al.*, 2011).

A second stream of literature to which our work contributes is the literature examining the effectiveness of corporate governance practices. Obviously, with regard to insider trading policies, we expect a direct impact on insiders' behavior and the magnitude of their profits. Previous studies addressing this issue include Bettis *et al.* (2000), Jagolinzer *et al.* (2011) and Petracci (2011). These studies generally focus on a single aspect of insider trading restrictions and do not take into account differences in the stringency of the restrictions. We expand this research by considering the combined impact of all trading restrictions on the magnitude of insiders' abnormal returns.

1.4. References

Anand, A. I., Milne, F., & Purda, L. (2006). *Voluntary Adoption of Corporate Governance Mechanisms*. Working paper. Available at

Bajo, E., & Petracci, B. (2006). Do What Insiders Do: Abnormal Performances after the Release of Insiders' Relevant Transactions. *Studies in Economics and Finance*, 23(2), p.94-118.

Bettis, C., Vickrey, D., & Vickrey, D. W. (1997). Mimickers of Corporate Insiders Who Make Large-Volume Trades. *Financial Analysts Journal*, 53(5), p.57-66.

Bettis, J. C., Coles, J. L., & Lemmon, M. L. (2000). Corporate Policies Restricting Trading by Insiders. *Journal of Financial Economics*, 57(2), p.191-220.

Betzer, A., & Theissen, E. (2009). Insider Trading and Corporate Governance: The Case of Germany. *European Financial Management*, 15(2), p.402-429.

Bris, A. (2005). Do Insider Trading Laws Work? *European Financial Management*, 11(3), p.267-312.

Brochet, F. (2010). Information Content of Insider Trades before and after the Sarbanes-Oxley Act. *Accounting Review*, 85(2), p.419-446.

Brown, S., & Hillegeist, S. A. (2007). How Disclosure Quality Affects the Level of Information Asymmetry. *Review of Accounting Studies*, 12(2-3), p.443-477.

Bushman, R. M., & Smith, A. J. (2001). Financial Accounting Information and Corporate Governance. *Journal of Accounting and Economics*, 32(1-3), p.237-333.

Buysschaert, A., Deloof, M., & Jegers, M. (2004). Equity Sales in Belgian Corporate Groups: Expropriation of Minority Shareholders? A Clinical Study. *Journal of Corporate Finance*, 10(1), p.81-103.

Chang, M., & Wee, M. (2012). *How Do Insider Trading Policies Affect the Information Content of Insider Trades?* Working paper. Available at http://ssrn.com/abstract=2020081.

Cheng, L. T. W., & Leung, T. Y. (2008). Is There Information Content from Insider Trading Activities Preceding Earnings and Dividend Announcements in Hong Kong? *Accounting and Finance*, 48(3), p.417-437.

Cheong, C. W., Hassan Shaari Mohd Nor, A., & Isa, Z. (2007). Asymmetry and Long-Memory Volatility: Some Empirical Evidence Using GARCH. *Physica A: Statistical and Theoretical Physics*, 373, p.651-664.

Cheuk, M.-Y., Fan, D. K., & So, R. W. (2006). Insider Trading in Hong Kong: Some Stylized Facts. *Pacific-Basin Finance Journal*, 14(1), p.73-90.

Chiang, M.-H., Hwang, L.-J., & Wu, Y.-C. (2004). Insider Trading Performance in the Taiwan Stock Market. *International Journal of Business*, 3(3), p.239-256.

Clacher, I., Hillier, D., & Lhaopadchan, S. (2009). Corporate Insider Trading: A Literature Review [Negociación De Títulos Con Información Confidencial]. *Revista española de financiación y contabilidad*, 38(143), p.373-397.

Clarke, J., Dunbar, C., & Kahle, K. M. (2001). Long-Run Performance and Insider Trading in Completed and Canceled Seasoned Equity Offerings. *Journal of Financial and Quantitative Analysis,* 36(4), p.415-430.

Degryse, H., De Jong, F., & Lefebvre, J. (2009). *An Empirical Analysis of Legal Insider Trading in the Netherlands*. Working paper. Available at

Del Brio, E. B., Miguel, A., & Perote, J. (2002). An Investigation of Insider Trading Profits in the Spanish Stock Market. *Quarterly Review of Economics and Finance,* 42(1), p.73-94.

De Morgen. (2012). *Regering Wil Financiële Handel Met Voorkennis Strenger Aanpakken*.

Diamond, D. W. (1985). Optimal Release of Information by Firms. *Journal of Finance,* 40(4), p.1071-1094.

Dimson, E. (1979). Risk Measurement When Shares Are Subject to Infrequent Trading. *Journal of Financial Economics,* 7(2), p.197-226.

Doffou, A. (2003). Insider Trading: A Review of Theory and Empirical Work. *Journal of Accounting and Finance Research,* 11(1), p.1-17.

Doidge, C., Karolyi, G. A., & Stulz, R. M. (2007). Why Do Countries Matter So Much for Corporate Governance? *Journal of Financial Economics,* 86(1), p.1-39.

Durnev, A. R. T., & Kim, E. H. (2005). To Steal or Not to Steal: Firm Attributes, Legal Environment, and Valuation. *Journal of Finance,* 60(3), p.1461-1493.

Economist. (2011). *The Fight against Crooked Trading Gathers Pace*.

Engelen, P.-J., & Liedekerke, L. (2007). The Ethics of Insider Trading Revisited. *Journal of Business Ethics,* 74(4), p.497-507.

European Commission. (2009). *Proposal for a Regulation of the European Parliament and of the Council Establishing a European Securities and Markets Authority.* Available at http:\\ec.europe.eu.

European Commission. (2011a). *Proposal for a Regulation of the European Parliament and of the Council on Insider Dealing and Market Manipulation (Market Abuse).* Available at http:\\ec.europe.eu.

European Commission. (2011b). *Proposal for a Directive of the European Parliament and of the Council on Criminal Sanctions for Insider Dealing and Market Manipulation*. Available at http:\\ec.europe.eu.

Fama, E. F. (1970). Efficient Capital Markets: Review of Theory and Empirical Work. *Journal of Finance,* 25(2), p.383-423.

Fernandes, N., & Ferreira, M. A. (2009). Insider Trading Laws and Stock Price Informativeness. *Review of Financial Studies,* 22(5), p.1845-1887.

Fidrmuc, J. P., Goergen, M., & Renneboog, L. (2006). Insider Trading, News Releases, and Ownership Concentration. *Journal of Finance,* 61(6), p.2931-2973.

Fidrmuc, J. P., Korczak, A., & Korczak, P. (2011). *Why Are Abnormal Returns after Insider Transactions Larger in Better Investor Protection Countries?* Working paper. Available at www.ssrn.com.

Finnerty, J. E. (1976). Insiders and Market Efficiency. *Journal of Finance,* 31(4), p.1141-1148.

Frankel, R., & Li, X. (2004). Characteristics of a Firm's Information Environment and the Information Asymmetry between Insiders and Outsiders. *Journal of Accounting and Economics,* 37(2), p.229-259.

FSMA. (2009). *Annual Report 2008-2009*. Available at www.fsma.be.

FSMA. (2010). *Annual Report 2009-2010*. Available at www.fsma.be.

FSMA. (2012). *Annual Report 2011*. Available at www.fsma.be.

Fuller, K. P. (2003). The Impact of Informed Trading on Dividend Signaling: A Theoretical and Empirical Examination. *Journal of Corporate Finance,* 9(4), p.385-407.

Garfinkel, J. A. (1997). New Evidence on the Effects of Federal Regulations on Insider Trading: The Insider Trading and Securities Fraud Enforcement Act (ITSFEA). *Journal of Corporate Finance,* 3(2), p.89-111.

Gosnell, T., Keown, A. J., & Pinkerton, J. M. (1992). Bankruptcy and Insider Trading: Differences between Exchange-Listed and OTC Firms. *Journal of Finance,* 47(1), p.349-362.

Gregory, A., Matatko, J., Tonks, I., & Purkis, R. (1994). UK Directors' Trading: The Impact of Dealings in Smaller Firms. *Economic Journal,* 104(422), p.37-53.

Healy, P. M., & Palepu, K. G. (2001). Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature. *Journal of Accounting and Economics,* 31(1-3), p.405-440.

Himmelberg, C. P., Hubbard, R. G., & Palia, D. (1999). Understanding the Determinants of Managerial Ownership and the Link between Ownership and Performance. *Journal of Financial Economics,* 53(3), p.353-384.

Hirschey, M., Slovin, M. B., & K. Zaima, J. (1990). Bank Debt, Insider Trading, and the Return to Corporate Selloffs. *Journal of Finance,* 14(1), p.85-98.

Jaffe, J. F. (1974). Special Information and Insider Trading. *Journal of Business,* 47(3), p.410-428.

Jagolinzer, A. D., Larcker, D. F., & Taylor, D. J. (2011). Corporate Governance and the Information Content of Insider Trades. *Journal of Accounting Research,* 49(5), p.1249-1274.

Jeng, L. A., Metrick, A., & Zeckhauser, R. (2003). Estimating the Returns to Insider Trading: A Performance-Evaluation Perspective. *Review of Economics and Statistics,* 85(2), p.453-471.

Ke, B., Huddart, S., & Petroni, K. (2003). What Insiders Know About Future Earnings and How They Use It: Evidence from Insider Trades. *Journal of Accounting and Economics,* 35(3), p.315-346.

Keown, A. J., & Pinkerton, J. M. (1981). Merger Announcements and Insider Trading Activity: An Empirical Investigation. *Journal of Finance,* 36(4), p.855-869.

Klapper, L. F., & Love, I. (2004). Corporate Governance, Investor Protection, and Performance in Emerging Markets. *Journal of Corporate Finance,* 10(5), p.703-728.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1997). Legal Determinants of External Finance. *Journal of Finance,* 52(3), p.1131-1150.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and Finance. *Journal of Political Economy*, 106(6), p.1113-1155.

Lakonishok, J., & Lee, I. (2001). Are Insider Trades Informative? *Review of Financial Studies*, 14(1), p.79-111.

Larcker, D. F., Reder, R. E., & Simon, D. T. (1983). Trades by Insiders and Mandated Accounting Standards. *Accounting Review*, 58(3), p.606-620.

Lee, I. (1997). Do Firms Knowingly Sell Overvalued Equity? *Journal of Finance*, 52(4), p.1439-1466.

Leland, H. E. (1992). Insider Trading: Should It Be Prohibited? *Journal of Political Economy*, 100(4), p.859-887.

Lim, K.-P., Brooks, R. D., & Kim, J. H. (2008). Financial Crisis and Stock Market Efficiency: Empirical Evidence from Asian Countries. *International Review of Financial Analysis*, 17(3), p.571-591.

Lin, J.-C., & Howe, J. S. (1990). Insider Trading in the OTC Market. *Journal of Finance*, 45(4), p.1273-1284.

MacKinlay, A. C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature*, 35(1), p.13-39.

Mallin, C. (2002). The Relationship between Corporate Governance, Transparency and Financial Disclosure. *Corporate Governance: An International Review*, 10(4), p.253-255.

Manne, H. G. (1966). In Defense of Insider Trading. *Harvard Business Review*, 44(4), p.113-122.

Odaiyappa, R., & Nainar, S. M. K. (1992). Economic Consequences of SFAS No. 33-an Insider-Trading Perspective. *Accounting Review*, 67(3), p.599-609.

OECD. (2004). *OECD Principles of Corporate Governance.* Paris: OECD. Available at www.oecd.org.

Park, J. C., & Shin, Y. C. (2009). *The Impact of Increased Segment Disclosure on Insider Trading Profits: Evidence from SFAS No. 131*. Working paper. Available at

Petracci, B. (2011). Trading When You Cannot Trade: Blackout Periods in Italian Firms. *International Review of Law and Economics*, 31(3), p.196-204.

Scannell, K. 2012. US Steps up Probes on Insider Trading. *Financial Times.*

Seyhun, H. N. (1986). Insiders' Profits, Costs of Trading, and Market Efficiency. *Journal of Financial Economics*, 16(2), p.189-212.

Seyhun, H. N., & Bradley, M. (1997). Corporate Bankruptcy and Insider Trading. *Journal of Business*, 70(2), p.189-216.

Strasburg, J., & Albergotti, R. 2012. Insider Targets Expanding. *Wall Street Journal*.

Verrecchia, R. E. (2001). Essays on Disclosure. *Journal of Accounting and Economics*, 32(1-3), p.97-180.

Welker, M. (1995). Disclosure Policy, Information Asymmetry, and Liquidity in Equity Markets. *Contemporary Accounting Research*, 11(2), p.801-827.

Wisniewski, T. P., & Bohl, M. T. (2005). The Information Content of Registered Insider Trading under Lax Law Enforcement. *International Review of Law and Economics,* 25(2), p.169-185.

Wong, E. S. K., Fatt, C. K., & Yap, P. (2010). Disclosure and Corporate Governance of Insider Trading: The Malaysian Perspectives. *African Journal of Business Management,* 4(9), p.1883-1893.

CHAPTER 2:

THE IMPACT OF THE FINANCIAL CRISIS ON INSIDER TRADING PROFITABILITY IN BELGIUM*

Debby Van Geyt [a], Philippe Van Cauwenberge [a] and Heidi Vander Bauwhede [a]

Abstract

The 2007 global financial crisis led to a chaotic financial environment characterized by highly uncertain and volatile stock markets. This created additional uncertainty about the fundamental value of shares and potentially increased the benefit of inside information. In this paper, we use event study methodology to examine whether Belgian corporate insiders were able to benefit from these turbulent market conditions. Given the large weight of financial institutions, the Belgian stock market was especially vulnerable to the financial crisis and provides an interesting environment to test this hypothesis. Our results show that, while insiders are generally able to earn abnormal returns, these returns are significantly higher during the years of the financial crisis.

[a] Ghent University, Department of Accountancy and Corporate Finance, Kuiperskaai 55/E, 9000 Ghent, Belgium

* A version of this paper is accepted for publication in Journal of Business Economics and Management. This paper has benefited from presentations at the 2010 European Accounting Association Annual Congress (Istanbul, Turkey) and the 2010 Annual PhD Day of Ghent University. Financial support from the "Special Research Fund" (BOF) and the Hercules project is gratefully acknowledged.

2.1. Introduction

In 2007, the subprime mortgage crisis emerged in the U.S. and rapidly spread across the world-wide financial system. This global financial crisis was marked by the failure of several financial institutions and the fast decline of various stock market indices. The financial turmoil led to a chaotic environment in which it was difficult for market participants to determine the fundamental value of companies and their capability to withstand the financial crisis.

An interesting research question against this background is whether the increased uncertainty surrounding the financial crisis enlarged the opportunities of insiders to exploit their informational benefits. Prior studies have already evidenced that insiders are generally better informed about their firm's prospects as they receive relevant information in a more timely manner (Ching *et al.*, 2006; Li and Zhang, 2006; Cheng and Leung, 2008). For example, insiders seem to sell considerably more shares prior to the bankruptcy filing of their company (Gosnell *et al.*, 1992; Seyhun and Bradley, 1997). In addition, numerous studies have documented that insiders are able to convert their informational benefit into excess stock market returns (e.g. Seyhun, 1986; Lakonishok and Lee, 2001; Del Brio *et al., 2*002; Wisniewski and Bohl, 2005; Bajo and Petracci, 2006; Cheuk *et al., 2*006; Betzer and Theissen, 2009). Also, using the 1997 Asian financial crisis as a test case, Cheong *et al.* (2007) and Lim *et al.* (2008) concluded that the efficiency of financial markets is adversely affected by the occurrence of a financial crisis. Based on these previous findings, we hypothesize that the highly uncertain and volatile stock markets during the recent financial crisis exacerbated the information asymmetry between insiders and other market participants and created additional opportunities for insiders to gain excess returns.

Given the large weight of financial institutions, the Belgian stock market was especially vulnerable to the financial crisis. This provides an interesting environment to test this hypothesis. Using a unique dataset of insider trading transactions in Belgium, we evaluate this research question by testing whether higher abnormal profits were earned during the financial crisis compared to non-crisis periods.

Consistent with previous studies, we proxy the informational advantage of insiders by determining the profitability of their trades (e.g. Frankel and Li, 2004; Park and Shin, 2009). We apply event study methodology and measure trading profits as the cumulative average abnormal return after the trading event. A correction for thin trading is applied to infrequently traded securities (Dimson, 1979). Furthermore, transactions with overlapping event windows are excluded from the sample to avoid event clustering.

Our empirical findings confirm that during the peak of the financial crisis, insider trading resulted in considerably higher profits. This finding suggests that the crisis enlarged the informational benefits of insiders.

These results are of potential interest to market regulators. They indicate that supervisory authorities should be aware of the greater information asymmetry and stock market inefficiency during a financial crisis. Consequently, stricter enforcement of insider trading regulation and more supervision might be needed during these periods.

Our results are also of importance to companies. Previous research has identified information asymmetry as an important driver of the cost of capital. In addition, Love *et al.* (2007), and Ivashina and Scharfstein (2010) have shown that credit lines contract in the months and even years following a financial crisis. Consequently, companies have an interest in limiting the informational benefits of their insiders in order to retain a sufficient supply of external capital. Maybe, reducing this information asymmetry could be achieved by increasing corporate transparency.

Our study contributes to the literature in several ways. First, we add to the emerging literature on insider trading in Europe since we are the first to investigate the profitability of insider trading in Belgium. Second, our study identifies crisis periods as an additional driver of insider trading profitability. Previous studies already documented that several firm and trade characteristics influence the information asymmetry between insiders and outside, uninformed investors. Higher profits are, for example, earned in small companies (Lakonishok and Lee, 2001) and in companies with low market-to-book values (Rozeff and Zaman, 1988). Third, our results also contribute to the literature on the

efficiency of stock markets during a financial crisis. Cheong *et al.* (2007) and Lim *et al.* (2008) provided evidence of increased inefficiency on several Asian stock markets during the 1997 financial crisis. We corroborate and generalize these findings by focusing on the highly developed Belgian stock market during another crisis period.

The remainder of this chapter is organized as follows. Section 2 briefly describes the insider trading regulation in Belgium. Section 3 provides an overview of related insider trading literature. Section 4 includes a description of the financial crisis and the hypothesis development. Section 5 discusses the measurement of insider trading profits and section 6 gives an overview of the data collection and sample selection criteria. Section 7 provides some descriptive statistics and finally, section 8 presents and discusses our research results.

2.2. Insider trading regulation in Belgium

The current Belgian legislation on insider trading is founded in the 2003 European Directive on insider dealing and market manipulation, *i.e.* the Market Abuse Directive.[1] This directive introduced an important amendment to previous regulation by requiring insiders to report their transactions to a competent authority. This notification duty is based on the regulation in the U.S., where insiders are already required to report their transactions since 1934 under the Securities and Exchange Act.

In Belgium, insiders must notify their trading activity to the Financial Services and Markets Authority (FSMA) which is entrusted with the supervision of the Belgian stock market. They are required to report transactions no later than five trading days following the execution. Afterwards, the FSMA makes the trading activity publicly available on its website.[2] These notification terms are similar to the ones in other European and non-European countries.[3]

[1] Directive 2003/6/EC.
[2] www.fsma.be
[3] Examples of other reporting requirements: Poland: 24-hours disclosure deadline (Wisniewski and Bohl 2005); Italy: no disclosure required when total quarterly cumulative transactions is below €50,000, quarterly disclosure when between €50,000 and €250,000, and within three business days when above €250 000 (Bajo *et al.*, 2009); U.K.: insiders must report as soon as possible and no later than five business days after the transaction (Fidrmuc *et al.*, 2006), in addition a black-out

2.3. Insider trading: literature review

Research on the profitability of insider trading is essentially based on the efficient markets paradigm. According to this theory, markets are strongly efficient if all information, including inside information, is reflected into stock prices. On the contrary, markets are perceived as semi-strong efficient if only publically available information is incorporated into prices (Tvaronavičienė and Michailova, 2006). As a consequence, insider trading can only be profitable if markets are not strongly efficient.

Early studies investigating the ability of insiders to profit from their trading were concentrated on the U.S. stock markets (e.g. Jaffe, 1974; Finnerty, 1976; Seyhun, 1986; Lin and Howe, 1990; Lakonishok and Lee, 2001; Jeng *et al.*, 2003). In recent years however, research on insider trading in the European and Asian stock market has emerged. Studies on European stock markets were performed for Germany (Betzer and Theissen, 2009), Spain (Del Brio *et al.*, 2002), Poland (Wisniewski and Bohl, 2005), the U.K. (Gregory *et al.*, 1994; Fidrmuc *et al.*, 2006), Italy (Bajo and Petracci, 2006) and the Netherlands (Degryse *et al.*, 2009). Studies on Asian stock markets were performed for Taiwan (Chiang *et al.*, 2004), Hong Kong (Wong *et al.*, 2000; Cheuk *et al.*, 2006) and Malaysia (Wong *et al.*, 2010). In general, these insider trading studies support the semi-strong efficient market hypothesis and find that insiders are indeed able to profit from their superior information.

A second evolution in the insider trading literature is the investigation of potential drivers of insiders' profits. First, Jaffe (1974), and Rozeff and Zaman (1988), amongst others, provided evidence that abnormal returns are partly or wholly attributable to latent risk factors like company size and the market-to-book ratio. For example, regarding company size, these studies documented that insiders in small firms earn higher abnormal returns. For these insiders, it is easier to know a significant proportion of all inside information. In addition, prior research has shown that information asymmetries are larger in small companies as they experience less extensive media (Fang and Peress, 2009) and analyst coverage (Bhushan, 1989; Barth *et al.*, 2001). In later studies, additional firm and trade characteristics were evaluated as potential determinants of insider trading profitability. Examples

period before earnings announcements is imposed (Betzer and Theissen 2009); U.S.: reporting no later than two days following the transaction (Cheng *et al.*, 2007).

of such characteristics are the debt-to-equity ratio (Aussenegg and Ranzi, 2008), transaction size (Wisniewski and Bohl, 2005) and trading intensity (Aussenegg and Ranzi, 2008; Betzer and Theissen, 2009). Furthermore, some recent studies have started to take corporate governance related variables into account such as ownership concentration (Fidrmuc *et al.*, 2006), type of controlling shareholder (Betzer and Theissen, 2009; Bajo and Petracci, 2006), board composition (Chang *et al.*, 2005) and executive compensation (Zhang *et al.*, 2005). Chang *et al.* (2005), for example, investigated whether corporate governance mechanisms which are believed to reduce information asymmetry also reduce to opportunities of insiders to earn excess returns. Their results showed that profits were indeed lower in companies with a higher proportion of non-executive directors in the board and audit committee, in companies where the CEO does not occupy the function of board chair and in companies with lower levels of director and block ownership. Other studies investigating the impact of ownership and control structures include Del Brio and Perote (2007), and Betzer and Theissen (2009). These studies documented that insider trading profits in shares of widely held firms are higher compared to those in controlled companies. Also, Bajo and Petracci (2006) investigated whether institutional investors monitor management more closely and concluded that the presence of an institutional investor among a company's shareholders decreases profits from insider trading. Studies which, like our paper, focus on country-specific or economy-wide determinants are rather limited. In general, they focus on differences in the institutional environment such as law enforcement (e.g. Beny, 1999; Wisniewski and Bohl, 2005), investor protection (Fidrmuc *et al.*, 2011) and stock market characteristics, *i.e.* emerging versus developed stock markets (e.g. Bhattacharya *et al.*, 2000; Cheuk *et al.*, 2006). These studies found larger trading profits on emerging markets (e.g. Hong Kong: Cheuk *et al.*, 2006) and in countries with weak law enforcement (e.g. Poland: Wisniewski, Bohl, 2005).

2.4. Financial crisis and hypothesis development

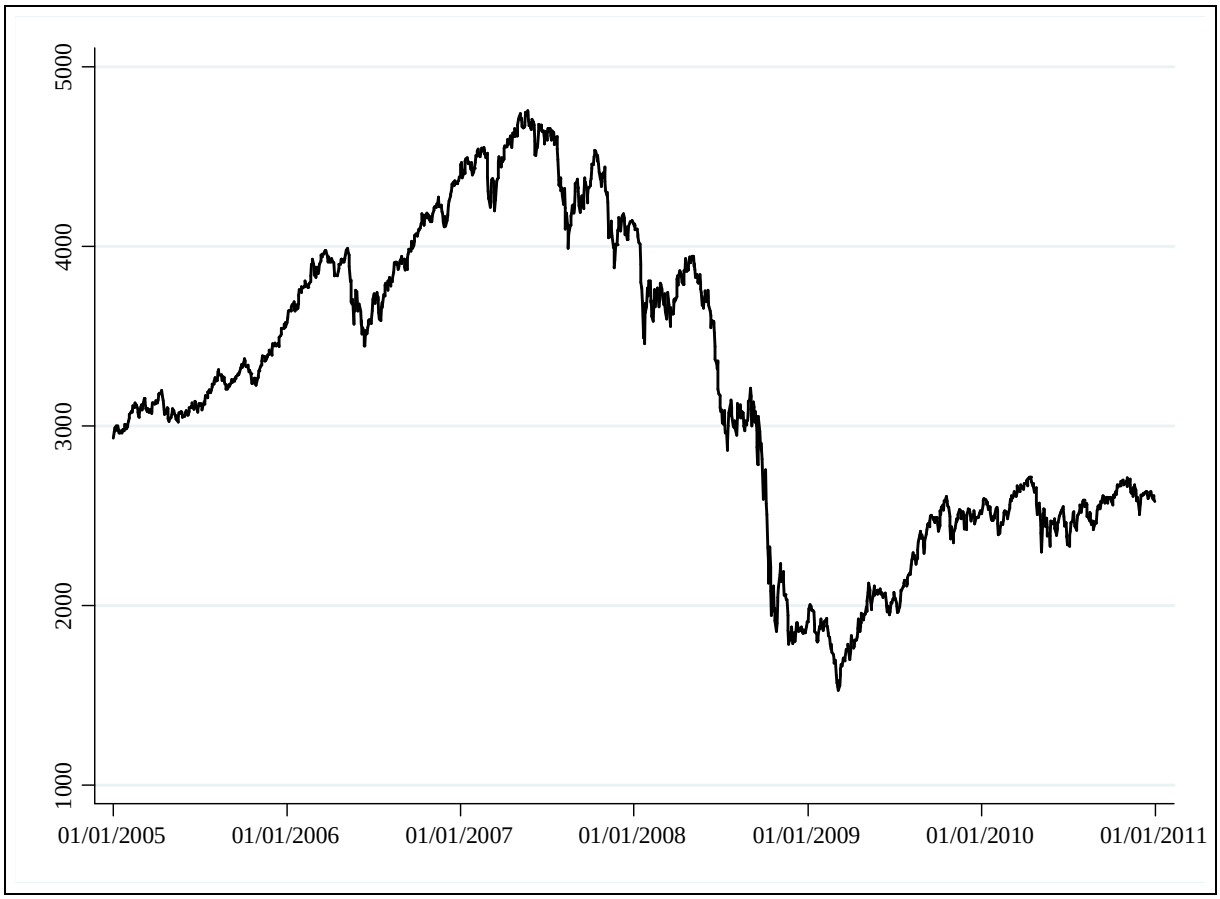
In 2007, the United States housing bubble escalated into the subprime mortgage crisis. This crisis did not only affect the U.S. stock market but spread throughout the financial system, creating a global

financial crisis. Various stock market indices declined rapidly and several financial institutions faced considerable liquidity problems. This crisis was so severe that in several countries, including Belgium, governments and central banks took remedial actions in an attempt to calm the markets and restore confidence in the financial system (European Central Bank, 2008). In this chaotic financial environment, investors reacted more nervously to news and experienced more difficulties in ascertaining the fundamental value of companies.

In this paper, we examine whether these turbulent market conditions created additional informational benefits for insiders. Previous studies have already confirmed that insiders possess private information about their companies (e.g. Seyhun, 1986; Lakonishok and Lee, 2001; Del Brio and Perote, 2002; Wisniewski and Bohl, 2005; Bajo and Petracci, 2006; Cheuk *et al.*, 2006; Betzer and Theissen, 2009). In addition, using the Asian financial crisis as a test case, Cheong *et al.* (2007) and Lim *et al.* (2008) have documented that the efficiency of stock markets is negatively impacted by the occurrence of a financial crisis. Based on these findings, we expect insiders to earn higher abnormal profits during the financial crisis compared to non-crisis periods.

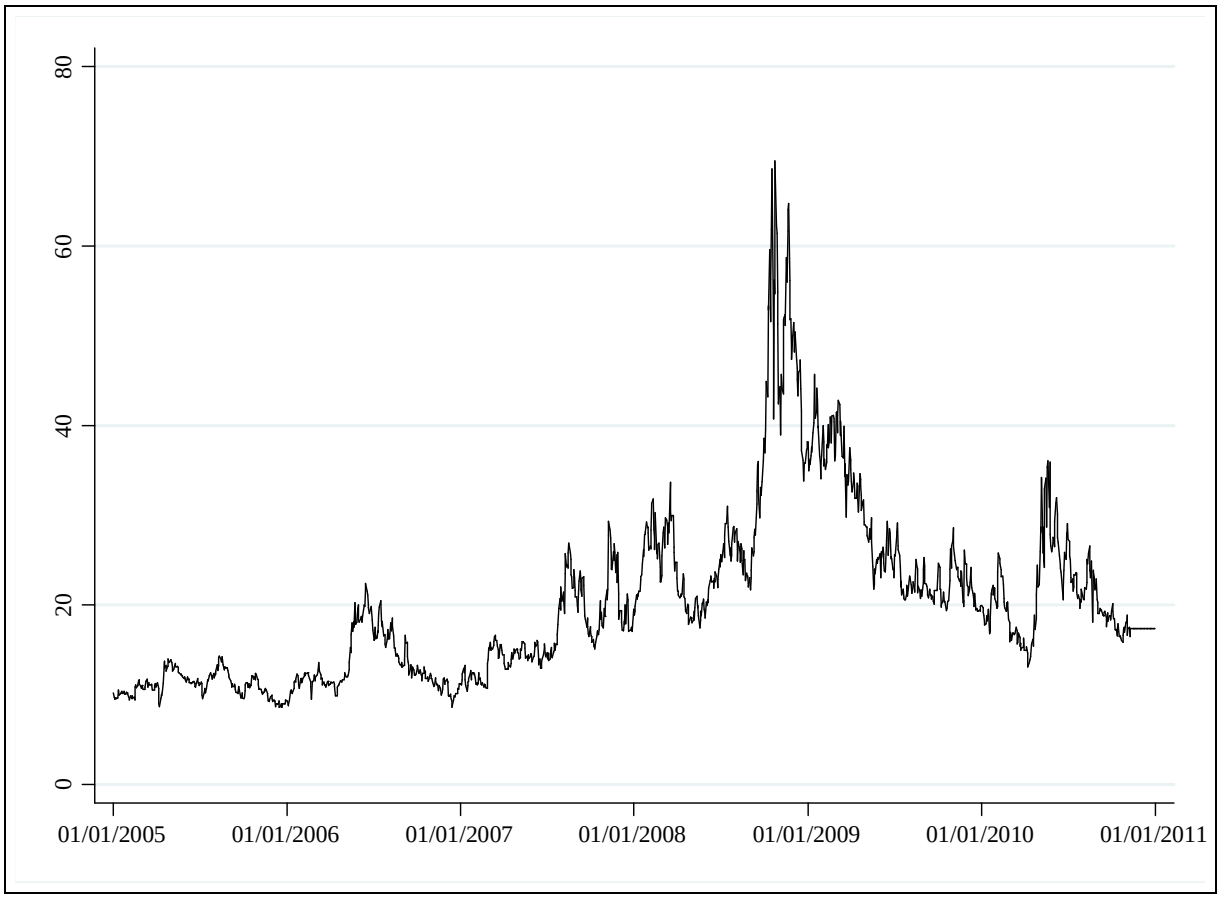
We address this research question by investigating the profitability of insider trading on the Belgian stock market. In Belgium, the highlight of the financial crisis was situated in the period 2008 and 2009. This is illustrated by Figure 2.1. which shows a fast depreciation of the BEL 20 Index, *i.e.* the Blue-chip index for Euronext Brussels, from 2008 until the second half of 2009. Since financial institutions represent a large share of the Belgian market capitalization, the Belgian stock market was especially vulnerable to the financial crisis. At the start of 2008, the three major Belgian banks (Dexia, Fortis and KBC) accounted for no less than 36% of the market value of the BEL 20 Index. In addition, while the EURO STOXX 50 declined by 45% between the beginning of 2008 and the middle of 2009, the BEL 20 lost 51% of its value.

Figure 2.1. BEL 20 Price Index



To further illustrate the gravity of the crisis in the Belgian stock market, Figure 2.2. provides the evolution of the BEL 20 Volatility Index. This index is an indicator of investor sentiment on the Belgian stock market. The calculation uses prices of BEL 20 options and is based on the methodology of the implied Volatility Index (VIX) for S&P500 Index options, *i.e.* the sensitivity barometer for the U.S. stock market. Figure 2.2. indicates that Belgian insiders perceived the investment environment as highly uncertain and unstable during 2008 and 2009. Especially at the end of 2008 the Volatility Index rose dramatically.

Figure 2.2. BEL 20 Volatility Index



In order to empirically assess the impact of the financial crisis, we compare the profitability of insider trading during crisis and non-crisis periods. We estimate the following OLS regression and include the dummy variable *FinancialCrisis*, which is equal to one for transactions carried out during 2008 and 2009 and zero otherwise, *i.e.* during 2006, 2007, and 2010:

$$CAR_{(0,20)} = \alpha + \beta FinancialCrisis + \gamma \mathbf{x} + \varepsilon, \quad (1)$$

where $CAR_{(0,20)}$ stands for the event-specific cumulative abnormal return over 21 trading days, *FinancialCrisis* is the test variable and **x** represents a vector of control variables which are expected to influence the profitability of insider trading. In particular, we included *TradeSize*, which is measured as the net transaction value scaled by the market value of the company at the beginning of the fiscal

year.[4] Previous studies have documented that insiders execute larger transactions if they have stronger beliefs in the future company performance (Karpoff, 1987).

FirmSize, which is measured as the log of the market value of equity, is also controlled for as potential information asymmetries are expected to be larger in smaller firms (Grant, 1980; Collins *et al.*, 1987; Bhushan, 1989). In particular, smaller companies are less followed by financial analysts (Bhushan, 1989; Barth *et al.*, 2001) and experience less media coverage (Fang and Peress, 2009). As a consequence, it is easier for insiders of smaller companies to have an informational benefit over other investors. Insider trading profits should thus be negatively related to firm size (Seyhun, 1986; Finnerty, 1976; Betzer and Theissen, 2009).

MarketToBook, which is equal to the market value of equity divided by the book value of equity (both measured at the beginning of the fiscal year), is also included. *MarketToBook* may have a positive association with insiders' abnormal returns as growth firms with high market-to-book ratios have more unrecognized intangible assets and valuable research and development projects. This allows insiders to have greater informational benefits with respect to future prospects and cash flows (Dierkens, 1991; Smith and Watts, 1992). *MarketToBook* may, on the other hand, also have a negative association with insiders' gains as previous studies have shown that low market-to-book companies outperform high market-to-book companies, *i.e.* the value premium (e.g. Rozeff and Zaman, 1998; Lakonishok and Lee, 2001; Jenter, 2005). Therefore, no prediction is made on the relationship between *MarketToBook* and insider trading profits.

Leverage, which is measured as the debt-to-asset ratio at the beginning of the fiscal year, is controlled for because more levered firms are expected to disseminate more information in an attempt to reduce agency costs. Furthermore, creditors often produce additional information about the borrower in question (Aksu and Kosedag, 2006). Firms with higher debt-to-asset ratios are therefore expected to have smaller information asymmetries.

[4] Jenter (2005) argues that it is preferable to measure trade size relative to some measure of wealth or total equity instead of using absolute trade size. The former is assumed to be a more relevant measure of trading behavior.

A dummy variable for sales transactions (*Sale*) is included because sales of Belgian insiders are expected to be more profitable than purchases. In particular, Belgian listed companies are characterized by a highly concentrated ownership structure (Faccio and Lang, 2002). Controlling shareholders are expected to refrain from selling unless they have strong negative believes about the company future. While, regarding purchases, they are expected to more often execute purchase transactions driven by the objective to obtain or maintain corporate control and less by a profit objective.

A dummy variable *BanksInsurance*, which is set equal to one if a company belongs to the bank or insurance industry and zero otherwise, is also included because of the prevalence of these industries on the Belgian stock market. This approach is in line with Chang and Corbitt (2012) who control for the mining and resource industry, which is predominant on the Australian stock exchange.

Next, we also controlled for companies with a concentrated ownership structure. A dummy variable *OwnershipConc* is set equal to one for companies where a shareholder directly or indirectly controls 50% of the shares and zero otherwise. On the one hand, incentives to monitor the company management may be stronger for dominant shareholders (Del Brio and Perote, 2002). However, on the other hand, controlling shareholders may also use their power to privately obtain information and may consequently increase the information asymmetry with other investors (Demsetz, 1986). Therefore, no prediction is made on the relationship between *OwnershipConc* and insiders' profits.

Furthermore, two variables are included which potentially drive our results regarding the magnitude of insiders' abnormal gains during the financial crisis. First, we expect that the increased uncertainty in financial markets provides additional opportunities for insiders to take advantage of their privileged information. To control for this, we included the BEL 20 Volatility Index as a measure for uncertainty (*VolatilityIndex*). Second, we control for the number of shares traded per transaction day (*InsiderTradesPerDay*) as it can be expected that the trading behavior of insiders differs between crisis and non-crisis periods. On the one hand, insiders might increase their trading frequency as the opportunities to obtain abnormal profits are believed to be larger during the financial crisis. On the

other hand, insiders may also face a higher risk of prosecution if financial markets are unstable as market authorities are even more on alert for violations of trading regulations and especially for infringements on insider trading restrictions. Consequently, insiders might refrain from trading during a period of financial crisis.

2.5. Measurement of insider trading profits

Consistent with previous insider trading studies, we use event-study methodology to measure abnormal gains from insider trading (e.g. Seyhun, 1986; Fidrmuc *et al.*, 2006; Betzer and Theissen, 2009). A first step is to calculate the "normal" or "expected" return using a standard market model (MacKinlay, 1997) or a market model adjusted for thin trading (Dimson, 1979) as the Belgian stock market consists of frequently traded and thinly traded securities (Buysschaert *et al.*, 2004). When a stock is thinly traded this means that it sometimes does not trade for a prolonged period of time. As a consequence, stock prices might cease to immediately reflect new information. This, in turn, leads to an imperfect synchronization between movements in individual stock prices and the market index because both are recorded over different time intervals. This phenomenon is referred to as non-synchronous trading and causes a downward bias in market model beta estimates (Scholes and Williams, 1977; Dimson, 1979). In the Dimson-adjusted market model, stock returns are not only regressed on the contemporaneous market return but also on a number of leading and lagged market returns. Following Buysschaert *et al.* (2004), we added one leading and three lagged coefficients to the market model for Belgian thinly traded securities. In order to determine for which shares the thin trading model should be used, we follow the approach of Friederich *et al.* (2002). According to this approach, we sort companies based on the number of zero returns during the estimation and event window. Next, we apply the Dimson market model to companies in the bottom quartile and the standard market model to all other companies.

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt} \qquad \text{Standard market model,} \qquad (2)$$

$$R_{jt} = \alpha_j + \sum_{k=-3}^{+1} \beta_{jk} R_{m,\,t+k} + \varepsilon_{jt} \qquad \text{Dimson-adjusted market model,} \qquad (3)$$

where R_{jt} is the daily stock return for firm j on day t adjusted for stock dividends, stock splits and issues; R_{mt} and $R_{m,t+k}$ are the daily value-weighed and dividend-adjusted returns on the market index for day t and day $t+k$ respectively. For Belgian listed companies, the benchmark market index is the Brussels All Shares Return Index.

Forecasted "expected" returns are then equal to:

$$\hat{R}_{jt} = \hat{\alpha}_j + \hat{\beta}_j R_{mt} \qquad \text{Standard market model,} \qquad (4)$$

$$\hat{R}_{jt} = \hat{\alpha}_j + \sum_{k=-3}^{+1} \hat{\beta}_{jk} R_{m,\,t+k} \qquad \text{Dimson-adjusted market model,} \qquad (5)$$

where $\hat{\alpha}_j$ and $\hat{\beta}_{j(k)}$ are estimated over an estimation window of 160 trading days (day -160 to day -1) using OLS regression.

Second, abnormal returns, AR_{jt}, are calculated on a company-per-company basis for each day t, with t ranging from day zero, the day of the insider trade, to day 20. This event window of 21 trading days is commonly used in insider trading literature (e.g. Betzer and Theissen, 2009). It enables us to capture the full market reaction to the insider trade without introducing excessive noise from subsequent events. Abnormal returns are calculated by deducting the forecasted "expected" return from the actual return.

$$AR_{jt} = R_{jt} - \hat{R}_{jt}\,, \qquad (6)$$

In particular,

$$AR_{jt} = R_{jt} - \hat{\alpha}_j - \hat{\beta}_j R_{mt} \qquad \text{Standard market model,} \qquad (7)$$

$$AR_{jt} = R_{jt} - \hat{\alpha}_j - \sum_{k=-3}^{+1} \hat{\beta}_{jk} R_{m,t+k} \qquad \text{Dimson-adjusted market model,} \tag{8}$$

Third, the cumulative abnormal return for event *i* of company *j*, $CAR_{ij(0,20)}$, is calculated over a time interval of 21 trading days ranging from day 0 to 20 trading days thereafter. This variable is used as the dependent variable in our regression analysis.

$$CAR_{ij(0,20)} = \sum_{t=0}^{20} AR_{jt} \ , \tag{9}$$

Finally, the cumulative average abnormal return over 21 days, $CAAR_{(0,20)}$, is calculated by averaging the cumulative abnormal returns across all events of all companies.

$$CAAR_{(0,20)} = \frac{1}{N} \sum_{i=1}^{N} CAR_{ij} \ . \tag{10}$$

where *N* is the number of events.

2.6. Sample selection

In our study, we used a unique dataset on the trading activity of Belgian insiders obtained upon request from the FSMA. Data on daily return indices for Belgian companies were gathered from Datastream, while data on the Brussels All Shares Return Index were provided by Euronext Brussels.[5] Both indices are adjusted for dividends as well as stock splits and issues. Furthermore, data on company size and market-to-book and debt-to-asset ratios were collected from Worldscope. Information on company ownership structures was gathered from the Belfirst database of *Bureau Van Dijk*. Industry classifications were obtained from Euronext Brussels and were based on the Industry Classification Benchmark (ICB).

[5] We gratefully acknowledge the assistance of Euronext Brussels for providing the data on the Brussels All Shares Index (ISIN: BE0389550956).

The initial insider trading database included 4889 insider trades reported between May 2006 and August 2010. Consistent with previous studies, several filters were applied to ensure the quality of our data. In order to focus on trades which are most likely to be driven by superior information, we first excluded all over-the-counter transactions as these are expected to be mainly inter-insider trades. In addition, prices negotiated during these private transactions may differ substantially from the quoted stock prices. This could introduce a serious bias in the estimation of abnormal trading gains as the calculation of abnormal returns is based on market-determined prices. Second, we also eliminated all trades involving the acquisition, exercise or conversion of options, warrants, or scripts. For example, regarding the exercise of stock options, previous studies have documented a high correlation between the exercise of options and the subsequent sale of the underlying shares (Ofek and Yermack, 2000). Exercise-events were therefore excluded from the sample in order to avoid double-counting (Huddart and Ke, 2007). Third, we deleted transactions that were reported before their execution because, once the information on insider trades is available to other investors, we expect this information to be incorporated into stock prices and to eliminate any abnormal gains.

Sample size was also further reduced because we deleted all transactions that were not reported in euros, transactions of companies which were not listed during the entire estimation and event window and transactions of companies which were not included in the Brussels All Shares index. In addition, if insiders of the same company executed more than one transactions on the same day, we calculated net transactions. More specifically, trading volumes were deducted from each other when both purchases and sales were executed on the same day and were aggregated when only one of these transaction types occurred. The calculation of daily net transactions is in line with previous insider trading studies (e.g. Jaffe, 1974; Fidrmuc *et al.*, 2006; Betzer and Theissen, 2009) and allows us to determine the daily investment consensus among insiders. Transactions with a net transaction size equal to zero were filtered out. Furthermore, we checked for event-clustering on a company-per-company basis. Transactions for a specific company executed within the event-window of a previous insider trade were eliminated from the sample. If we would not adjust for event-clustering, abnormal returns may be biased because they would also reflect the price reaction to trades that were carried out

later in the event window. Finally, transactions were deleted because of missing data on control variables.

Table 2.1. provides an overview of the applied filters and the number of deleted transactions. The final sample consists of 780 firm-event observations of 96 different companies. 427 transactions were executed outside the financial crisis and 353 trades were executed during the financial crisis. Furthermore, 440 transactions (56.41%) are net purchases and 340 transactions (43.59%) are net sales. In particular, our financial crisis sample consists of 237 net purchases (67.14%) and 116 net sales (32.86%). The non-crisis sample contains 203 net purchases (47.54%) and 224 (52.46%) net sales.

Table 2.1. Sample selection

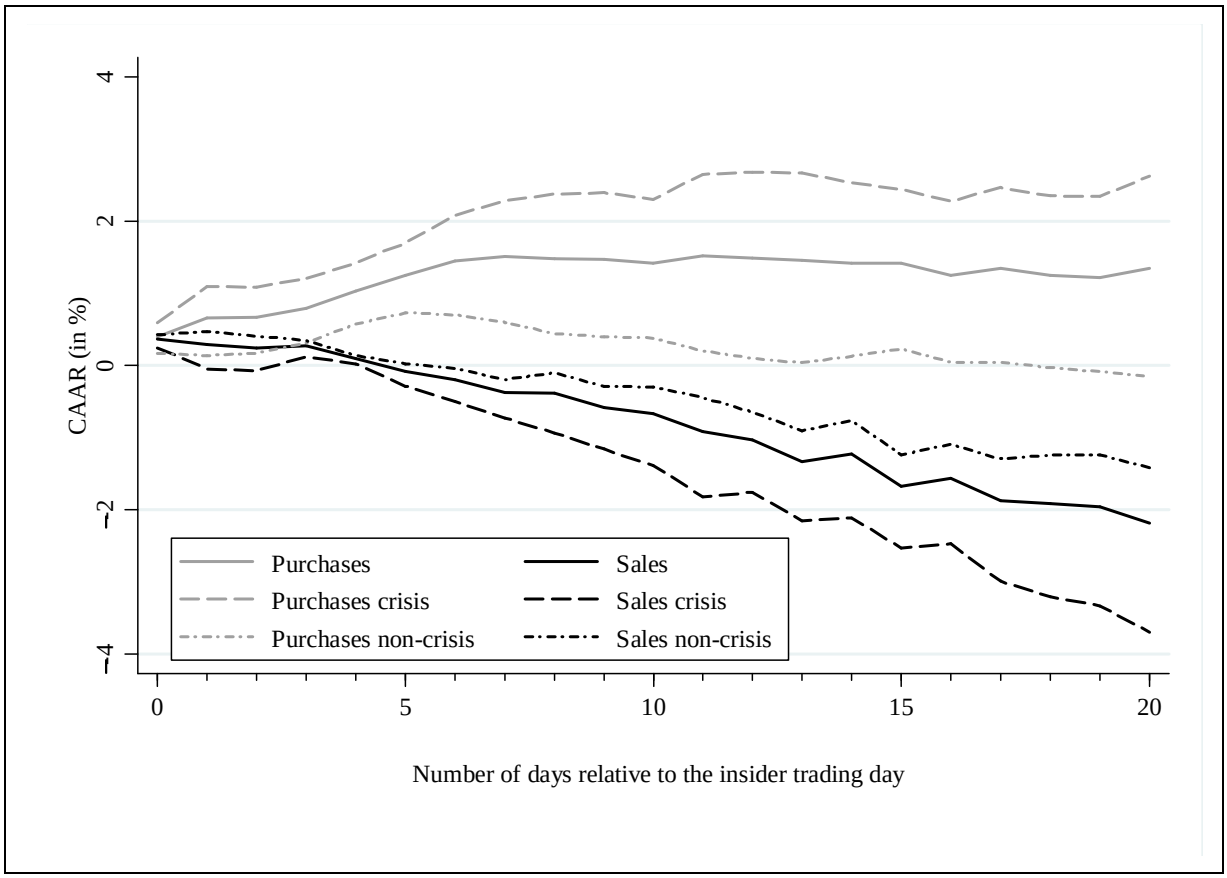
Initial sample	4,889	
Applied filters:		
- over-the-counter transactions		1,241
- trades not involving buying and selling of common shares		369
- trades reported before execution		5
- trades not reported in euro		27
- trades of companies not included in benchmark		128
- net transactions		488
- event clustering adjustment		1,760
- missing stock price data		16
- net trade value equal to 0		5
- missing data on control variables		70
Final sample	780	

2.7. Summary statistics

In Figure 2.3., we show the evolution of the cumulative average abnormal returns over 21 trading days. As can be observed in this figure, the cumulative average abnormal returns following purchases and sales display a similar pattern during crisis and non-crisis periods. Consistent with our hypothesis,

Figure 2.3. seems to indicate that during the financial crisis insider purchases yield more positive abnormal returns, while insider sales yield more negative abnormal returns.

Figure 2.3. Post-event cumulative average abnormal returns



In Table 2.2., we evaluate whether the difference in mean and median cumulative abnormal returns between crisis and non-crisis periods is statistically significant using a univariate t-test and a Mann-Whitney U test respectively. In Table 2.2., it can be observed that insider trading profits are higher during the financial crisis. In particular, the mean (median) cumulative abnormal return in the non-crisis period is equal to 0.67% (0.34%) compared to 2.98% (0.52%) during the financial crisis. For insider purchases, the difference between crisis and non-crisis mean cumulative abnormal returns is equal to 2.78 percentage points. For insider sales, this difference is slightly smaller being 2.28 percentage points. For both transaction types the difference in means is statistically significant. When median cumulative abnormal returns are compared, results are somewhat different. Only for purchases

Table 2.2. Descriptive statistics

	mean				Median			
	non-crisis	crisis	t-stat	p-value	non-crisis	crisis	z-stat	p-value
$CAR_{ij(0,20)}$	0.67	2.98	-2.88	0.00	0.34	0.52	-1.51	0.13
$CAR_{ij(0,20)}$ purchases	-0.15	2.63	-2.50	0.01	-0.53	0.29	-1.67	0.10
$CAR_{ij(0,20)}$ sales	-1.41	-3.69	1.79	0.08	-0.98	-1.72	0.99	0.32
TradeSize	0.10	0.11	-0.17	0.87	0.01	0.02	0.39	0.39
FirmSize	6.30	5.89	2.59	0.01	6.29	5.65	0.01	0.01
MTBV	2.29	1.94	2.13	0.03	1.89	1.25	6.82	0.00
Leverage	23.01	21.97	0.76	0.45	22.67	15.27	1.99	0.05
Sale	0.52	0.33	5.63	0.00	1.00	0.00	5.49	0.00
BanksInsurance	0.05	0.07	-0.80	0.42	0.00	0.00	-0.81	0.42
OwnershipConc	0.27	0.31	-1.29	0.20	0.00	0.00	-1.297	0.19
InsiderTradesPerDay	1.12	1.08	1.42	0.16	1.00	1.00	1.46	0.14
VolatilityIndex	17.63	29.65	-18.87	0.00	15.22	24.82	-18.55	0.00

Notes: Descriptive statistics for a pooled sample of net purchases and sales (N=780). Abnormal returns for sales transactions are multiplied by minus 1 for the calculation of $CAR_{ij(0,20)}$. $CAR_{ij(0,20)}$ is equal to the cumulative abnormal return measured using a standard market model or a Dimson-adjusted market model. *TradeSize* is equal to the eurovalue of the net transactions divided by the market value of the company expressed in percentage. *FirmSize* is equal to the market value of the company at the beginning of the fiscal year expressed in millions of euros. *MarketToBook* is equal to the ratio of the market value of the company divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Sale* is a dummy variable equal to one for net sales transactions and zero otherwise. *BankInsurance* is a dummy variable equal to one if a company belongs to the bank or insurance industry based on the ICB-classification and zero otherwise. *OwnershipConc* is a dummy variable equal to one if a shareholder directly or indirectly controls at least 50% of the company shares and zero otherwise. *FinancialCrisis* represents a dummy variable equal to one for trades executed in 2008 and 2009 and zero otherwise. *InsiderTradePerDay* is equal to the number of shares traded by insiders on a particular trading day. *VolatilityIndex* represents the BEL20 Volatility Index.

the difference between the median CAR during the crisis period (0.29%) and non-crisis period (-0.53%) is significant at the 10%-level. For insider sales, the median CAR earned during the 2008–2009 financial crisis is 0.74 percentage points higher. This difference is, however, not statistically significant.

Table 2.2. further also includes descriptive statistics on the explanatory and control variables. In particular, this table shows that insiders do not trade a significantly larger proportion of company shares during the financial crisis (*TradeSize*) and do not execute more transactions per trading day (*InsiderTradesPerDay*). Also, notwithstanding the fact that Belgian bank and insurance companies suffered severe losses during the 2008–2009 financial crisis, their insiders did not trade substantially more frequent during this financial crisis (*BanksInsurance*). Comparing the proportion of sales transactions between crisis and non-crisis periods (*Sale*), results show that insiders executed relatively less sales during the financial crisis. Finally, crisis-period transactions seem to be concentrated in smaller firms (*FirmSize*) and in firms with a lower market-to-book value (*MarketToBook*).

Table 2.3. contains Spearman and Pearson correlation coefficients of the regression variables. Although both methods indicate that insider trading profitability and the FinancialCrisis-dummy are positively related, only the Pearson correlation is significant. Based on the reported correlations, no multicollinearity problems should be expected as the correlations between the independent variables are below the 0.7 limit identified by Kervin (1992).

2.8. Results

In Table 2.4., OLS regression results are reported. The CARs for sales transactions were multiplied by minus one because we estimated a single, pooled regression for purchases and sales. Furthermore, standard errors are heteroskedasticity robust and adjusted for clustering at the firm-level (Rogers, 1993).

Table 2.3. Spearman and Pearson correlations

	$CAR_{ij(0,20)}$	Financial Crisis	TradeSize	FirmSize	Market ToBook	Leverage	Sale	Banks Insurance	Con-centrated Own	Insider Trades PerDay	Volatility Index
$CAR_{ij(0,20)}$		0.11*	0.05	-0.11*	-0.08*	-0.02	0.04	0.02	0.03	0.04	0.05
FinancialCrisis	0.05		0.01	-0.09*	-0.08*	-0.03	-0.20*	0.03	0.05	-0.05	0.58*
TradeSize	0.01	0.03		-0.09*	0.01	0.03	-0.03	-0.03	-0.01	0.04	-0.02
FirmSize	-0.07	-0.09*	-0.37*		0.22*	0.31*	0.20*	0.42*	0.02	0.06	-0.07*
MarketToBook	-0.04	-0.24*	-0.02	0.39*		0.10*	0.32*	-0.08*	-0.08*	-0.02	-0.04
Leverage	0.03	-0.07*	-0.01	0.32*	0.16*		0.02	0.23*	-0.11*	0.06	0.01
Sale	0.07*	-0.20*	-0.05	0.20*	0.40*	0.03		-0.07*	-0.06	0.03	-0.27*
BanksInsurance	-0.01	0.03	-0.23*	0.37*	-0.03	0.21*	-0.07*		-0.13*	0.03	0.01
ConcentratedOwn	0.01	0.05	0.03	0.00	-0.06	-0.14*	-0.06	-0.13*		-0.06	0.01
InsiderTradesPerDay	0.00	-0.05	0.13*	0.05	0.03	0.07	0.04	0.02	-0.09*		-0.04
VolatilityIndex	0.03	0.66*	0.03	-0.10*	-0.22*	-0.04	-0.30*	0.01	0.03	-0.07	

Notes: Spearman (below diagnonal) and Pearson (above diagonal) correlations for a pooled sample of net purchases and sales (N=780). Abnormal returns for sales transactions are multiplied by minus 1. $CAR_{ij(0,20)}$ is equal to the cumulative abnormal return measured using a standard market model or a Dimson-adjusted market model. *FinancialCrisis* represents a dummy variable equal to one for trades executed in 2008 and 2009 and zero otherwise. *TradeSize* is equal to the eurovalue of the net transactions divided by the market value of the company expressed in percentage. *FirmSize* is equal to the market value of the company at the beginning of the fiscal year expressed in millions of euros. *MarketToBook* is equal to the ratio of the market value of the company divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Sale* is a dummy variable equal to one for net sales transactions and zero otherwise. *BankInsurance* is a dummy variable equal to one if a company belongs to the bank or insurance industry based on the ICB-classification and zero otherwise. *OwnershipConc* is a dummy variable equal to one if a shareholder directly or indirectly controls at least 50% of the company shares and zero otherwise. *InsiderTradePerDay* is equal to the number of shares traded by insiders on a particular trading day. *VolatilityIndex* represents the BEL20 Volatility Index. * denotes two-tailed significance at the 0.05 level.

With respect to the control variables our results show that insider trading profits are significantly higher when insiders buy or sell a larger proportion of the company. Transaction size thus seems to be a reflection of the quality of inside information (Karpoff, 1987). This result was also found in Seyhun (1986) and Cheuk *et al.* (2006).

Furthermore, as in other studies (e.g. Gregory *et al., 1*994; Aussenegg and Ranzi, 2008; Betzer and Theissen, 2009), insider trading profits are negatively related to the size of the company. Insiders of large companies are expected to have a smaller informational advantage as large companies are more intensely monitored by media (Fang and Peress, 2009) and analysts (Bhushan, 1989; Barth *et al.*, 2001).

Our regression results also show that the market-to-book value of a company has a significant negative influence on the profitability of insider trading. This finding is consistent with, amongst others, Cheuk *et al.* (2006), and Betzer and Theissen (2009). Trades in value stocks with low market-to-book ratios thus yield high abnormal returns, while trading in overvalued, high market-to-book companies renders lower abnormal profits.

Furthermore, a firm's financial structure does not seem to influence the magnitude of insiders' gains as the coefficient on *Leverage* is insignificant. This contrasts prior studies' expectations of less information asymmetry and lower abnormal gains in companies with a higher proportion of debt as both creditors and debtors disseminate incidental information when a company raises debt financing (Aksu and Kosedag, 2006).

As expected for insiders of Belgian listed companies, our results show that net sales transactions yield higher abnormal returns than net purchases. Other studies documenting that sales are more informative than purchases include Del Brio *et al.* (2002) and Cheuk *et al.* (2006).

Regarding the profitability of insider trading in bank and insurance companies, our regression analysis indicates that transactions executed by their insiders generate significant higher abnormal returns compared to other industries. Furthermore, as the 2008–2009 financial crisis was denoted as a banking crisis, we also included the interaction of the sector dummy and the financial crisis dummy

(*Crisis*BanksIns)* in order to investigate whether the increased profitability of insider trading during the financial crisis was especially driven by transactions in shares of these financial companies. Our results however indicate that transactions in shares of the bank and insurance companies did not yield significant higher abnormal profits during this period.

Finally, concentrated ownership structures do not seem to affect insiders' abnormal gains as *OwnershipConc* is not significant.

Table 2.4. OLS regression results

Variables	Expected sign	Coef.	s.e.
Constant	?	2.522	2.21
TradeSize	+	0.678**	0.31
FirmSize	-	-0.749***	0.30
MarketToBook	-	-0.305**	0.16
Leverage	-	0.005	0.02
Sale	+	2.673***	0.89
BanksInsurance	?	2.608**	1.20
Crisis*BanksIns	?	3.228	5.38
OwnershipConc	?	1.107	0.92
FinancialCrisis	+	2.032**	1.10
InsiderTradesPerDay	?	1.197	0.91
VolatilityIndex	+	0.012	0.06
Observations		780	
R^2		0.05	
R^2 adj.		0.03	
F-stat.		2.21	
P-value		0.02	

Notes: OLS regression results for a pooled sample of net purchases and sales (N=780). Abnormal returns for sales transactions are multiplied by minus 1. $CAR_{ij(0,20)}$ is equal to the cumulative abnormal return measured using a standard market model or a Dimson-adjusted market model. *TradeSize* is equal to the eurovalue of the net transactions divided by the market value of the company expressed in percentage. *FirmSize* is equal to the market value of the company at the beginning of the fiscal year expressed in millions of euros. *MarketToBook* is equal to the ratio of the market value of the company divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Sale* is a dummy variable equal to one for net sales transactions and zero otherwise. *BankInsurance* is a dummy variable equal to one if a company belongs to the bank or insurance industry based on the ICB-classification. *OwnershipConc* is a dummy variable equal to one if a shareholder directly or indirectly controls at least 50% of the company shares and zero otherwise. *FinancialCrisis* represents a dummy variable equal to one for trades executed in 2008 and 2009 and zero otherwise. *InsiderTradePerDay* is equal to the number of shares traded by insiders on a particular trading day. *VolatilityIndex* represents the BEL20 Volatility Index. Standard errors are adjusted for firm-clustering and heteroskedasticity. ***,**,* denote two-tailed significance at the 0.01, 0.05, 0.10 levels respectively when "Expected sign" is a "?" and one-tailed otherwise.

In order to address our main research question, we included a dummy variable which is equal to one when transactions were carried out during the highlight of the financial crisis in the period 2008–2009 and zero otherwise. The significant and positive coefficient on the dummy variable indicates insider trading yielded significantly higher abnormal returns during the financial crisis.[6] Consequently, the financial crisis increased the level of asymmetric information and negatively affected the efficiency of the Belgian stock market. Our research result corroborates and generalizes the findings by Cheong *et al.* (2007) and Lim *et al.* (2008) who investigated the influence of the 1997 financial crisis on various Asian stock markets and who find that the level of information asymmetry is higher in times of financial crises.

In order to investigate which factors are potentially driving our results concerning the profitability of insider trading during the financial crisis, we also included the BEL 20 Volatility Index (*VolatilityIndex*) and the number of shares traded per transaction day (*InsiderTradesPerDay*) in our regression analysis. With regard to the volatility index, our results show that this index does not have an incremental impact over the financial crisis dummy. So it seems that while the increased volatility over the crisis period, which is reflected by our yearly crisis dummy, is significant in explaining insiders' returns; it is not so that the day-to-day changes in volatility, which are reflected in the volatility index itself, are reflected in changes in insiders' returns once the crisis dummy is included. Also, insider trading activity does not seem to provide incremental information over the financial crisis dummy.

2.9. Conclusion

In this paper, we examined the profitability of trades made by Belgian insiders. Especially, we investigated whether insiders were able to earn higher abnormal gains during the peak of the financial crisis in 2008 and 2009.

[6] In order to check the robustness of our results, we performed an ANOVA and ANCOVA. Both analyses confirm our results from the OLS regression. Furthermore, our results are also robust if no adjustment for non-contaminated event windows is applied.

Our research results show that, while Belgian insiders were generally able to earn excess returns, the magnitude of their abnormal profits was substantially higher during the years of the financial crisis. Consequently, our findings indicate that the efficiency of the stock market was further deteriorated by the occurrence of the financial crisis.

By evaluating this research question we contribute to the literature in several ways. First, we add to the emerging literature on the profitability of insider trading on European stock markets. Second, our results show that the occurrence of a financial crisis is an important determinant of insider trading profitability. Contrary to our study, prior studies have focused on firm and trade characteristics to explain differences in profitability. Finally, our results also contribute to the literature on the efficiency of stock markets during financial crises. Cheong *et al.* (2007) and Lim *et al.* (2008) focused on Asian stock markets during the 1997 financial crisis and found evidence of increased inefficiency. We confirm and generalize their findings by evaluating the efficiency of the highly developed Belgian stock market during another financial crisis.

Our research results also have practical implications. First, they are of potential interest to market regulators. By providing evidence of increased information asymmetry and stock market inefficiency, they indicate that stricter enforcement of insider trading regulation and more supervision might be needed during a financial crisis. Second, our results are also of importance to companies. Previous research has identified information asymmetry as an important driver of the cost of capital. In addition, Love *et al.* (2007), and Ivashina and Scharfstein (2010) have shown that credit lines contract following a financial crisis. Consequently, companies have an interest in limiting the informational benefits of their insiders in order to retain a sufficient supply of external capital. A reduction in insider trading profitability could be achieved by increasing corporate transparency. The influence of corporate transparency on information asymmetry seems an interesting area for future research.

2.10. References

Aksu, M., & Kosedag, A. (2006). Transparency and Disclosure Scores and Their Determinants in the Istanbul Stock Exchange. *Corporate Governance: An International Review*, 14(4), p.277-296.

Aussenegg, W., & Ranzi, R. (2008). *Corporate Insider Trading and the Short-Run Price Impact of Private Information in Continental Europe*. Working paper.

Bajo, E., & Petracci, B. (2006). Do What Insiders Do: Abnormal Performances after the Release of Insiders' Relevant Transactions. *Studies in Economics and Finance*, 23(2), p.94-118.

Bajo, E., Bigelli, M., Hillier, D., & Petracci, B. (2009). The Determinants of Regulatory Compliance: An Analysis of Insider Trading Disclosures in Italy. *Journal of Business Ethics*, 90(3), p.331-343.

Barth, M. E., Kasznik, R., & McNichols, M. F. (2001). Analyst Coverage and Intangible Assets. *Journal of Accounting Research*, 39(1), p.1-34.

Beny, L. N. (1999). *A Comparative Empirical Investigation of Agency and Market Theories of Insider Trading*. Working paper.

Betzer, A., & Theissen, E. (2009). Insider Trading and Corporate Governance: The Case of Germany. *European Financial Management*, 15(2), p.402-429.

Bhattacharya, U., Daouk, H., Jorgenson, B., & Kehr, C. H. (2000). When an Event Is Not an Event: The Curious Case of an Emerging Market. *Journal of Financial Economics*, 55(1), p.69-101.

Bhushan, R. (1989). Firm Characteristics and Analyst Following. *Journal of Accounting and Economics*, 11(2-3), p.255-274.

Buysschaert, A., Deloof, M., & Jegers, M. (2004). Equity Sales in Belgian Corporate Groups: Expropriation of Minority Shareholders? A Clinical Study. *Journal of Corporate Finance*, 10(1), p.81-103.

Chang, M., Hillman, R., & Watson, I. D. (2005). Are Corporate Governance Mechanisms Effective in Reducing Insider Trading Profits? *Company and Securities Law Journal*, 23(3), p.165-180.

Chang, M., & Corbitt, R. (2012). The Effect of Cross-Listing on Insider Trading Returns. *Accounting and Finance*, 52(3), p.723-741.

Cheng, L. T. W., & Leung, T. Y. (2008). Is There Information Content from Insider Trading Activities Preceding Earnings and Dividend Announcements in Hong Kong? *Accounting and Finance*, 48(3), p.417-437.

Cheng, S., Nagar, V., & Rajan, M. V. (2007). Insider Trades and Private Information: The Special Case of Delayed-Disclosure Trades. *Review of Financial Studies*, 20(5), p.1833-1864.

Cheong, C. W., Hassan Shaari Mohd Nor, A., & Isa, Z. (2007). Asymmetry and Long-Memory Volatility: Some Empirical Evidence Using GARCH. *Physica A: Statistical and Theoretical Physics*, 373, p.651-664.

Cheuk, M.-Y., Fan, D. K., & So, R. W. (2006). Insider Trading in Hong Kong: Some Stylized Facts. *Pacific-Basin Finance Journal*, 14(1), p.73-90.

Chiang, M.-H., Hwang, L.-J., & Wu, Y.-C. (2004). Insider Trading Performance in the Taiwan Stock Market. *International Journal of Business*, 3(3), p.239-256.

Ching, K. M. L., Firth, M., & Rui, O. M. (2006). The Information Content of Insider Trading around Seasoned Equity Offerings. *Pacific-Basin Finance Journal*, 14(1), p.91-117.

Collins, D. W., Kothari, S. P., & Rayburn, J. D. (1987). Firm Size and the Information Content of Prices with Respect to Earnings. *Journal of Accounting and Economics*, 9(2), p.111-138.

Degryse, H., De Jong, F., & Lefebvre, J. (2009). *An Empirical Analysis of Legal Insider Trading in the Netherlands*. Working paper.

Del Brio, E. B., Miguel, A., & Perote, J. (2002). An Investigation of Insider Trading Profits in the Spanish Stock Market. *Quarterly Review of Economics and Finance*, 42(1), p.73-94.

Del Brio, E. B., & Perote, J. (2007). What Enhances Insider Trading Profitability? *Atlantic Economic Journal*, 35(2), p.173-188.

Demsetz, H. (1986). Corporate Control, Insider Trading, and Rates of Return. *American Economic Review*, 76(2), p.313-316.

Dierkens, N. (1991). Information Asymmetry and Equity Issues. *Journal of Financial and Quantitative Analysis*, 26(2), p.181-199.

Dimson, E. (1979). Risk Measurement When Shares Are Subject to Infrequent Trading. *Journal of Financial Economics*, 7(2), p.197-226.

European Central Bank. *Financial Stability Review December 2008*. Available at: http://www.ecb.int/pub/pdf/other/financialstabilityreview200812en.pdf.

Faccio, M., & Lang, L. H. P. (2002). The Ultimate Ownership of Western European Corporations. *Journal of Financial Economics*, 65(3), p.365-395.

Fang, L., & Peress, J. (2009). Media Coverage and the Cross-Section of Stock Returns. *Journal of Finance*, 64(5), p.2023-2052.

Fidrmuc, J. P., Goergen, M., & Renneboog, L. (2006). Insider Trading, News Releases, and Ownership Concentration. *Journal of Finance*, 61(6), p.2931-2973.

Fidrmuc, J. P., Korczak, A., & Korczak, P. (2011). *Why Are Abnormal Returns after Insider Transactions Larger in Better Investor Protection Countries?* Working paper.

Finnerty, J. E. (1976). Insiders and Market Efficiency. *Journal of Finance*, 31(4), p.1141-1148.

Frankel, R., & Li, X. (2004). Characteristics of a Firm's Information Environment and the Information Asymmetry between Insiders and Outsiders. *Journal of Accounting and Economics*, 37(2), p.229-259.

Friederich, S., Gregory, A., Matatko, J., & Tonks, I. (2002). Short-Run Returns around the Trades of Corporate Insiders on the London Stock Exchange. *European Financial Management*, 8(1), p.7-30.

Gosnell, T., Keown, A. J., & Pinkerton, J. M. (1992). Bankruptcy and Insider Trading: Differences between Exchange-Listed and OTC Firms. *Journal of Finance*, 47(1), p.349-362.

Grant, E. B. (1980). Market Implications of Differential Amounts of Interim Information. *Journal of Accounting Research*, 18(1), p.255-268.

Gregory, A., Matatko, J., Tonks, I., & Purkis, R. (1994). UK Directors' Trading: The Impact of Dealings in Smaller Firms. *Economic Journal*, 104(422), p.37-53.

Huddart, S. J., & Ke, B. (2007). Information Asymmetry and Cross-Sectional Variation in Insider Trading. *Contemporary Accounting Research*, 24(1), p.195-232.

Ivashina, V., & Scharfstein, D. (2010). Bank Lending During the Financial Crisis of 2008. *Journal of Financial Economics*, 97(3), p.319-338.

Jaffe, J. F. (1974). Special Information and Insider Trading. *Journal of Business*, 47(3), p.410-428.

Jeng, L. A., Metrick, A., & Zeckhauser, R. (2003). Estimating the Returns to Insider Trading: A Performance-Evaluation Perspective. *Review of Economics and Statistics*, 85(2), p.453-471.

Jenter, D. (2005). Market Timing and Managerial Portfolio Decisions. *Journal of Finance*, 60(4), p.1903-1949.

Karpoff, J. M. (1987). The Relation between Price Changes and Trading Volume: A Survey. *Journal of Financial and Quantitative Analysis*, 22(1), p.109-126.

Kervin, J. B. (1992). *Methods for Business Research*. New York, NY: Harper Collins.

Lakonishok, J., & Lee, I. (2001). Are Insider Trades Informative? *Review of Financial Studies*, 14(1), p.79-111.

Li, O. Z., & Zhang, Y. (2006). *Financial Restatement Announcements and Insider Trading*. Working paper.

Lim, K.-P., Brooks, R. D., & Kim, J. H. (2008). Financial Crisis and Stock Market Efficiency: Empirical Evidence from Asian Countries. *International Review of Financial Analysis*, 17(3), p.571-591.

Lin, J.-C., & Howe, J. S. (1990). Insider Trading in the OTC Market. *Journal of Finance*, 45(4), p.1273-1284.

Love, I., Preve, L. A., & Sarria-Allende, V. (2007). Trade Credit and Bank Credit: Evidence from Recent Financial Crises. *Journal of Financial Economics*, 83(2), p.453-469.

MacKinlay, A. C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature*, 35(1), p.13-39.

Ofek, E., & Yermack, D. (2000). Taking Stock: Equity-Based Compensation and the Evolution of Managerial Ownership. *Journal of Finance*, 55(3), p.1367-1384.

Park, J. C., & Shin, Y. C. (2009). *The Impact of Increased Segment Disclosure on Insider Trading Profits: Evidence from SFAS No. 131*. Working paper.

Rogers, W. (1993). Quantile Regression Standard Errors. *Stata Technical Bulletin*, 2(9), p.19-22.

Rozeff, M. S., & Zaman, M. A. (1988). Market-Efficiency and Insider Trading: New Evidence. *Journal of Business*, 61(1), p.25-44.

Rozeff, M. S., & Zaman, M. A. (1998). Overreaction and Insider Trading: Evidence from Growth and Value Portfolios. *Journal of Finance*, 53(2), p.701-716.

Scholes, M., & Williams, J. (1977). Estimating Betas from Nonsynchronous Data. *Journal of Financial Economics,* 5(3), p.309-327.

Seyhun, H. N. (1986). Insiders' Profits, Costs of Trading, and Market Efficiency. *Journal of Financial Economics,* 16(2), p.189-212.

Seyhun, H. N., & Bradley, M. (1997). Corporate Bankruptcy and Insider Trading. *Journal of Business,* 70(2), p.189-216.

Smith, C. W., & Watts, R. (1992). The Investment Opportunity Set and Corporate Financing, Dividend, and Compensation Policies. *Journal of Financial Economics,* 32(3), p.263-292.

Tvaronavičienė, M., & Michailova, J. (2006). Factors Affecting Securities Prices: Theoretical Versus Practical Approach. *Journal of Business Economics and Management,* 7(4), p.213-222.

Wisniewski, T. P., & Bohl, M. T. (2005). The Information Content of Registered Insider Trading under Lax Law Enforcement. *International Review of Law and Economics,* 25(2), p.169-185.

Wong, E. S. K., Fatt, C. K., & Yap, P. (2010). Disclosure and Corporate Governance of Insider Trading: The Malaysian Perspectives. *African Journal of Business Management,* 4(9), p.1883-1893.

Wong, M. C. S., Cheung, Y.-L., & Wu, L. (2000). Insider Trading in the Hong Kong Stock Market. *Asia-Pacific Financial Markets,* 7(3), p.275-288.

Zhang, W., Cahan, S. F., & Allen, A. C. (2005). Insider Trading and Pay-Performance Sensitivity: An Empirical Analysis. *Journal of Business Finance and Accounting,* 32(9-10), p.1887-1919.

CHAPTER 3:

DOES HIGH-QUALITY CORPORATE COMMUNICATION REDUCE INSIDER TRADING PROFITABILITY*

Debby Van Geyt [a], Philippe Van Cauwenberge [a] and Heidi Vander Bauwhede [a]

Abstract

Exploring a unique database on insider trading in Belgium, we investigate whether high-quality corporate communication contributes to reducing insider trading profitability and information asymmetry. Using disclosure scores of professional financial analysts as a proxy for communication quality, we find a significant negative association between corporate communication quality and insider trading profitability. Closer inspection of different communication channels shows that the quality of annual reports, press releases and investor relation activities is more relevant in explaining insiders' abnormal returns than the quality of corporate websites.

[a] Ghent University, Department of Accountancy and Corporate Finance, Kuiperskaai 55/E, 9000 Ghent, Belgium

* This paper has benefited from presentation at the 2011 European Accounting Association Annual Congress (Rome, Italy). Financial support from the "Special Research Fund" (BOF) and the Hercules project is gratefully acknowledged.

3.1. Introduction

This paper examines whether high-quality communication is effective in reducing the profitability of insider trading. Previous research has documented that, despite regulations on insider trading, insiders still earn significant abnormal returns from trading on information asymmetries between insiders and outside investors. As suggested by analytical work on disclosure (e.g. Diamond 1985; Verrecchia, 2001), an important instrument to decrease this asymmetry could be the dissemination of high-quality information. Particularly, when a company improves its communication by disseminating more, precise and/or timely information, then the informational advantage of insiders should decrease as the quality and quantity of information available to other investors ameliorates. Consequently, as insiders' trading returns are a representation of the importance and precision of their informational advantage, we hypothesize that insiders' abnormal returns are reduced in companies with higher-quality corporate communication.

In an additional analysis this paper also examines whether the impact of disclosure quality differs between communications channels, *i.e.* annual reports, press releases, websites and investor relation activities. The different channels and information communicated through these channels have specific characteristics that might limit or enhance their ability to affect the level of information asymmetry, like, for example, timeliness of the disclosed information, time horizon (forward-looking versus backward-looking), need for external verification and voluntary or mandatory disclosures. We therefore hypothesize that the impact of disclosure quality on insider trading profits and on information asymmetry in general depends on the communication channel.

Within the extensive literature on insider trading, an important line of research has focused on the determinants of insider trading profitability. Early studies by Jaffe (1974) and Finnerty (1976) identified company risk factors like size and the market-to-book ratio as important drivers of insiders' abnormal returns. Building on these findings, later studies attempted to broaden the scope of analysis and considered additional firm and trade characteristics. For example, some researchers examined whether the informational benefit of insiders is related to their position within a company (e.g.

Seyhun, 1986; Fidrmuc *et al.*, 2006; Betzer and Theissen, 2009). Others investigated the influence of the debt-to-asset ratio (Aussenegg and Ranzi, 2008), trade size (Seyhun, 1986; Cheuk *et al.*, 2006; Wisniewski and Bohl, 2005), trade intensity (Aussenegg and Ranzi, 2008; Betzer and Theissen, 2009) and cross-listing on foreign stock markets (Korczak and Lasfer, 2007; Chang and Corbitt, 2012). More recently, as researchers and practitioners emphasized the importance of good corporate governance in managing the information asymmetry problem, insider trading research has started to explore whether corporate governance practices affect the magnitude of insiders' trading profits. Accordingly, previous studies have looked into the effect of ownership concentration (Fidrmuc *et al.*, 2006; Del Brio and Perote, 2007; Betzer and Theissen, 2009), type of controlling shareholder (Betzer and Theissen, 2009), board composition (Chang *et al.*, 2005) and executive compensation (Zhang *et al.*, 2005). Nevertheless, while it is generally acknowledged that comprehensive, transparent and timely disclosures are essential elements of good corporate governance (Bushman and Smith, 2001; Mallin, 2002; Mitton, 2002; Patel and Dallas, 2002; OECD, 2004), no prior study has thoroughly investigated the effect of the quality of corporate disclosures on insider trading returns. In this study, we examine this relation by relating professional analyst disclosure scores to the profitability of insider trading.

To address our research question, we use data from Belgian listed companies. La Porta *et al.* (1997, 1998) and Faccio and Lang (2002) depict Belgium as an insider economy characterized by highly concentrated and controlling ownership. In such an environment, minority shareholders are at a disadvantage as large, dominant shareholders can use their power to privately acquire information, which makes them less dependent on public communication. As a consequence, in Belgium, the role of corporate communication in reducing information asymmetry is potentially very important.

To measure the quality of corporate communication, we use a disclosure score granted by the Belgian Association of Financial Analysts (BVFA).[1] Each year, the BVFA invites its members to screen the communication of a number of companies and assign a disclosure rating. This rating evaluates several disclosure characteristics identified as important attributes of high-quality communication, *i.e.* preciseness, transparency, timeliness and scope (Brown and Hillegeist, 2007). Contrary to comparable

[1] BVFA stands for "*Belgische Vereniging van Financiële Analisten*".

analyst ratings, like those assigned by Standards and Poor's (S&P) and the Association for Investment Management and Research (AIMR) (Welker, 1995; Patel *et al.*, 2002; Khanna *et al.*, 2004; Brown and Hillegeist, 2007), the BVFA also evaluates the communication quality of smaller companies. For these companies, information asymmetries between insiders and other market participants are potentially more significant, which makes high-quality communication even more relevant (BVFA press release, 2010).

To measure the profitability of insider trading, we exploit a unique database on insider trading provided by the Belgian Financial Services and Markets Authority (FSMA) and calculate the cumulative abnormal returns that insiders earn when trading in their own stock. Since the liquidity of some Belgian listed securities is rather low (Buysschaert *et al.*, 2004), the abnormal returns are estimated either using a standard market model (MacKinlay, 1997) or market model adjusted for thin trading (Dimson, 1979) depending on whether stocks are thinly traded or not.

Based on a sample of insider trades that occurred between May 2006 and August 2010, our results show that high-quality communication is important in reducing the profitability of insider trading. Furthermore, we find that the quality of annual reports, press releases and investor relation activities, is relatively more effective in reducing information asymmetry than the quality of corporate websites. Investor relation activities, which are used to communicate timely and forward-looking information directly to the investor community, appear to be most effective.

Our research contributes to two streams of literature. First, we add to the literature on insider trading profitability by examining the impact of high-quality communication, as proxied by a comprehensive measure of disclosure quality assigned by professional users of corporate communication. To our knowledge, there are only a handful of papers that investigate whether corporate communication quality influences insiders' informational benefits. In addition, these papers obtain inconclusive results and use indirect measures of reporting quality, such as analyst following, news coverage and value relevance (e.g. Frankel and Li, 2004). In contrast to these studies, we use a more direct and objective measure of communication quality which is assigned by professional users of corporate

communication, *i.e.* financial analysts and fund managers. In addition, our measure includes an individual assessment of the quality of annual reports, press releases, websites and investor relation activities. This allows us to assess whether the effect of the quality of communication differs across alternative communication channels. A general advantage of using externally-developed disclosure ratings is that these do not involve judgment by the researcher(s) in question. This facilitates the verification of research results and the application of the rating in other research designs (Healy and Palepu, 2001). In addition, researchers only have access to published information and lack knowledge of disclosures distributed through unpublished channels like analyst meetings and conference calls (Healy and Palepu, 2001). Analysts are also regarded as the primary and most influential users of corporate communication as they communicate with companies on a daily basis (e.g. Schipper, 1991; Hirst *et al.*, 1995; Revsine *et al.*, 2004; IASB, 2005). This puts them in a privileged position to objectively evaluate the quality of corporate disclosures.

Second, our work contributes to the literature examining the relationship between disclosure and information asymmetry by using an alternative proxy for information asymmetry. Prior work examined this relation using, for example, bid-ask spreads and the probability of informed trading as proxies for information asymmetry (e.g. Welker, 1995; Brown and Hillegeist, 2007). By contrast, we proxy information asymmetry by the magnitude of insiders' abnormal returns. The use of this proxy is well-established in the empirical literature (e.g. Frankel and Li, 2004; Chang *et al.*, 2005) and supported by theoretical work (Kyle, 1985). Furthermore, the majority of prior disclosure studies is based on U.S. data (Healy and Palepu, 2001). Re-examining the disclosure - information asymmetry relation for a sample of Belgian listed companies may provide valuable new insights as the Belgian institutional setting differs from the U.S. For example, with regard to ownership structures, Belgian listed companies generally have a concentrated and controlling ownership (La Porta *et al.*, 1997, 1998; Renneboog, 2000; Faccio and Lang, 2002; Barontini and Caprio, 2006). In addition, they are often controlled by a family or a single controlling owner (Faccio and Lang, 2002). U.S. companies, on the other hand, tend to have diffuse ownership and are less (family-) controlled. Regarding the provision of external capital, Belgian companies primarily raise external capital through bank financing while

their U.S. counterparts generally rely an equity financing (La Porta, 1997). Obviously, information needs of both capital providers differ substantially. Other institutional differences include the weaker level of investor protection (La Porta, 1998; Djankov *et al*., 2008; Fidrmuc *et al.*, 2011) and the influence of corporate law and taxation on financial reporting in Belgium (Vanstraelen *et al.*, 2003). The above characteristics of the Belgian institutional environment do on the other hand bear a strong resemblance to the economies of other continental European countries with a French-based civil law system. According to La Porta *et al.* (1997, 1998), the Belgium legal and institutional environment is similar to the French, Dutch, Spanish, Italian and Portuguese environment. Consequently, we may assume that the results of our inquiry are, to some extent, generalizable to these economies. Prior research on the disclosure - information asymmetry relation in French civil law countries is very limited. The only examples that we are aware of are Vanstraelen *et al.* (2003) which focused on three European countries including Belgium and the Netherlands, Aerts *et al.* (2007) which examined disclosure practices in several continental European countries including Belgium, France and the Netherlands and finally, Lakhal (2009) which focused on French listed companies. None of these studies have however used a comprehensive disclosure score similar to the BVFA-rating that evaluates different communication channels. In addition, both Vanstraelen *et al.* (2003) and Lakhal (2009) do not take the quality of disclosures into account. Aerts *et al.* (2007) accounts for disclosure quality by considering the way in which items are described, *i.e.* general terms, specific terms or quantitative/ monetary terms.

From a regulator's point of view, we believe that the results of our inquiry provide additional insight into the effect of higher-quality communication on information asymmetry. In general, they confirm the importance of high-quality communication in reducing information inequities between a company and its stakeholders and in preventing unfair enrichment by privileged insiders. In addition, we further deepen the insight into the disclosure - information asymmetry relationship by examining this relation for different communication channels, *i.e.* semi-mandatory (*i.e.* annual reports)[2] and voluntary channels (*i.e.* press releases, websites, investor relations), and providing evidence that different

[2] Information included in annual reports consists of mandatory financial statements information possibly supplemented by voluntary disclosures on business segments, future prospects, company objectives, etc.

channels have a different effect on the level of information asymmetry. Interestingly, our results show that, whereas regulators primarily focus on annual reports and backward-looking financial statements information, this communication channel is not the most effective in reducing the level of information asymmetry. By contrast, investor relation activities, which are used to communicate timely and forward-looking information on a voluntary basis, appear to be most effective. We believe that this finding is relevant for regulators and may shed new light on the discussion concerning the shift towards more or less regulation of markets.

The remainder of this chapter is organized as follows. In section 2 a discussion is provided of the current Belgian legislation on insider trading. In section 3 a brief overview of related literature is given, accompanied by the hypothesis development. The research design and proxies for information asymmetry and corporate communication quality are discussed in section 4. Next, section 5 describes the data which are used and section 6 reports some descriptive statistics. The results of the empirical inquiry are disclosed and interpreted in section 7. In section 8 some sensitivity checks are performed. Finally, section 9 concludes.

3.2. Belgian legislation on insider trading

The current Belgian legislation on insider trading is founded in the 2003 European Directive on insider dealing and market manipulation (Directive 2003/6/EC), *i.e.* the Market Abuse Directive. The legislation is based on the central concept of "inside information" which is defined as "any information of a precise nature which has not been made public, relating, directly or indirectly, to one or more issuers of financial instruments or to one or more financial instruments and which, if it were made public, would be likely to have a significant effect on the prices of those financial instruments or on the price of related financial instruments" (Law of 2 August 2002, art. 2). The Belgian legislation formulates three prohibitions on the use of this inside information (Law of 2 August 2002, art. 25 and art. 40). First, persons in possession of inside information who are aware, or should be aware that the information concerned is inside information are prohibited from trading. In particular, they may not

use the information by acquiring or disposing of financial instruments to which the information relates, or by trying to do so. Second, they may not communicate the inside information to third parties, except within the framework of the normal exercise of their job description. Finally, they must also refrain from making recommendations or induce another person to acquire or dispose of the financial instruments in question on the basis of the information.

An offender of these legal prohibitions may face administrative sanctions imposed by the FSMA as well as criminal sanctions.[3] In particular, the FSMA may order the offender to pay damages between 250 euros and 50,000 euros for each day an infringement on the insider trading regulations occurs. The total amount of payments may however not exceed 2,500,000 euros. In addition, the FSMA may also impose an administrative fine between 2,500 euros and 2,500,000 euros. If however the offender obtained a capital gain from the infringement, the maximum fine is raised to twice this gain and, in case of a repeat offence, to three times the capital gain (Law 2 August 2002, art. 36). With regard to the criminal sanctions, an offender may be condemned to a prison sentence between three months and one year, payment of a fine between 50 euros and 10,000 euros and/or payment of criminal fine corresponding to a maximum of three times the gain earned, directly or indirectly, by illegal insider trading (Law 2 August 2002, art. 40).

In order to prevent illegal trading by insiders, the Belgian legislation has also formulated several preventive measures including: (1) the obligation for issuers of financial instruments to reveal inside information immediately. This information should be published on the website of the financial market on which the financial instrument is listed (Law 2 August 2002, art. 10). (2) The requirement for issuers to draw up a list of persons who have access to inside information. This list must be kept at the disposal of the FSMA for a period of five years (Law 2 August 2002, art. 25bis). (3) The obligation for persons who professionally arrange transactions in financial instruments to inform the FSMA about suspicious insider transactions (Law 2 August 2002, art. 25bis). (4) And the requirement for persons

[3] With regard to the prohibition of trading on inside information an important distinction is made between administrative and criminal sanctions. In particular, in case of trading by insiders themselves, criminal sanctions can only be imposed if there is sufficient proof of a causal connection between the possession of inside information and the reprehensible transaction. Administrative fines, on the other hand, may be enforced as soon as a person is in possession of inside information and makes a transaction. No proof is required that a transaction was actually inspired by the inside information. (Tison and Ravelingien, 2007).

who fulfill an executive function in the issuing company as well as persons closely related to them, e.g. spouses, partners, children and other relatives, to report their transactions to the FSMA. The transactions must be reported within five working days after their execution. However, as long as the total sum of the transactions during the current calendar year is below 5,000 euros, the reporting may be delayed until 31 January of the next calendar year (Law 2 August 2002, art. 25bis). The FSMA is responsible for publishing all reported transactions on their website. In case of non-compliance with the above preventive measure, the FSMA has the authority to impose administrative sanctions (Law of 2 August 2002, art. 36).

3.3. Prior literature and hypothesis development

3.3.1. The impact of corporate communication quality on insider trading profitability

Theoretical research on disclosure shows that information asymmetry should be negatively associated with the quality of corporate communication (e.g. Diamond, 1985; Verrecchia, 2001). By disclosing more, precise and complete information in a timely and transparent manner, companies reduce the amount of private information while simultaneously increasing the amount and quality of public information available to investors. In general, the existence of this negative association is supported by empirical research. Using a myriad of proxies for disclosure quality, including conference call activity and analyst disclosure ratings, studies have shown that a lower level of information asymmetry results into more informative stock prices (Gelb and Zarowin, 2002; Lundholm and Myers, 2002), lower bid-ask spreads (Welker, 1995; Heflin *et al.* 2005), less analyst forecast dispersion (Lang and Lundholm, 1996; Hope, 2003), and a lower cost of equity (Botosan, 1997) and dept capital (Sengupta, 1998).

Information asymmetry can, however, also affect the profitability of insider trading. In particular, insider trading research is based on the presumption that a certain level of information asymmetry exists between insiders and outside investors as insiders are assumed to have a more in-depth knowledge of a firm's economics as well as privileged access to private information. If insiders decide

to trade upon their informational benefits, prior research indicates that significant abnormal trading profits can be earned (e.g. Lin and Howe, 1990; Fidrmuc *et al.*, 2006; Aktas *et al.*, 2008). In addition, supporting theoretical work by Kyle (1985), these studies have shown that insiders' profits increase with their informational benefits.

Hence, given the above theory and findings that higher-quality communication decreases the level of information asymmetry and that information asymmetry determines the profitability of insider trading, it can be expected that better communication reduces the magnitude of insiders' abnormal returns. However, despite the large attention given to corporate communication quality by practitioners and by researchers in corporate governance and disclosure literature (e.g. Patel and Dallas, 2002; OECD, 2004; Brown and Hillegeist, 2007; Chen *et al.*, 2007), only few studies have examined the effect on insider trading profitability. One theoretical study by Baiman and Verrecchia (1996) examined this relationship and confirmed that higher-quality disclosures reduce the profits from insider trading. Empirically, Frankel and Li (2004) found that some elements of a firm's information environment, *i.e.* the extent of analyst following and the value relevance of financial statements, indeed mitigate the informational benefits of insiders (*i.e.* lower gains for and/or less purchase transactions by insiders). However, other elements of the information environment, *i.e.* news coverage, seem to enhance these informational benefits. A more recent study by Betzer and Theissen (2009) used the voluntary adoption of international accounting standards (*i.e.* U.S. Generally Accepted Accounting Principles or International Accounting Standards) as a proxy for the informativeness and transparency of financial statements. Contrary to their expectations, their results suggested that higher abnormal insider trading profits are earned in companies preparing financial statements according to the international standards.

In light of this mixed evidence, we re-examine the relationship between the quality of corporate communication and insider trading profitability using analyst disclosure ratings. This proxy of corporate communication quality has been widely used in previous disclosure studies for it provides a comprehensive measure of disclosure quality assigned by professional users of corporate communication. Testing the relationship between corporate communication quality and insider trading profitability, we expect better communication to mitigate the information asymmetry between insiders

and outside, uninformed investors and to simultaneously lower abnormal trading profits. Our test hypothesis is formulated as follows:

Hypothesis 1: *The profitability of insider trades will be negatively associated with the quality of corporate communication.*

3.3.2. The role of alternative communication channels

The aggregate measure of corporate communication quality used in this study covers four individual corporate communication quality ratings. Each rating assesses the quality of communication through a specific communication channel, *i.e.* the annual report, press releases, corporate websites and investor relation activities. The extent to which the communicated information impacts the level of information asymmetry may differ across these communication channels as both the information communicated through each channel and the channel itself have specific characteristics. Regarding annual reports, for example, the included information consists of mandatory financial statements information possibly supplemented by voluntary disclosures on business segments, future prospects, company objectives, etc. An important characteristic of the mandatory financial statements information is that this information is verified by an external auditor which enhances the level of credibility. Nevertheless, the fact that this mandatory information is subject to international reporting requirements and external verification, limits the degrees of freedom for companies to distinguish themselves regarding the quality of the financial statements information. Consequently, differences in the quality of annual report disclosures, if any, are expected to ensue from differences in the quantity and quality of the included voluntary information (Brown and Hillegeist, 2007). Furthermore, despite the focus of regulators on annual reports and financial statements in particular, practitioners (*i.e.* financial analysts and investors) often no longer regard them as the main tool of communication because of their backward-looking nature and lack of timeliness (Vergoossen, 1993; AIMR, 2000).

A second potential communication channel are press releases. This communication channel is used by companies to voluntarily disclose periodic updates of financial results (*i.e.* quarterly and half-year results) as well as information on important events that could affect the risk profile of a company (BVFA evaluation grid, 2010). From analysts' point of view, the high degree of timeliness has made press releases essential for the assessment of companies (BVFA press release, 2010). Empirical support for this proposition was found by McNichols and Manegold (1983) who showed that press releases containing interim financial results pre-empt some information which is later disclosed through annual reports. In addition, Brown and Niederhoffer (1968) and Brown and Rozeff (1979) provided evidence that financial press releases improve the accuracy of annual earnings forecasts by financial analysts. A potential limitation of press releases could be that the disseminated information is unaudited and may therefore be less credible. Nonetheless, studies by Stocken (2000), Lundholm (2003) and Ball *et al.* (2012) suggest that as the credibility of press release disclosures can be subsequently verified using audited financial statements information, managers are likely disciplined to be more truthful in their *ex ante* communications.

A third communication channel used by companies are corporate websites. This communication channel is a permanent source of information which is often used to disclose information on, for example, the company's history and mission statement, corporate governance structures and social and environmental issues complementary to the traditional financial information (BVFA evaluation grid, 2010; Trabelsi *et al.*, 2008). As such, the information disclosed through corporate websites is often also disseminated through other communications channels like annual reports and press releases. This characteristic might potentially limit the ability of web disclosures to affect the level of information asymmetry. Nevertheless, prior studies on internet reporting agree that voluntary web disclosures are taking an increasingly prominent place in corporate communication because of their timeliness and ease of access and the consequent lower cost of disclosure (e.g. Jones and Xiao, 2004; Marston and Polei, 2004; Bollen *et al.*, 2006). Focusing on the usefulness of web disclosures in reducing the level of information asymmetry, Trabelsi *et al.* (2008) and Aerts *et al.* (2007) found that the extent of voluntary disclosures through corporate websites is negatively related to the dispersion of analyst

forecasts. This finding indicates that web disclosures provide relevant information for the evaluation of companies.

A final communication channel used by companies are investor relation activities. The use of this communication channels has been well established in the U.S. and U.K. for a considerable time. More recently, investor relation activities have also in Europe become increasingly important in response to the growing reliance on (foreign) equity financing (Marston and Straker, 2001). A study by Chang *et al.* (2008, pp. 378) defined investor relations as the continuous dissemination of "company information in the form of annual reports, earnings forecasts, proposed investments, governance procedures, dividends and financing intentions and a wide range of other information, both formal and informal". Accordingly, much of the information communicated through investor relation activities is voluntary, timely and forward-looking (Brown and Hillegeist, 2007). The credibility of the information may, however, be lower for it is often disclosed verbally and sometimes represents non-quantifiable and non-verifiable information such as the degree of optimism held by executives (Brown and Hillegeist, 2007). Despite these negative characteristics, the BVFA considers good investor relation services as crucial for companies to get information across to the investor community (BVFA press release, 2010).

In sum, the above discussion clearly indicates that each communication channel and the included information have specific characteristics that can enhance or limit their ability to affect the level of information asymmetry. Given the above findings, we investigate whether the effect of corporate communication quality on insiders' trading profits differs across alternative communication channels. The second hypothesis proposed in our study is:

> ***Hypothesis 2:*** *Any relation between the quality of corporate communications and insider trading profitability differs between the communication channels.*

3.4. Methodology

3.4.1. Research design

To empirically investigate whether high-quality communication reduces information asymmetry - and hence the profitability of insider trading - we estimate the following regression using ordinary least squares and clustered, heteroskedasticity robust standard errors (Rogers, 1993).

$$CAR_{(0,20)} = \alpha + \omega_1 CommunicationQuality + \boldsymbol{\gamma}\mathbf{x} + \varepsilon, \quad (1)$$

where the dependent variable, $CAR_{(0,20)}$, is the cumulative average abnormal return over a 21-day event window following each insider trade. The test variable, *CommunicationQuality*, represents the disclosure score awarded by the financial analysts and fund managers of the BVFA. The vector **x** includes a set of control variables. In the following subsections, the measurement of the regression variables is explained in detail.

3.4.2. Measurement of insider trading profitability

To measure the abnormal gains of insider trading, we apply event study methodology and calculate abnormal returns of insider trades over a certain period starting from the transaction date of each insider trade. However, since the liquidity of some Belgian listed securities is rather low (Buysschaert *et al.*, 2004), we estimate the abnormal returns either using a standard market model (MacKinlay, 1997) or a market model adjusted for thin trading (Dimson, 1979) depending on the liquidity of the underlying shares. The issue is that when a stock is infrequently traded, stock prices recorded at the end of a time period may include adjustments to news events occurring earlier in that period. Consequently, when using a standard market model for such stocks, a problem of non-synchronous trading arises due to a mismatch between the return of these stocks and the return of the market index. To address this problem, the aggregated coefficients method of Dimson (1979) includes lagged, leading and contemporaneous beta coefficients in order to provide unbiased beta estimates for thinly

traded securities. Following a suggestion by Friederich *et al.* (2002), we apply the Dimson-adjustment to stocks with the highest number of daily zero returns. More specifically, firms are first sorted in ascending order based on the number of daily zero returns during the estimation and event window. Next, the ordinary market model is applied to firms belonging to the first three quartiles (with the lowest number of zero return days), while the Dimson-adjusted model is used to calculate betas for firms in the bottom quartile (with the highest number of zero return days). Applying the adjustment to all stocks would lead to an overestimation of the betas of actively traded securities. Following Buysschaert *et al.* (2004), we add one leading and three lagged coefficients to the market model for Belgian, thinly traded securities.

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt} \qquad \text{Standard market model,} \qquad (2)$$

$$R_{jt} = \alpha_j + \sum_{k=-3}^{+1} \beta_{jk} R_{m,t+k} + \varepsilon_{jt} \qquad \text{Dimson-adjusted market model,} \qquad (3)$$

where R_{jt} is the daily stock return for firm j on day t adjusted for stock splits, stock dividends and issues; R_{mt} and $R_{m,t+k}$ are the daily value-weighed and dividend-adjusted returns of the market index on day t and day $t+k$ respectively. Our benchmark index R_m is the Brussels All Shares Return Index.

Next, the abnormal return to firm j on day t, AR_{jt}, is calculated each day from the insider trading day (day 0) to 20 trading days after the event (day + 20):

$$AR_{jt} = R_{jt} - \hat{\alpha}_j - \hat{\beta}_j R_{mt} \qquad \text{Standard market model,} \qquad (4)$$

$$AR_{jt} = R_{jt} - \hat{\alpha}_j - \sum_{k:=-3}^{+1} \hat{\beta}_{jk} R_{m,t+k} \qquad \text{Dimson-adjusted market model,} \qquad (5)$$

where $\hat{\alpha}_j$ and $\hat{\beta}_{j(k)}$ are estimated by means of an OLS regression over an estimation window of 160 trading days, going from day -160 to day -1. Since our results are reported for a pooled sample including both purchases and sales, the abnormal returns for insider sales are multiplied by minus one,

as insiders profit when securities outperform the market after a buy transaction and when stocks underperform the market after a sales transaction.

Finally, to evaluate the event-specific cumulative abnormal performance from day 0 to day 20, the abnormal returns are summed over the time interval in question:

$$CAR_{ij(0,20)} = \sum_{t=0}^{20} AR_{jt} \,, \tag{6}$$

where $CAR_{ij(0,20)}$ represents the cumulative abnormal return over 21 trading days for a particular event *i* of firm *j*.[4] The latter is the dependent variable in equation (1).

3.4.3. Measurement of corporate communication quality

Corporate communication quality is measured using a disclosure rating awarded by the Belgian Association of Financial Analysts (BVFA). In particular, we measure the explanatory variable in equation (1) as the BVFA-score assigned to company *j* in the year in which the insider trade occurred.

The BVFA is part of the European Federation of Financial Analyst Societies (EFFAS) and the Association of Certified International Investment Analysts (ACIIA). For the past 50 years, this organization has granted an "Award for the Best Financial Information". According to the President of the BVFA, the purpose of the award is to "reward Belgian listed companies that stand out in terms of financial communication policy, transparency and investor relations".

Each year, a group of financial analysts and fund managers assigns the disclosure rating. More specifically, financial analysts evaluate companies on four different communication channels, *i.e.* annual reports, press releases, corporate websites and investor relation activities. In addition, fund managers also provide an appreciation of the investor relation activities from their point of view. Each communication channel is evaluated on different criteria. These criteria focus on different aspects of

[4] Obviously, a particular firm can have more than one insider trading event during the sample period.

quality and quantity tailored to the specific communication objectives of each channel. Annual reports, for example, are screened on the provision of key numerical items, the reliability and transparency of financial data, and the availability of information on products, services and markets and on strategy and long-term objectives. For press releases, scores are provided on the disclosure of half- and full-year results, on whether explanations are given on the year-over-year evolution of these numbers, on the dissemination of other important information and on the timing of the press releases. Websites are judged on the presence of a financial calendar and an archive of annual reports and press releases, on the availability and preciseness of information on investor relation activities and corporate governance and on the navigation comfort of the website. Finally, investor relation activities are rated on, among other things, the quality of the guidance, consistency and reliability of the provided information, quickness of response to analysts' questions, and the organization of analyst meetings, conference calls and client visits. In Appendix 3.A. a full overview of the evaluation criteria for each communication channel is provided.[5]

For listed companies to qualify for the BVFA-award, obviously, a first criterion to be selected is that there is a sufficient number of analyst following the company.[6] In a first stage, a preliminary questionnaire is sent to the companies themselves. The responses to the included factual questions are used to underpin the screening process and give a first indication about the willingness of companies to support financial communication. In a second stage, each company is screened in detail by financial analysts and fund managers on a company per company basis. In a third and final stage, the final results are compared and discussed within a panel of financial analysts that makes a decision on the final ranking.

The use of analyst disclosure ratings as a measure of communication quality is well-established in prior literature. Studies focusing on U.S. listed companies generally use the AIMR-rating which strongly resembles the Belgian BVFA-rating (e.g. Lang and Lundholm, 1993,1996; Welker, 1995; Sengupta, 1998; Healy *et al.*, 1999; Botosan and Plumlee, 2002; Nagar *et al.*, 2003; Brown and

[5] Appendix 3.A. includes the evaluation criteria for the award of 2010. Criteria for all other years can be found on the website of the BVFA: www.bvfa.be.
[6] A minimum of three analysts per company is imposed.

Hillegeist, 2007). In cross-country studies, the CIFAR[7] (e.g. Salter, 1998; Carlin and Mayer, 2003; Hope, 2003; Bushman and Smith, 2001) or S&P index (e.g. Patel *et al.*, 2002; Khanna *et al.*, 2004; Durnev and Kim, 2005: Litvak, 2007) are often applied. A general advantage of using externally-developed disclosure ratings is that these do not involve judgment by the researcher(s) in question. This facilitates the verification of research results and the application of the rating in other research designs (Healy and Palepu, 2001). Furthermore, unlike researchers, analysts also have access to unpublished and sometimes informal information disclosed during analyst meetings and conference calls (Healy and Palepu, 2001). Analysts are also regarded as the primary and most influential users of corporate communication as they communicate with companies on a daily basis (e.g. Schipper, 1991; Hirst *et al.*, 1995; Revsine *et al.*, 2004; IASB, 2005). This gives them the expertise and experience to objectively evaluate the quality of corporate disclosures.

For studies using researcher-developed instead of externally-developed disclosure indices, two main approaches can be distinguished, *i.e.* content analysis (e.g. Wallace *et al.*, 1994; Aerts *et al.*, 2007) or a dichotomous scoring mechanism where an item is given a score of one if it is disclosed and a score of zero otherwise (e.g. Bollen *et al.*, 2006; Trabelsi *et al.*, 2008). Both approaches, however, have several drawbacks. A major issue related to content analysis is the determination of the unit of analysis, *i.e.* words, sentences, paragraphs, etc. (Bravo *et al.*, 2009). Studies which have applied content analysis often also claim to not only measure the quantity of communication but also the quality as they assume that quantity and quality are positively related. Obviously, a higher number of sentences or words does not necessarily imply that higher-quality information is provided (Bravo *et al*., 2009). A potential drawback for studies using a dichotomous scoring mechanism is that researchers have to rely on prior studies and/or survey evidence in an attempt to select items which are considered useful by investors, financial analysts and standard setters. Furthermore, the disclosure score is obtained by counting the number of disclosed items. Consequently, again only the quantity of disclosures is taken into account. Some studies have attempted to incorporate the quality of disclosures by assigning weights. These weights are subjectively determined by the researcher in question (e.g. Aerts *et al.*,

[7] CIFAR stands for Center for International Financial Analysis and Research

2007) or based on surveys among practitioners (e.g. Bollen *et al.*, 2006). Finally, a general disadvantage of both approaches is the labor-intensity. As a consequence, studies using these researcher-developed disclosure indices have a tendency to focus on one specific communication channel whereas the AIMR and BVFA-rating both evaluate the overall communication quality by taking multiple disclosure channels into account. The latter is an important advantage of both analyst disclosure scores as different communication channels may be used as complements or substitutes of each other (Botosan and Plumlee, 2002; Leuz and Wysocki, 2008).

A potential drawback of analyst disclosure scores is that analysts' personal motivations may bring bias to the assigned ratings. However, the BVFA is aware of this possibility and imposes several control mechanisms to enhance to objectivity of the rating. First, companies are individually evaluated by more than one financial analyst and only summary scores are presented. This reduces the opportunity and incentives for an individual analyst to provide a more positive evaluation than warranted in order to gain favor with company management (Lang and Lundholm, 1993). Second, evaluations are based on a checklist of criteria constructed by the BVFA in consultation with their members. Analysts cannot make their evaluations capriciously as they have to provide a written justification for each item where they score a company's disclosure policy above or below average. To further exclude any errors in the analyst ratings, an *ex post* and ad hoc verification is performed by BVFA board members and the top-ranked companies are subjected to an additional evaluation before a panel of financial analysts makes a decision on the definitive ranking.

A specific advantage of the BVFA-rating against other analyst ratings is that it also evaluates the quality of communication by smaller companies. In 2007, for example, the sample of screened companies consisted of 18 members of the Belgian blue-chip index (*i.e.* Bel20-index), 18 midcaps and 13 smallcaps. For these smaller companies, information asymmetries between insiders and other market participants are potentially larger, which makes high-quality communication even more necessary (BVFA press release, 2010). Furthermore, the BVFA-rating has been granted annually between 1951 and 2010. This differs from CIFAR and S&P ratings which are only published intermittently making it impossible to evaluate the year-over-year evolution of a specific company.

Furthermore, CIFAR and AIMR-rating were no longer published after 1995 and 1996 respectively. As a consequence, researchers have raised concerns about the applicability of these scores in contemporary studies since disclosure requirements have substantially changed over time (Hussainey *et al.*, 2003; Brown and Hillegeist, 2007; Ertimur, 2007).

Like the AIMR-rating, BVFA-scores provide a comprehensive evaluation of corporate communication quality, including both quantitative and qualitative criteria. This is an important advantage compared to researcher-based indices and the CIFAR and S&P-index which generally focus on the number of disclosed items and not on disclosure content.

Finally, for this country-specific study, the BVFA-rating is preferred above cross-country indices as it covers a broad range of Belgian listed companies. In particular, the BVFA-sample on average includes 50 companies each year, while only 8 Belgian companies were included in the S&P index of 2002 (Khanna *et al.*, 2004).

3.4.4. Control variables

A number of control variables which are assumed to influence the profitability of insider trading are included in the regression. The first control variable is the size of the transaction (*TradeSize*), which is equal to the value of the net transaction scaled by the market value of the company at the beginning of the fiscal year.[8] This control variable is included because larger transactions are assumed to signal stronger beliefs in the future performance of the company (Karpoff, 1987). Thus, if insiders are in possession of higher-quality information, we expect this to be reflected in a larger proportion of the firm being traded.

Second, we control for the size of the firm (*FirmSize*), which is measured by the log of the market value of equity at the beginning of the fiscal year. A higher potential for information asymmetry is expected in smaller companies (Grant, 1980; Collins *et al.*, 1987; Bhushan, 1989). These firms

[8] Jenter (2005) argues it is preferable to measure trade size relative to some measure of wealth or total equity instead of using absolute trade size. The former is assumed to be a more relevant measure of trading behavior.

experience less extensive analyst following (Bhushan, 1989; Lang and Lundholm, 1996; Barth *et al.*, 2001) and media coverage (Fang and Peress, 2009), which makes it easier for insiders of small companies to have greater informational benefits. In support of this reasoning, Seyhun (1986), Finnerty (1976), and Betzer and Theissen (2009), for example, documented that abnormal trading profits have a negative relation with the size of the company. Also Lakonishok and Lee (2001) found that insider purchases predict future returns only in small companies. Accordingly, we expect abnormal profits to be negatively associated with firm size.

The third control variable we include is the market-to-book ratio (*MarketToBook*) calculated as the ratio of the market value of equity divided by the book value of equity, both measured at the beginning of the fiscal year. This variable controls for a firm's investment opportunity set as firms with a higher market-to-book ratio are assumed to have more unrecognized intangible assets and valuable research and development projects. As a result, these growth firms are characterized by a greater uncertainty regarding their fundamental value, allowing insiders to have greater informational benefits with respect to future prospects and cash flows (Dierkens, 1991; Smith and Watts, 1992). Accordingly, we expect a larger amount of privileged information to be available to insiders of high market-to-book companies. On the other hand, previous studies have also documented that insiders act as contrarian investors who take the under- or overvaluation by the market into account (e.g. Rozeff and Zaman, 1998; Lakonishok and Lee, 2001; Jenter, 2005; Gregory *et al.*, 2009). More specifically, these studies assume that low market-to-book values signal undervaluation and thus good future stock market performance, while high market-to-book ratios are associated with bad future share performance as they signal overvaluation. If insiders act as contrarian investors, we expect insiders of low market-to-book firms to earn higher abnormal profits.

A fourth control variable is the debt-to-asset ratio at the beginning of the fiscal year (*Leverage*). We include this variable to control for the proportion of external debt financing in a firm's capital structure. Agency theory assumes that disclosure increases with the amount of external financing (Jensen and Meckling, 1976). In particular, levered firms try to reduce agency costs by disseminating more information, while creditors also produce additional information about the borrower in question

(Aksu and Kosedag, 2006). In line with this conjecture, Frankel and Li (2004) argue that firms with more external financing issue more earnings forecasts in order to reduce information asymmetry. In addition, Bradbury (1992) found that a larger amount of voluntary segment information was disclosed by highly-levered firms. Hossain *et al.* (1995) extended this research and documented a positive association between the total amount of voluntary disclosed information and the ratio of long-term debt-to-equity. Based on these findings, we argue that insiders in highly-levered firms earn lower abnormal returns.

Fifth, we include a dummy variable *Sale* equal to one if an insider executes a sales transaction and zero otherwise. In general, previous literature suggests that purchases are more informative than sales because sales transactions are not always driven by a profit objective but may also result from diversification or liquidity needs of the seller (Lakonhishok and Lee, 2001). However, in a setting with highly concentrated ownership, sales might be more profitable, because controlling shareholders limit sales transactions for fear of losing control and only sell as a result of negative future prospects. In addition, purchases by insiders of companies with concentrated ownership probably have a lower information content because they are often control-induced. As a consequence, for Belgian insiders, we expect higher abnormal returns for sales transactions.

Next, we control for the effect of cross-listing (*Cross-listing*) using a dummy variable equal to one if a company is listed on a foreign stock exchange and zero otherwise. According to the bonding hypothesis, cross-listing subjects companies to domestic as well as foreign regulatory requirements (Coffee, 1999; Coffee, 2002). Consequently, the additional and potentially stricter regulations likely mitigate the opportunities for insiders and controlling shareholders to exploit their informational benefits at the expense of other shareholders (Sami and Zhou, 2008; Chang and Corbitt, 2012). Moreover, cross-listing is expected to further reduce the level of information asymmetry by enhancing firm visibility through greater analyst following, increased disclosure requirements, a more thorough investor monitoring and an increased media coverage (e.g. Baker *et al.*, 2002; Lang *et al.*, 2003, 2004; Lambert *et al.*, 2006). Supporting these assumptions, prior studies by Korzak and Lasfer (2008) and Chang and Corbitt (2012) found that insiders in cross-listed companies earn less abnormal returns

compared to insiders in domestically-listed companies. Consequently, given the above findings, we expect potential gains from insider trading to be lower in companies cross-listed on a foreign stock exchange.

Finally, we control for a company's ownership structure (*OwnershipConc)* proxied by the percentage of shares held by the five largest shareholders. Generally, incentives for shareholders to monitor corporate insiders are elevated in companies with a concentrated ownership structure as supervisory costs are expected to be lower in such companies (Del Brio and Perote, 2007). However, this increased monitoring may not result in a lower level of information asymmetry as the interests of large shareholders and minority shareholders are not necessarily aligned (Betzer and Theissen, 2009). In particular, controlling shareholders might use their power to obtain representation in the board of directors and acquire inside information. Accordingly, the information asymmetry problem between managers and controlling shareholders on the one hand and minority shareholders on the other hand might even enlarge (Demsetz, 1986). Empirically, support for both propositions has been found. Betzer and Theissen (2009) provided evidence of larger abnormal returns in widely held companies, while Demsetz (1986) reported higher abnormal returns in companies with controlling share ownership. In light of this mixed evidence, we do not make any *a priori* assumptions on the relation between insider trading profitability and ownership structure.

3.5. Sample selection

The insider trading data were obtained upon request from the FSMA, which is entrusted with the supervision of the Belgian stock market. Since 2005, insiders are required to report their transactions to this authority within five business days following the execution. This legislation is based on the 2003 European Directive on insider dealing and market manipulation (*i.e.* the Market Abuse Directive) and is similar to the requirements on other stock markets including the U.S.[9] The database

[9] Examples of other reporting requirements are New Zealand: continuous disclosure of trades by all insiders (Tourani-Rad *et al.*, 2003); Poland: 24-hours disclosure deadline (Wisniewski and Bohl, 2005); Italy: no disclosure required when total quarterly cumulative transactions is below €50,000, quarterly disclosure when between €50,000 and €250,000, and disclosure

includes all insider trades reported between May 2006 and August 2010. The fact that transactions are reported does, however, not guarantee that no illegal transactions are included in our sample as the distinction between legal and illegal transactions is made based on the fact whether transactions are inspired by inside information or not.[10]

The annual BVFA-disclosure scores were gathered from the association's website. For each individual company the yearly total score is disclosed as well as the subscores on four individual communication channels, *i.e.* annual reports, press releases, corporate websites and investor relation activities. Information on cross-listing and the daily return index for Belgian listed companies was collected from Datastream. Data on the Brussels All Shares Return Index were obtained from Euronext Brussels.[11] Furthermore, data on company size, market-to-book and debt-to-asset ratios were gathered from Worldscope. The Belfirst database of *Bureau Van Dijk* was used to collect data on ownership structure.

The initial insider trading database included 4,889 transactions reported by insiders of 138 different companies from May 2006 through August 2010. The database was filtered based on several sample selection criteria. First, our study focuses only on open market purchases and sales. We expect over-the-counter transactions to be mainly inter-insider trades, which are not driven by an informational benefit. Moreover, private transactions lack a market-determined price (Finnerty, 1976), which leads to a potentially large deviation between the negotiated and quoted stock price. Since the calculation of abnormal returns is based on market-determined prices, this could introduce a serious bias in the estimation of insiders' abnormal gains.

Second, trades involving the acquisition, exercise or conversion of options, warrants, or scripts, were filtered out. We expect these transactions to be less plausible to be information-motivated. For

within three business days when above €250,000 (Bajo *et al.*, 2009); U.K.: insiders must report as soon as possible and no later than five business days after the transaction (Fidrmuc *et al.*, 2006), in addition a black-out period before earnings announcements is imposed (Betzer and Theissen, 2009); U.S.: reporting no later than two days following the transaction (Cheng *et al.*, 2007).

[10] Following the European Market Abuse Directive, the Belgian law defines inside information as "any information of a precise nature which has not been made public, relating, directly or indirectly, to one or more issuers of financial instruments or to one or more financial instruments and which, if it were made public, would be likely to have a significant effect on the prices of those financial instruments or on the price of related financial instruments" (Law of 2 August 2002, art. 2).

[11] We are grateful to Euronext Brussels for providing the data on the Brussels All Shares Return Index (ISIN: BE0389550956).

example, regarding the exercise of stock options, a study by Ofek and Yermack (2000) documented that option exercises are highly correlated with the subsequent sale of the underlying securities. Huddart and Ke (2007) therefore claim that the exercise-event should be excluded from the sample in order to avoid double counting.

Third, transactions were deleted if they were reported before the execution. The regulatory objective of the notification duty is to reduce the information asymmetry between insiders and other market participants as the knowledge of insider trades provides valuable information (Givoly and Palmon, 1985). Consequently, once transactions are reported, we no longer expect abnormal trading profits as prices have already adjusted to the previous release of this information.

Fourth, transactions not reported in euro were also deleted. This approach is consistent with other insider trading studies and intends to prevent bias in the calculation of abnormal returns due to the evolution of the underlying currency. In particular, the abnormal returns calculated in insider trading studies are a measure of the advantage insiders have in terms of superior inside knowledge or because they are more familiar with their company and its environment. However, when transactions in a foreign currency are transformed into euro transactions, the evolution of the underlying currency influences the magnitude of the abnormal returns and thus the measurement of the profits earned by insiders. As the currency evolution is *a priori* unknown to insiders, the calculated abnormal returns may give a biased picture of the informational advantage of insiders.

Fifth, transactions were filtered out if the company involved is not included in the Brussels All Shares index. This index is used as the benchmark index in the calculation of abnormal returns. Transactions were therefore removed in order to avoid bias in the calculation of these returns.

If more than one trade was executed on the same day by the same or different insiders from the same company, net transactions were calculated. First, we sum the transaction size of all purchases and sales respectively. Next, the total value of sold securities is deducted from the total value of purchased securities.

Furthermore, net transactions less than 20 trading days apart were deleted from the sample to filter out noise due to successive trades. If no adjustment for event-clustering is made, the cumulative abnormal returns will not only capture the price reaction related to the transaction in question, but also to other trades carried out later within the event window. These adjustments for netting and event-clustering are consistent with other insider trading studies (e.g. Jaffe, 1974; Seyhun, 1986; Friederich *et al.*, 2002; Fidrmuc *et al.*, 2006; Betzer and Theissen, 2009).

To be included in the sample, companies were also required to be listed 160 trading days prior to the event date and 20 days thereafter in order to prevent missing data problems. Next, we filtered out transactions with a net transaction size equal to zero. In addition, because a disclosure rating is not available for all Belgian listed companies, the sample was further reduced by eliminating all transactions of companies for which no disclosure rating was reported. Finally, transactions were deleted due to missing data with regard to the control variables. In Table 3.1. an overview is provided of the applied filters and the number of deleted insider transactions.

Table 3.1. Sample selection

Initial sample	4,889	
Applied filters:		
- over-the-counter transactions		1,241
- trades not involving buying and selling of common shares		369
- trades reported before execution		5
- trades not reported in euro		27
- trades of companies not included in benchmark		128
- net transactions		488
- event clustering adjustment		1,760
- missing stock price data		16
- net trade value equal to 0		5
- not in BVFA sample		430
- missing data on control variables		13
Final sample	407	

3.6. Descriptive statistics

The application of the above filters resulted in a final sample of 407 firm-event observations. The sample consists of 199 net purchases and 208 net sales reported by insiders of 52 different companies. Additional descriptive statistics at company-level are provided in Table 3.2. This table shows that insiders of a particular company on average earn an abnormal return of 1.14%, the median being 0.89%. This indicates that insider trading is, on average, profitable on the Belgian stock market. Furthermore, a high standard deviation is observed with regard to the total BVFA-scores. This indicates that there is much variety in corporate communication quality across companies. The lowest standard deviation is observed with respect to corporate websites. The quality of web disclosures thus

Table 3.2. Descriptive statistics (company-level)

	Mean	Std. Dev.	Q1	Median	Q3
Dependent variable					
$CAR_{j(0,20)}$	1.14	3.88	-1.19	0.89	3.72
Explanatory variables					
$CommunicationQuality_j$	307.44	51.40	274.21	310.64	344.91
$AnnualReport_j$	59.03	13.52	50.00	60.00	67.75
$PressRelease_j$	55.89	17.49	44.75	55.17	69.63
$Website_j$	68.53	10.02	61.63	68.50	75.38
$InvestorRelations_j$	124.26	20.37	114.83	123.13	135.13
Control variables					
$TradeSize_j$	0.07	0.13	0.01	0.02	0.06
$FirmSize_j$	6.80	1.62	5.56	6.47	7.84
$MarketToBook_j$	2.40	2.06	1.28	1.63	2.47
$Leverage_j$	24.62	18.10	8.89	24.55	37.49
$Sale_j$	0.48	0.36	0.13	0.50	0.82
$Cross\text{-}listing_j$	0.73	0.45	0.00	1.00	1.00
$OwnershipConc_j$	54.04	23.68	36.57	52.42	66.00

Notes: Descriptive statistics on company-level (N=52). Abnormal returns for sales transactions are multiplied by minus one. $CAR_{j(0,20)}$ is equal to the average cumulative abnormal return for company *j*. Abnormal returns were measured using a standard market model or a Dimson-adjusted market model depending on the number of zero returns. $CommunicationQuality_j$, $AnnualReport_j$, $PressRelease_j$, $Website_j$, and $InvestorRelations_j$ respectively represent the average disclosure quality score of company *j* over the sample period for the total disclosure strategy (score on 500), annual reports (score on 100), press releases (score on 100), corporate websites (score on 100) and investor relation activities (score on 200) awarded to Belgian listed companies by the BVFA. $TradeSize_j$ is equal to the average eurovalue of the net transactions from company *j* divided by the market value of the company at the beginning of the fiscal year expressed in percentage. $FirmSize_j$ is equal to the average of the log of the market value of the company *j* expressed in millions of euros. $MarketToBook_j$ is equal to the average ratio of the market value of the company *j* divided by the book value of equity at the beginning of the fiscal year expressed in percentage. $Leverage_j$ is equal to the average debt-to-asset ratio of company *j* at the beginning of the fiscal year expressed in percentage. $Sale_j$ is equal to the average proportion of net sales transactions for company *j*. $Cross\text{-}listing_j$ is a dummy variable equal to one if a company is cross-listed in 2010 and zero otherwise. $OwnershipConc_j$ is equal to the average percentage of shares held by the five largest shareholders of company *j*.

seems relatively most uniform across companies. Also, corporate websites seem to score the highest on the evaluation by financial analysts. Table 3.2. further shows that, on average, only a small proportion of the company (0.07%) is traded by insiders. The average (median) firm size is equal to 6.80 (6.47) million euros. Unreported results show that the market value of equity ranges from 4.20 to 10.58 million euros, providing evidence of both small and large companies being incorporated in the sample. The market-to-book ratio is on average equal to 2.40%, while the median ratio is equal to 1.63%. The average (median) debt-to-asset ratio is equal to 24.62% (24.55%). On average, 48% of the transactions within a particular company are net sales, the median being 50%. Furthermore, the majority of sample companies is cross-listed on a foreign stock exchange. Finally, the five largest shareholders of companies included in our sample on average hold 54.04% of all shares.

Tables 3.3. and 3.4. provide some additional descriptive statistics on the BVFA-scores and their evolution between 2006 and 2010. In order to calculate these descriptives, we retained one firm-observation each year. This resulted in a total sample of 143 observations.[12] Table 3.3. containing the summary statistics on the total BVFA-scores indicates that the average and median quality of corporate communication is rather stable between 2006 and 2010. The highest and lowest score earned by a company in which insiders have traded shares was recorded in 2007. In Table 3.4. descriptives are reported on the separate communication channels. Comparing median and mean scores between these channels, the quality of annual reports and press releases is generally worse than the quality of

Table 3.3. Descriptive statistics on the total BVFA-score

Year	N	Mean	Std. Dev	Min	Median	Max
2006	19	352.76	37.67	273.77	363.14	403.34
2007	36	308.59	55.58	98.50	323.51	421.88
2008	37	305.42	47.99	202.92	315.90	388.56
2009	27	310.00	48.90	196.00	317.43	393.46
2010	24	311.96	46.88	217.55	305.09	391.75
Total	143	314.47	50.50	98.50	320.64	421.88

[12] The number of 143 observations for the BVFA descriptives differs from the number of 52 unique sample companies as a particular company may have qualified for screening by the BVFA in multiple years.

Table 3.4. Descriptive statistics on the separate communication channels

		AnnualReport					PressRelease				
Year	N	Mean	Std. Dev	Min	Median	Max	Mean	Std. Dev	Min	Median	Max
2006	19	70.79	7.58	54.00	72.00	86.00	68.68	16.65	30.00	70.00	100.00
2007	36	60.86	14.26	13.00	62.50	90.00	54.94	21.42	5.00	61.00	90.00
2008	37	57.76	14.33	30.00	60.00	85.00	58.73	16.12	20.00	60.00	90.00
2009	27	56.15	16.50	13.00	58.00	84.00	57.78	16.46	15.00	60.00	85.00
2010	24	54.96	13.29	33.00	55.50	82.00	58.04	15.78	38.00	55.50	87.00
Total	143	59.50	14.56	13.00	60.00	90.00	58.80	17.92	5.00	61.00	100.00
		Website					InvestorRelations				
Year	N	Mean	Std. Dev	Min	Median	Max	Mean	Std. Dev	Min	Median	Max
2006	19	71.63	7.96	52.00	72.00	84.00	141.79	15.49	112.00	143.00	163.00
2007	36	68.86	10.42	38.00	70.00	85.00	124.17	23.83	43.00	123.00	162.00
2008	37	69.22	11.17	45.00	69.00	86.00	119.97	19.77	82.00	122.00	162.00
2009	27	70.52	11.33	48.00	71.00	88.00	125.81	15.58	98.00	125.00	151.00
2010	24	71.83	8.67	58.00	71.50	87.00	127.46	20.77	84.00	131.50	168.00
Total	143	70.13	10.17	38.00	71.00	88.00	126.29	20.68	43.00	126.00	168.00

websites and investor relation activities.[13] In addition, the quality of annual reports and press releases seems to diminish over time, while the quality of websites and investor relations improves. In 2006, one sample company earned the maximum score on press release. The lowest score for press releases was recorded in 2007, when one company only scored 5 points out of 100. Comparing standard deviations, Table 3.4. indicates that the largest quality differences are observed between press releases. The quality of websites on the other hand is most uniform over our sample companies, confirming our finding based on the company-level descriptive statistics.

Table 3.5. reports Spearman and Pearson correlation coefficients of the regression variables. The highly significant negative correlation between the total disclosure score and insiders' abnormal profits seems to indicate that higher-quality communication contributes to reducing insider trading profitability. Comparing the correlation between insider trading profitability and the four separate disclosure scores, only press releases and investor relation activities seem to be significantly correlated with insiders' abnormal profits. The separate disclosure scores are furthermore all highly correlated with the total score and positively correlated with each other. The latter finding shows a certain consistency within the communication strategy of companies. Companies do not seem to devote their efforts to one particular communication channel, but enhance the quality of all forms of corporate communication simultaneously.

3.7. Results

3.7.1. The impact of the overall corporate communication quality on insider trading profitability

Table 3.6. reports the OLS regression results with regard to the overall communication quality. These results generally support our expectations regarding the control variables. First, with respect to *TradeSize*, we find a positive relation between transaction size and insiders' gains (Karpoff, 1987). If

[13] For investor relation activities scores are provided on 200 as this channels is rated by financial analysts as well as fund managers. For all other channels, the maximum score is equal to 100.

Table 3.5. Spearman and Pearson correlations

	$CAR_{ij(0,20)}$	Comm. Quality	Annual Report	Press Release	Website	Investor Relations	Trade Size	Firm Size	Market ToBook	Leverage	Sale	Cross Listing	Ownership Conc
$CAR_{ij(0,20)}$		-0.13*	-0.08	-0.14*	-0.05	-0.11*	0.09	-0.10	-0.09	0.00	0.04	-0.10*	0.02
CommunicationQuality	-0.14*		0.73*	0.78*	0.78*	0.74*	-0.14*	0.44*	-0.06	0.08	0.10*	0.33*	-0.27*
AnnualReport	-0.03	0.66*		0.39*	0.54*	0.37*	-0.08	0.42*	-0.24*	0.13*	0.10*	0.12*	-0.05
PressRelease	-0.13*	0.74*	0.38*		0.59*	0.34*	-0.17*	0.45*	0.04	0.11*	-0.04	0.43*	-0.22*
Website	-0.08	0.77*	0.50*	0.56*		0.41*	-0.10	0.38*	-0.27*	0.09	-0.02	0.29	-0.19*
InvestorRelations	-0.14*	0.73*	0.29*	0.30*	0.39*		-0.07	0.13*	0.13*	-0.04	0.23*	0.16*	-0.31*
TradeSize	0.01	-0.18*	-0.16*	-0.08	-0.13*	-0.14*		-0.12*	0.14*	0.05	0.06	-0.01	0.09
FirmSize	-0.08	0.49*	0.41*	0.49*	0.43*	0.18*	-0.28*		0.06	0.30*	0.15*	0.31*	0.15*
MarketToBook	-0.04	-0.07	-0.20*	-0.02	-0.29*	0.11*	0.09	0.26*		0.07	0.30*	0.11*	0.06
Leverage	0.07	0.05	0.17*	0.05	0.08	-0.11*	-0.01	0.31*	0.03		-0.04	-0.06	0.29*
Sale	0.05	0.11*	0.10*	-0.04	-0.03	0.20*	-0.02	0.15*	0.38*	-0.03		0.06	0.04
Cross-listing	-0.10*	0.31*	0.09	0.40*	0.24*	0.23*	-0.08	0.36*	0.05	-0.09	0.06		-0.27*
OwnershipConc	0.05	-0.27*	-0.02	-0.21*	-0.22*	-0.35*	0.06	0.14*	0.28*	0.36*	0.04	-0.28*	

Notes: Spearman (below diagonal) and Pearson (above diagonal) correlations for a pooled sample of net purchases and sales (N=407). $CAR_{ij(0,20)}$ is equal to the event-specific cumulative abnormal return measured using a standard market model or a Dimson-adjusted market model depending on the number of zero returns. Abnormal returns for sales transactions are multiplied by minus one. *CommunicationQuality*, *AnnualReport*, *PressRelease*, *Website*, and *InvestorRelations* respectively represent the disclosure quality score on 100 for the total disclosure strategy, annual reports, press releases, corporate websites and investor relation activities awarded to Belgian listed companies by the BVFA. *TradeSize* is equal to the eurovalue of the net transactions divided by the market value of the company at the beginning of the fiscal year expressed in percentage. *FirmSize* is equal to the log of the market value of the company at the beginning of the fiscal year expressed in millions of euros. *MarketToBook* is equal to the ratio of the market value of the company divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Sale* is a dummy variable equal to one for net sale transactions and zero otherwise. *Cross-listing* is dummy variable equal one if a company is cross-listed on a foreign stock exchange and zero otherwise. *OwnershipConc* is equal to the percentage of shares held by the five largest shareholders. * denotes two-tailed significance at the 0.05 level.

insiders put a higher proportion of their stock ownership at stake, they earn higher abnormal profits. This finding is consistent with Seyhun (1986) and Cheuk *et al.* (2006).[14] Second, our results also show that *FirmSize* is negatively associated with the profitability of insider trading.[15] This finding seems to confirm that there is a higher potential for information asymmetry in smaller companies (Seyhun, 1986; Cheuk *et al.*, 2006). Third, the market-to-book ratio (*MarketToBook*) is negatively associated with abnormal profits. This finding indicates that investing in undervalued securities yields positive abnormal returns, while investing in overvalued securities yields negative abnormal returns.

Table 3.6. OLS regression results: total disclosure score

	Expected	Model 1		Model 2	
Variables	sign	Coef.	s.e.	Coef.	s.e.
Constant	?	5.536***	2.09	11.970***	3.61
TradeSize	+	4.494*	2.73	4.136*	2.76
FirmSize	-	-0.460**	0.25	-0.204	0.25
MarketToBook	?	-0.408***	0.14	-0.450***	0.16
Leverage	-	0.014	0.02	0.017	0.02
Sale	+	1.580***	0.63	1.767***	0.60
Cross-listing	-	-1.739*	1.34	-1.319	1.28
OwnershipConc	?	0.330	0.01	-0.984	0.01
CommunicationQuality	-			-0.123**	0.01
Observations		407		407	
R^2		0.04		0.05	
R^2 adj		0.02		0.03	
F-stat		3.60		3.82	
P-value		0.00		0.00	

Notes: OLS regression results for a pooled sample of net purchases and sales (N=407). Abnormal returns for sales transactions are multiplied by minus one. $CAR_{ij(0,20)}$ is equal to the event-specific cumulative abnormal return measured using a standard market model or a Dimson-adjusted market model depending on the number of zero returns. *CommunicationQuality* represents the disclosure quality score on 100 points awarded to Belgian listed companies by the BVFA. *TradeSize* is equal to the eurovalue of the net transactions divided by the market value of the company at the beginning of the fiscal year expressed in percentage. *FirmSize* is equal to the log of the market value of the company at the beginning of the fiscal year expressed in millions of euros. *MarketToBook* is equal to the ratio of the market value of the company divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Sale* is a dummy variable equal to one for net sale transactions and zero otherwise. *Cross-listing* is dummy variable equal one if a company is cross-listed on a foreign stock exchange and zero otherwise. *OwnershipConc* is equal to the percentage of shares held by the five largest shareholders. Standard errors are adjusted for firm-clustering and heteroskedasticity. Significance levels are two-tailed when "Expected sign" is a "?" and one-tailed otherwise, with *** < 0.01,** < 0.05, * < 0.10.

[14] Similar results are obtained when measuring trade size as the percentage of the number of shares traded relative to the number of shares outstanding.
[15] Similar results are obtained when using alternative measures for company size.

Furthermore, *Leverage*, which measures the proportion of external financing, does not seem to affect the magnitude of insiders' profits. With regard to the profitability of sales transactions, our results provide evidence that sales (*Sale*) yield substantially higher abnormal returns compared to purchases. This result is consistent with other studies performed in countries with highly concentrated ownership structures (e.g. Cheuk *et al.*, 2006). Furthermore, support is also found for the bonding hypothesis as cross-listing (*Cross-listing*) on foreign stock exchanges negatively influences the magnitude of insiders' abnormal returns. Finally, the ownership structure (*OwnershipConc)* does not seem to affect the profitability of insider trading.

With regard to our main research question, model 2 of Table 3.6. shows a highly significant negative coefficient on disclosure quality. This finding implies that high-quality corporate communication is effective in reducing information asymmetry and the profitability of insider trading, consistent with hypothesis 1.[16]

3.7.2. The impact of the quality of individual communication channels on insider trading profitability

Next, we evaluate whether the individual communication channels have a different impact on reducing the informational benefits of insiders.[17] To investigate this proposition, we first performed four separate regression analyses containing the control variables and the disclosure score on the respective communication channel (Table 3.7., models 3 to 6). It must be noted that, although the BVFA values investor relation activities twice as important as the other communication channels, we standardized all disclosure scores to a score on 100 for reasons of comparability.

In general, the regression results in Table 3.7. are consistent with hypothesis 2 and show that the influence of disclosure quality differs across communication channels. First, our results show that the

[16] Similar results are obtained when no adjustment for overlapping event windows is applied. Results are available upon request.

[17] It must be noted that we do not investigate the relation between insiders' abnormal returns and the content or quality of a particular disclosure. As such, we do not investigate the reaction of insiders to good or bad news. Our analysis only evaluates whether the average quality of all disclosures through a specific communication channel during a fiscal year affects the abnormal returns from insider trading

quality of corporate websites does not seem to affect the level of information asymmetry and the resulting insider trading returns (model 5). Contrary to all other communications, website disclosures are not directly and primarily aimed at the investor community. In addition, the quality of websites and web disclosures is rather uniform across companies, which limits the opportunities to have a decisive impact on insiders' informational benefits. Second, models 3 and 4 of Table 3.7. report significant negative coefficients on *AnnualReports* and *PressReleases*. This finding suggests that the quality of these communication channels has an impact on the profitability of insider trading. The most important tool in reducing insiders' trading gains and getting valuable information across to the investor community, however, seems to be a firm's interactions with financial analysts and fund managers as suggested by the coefficient on *InvestorRelations* (model 6). The information communicated through investor relation activities is typically informal, unaudited and not subject to litigation. However, as suggested by Brown and Hillegeist (2007), the credibility of investor relation activities might be enhanced by reputational concerns of managers.

Following the approach of Botosan and Plumlee (2002), we also performed a regression analysis including the disclosure score on all communication channels (Table 3.7., model 7). The authors found that, although the correlation between individual communication channels might induce multicollinearity, not controlling for other types of disclosure might lead to a correlated omitted variable bias and erroneous conclusions regarding the impact of a particular communication channel. However, we do not expect any multicollinearity problems in the aggregated regression model (model 7) as the correlations between the independent variables reported in Table 3.5. are below the 0.7 limit identified by Kervin (1992). In addition, VIF values are well below the recommended cutoff of 10 (Chatterjee and Hadi, 2006). Regression results in model 7 confirm our previous results.

In sum, our regression results seem to indicate that the content and quality of annual reports and press releases has a comparable impact on the level of information asymmetry. Furthermore, they suggest that the disclosure quality of investor relation activities has the largest contribution to the reduction of

Table 3.7. OLS regression results: individual disclosure scores

	Expected	Model 3		Model 4		Model 5		Model 6		Model 7		
Variables	sign	Coef.	s.e.	Coef	s.e.	Coef	s.e.	Coef.	s.e.	Coef.	s.e.	VIF
Constant	?	8.347***	2.62	6.853***	2.18	7.460***	3.41	11.940***	3.60	10.290***	3.41	
TradeSize	+	4.536**	2.82	4.046*	2.65	4.497*	2.75	4.260*	2.73	3.953*	2.64	1.08
FirmSize	-	-0.252	0.26	-0.299	0.25	-0.399*	0.24	-0.389*	0.24	-0.234	0.26	1.76
MarketToBook	?	-0.507***	0.17	-0.395***	0.15	-0.443***	0.15	-0.377***	0.15	-0.376***	0.15	1.53
Leverage	-	0.017	0.02	0.016	0.02	0.015	0.02	0.015	0.02	0.017	0.02	1.22
Sale	+	1.823***	0.63	1.416**	0.63	1.595***	0.62	1.947***	0.64	1.901***	0.65	1.25
Cross-listing	-	-1.770*	1.25	-1.179	1.35	-1.595	1.41	-1.740*	1.25	-1.580	1.23	1.41
OwnershipConc	?	-0.101	0.01	-0.292	-0.98	0.094	0.01	-0.909	0.01	-0.011	0.01	1.40
AnnualReport	-	-0.065**	0.04							-0.047*	0.04	1.75
PressRelease	-			-0.043**	0.02					-0.035*	0.02	2.10
Website	-					-0.032	0.04			0.063	0.06	2.26
InvestorRelations	-							-0.101**	0.04	-0.085**	0.04	1.59
Observations		407		407		407		407		407		
R^2		0.04		0.04		0.04		0.04		0.05		
R^2 adj.		0.02		0.02		0.02		0.02		0.02		
F-stat.		3.70		3.18		3.27		3.72		3.21		
P-value		0.00		0.01		0.00		0.00		0.00		

Notes: OLS regression results for a pooled sample of net purchases and sales (N=407). Abnormal returns for sales transactions are multiplied by minus one. $CAR_{ij(0,20)}$ is equal to the event-specific cumulative abnormal return measured using a standard market model or a Dimson-adjusted market model depending on the number of zero returns. *AnnualReport*, *PressRelease*, *Website*, and *InvestorRelations* respectively represent the disclosure quality score on 100 for annual reports, press releases, corporate websites and investor relation activities awarded by the BVFA to company *j* in the year of the insider trade. *TradeSize* is equal to the eurovalue of the net transactions divided by the market value of the company at the beginning of the fiscal year expressed in percentage. *FirmSize* is equal to the log of the market value of the company at the beginning of the fiscal year expressed in millions of euros. *MarketToBook* is equal to the ratio of the market value of the company divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Sale* is a dummy variable equal to one for net sale transactions and zero otherwise. *Cross-listing* is a dummy variable equal one if a company is cross-listed on a foreign stock exchange and zero otherwise. *OwnershipConc* is equal to the number of shares held by the five largest shareholders. Standard errors are adjusted for firm-clustering and heteroskedasticity. VIF are the Variance Inflation Factors. Significance levels are two-tailed when 'Expected sign' is a '?' and one-tailed otherwise, with *** < 0.01,** < 0.05, * < 0.10.

information asymmetry and the resulting abnormal trading profits.[18] This communication channel is aimed directly at the investor community and exhibits a substantial level of discretion. This provides companies with more degrees of freedom to customize their disclosures to the investors' needs. Possibly, the importance of this voluntary disclosure channel is further enhanced by the broad range of disseminated information as well as the high degree of timeliness.

3.8. Robustness checks

In order to check the robustness of our results, we present some sensitivity analyses for the event study methodology. First, we re-examine the relation between corporate communication quality and insider trading profitability using cumulative abnormal returns only calculated by means of a standard market model instead of using a combination of a standard market model and a market model adjusted for thin trading. Results reported in Table 3.8., model 8 show that an alternative estimation of the insiders' gains does not alter our conclusions.[19] Consistent with results in Table 3.6., we find a significant negative association between corporate communication quality and the abnormal insider trading profits.

Second, we test whether our conclusions hold if alternative event windows are used and estimate the cumulative abnormal returns from day 0 to day 5 and day 10 respectively. Regression results are reported in models 9 and 10 of Table 3.8. They indicate that our results are not sensitive to the length of the event window. Again, we find support for hypothesis 1 and find that abnormal returns to insiders are significantly lower in companies with a higher communication quality.

Furthermore, we also checked whether the results of our inquiry are potentially driven by fluctuations in the overall economic situation and investment climate. A study by Van Geyt *et al.* (2012), for example, showed that the turbulent market conditions and uncertain investment environment created

[18] Using alternative estimation windows for the cumulative abnormal returns does not alter our conclusions. Results are available upon request.
[19] Also, results on the impact of different communication channels are similar when cumulative abnormal returns are calculated using the standard market model.

Table 3.8. Robustness checks : Alternative estimation method and event windows

		Model 8 : $CAR_{MM\ ij(0,20)}$		Model 9 : $CAR_{ij(0,5)}$		Model 10 : $CAR_{ij(0,10)}$	
Variables	Expected sign	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.
Constant	?	11.717***	3.54	5.450***	1.25	6.920***	2.28
TradeSize	+	4.129*	2.76	1.394	1.48	-0.601	1.00
FirmSize	-	-0.193	0.25	-0.109	0.10	-0.159	0.16
MarketToBook	?	-0.446***	0.16	-0.119	0.11	-0.215**	0.11
Leverage	-	0.017	0.02	0.017	0.01	0.023	0.01
Sale	+	1.726***	0.60	0.022	0.26	0.020	0.52
Cross-listing	-	-1.300	1.29	-1.353**	0.71	-1.051	1.06
OwnershipConc	?	-0.009	0.01	-0.016**	0.01	-0.012	0.01
CommunicationQuality	-	-0.121**	0.05	-0.036**	0.02	-0.055*	0.04
Observations		407		664		515	
R^2		0.04		0.02		0.02	
R^2 adj.		0.02		0.01		0.01	
F-stat.		3.78		4.08		2.16	
P-value		0.00		0.00		0.05	

Notes: OLS regression results for a pooled sample of net purchases and sales (N=407). Abnormal returns for sales transactions are multiplied by minus one. $CAR_{MM\ ij(0,20)}$ is equal to the event-specific cumulative abnormal return measured using a standard market model (Model 8). $CAR_{ij(0,5)}$ and $CAR_{ij(0,10)}$ are equal to the event-specific cumulative abnormal return from day 0 to day 5 or day 10 respectively and are measured using a standard market model or a Dimson-adjusted market model depending on the number of zero returns (Models 9 and 10). *CommunicationQuality* represents the disclosure quality score on 100 points awarded by the BVFA to company *j* in the year of the insider trade. *TradeSize* is equal to the eurovalue of the net transactions divided by the market value of the company at the beginning of the fiscal year expressed in percentage. *FirmSize* is equal to the log of the market value of the company at the beginning of the fiscal year expressed in millions of euros. *MarketToBook* is equal to the ratio of the market value of the company divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Sale* is a dummy variable equal to one for net sale transactions and zero otherwise. *Cross-listing* is dummy variable equal one if a company is cross-listed on a foreign stock exchange and zero otherwise. *OwnershipConc* is equal to the percentage of shares held by the five largest shareholders. Standard errors are adjusted for firm-clustering and heteroskedasticity. Significance levels are two-tailed when "Expected sign" is a "?" and one-tailed otherwise, with *** < 0.01,** < 0.05, * < 0.10.

by the recent financial crisis enlarged the opportunities for insiders to exploit their informational benefit. Accordingly, the study evidenced that the magnitude of insiders' trading profits was substantially higher during the years of the financial crisis. Following their approach, we included a dummy variable (*FinancialCrisis*) for transactions carried out during 2008 and 2009, the peak of the financial crisis in Belgium. Results reported in Tables 3.9. and 3.10. confirm the prior research results and show that insider trading was indeed more profitable during 2008 and 2009. In addition, our results on communication quality also hold when the *FinancialCrisis*-dummy is included as the overall communication quality and voluntary disclosure channels in particular still have a significant negative influence on insider trading profitability.

Table 3.9. Robustness check : OLS regression results on total disclosure score including *FinancialCrisis*-dummy

		Model 11		Model 12	
Variables	Expected sign	Coef.	s.e.	Coef.	s.e.
Constant	?	4.720**	2.10	10.504***	3.62
TradeSize	+	4.694**	2.66	4.351*	2.70
FirmSize	-	-0.407*	0.25	-0.189	0.26
MarketToBook	?	-0.429**	0.16	-0.463***	0.17
Leverage	-	0.009	0.02	0.013	0.02
Sale	+	1.964***	0.74	2.076***	0.70
Cross-listing	-	-2.135*	1.38	-1.710*	1.34
OwnershipConc	?	0.002	0.01	-0.009	0.01
FinancialCrisis	+	1.763**	0.86	1.518**	0.83
CommunicationQuality	-			-0.109**	0.01
Observations		407		407	
R^2		0.04		0.05	
R^2 adj		0.02		0.03	
F-stat		3.38		3.62	
P-value		0.00		0.00	

Notes: OLS regression results for a pooled sample of net purchases and sales (N=407). Abnormal returns for sales transactions are multiplied by minus one. $CAR_{ij(0,20)}$ is equal to the event-specific cumulative abnormal return measured using a standard market model or a Dimson-adjusted market model depending on the number of zero returns. *CommunicationQuality* represents the disclosure quality score on 100 points awarded to Belgian listed companies by the BVFA. *TradeSize* is equal to the eurovalue of the net transactions divided by the market value of the company at the beginning of the fiscal year expressed in percentage. *FirmSize* is equal to the log of the market value of the company at the beginning of the fiscal year expressed in millions of euros. *MarketToBook* is equal to the ratio of the market value of the company divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Sale* is a dummy variable equal to one for net sale transactions and zero otherwise. *Cross-listing* is dummy variable equal one if a company is cross-listed on a foreign stock exchange and zero otherwise. *OwnershipConc* is equal to the percentage of shares held by the five largest shareholders. *FinancialCrisis* is a dummy variable equal to one for net trades executed in 2008 and 2009 and zero otherwise. Standard errors are adjusted for firm-clustering and heteroskedasticity. Significance levels are two-tailed when "Expected sign" is a "?" and one-tailed otherwise, with *** < 0.01,** < 0.05, * < 0.10.

Table 3.10. Robustness check : OLS regression results on separate communication channels including *FinancialCrisis*-dummy

	Expected	Model 13		Model 14		Model 15		Model 16		Model 17	
Variables	sign	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.
Constant	?	7.179***	2.64	6.003***	2.17	6.693*	3.47	10.250***	3.48	9.101**	3.53
TradeSize	+	4.704**	2.75	4.258*	2.58	4.697**	2.67	4.466*	2.67	4.137*	2.59
FirmSize	-	-0.240	0.26	-0.254	0.26	-0.345*	0.25	-0.355*	0.25	-0.210	0.27
MarketToBook	?	-0.509***	0.18	-0.416**	0.16	-0.465***	0.17	-0.399**	0.16	-0.396**	0.17
Leverage	-	0.012	0.02	0.011	0.02	0.010	0.02	0.010	0.02	0.013	0.02
Sale	+	2.119***	0.72	1.799***	0.74	1.980***	0.74	2.215***	0.72	2.117***	0.72
Cross-listing	-	-2.111*	1.31	-1.589	1.39	-1.989*	1.45	-2.075*	1.30	-1.828*	1.30
OwnershipConc	?	-0.001	0.01	-0.004	0.01	0.000	0.01	-0.008	0.01	-0.010	0.01
FinancialCrisis	+	1.539**	0.84	1.731**	0.84	1.768**	0.87	1.494**	0.82	1.347**	0.77
AnnualReport	-	-0.054*	0.04							-0.039	0.03
PressRelease	-			-0.041*	0.03					-0.035*	0.03
Website	-					-0.033	0.05			0.051	0.05
InvestorRelations	-							-0.085**	0.04	-0.070*	0.04
Observations		407		407		407		407		407	
R^2		0.05		0.05		0.04		0.05		0.05	
R^2 adj		0.03		0.03		0.02		0.03		0.02	
F-stat		3.62		3.10		3.20		3.45		3.10	
P-value		0.00		0.00		0.00		0.00		0.00	

Notes: OLS regression results for a pooled sample of net purchases and sales (N=407). Abnormal returns for sales transactions are multiplied by minus one. $CAR_{ij(0,20)}$ is equal to the event-specific cumulative abnormal return measured using a standard market model or a Dimson-adjusted market model depending on the number of zero returns. *AnnualReport*, *PressRelease*, *Website*, and *InvestorRelations* respectively represent the disclosure quality score on 100 for annual reports, press releases, corporate websites and investor relation activities awarded to Belgian listed companies by the BVFA. *TradeSize* is equal to the eurovalue of the net transactions divided by the market value of the company at the beginning of the fiscal year expressed in percentage. *FirmSize* is equal to the log of the market value of the company at the beginning of the fiscal year expressed in millions of euros. *MarketToBook* is equal to the ratio of the market value of the company divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Sale* is a dummy variable equal to one for net sale transactions and zero otherwise. *Cross-listing* is dummy variable equal one if a company is cross-listed on a foreign stock exchange and zero otherwise. *OwnershipConc* is equal to the percentage of shares held by the five largest shareholders. *FinancialCrisis* is a dummy variable equal to one for net trades executed in 2008 and 2009 and zero otherwise. Standard errors are adjusted for firm-clustering and heteroskedasticity. Significance levels are two-tailed when "Expected sign" is a "?" and one-tailed otherwise, with *** < 0.01,** < 0.05, * < 0.10.

3.9. Conclusion

High-quality communication is a key feature of a firm's corporate governance strategy. Using a sample of Belgian listed companies, this paper investigated whether high-quality communication can reduce insider trading profitability, and thus information asymmetry between insiders and outsiders. A unique feature of our analysis is that we have proxied the quality of corporate communication by disclosure scores that were assigned by financial analysts and fund managers who are familiar with the peculiarities and demands of the companies' investor community. One of the advantages of using these scores is that they are more objective than researcher-assigned scores. Consistent with expectations, we have found that high-quality communication limits the profitability of insider trading. Moreover, we have reported evidence on the communication channels that contribute most to the reduction of information asymmetry between insiders and outsiders and the resulting insider trading gains. In particular, we have documented that, although disclosures in mandatory annual reports have some impact, voluntary disclosure channels, such as investor relation programs and press releases, are the most effective channels to reduce information asymmetry between insiders and outsiders. Furthermore, since the quality of corporate websites is rather uniform across companies, they are unable to explain the variance in insider trading profitability.

The results of this study are of interest to academics and regulators. From an academic point of view, this study contributes to various strands of literature. First, it contributes to the academic literature on insider trading profitability by providing evidence on the impact of high-quality communication and of the different channels through which companies can communicate on insider trading profitability. Second, the study also contributes to the academic literature on the relation between disclosure quality and information asymmetry by using insider trading profitability as a proxy for information asymmetry rather than, for example, bid-ask spreads or the probability of informed trading. Furthermore, we are also the first to investigate the disclosure - information asymmetry relation in a French civil law country using disclosure scores assigned by professional financial analysts and which rate the quality of different communication channels.

The results are furthermore of interest to regulators for the findings generally underline the importance of high-quality communication as an instrument to prevent information inequities and unfair enrichment by privileged insiders and to stimulate a more efficient allocation of resources. Interestingly, however, our results show that whereas regulators primarily focus on annual reports and backward-looking financial statements information, this communication channel is not the most effective in reducing the level of information asymmetry. By contrast, investor relation activities, which are used to communicate timely and forward-looking information on a voluntary basis, appear to be most effective. We believe that this finding is relevant for regulators and may shed new light on the discussion concerning the shift towards more or less regulation of markets.

3.10. References

Aerts, W., Cormier, D., & Magnan, M. (2007). The Association between Web-Based Corporate Performance Disclosure and Financial Analyst Behaviour under Different Governance Regimes. *Corporate Governance: An International Review,* 15(6), p.1301-1329.

AIMR. (2000). *AIMR Corporate Disclosure Survey: A Report to AIMR*. Saint-Louis, MO: Fleishman-Hillard Research.

Aksu, M., & Kosedag, A. (2006). Transparency and Disclosure Scores and Their Determinants in the Istanbul Stock Exchange. *Corporate Governance: An International Review,* 14(4), p.277-296.

Aktas, N., de Bodt, E., & Van Oppens, H. (2008). Legal Insider Trading and Market Efficiency. *Journal of Banking and Finance,* 32(7), p.1379-1392.

Aussenegg, W., & Ranzi, R. (2008). *Corporate Insider Trading and the Short-Run Price Impact of Private Information in Continental Europe*. Working paper.

Baiman, S., & Verrecchia, R. E. (1996). The Relation among Capital Markets, Financial Disclosure, Production Efficiency, and Insider Trading. *Journal of Accounting Research,* 34(1), p.1-22.

Bajo, E., Bigelli, M., Hillier, D., & Petracci, B. (2009). The Determinants of Regulatory Compliance: An Analysis of Insider Trading Disclosures in Italy. *Journal of Business Ethics,* 90(3), p.331-343.

Baker, H. K., Nofsinger, J. R., & Weaver, D. G. (2002). International Cross-Listing and Visibility. *Journal of Financial and Quantitative Analysis,* 37(3), p.495-521.

Ball, R., Jayaraman, S., & Shivakumar, L. (2012). Audited Financial Reporting and Voluntary Disclosure as Complements: A Test of the Confirmation Hypothesis. *Journal of Accounting and Economics,* 53(1–2), p.136-166.

Barontini, R., & Caprio, L. (2006). The Effect of Family Control on Firm Value and Performance: Evidence from Continental Europe. *European Financial Management,* 12(5), p.689-723.

Barth, M. E., Kasznik, R., & McNichols, M. F. (2001). Analyst Coverage and Intangible Assets. *Journal of Accounting Research,* 39(1), p.1-34.

Betzer, A., & Theissen, E. (2009). Insider Trading and Corporate Governance: The Case of Germany. *European Financial Management,* 15(2), p.402-429.

Bhushan, R. (1989). Firm Characteristics and Analyst Following. *Journal of Accounting and Economics,* 11(2-3), p.255-274.

Bollen, L., Hassink, H., & Bozic, G. (2006). Measuring and Explaining the Quality of Internet Investor Relations Activities: A Multinational Empirical Analysis. *International Journal of Accounting Information Systems,* 7(4), p.273-298.

Bonsón, E., & Escobar, T. (2002). A Survey on Voluntary Disclosure on the Internet: Empirical Evidence from 300 European Union Companies. *International Journal of Digital Accounting Research,* 2(1), p.27-51.

Bonsón, E., & Escobar, T. (2006). Digital Reporting in Eastern Europe: An Empirical Study. *International Journal of Accounting Information Systems,* 7(4), p.299-318.

Botosan, C. A. (1997). Disclosure Level and the Cost of Equity Capital. *Accounting Review,* 72(3), p.323-349.

Botosan, C. A., & Plumlee, M. A. (2002). A Re-Examination of Disclosure Level and the Expected Cost of Equity Capital. *Journal of Accounting Research,* 40(1), p.21-40.

Bradbury, M. E. (1992). Voluntary Disclosure of Financial Segment Data: New Zealand Evidence. *Accounting and Finance,* 32(1), p.15-26.

Bravo, F., Abad, C., & Trombetta, M. (2009). Disclosure Indices Design: Does It Make a Difference? *Revista de contabilidad,* 12(2), p.253-277.

Brown, L. D., & Rozeff, M. S. (1979). The predictive value of interim reports for improving forecasts of future quarterly earnings. *Accounting Review,* 54(3), p.179-189.

Brown, P., & Niederhoffer, V. (1968). The Predictive Content of Quarterly Earnings. *Journal of Business,* 41(4), p.488-497.

Brown, S., & Hillegeist, S. A. (2007). How Disclosure Quality Affects the Level of Information Asymmetry. *Review of Accounting Studies,* 12(2-3), p.443-477.

Bushman, R. M., & Smith, A. J. (2001). Financial Accounting Information and Corporate Governance. *Journal of Accounting and Economics,* 32(1-3), p.237-333.

Buysschaert, A., Deloof, M., & Jegers, M. (2004). Equity Sales in Belgian Corporate Groups: Expropriation of Minority Shareholders? A Clinical Study. *Journal of Corporate Finance,* 10(1), p.81-103.

BVFA. (2010). *Evaluation Grid 2010*. Available at: www.bvfa.be (published October, 2010).

BVFA. (2010). *Press Release 2010*. Available at: www.bvfa.be (published October, 2010).

Carlin, W., & Mayer, C. (2003). Finance, Investment, and Growth. *Journal of Financial Economics,* 69(1), p.191-226.

Chang, M., & Corbitt, R. (2012). The Effect of Cross-Listing on Insider Trading Returns. *Accounting and Finance,* 52(3), p.723-741.

Chang, M., D'Anna, G., Watson, L., & Wee, M. (2008). Does Disclosure Quality Via Investor Relations Affect Information Asymmetry? *Australian Journal of Management,* 33(2), p.375-390.

Chang, M., Hillman, R., & Watson, I. D. (2005). Are Corporate Governance Mechanisms Effective in Reducing Insider Trading Profits? *Company and Securities Law Journal,* 23(3), p.165-180.

Chatterjee, S., & Hadi, A. S. (2006). *Regression Analysis by Example* (4rd ed.). New York, NY: Wiley.

Chen, W.-P., Chung, H., Lee, C., & Liao, W.-L. (2007). Corporate Governance and Equity Liquidity: Analysis of S&P Transparency and Disclosure Rankings. *Corporate Governance: An International Review,* 15(4), p.644-660.

Cheng, S., Nagar, V., & Rajan, M. V. (2007). Insider Trades and Private Information: The Special Case of Delayed-Disclosure Trades. *Review of Financial Studies,* 20(5), p.1833-1864.

Cheuk, M.-Y., Fan, D. K., & So, R. W. (2006). Insider Trading in Hong Kong: Some Stylized Facts. *Pacific-Basin Finance Journal*, 14(1), p.73-90.

Coffee, J. C. (1999). Future as History: The Prospects for Global Convergence in Corporate Governance and Its Implications. *Northwestern University Law Review,* 93(3), p.641-707.

Coffee, J. C. (2002). Racing Towards the Top?: The Impact of Cross-Listings and Stock Market Competition on International Corporate Governance. *Columbia Law Review,* 102(7), p.1757-1831.

Collins, D. W., Kothari, S. P., & Rayburn, J. D. (1987). Firm Size and the Information Content of Prices with Respect to Earnings. *Journal of Accounting and Economics,* 9(2), p.111-138.

Del Brio, E. B., & Perote, J. (2007). What Enhances Insider Trading Profitability? *Atlantic Economic Journal,* 35(2), p.173-188.

Demsetz, H. (1986). Corporate Control, Insider Trading, and Rates of Return. *American Economic Review,* 76(2), p.313-316.

Diamond, D. W. (1985). Optimal Release of Information by Firms. *Journal of Finance,* 40(4), p.1071-1094.

Dierkens, N. (1991). Information Asymmetry and Equity Issues. *Journal of Financial and Quantitative Analysis,* 26(2), p.181-199.

Dimson, E. (1979). Risk Measurement When Shares Are Subject to Infrequent Trading. *Journal of Financial Economics,* 7(2), p.197-226.

Djankov, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2008). The Law and Economics of Self-Dealing. *Journal of Financial Economics,* 88(3), p.430-465.

Durnev, A. R. T., & Kim, E. H. (2005). To Steal or Not to Steal: Firm Attributes, Legal Environment, and Valuation. *Journal of Finance,* 60(3), p.1461-1493.

Ertimur, Y. (2007). Discussion Of "How Disclosure Quality Affects the Level of Information Asymmetry". *Review of Accounting Studies,* 12(2-3), p.479-485.

Faccio, M., & Lang, L. H. P. (2002). The Ultimate Ownership of Western European Corporations. *Journal of Financial Economics,* 65(3), p.365-395.

Fang, L., & Peress, J. (2009). Media Coverage and the Cross-Section of Stock Returns. *Journal of Finance,* 64(5), p.2023-2052.

Fidrmuc, J. P., Goergen, M., & Renneboog, L. (2006). Insider Trading, News Releases, and Ownership Concentration. *Journal of Finance,* 61(6), p.2931-2973.

Fidrmuc, J. P., Korczak, A., & Korczak, P. (2011). *Why Are Abnormal Returns after Insider Transactions Larger in Better Investor Protection Countries?* Working paper. Available at: www.ssrn.com.

Finnerty, J. E. (1976). Insiders and Market Efficiency. *Journal of Finance,* 31(4), p.1141-1148.

Frankel, R., & Li, X. (2004). Characteristics of a Firm's Information Environment and the Information Asymmetry between Insiders and Outsiders. *Journal of Accounting and Economics,* 37(2), p.229-259.

Friederich, S., Gregory, A., Matatko, J., & Tonks, I. (2002). Short-Run Returns around the Trades of Corporate Insiders on the London Stock Exchange. *European Financial Management,* 8(1), p.7-30.

Gelb, D., & Zarowin, P. (2002). Corporate Disclosure Policy and the Informativeness of Stock Prices. *Review of Accounting Studies,* 7(1), p.33-52.

Givoly, D., & Palmon, D. (1985). Insider Trading and the Exploitation of inside Information: Some Empirical Evidence. *Journal of Business,* 58(1), p.69-87.

Grant, E. B. (1980). Market Implications of Differential Amounts of Interim Information. *Journal of Accounting Research,* 18(1), p.255-268.

Gregory, A., Tharyan, R., & Tonks, I. (2009). *Insider Trading in Glamour and Value Firms*. Working paper.

Healy, P. M., Hutton, A., & Palepu, K. G. (1999). Stock Performance and Intermediation Changes Surrounding Sustained Increases in Disclosure. *Contemporary Accounting Research,* 16(3), p.485-520.

Healy, P. M., & Palepu, K. G. (2001). Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature. *Journal of Accounting and Economics,* 31(1-3), p.405-440.

Heflin, F. L., Shaw, K. W., & Wild, J. J. (2005). Disclosure Policy and Market Liquidity: Impact of Depth Quotes and Order Sizes. *Contemporary Accounting Research,* 22(4), p.829-865.

Hirst, D. E., Koonce, L., & Simko, P. J. (1995). Investor Reactions to Financial Analysts Research Reports. *Journal of Accounting Research,* 33(2), p.335-351.

Hope, O. K. (2003). Disclosure Practices, Enforcement of Accounting Standards, and Analysts' Forecast Accuracy: An International Study. *Journal of Accounting Research,* 41(2), p.235-272.

Hossain, M., Perera, M. H. B., & Rahman, A. R. (1995). Voluntary Disclosure in the Annual Reports of New Zealand Companies. *Journal of International Financial Management and Accounting,* 6(1), p.69-87.

Huddart, S. J., & Ke, B. (2007). Information Asymmetry and Cross-Sectional Variation in Insider Trading. *Contemporary Accounting Research,* 24(1), p.195-232.

Hussainey, K., Schleicher, T., & Walker, M. (2003). Undertaking Large-Scale Disclosure Studies When AIMR-FAF Ratings Are Not Available: The Case of Prices Leading Earnings. *Accounting and Business Research,* 33(4), p.275-294.

IASB. (2005). *International Financial Reporting Standards*. International Accounting Standards Board, London.

Jaffe, J. F. (1974). Special Information and Insider Trading. *Journal of Business,* 47(3), p.410-428.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics,* 3(4), p.305-360.

Jenter, D. (2005). Market Timing and Managerial Portfolio Decisions. *Journal of Finance,* 60(4), p.1903-1949.

Jones, M. J., & Xiao, J. Z. (2004). Financial Reporting on the Internet by 2010: A Consensus View. *Accounting Forum*, 28(3), p.237-263.

Karpoff, J. M. (1987). The Relation between Price Changes and Trading Volume: A Survey. *Journal of Financial and Quantitative Analysis*, 22(1), p.109-126.

Kervin, J. B. (1992). *Methods for Business Research*. New York, NY: Harper Collins.

Khanna, T., Palepu, K. G., & Srinivasan, S. (2004). Disclosure Practices of Foreign Companies Interacting with U.S. Markets. *Journal of Accounting Research*, 42(2), p.475-508.

Korczak, A., & Lasfer, M. A. (2008). *Does Cross-Listing Mitigate Insider Trading?* Working paper.

Kyle, A. S. (1985). Continuous Auctions and Insider Trading. *Econometrica*, 53(6), p.1315-1335.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1997). Legal Determinants of External Finance. *Journal of Finance*, 52(3), p.1131-1150.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and Finance. *Journal of Political Economy*, 106(6), p.1113-1155.

Lakhal, F. (2009). Does Corporate Disclosure Policy Change Financial Analysts' Behaviour? Evidence from France. *Journal of Accounting & Organizational Change*, 5(3), p.344-361.

Lakonishok, J., & Lee, I. (2001). Are Insider Trades Informative? *Review of Financial Studies*, 14(1), p.79-111.

Lambert, R., Leuz, C., & Verrecchia, R. E. (2007). Accounting Information, Disclosure, and the Cost of Capital. *Journal of Accounting Research*, 45(2), p.385-420.

Lang, M. H., Lins, K. V., & Miller, D. P. (2003). ADRs, Analysts, and Accuracy: Does Cross Listing in the United States Improve a Firm's Information Environment and Increase Market Value? *Journal of Accounting Research*, 41(2), p.317-345.

Lang, M. H., Lins, K. V., & Miller, D. P. (2004). Concentrated Control, Analyst Following, and Valuation: Do Analysts Matter Most When Investors Are Protected Least? *Journal of Accounting Research*, 42(3), p.589-623.

Lang, M. H., & Lundholm, R. J. (1993). Cross-Sectional Determinants of Analyst Ratings of Corporate Disclosures. *Journal of Accounting Research*, 31(2), p.246-271.

Lang, M. H., & Lundholm, R. J. (1996). Corporate Disclosure Policy and Analyst Behavior. *Accounting Review*, 71(4), p.467-492.

Leuz, C., & Wysocki, P. (2008). *Economic Consequences of Financial Reporting and Disclosure Regulation: A Review and Suggestions for Future Research*. Working paper.

Lin, J.-C., & Howe, J. S. (1990). Insider Trading in the OTC Market. *Journal of Finance*, 45(4), p.1273-1284.

Litvak, K. (2007). The Effect of the Sarbanes-Oxley Act on Non-US Companies Cross-Listed in the US. *Journal of Corporate Finance*, 13(2-3), p.195-228.

Lundholm, R. J. (2003). Historical Accounting and the Endogenous Credibility of Current Disclosures. *Journal of Accounting, Auditing and Finance*, 18(1), p.207.

Lundholm, R. J., & Myers, L. A. (2002). Bringing the Future Forward: The Effect of Disclosure on the Returns-Earnings Relation. *Journal of Accounting Research*, 40(3), p.809-839.

MacKinlay, A. C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature*, 35(1), p.13-39.

Mallin, C. (2002). The Relationship between Corporate Governance, Transparency and Financial Disclosure. *Corporate Governance: An International Review*, 10(4), p.253-255.

Marston, C., & Polei, A. (2004). Corporate Reporting on the Internet by German Companies. *International Journal of Accounting Information Systems*, 5(3), p.285-311.

Marston, C., & Straker, M. (2001). Investor Relations: A European Survey. *Corporate Communications: An International Journal*, 6(2), p.82-93.

McNichols, M., & Manegold, J. G. (1983). The Effect of the Information Environment on the Relationship between Financial Disclosure and Security Price Variability. *Journal of Accounting and Economics*, 5(0), p.49-74.

Mitton, T. (2002). A Cross-Firm Analysis of the Impact of Corporate Governance on the East Asian Financial Crisis. *Journal of Financial Economics*, 64(2), p.215-241.

Nagar, V., Nanda, D., & Wysocki, P. (2003). Discretionary Disclosure and Stock-Based Incentives. *Journal of Accounting and Economics*, 34(1-3), p.283-309.

OECD. (2004). *OECD Principles of Corporate Governance*. Paris: OECD.

Ofek, E., & Yermack, D. (2000). Taking Stock: Equity-Based Compensation and the Evolution of Managerial Ownership. *Journal of Finance*, 55(3), p.1367-1384.

Patel, S. A., Balic, A., & Bwakira, L. (2002). Measuring Transparency and Disclosure at Firm-Level in Emerging Markets. *Emerging markets review*, 3(4), p.325-337.

Patel, S. A., & Dallas, G. (2002). *Transparency and Disclosure: Overview of Methodology and Study Results - United States*. Working paper.

Renneboog, L. (2000). Ownership, Managerial Control and the Governance of Companies Listed on the Brussels Stock Exchange. *Journal of Banking & Finance*, 24(12), p.1959-1995.

Revsine, L., Collins, D. W., & Johnson, W. B. (2004). *Financial Reporting and Analysis*. Upper Saddle River, NJ: Prentice Hall.

Rogers, W. (1993). Quantile Regression Standard Errors. *Stata Technical Bulletin*, 2(9), p.19-22.

Rozeff, M. S., & Zaman, M. A. (1998). Overreaction and Insider Trading: Evidence from Growth and Value Portfolios. *Journal of Finance*, 53(2), p.701-716.

Salter, S. B. (1998). Corporate Financial Disclosure in Emerging Markets: Does Economic Development Matter? *International Journal of Accounting*, 33(2), p.211-234.

Sami, H., & Zhou, H. (2008). The Economic Consequences of Increased Disclosure: Evidence from Cross-Listings of Chinese Firms. *Journal of International Financial Management and Accounting,* 19(1), p.1-27.

Schipper, K. (1991). Commentary on Analysts' Forecasts. *Accounting horizons,* 5(4), p.105-121.

Sengupta, P. (1998). Corporate Disclosure Quality and the Cost of Debt. *Accounting Review,* 73(4), p.459-474.

Seyhun, H. N. (1986). Insiders' Profits, Costs of Trading, and Market Efficiency. *Journal of Financial Economics,* 16(2), p.189-212.

Smith, C. W., & Watts, R. (1992). The Investment Opportunity Set and Corporate Financing, Dividend, and Compensation Policies. *Journal of Financial Economics,* 32(3), p.263-292.

Stocken, P. C. (2000). Credibility of Voluntary Disclosure. *Rand Journal of Economics,* 31(2), p.359-374.

Tison, M., & Ravelingien, F. 2007. Preventie en repressie van misbruik van voorwetenschap in Belgisch recht na de omzetting van richtlijn 2003/6 inzake marktmisbruik. *Belgisch Kapitaalmarktrecht Op Europese Leest*. Antwerpen - Oxford: Intersentia. 347-406.

Tourani-Rad, A., Etebari, A., & Gilbert, A. (2003). Profitability of Insider Trading: New Zealand Evidence. *University of Auckland Business Review,* 5(2), p.1-15.

Trabelsi, S., Labelle, R., & Dumontier, P. (2008). Incremental Voluntary Disclosure on Corporate Websites, Determinants and Consequences. *Journal of Contemporary Accounting and Economics,* 4(2), p.120-155.

Van Geyt, D., Van Cauwenberge, P., & Vander Bauwhede, H. (2012). The Impact of the Financial Crisis on Insider Trading Profitability in Belgium. *Journal of Business Economics and Management,* p.1-22.

Vanstraelen, A., Zarzeski, M. T., & Robb, S. W. G. (2003). Corporate Nonfinancial Disclosure Practices and Financial Analyst Forecast Ability across Three European Countries. *Journal of International Financial Management and Accounting,* 14(3), p.249-278.

Vergoossen, R. G. A. (1993). The Use and Perceived Importance of Annual Reports by Investment Analysts in the Netherlands. *European Accounting Review,* 2(2), p.219-244.

Verrecchia, R. E. (2001). Essays on Disclosure. *Journal of Accounting and Economics,* 32(1-3), p.97-180.

Wallace, R. S. O., Naser, K., & Mora, A. (1994). The Relationship between the Comprehensiveness of Corporate Annual Reports and Firm Characteristics in Spain. *Accounting and Business Research,* 25(97), p.41-53.

Welker, M. (1995). Disclosure Policy, Information Asymmetry, and Liquidity in Equity Markets. *Contemporary Accounting Research,* 11(2), p.801-827.

Wisniewski, T. P., & Bohl, M. T. (2005). The Information Content of Registered Insider Trading under Lax Law Enforcement. *International Review of Law and Economics,* 25(2), p.169-185.

Zhang, W., Cahan, S. F., & Allen, A. C. (2005). Insider Trading and Pay-Performance Sensitivity: An Empirical Analysis. *Journal of Business Finance and Accounting,* 32(9-10), p.1887-1919.

BVFA –evaluation criteria for annual reports (Award 2010) (source: www.bvfa.be)

	Criteria for score below average	Criteria for average score	Criteria for score above average
Key Figures and Ratios			
Key numerical data on P&L, balance sheet and cash flow statements	conditions for average score are not (sufficiently) fulfilled	relevant, nicely presented and easy to find key numbers (min. 3 years): sales, EBITDA, (R)EBIT, net & recurring profit (per share), dividend, equity; + some ratios	numbers and ratios are given over a period of at least 5 years or if extra numbers are given (e.g. number of shares, net debt, capex or working capital)
Products/Services/Markets/Competition			
Information on key products, services, geographic markets and competitive positioning	conditions for average score are not (sufficiently) fulfilled	a clear and detailed presentation of most relevant products, services and markets (incl. description, numbers and/or pictures)	additional data is given on the competitive position, like a SWOT analysis or quantitative data on market shares of relevant products or services
Strategy and long-term objectives			
Information on the company's strategy and on how the company wants to reach its objectives	conditions for average score are not (sufficiently) fulfilled	a relevant comment on strategy: how does the group intend to develop its product portfolio, geographic presence & financial performance with time horizon > 1 year?	additional data is given, like quantified strategic objectives (e.g. on future market shares, sales volumes, sales number, margins, profit numbers or other)
Financial data			
Financial section of the annual report: screen for disclosure & transparency on balance sheet risks	conditions for average score are not (sufficiently) fulfilled	clear and relevant footnotes on goodwill (composition), pension deficits (with allocation of asset classes) and financial debt (composition & maturities)	more details are given like impairment criteria and valuation results for goodwill, a sensitivity analysis for pension deficits and/or covenants on individual loans
Other			
Other (relevant) content of the annual report	conditions for average score are not (sufficiently) fulfilled	other info that can help to better understand the company's history or its group structure, like a chronologic overview of past 12 months key events, or a chart with group subsidiaries	additional info is included like a lexicon (explaining abbreviations & technical terms) or an analysis of risks (legal, operational, financial, a.o.)

BVFA –evaluation criteria for press releases (Award 2010) (source: www.bvfa.be)

	Criteria for score below average	Criteria for average score	Criteria for score above average
HY/FY Results: Numbers			
Numbers presented in P&L, balance sheet and (if applicable) cash flow statement	conditions for average score are not (sufficiently) fulfilled	an IFRS-compliant set of numbers (P&L, balance sheet, cash flow, changes in equity), including non-recurring numbers (if applicable)	on top, FY results includes H2 (or Q4) results for the current and the previous year as separate set of numbers to allow an easy yoy comparison
HY/FY Results: Changes in numbers			
Relevant information explaining the year-over-year (yoy) evolution in the numbers	conditions for average score are not (sufficiently) fulfilled	a breakdown of the yoy change in revenues (volumes, prices/product mix, currencies, consolidation scope...)	on top, a breakdown of the yoy change in other relevant numbers like EBIT, net profit, net financial debt and/or working capital
HY/FY Results: Segments			
Numbers and Comments on Segments	conditions for average score are not (sufficiently) fulfilled	relevant numbers and comments on the performance of the segments	on top, additional numbers or other and high-quality information is given on segment results
HY/FY Results: Timing	REMARK: No input required, the score will be based on input from the company and checked by BVFA-ABAF		
Timing of press releases on final full- and half-year results	conditions for average score are not (sufficiently) fulfilled	the press releases on HY or FY results are made public more than 1 but no more than 2 months after the closing of the period	the press releases on HY and FY results are made public no more than 1 month after the closing of the period
Quarterly results & Other press releases			
Quantity and quality of other press releases, including a press release with full quarter results	conditions for average score are not (sufficiently) fulfilled	the company publishes good quality trading updates, preliminary results and/or ad hoc press releases on relevant events (with impact on risk profile or fair value estimate)	the company publishes complete quarterly results, within 2 months after the closing of the quarter

BVFA –evaluation criteria for corporate websites (Award 2010) (source: www.bvfa.be)

Operational info
Company history
Detailed overview divisions / products / services / markets
Useful links (e.g. sector organizations, subsidiaries…)
Financial Info and IR
Archive with annual reports and financial press releases
Are full- and half-year press releases available in pdf-format?
Recent analyst, investor, and roadshow presentations
Separate section on debt (credit ratings, debt composition and maturities, covenants)
Easy to find contact details of the investor relations department (phone number, address, e-mail, etc.)?
Can you subscribe to an e-mail service to receive press releases?
Corporate governance
Info on shareholder structure
Info on option plans
Info on annual general meeting (agenda)
Financial Calendar
How far does the calendar look forward (with concrete data) 1 week before half-year reporting?
Number of events included (e.g. annual general meeting results, investor day, ex-dividend date, dividend payment date, …)
Varia
Navigation comfort (including interactive analytical tools, excel conversion options, etc.)
How up to date is the website (e.g. key numbers, PowerPoint presentations immediately available?)

BVFA –evaluation criteria for investor relation activities (Award 2010) (source: www.bvfa.be)

Guidance
IR ability to give clear and consistent guidance on key parameters (sales, margins ...) throughout the year
Consistency
Consistency of the information provided by the IR (team)
Reliability
Reliability of the information provided by the IR (team)
Reactivity
Speed and quality of the IR (team)'s answers to analyst questions (face to face, by telephone or by e-mail)
Availability
Day-to-day availability of the IR (team)
Access to senior management
Access to senior management via the IR (team)
Date Alert Service
E-mail service to inform analysts on future event or publication dates (annual general meeting, publication of annual reports, results etc.)
Analyst meetings / Conference calls
Organization by IR (team) of analyst meetings and/or conference calls (quantity & quality)
Field Trips / Investor days
Field trips (plant visits), investor days (quantity & quality) or other efforts to support assist the analyst
Roadshows / Client visits
Effort of IR (team) to participate in roadshows or broker client visits (quantity & quality)

CHAPTER 4:

CORPORATE INSIDER TRADING POLICIES: DETERMINANTS AND EFFECT ON INSIDER TRADING PROFITABILITY*

Debby Van Geyt [a], Philippe Van Cauwenberge [a] and Heidi Vander Bauwhede [a]

Abstract

This paper focuses on corporate governance practices related to insider trading. In particular, we explore a unique and comprehensive dataset on the restrictions that companies impose on their insiders in addition to legal requirements, i.e. corporate insider trading policies. We are interested in the stringency of these restrictions and, more specifically, in which firm characteristics provoke differences in the stringency-level. Furthermore, using a unique database on insider trading activity in Belgium, we examine the effectiveness of the restrictions and examine whether abnormal insider trading gains are lower in companies with more strict insider trading policies. We develop a company-specific stringency index and find that restrictions are more stringent in companies with more growth opportunities and in non-financial companies. Furthermore, using hand-collected data on company board structures, we find that a higher representation of independent directors on the board has a positive impact on the stringency of insider trading policies. Analysis of the effectiveness shows no significant impact of policy stringency on insider trading returns. This lack of effectiveness is especially pronounced in smaller companies.

[a] Ghent University, Department of Accountancy and Corporate Finance, Kuiperskaai 55/E, 9000 Ghent, Belgium

*This paper has benefited from presentation at the Annual EIASM Corporate Governance Workshop 2012 (Brussels, Belgium). Financial support from the "Special Research Fund" (BOF) and the Hercules project is gratefully acknowledged.

4.1. Introduction

This paper focuses on corporate insider trading policies. These policies are restrictions on insider trading imposed by companies and fall within the scope of corporate governance mechanisms. In particular, we investigate whether the strictness of the policies differs across companies and which firm characteristics explain these differences. Some companies, for example, forbid their insiders from trading one week before the announcement of annual results, while others prohibit trading for as long as two months prior to the announcement. Following the agency theory of the firm, previous studies have argued that incentives for company management to commit to more stringent or higher-quality corporate governance practices depend on the firm's contracting environment (Himmelberg *et al.*, 1999). Specifically, these incentives are driven by differences in private benefits available to insiders, the need for external funding and the cost of implementing corporate governance mechanisms (Anand *et al.*, 2006).

In the second part of this paper, we analyze the effectiveness of the company-specific trading policies by investigating their impact on the profitability of insiders' trades. By introducing trading policies, companies aim to limit the opportunities for insiders to benefit from their potential inside information. As mentioned, companies for example forbid trading by insiders around the announcement of financial results. Within these so-called black-out periods, there is a higher risk of insiders having superior inside knowledge. By forbidding them to trade, companies prevent that insiders misuse this knowledge to obtain high trading returns at the expense of other investors and company stakeholders. Another possible restriction could be that insiders first have to ask permission to trade. Again this should prevent insiders from misusing information as speculative or information-driven trades will not be permitted. Similarly, companies sometimes prevent insiders for engaging in speculative trading by imposing restrictions on short selling and short term trading. Accordingly, we expect that if companies enforce more and stricter trading policies on their insiders, opportunities for insiders to exploit their informational benefit should be reduced, resulting in a lower profitability of their transactions

To address our research questions, we use data collected by the Belgian Financial Services and Markets Authority (FSMA) on insider trading policies included in the corporate governance charters of Belgian listed companies. The database includes information on all companies listed on the Belgian stock exchange and provides a unique and comprehensive overview of the trading restrictions imposed by each company. The data revealed that companies generally implement all restrictions suggested by the Belgian corporate governance code, but customize the strictness to their own contracting environment. Substantial differences are, for example, observed regarding the trading windows within which insider trading is allowed or not. Furthermore, it appears that companies do not only impose restrictions suggested by the Belgian corporate governance code, but often also implement additional restrictions in line with U.K. or U.S. best practices. These additional restrictions include policies on the trading of options, short selling, short-term trading and on the requirement to ask permission to trade.

To analyze which firm characteristics provoke differences in the stringency of corporate insider trading policies, we construct a company-specific stringency index. Regression analysis of the stringency index shows that restrictions are more stringent in companies with more growth opportunities and in non-financial companies. Furthermore, the stringency also seems to depend on a company's board structure. Using hand-collected data on corporate governance, our results indicate that a higher representation of independent board members who act in the interest of minority groups instead of executives, has a positive impact on the strictness of insider trading policies.

To examine the effect of policy stringency on insider trading profits, we rely on a unique database on insider trades provided by the FSMA. We use event-study methodology and calculate the cumulative abnormal returns by using a standard market model (MacKinlay, 1997) or a market model adjusted for thin trading (Dimson, 1979) as the liquidity of some Belgian securities is rather low. Interestingly, our results show that, after controlling for trade size, company size, market-to-book, leverage, transaction type, ownership concentration and cross-listing, insiders' profits are not significantly lower in companies with more stringent insider trading restrictions. However, a closer examination of the effect of stringency showed that this lack of effectiveness is especially pronounced in smaller companies.

Our research contributes to two streams of literature. First, we add to the literature investigating firm-level differences in corporate governance practices. Based on the seminal work of La Porta *et al.* (1998), prior research on corporate governance has primarily focused on how institutional differences result in a different approach towards corporate governance at country-level (e.g. Doidge *et al.*, 2007). Nonetheless, as prior studies have shown, corporate governance practices also differ substantially between companies located within the same country (e.g. Klapper and Love, 2004; Black *et al.*, 2006). In particular, corporate governance practices are often regulated based on the self-regulation principle of "comply or explain". This principle implies that (national) corporate governance codes formulate some broad principles and that companies are allowed to adapt their governance practices to their own contracting environment. Research into the firm characteristics that motivate companies to invest in higher-quality corporate governance is however rather limited (e.g. Klapper and Love, 2004; Durnev and Kim, 2005). Moreover, to the best of our knowledge, only two studies have specifically analyzed how company characteristics affect corporate insider trading policies. A first study was performed by Petracci (2011) and examined differences between firms which have adopted black-out periods and firms without black-out periods. Similarly, Jagolinzer *et al.* (2011) examined whether companies which exhibit a lower level of information asymmetry and were insiders consequently have less profitable trading opportunities, are more or less likely to require *ex ante* approval of insider trades by a general counsel. We expand this line of research in two ways. First, we do not focus on a single aspect of corporate restrictions like black-out periods or *ex ante* approval of insider trades. Instead, we consider the full set of policies that a company imposes on its insiders. Second, in contrast to previous studies which are mere compliance studies and only consider whether a policy was adopted or not, we also take into account the stringency of the adopted policy. As the policies on insider trading are part of corporate governance practices, the "comply or explain" principle should provoke substantial differences in the restrictions imposed on insiders as companies can customize the elaboration to their specific characteristics and environment. Consequently, it can be expected that companies exhibit substantial differences in the restrictions they impose on their insiders.

A second stream of literature to which our work contributes is the literature examining the effectiveness of corporate governance practices. A company which chooses to improve its corporate governance practices intends to mitigate agency problems and commits itself to act in the best interest of its stakeholders. If governance practices are effective and stakeholders acknowledge a company's efforts, this should be reflected in higher market valuation (Goncharov *et al.*, 2006), better operating performance (Gompers *et al.*, 2003) and easier access to external capital (Klapper and Love, 2004). Obviously, with regard to insider trading policies, we expect a direct impact on insiders' behavior in terms of timing, frequency and volume, and on the magnitude of their profits. Previous studies addressing this issue include Bettis *et al.* (2000), Jagolinzer *et al.* (2011) and Petracci (2011). Again, these studies generally focus on a single aspect of insider trading restrictions and do not take into account differences in the stringency of the restrictions. We expand this research by considering the combined impact of all trading restrictions on the magnitude of insiders' abnormal returns. We believe that the use of a comprehensive score that also takes into account the stringency of the imposed restrictions may provide better insight into the effect of corporate trading polices. As argued by Jagolinzer *et al.* (2011), trading policies may complement each other or may be used as substitutes. As such, the effectiveness of black-out periods may for example depend on whether or not *ex ante* approval of trades is required (Bettis *et al.*, 2000; Jagolinzer *et al.*, 2011)

Our research results may be of interest to policy makers as they provide evidence that companies make use of the self-regulation principle by adjusting their insider trading policies to their own contracting environment. Nonetheless, our result seem to indicate that this is no guarantee for success as the policies appear to have no effect on gains ensuing from insider trading.

The results of our inquiry may also be relevant for practitioners and policy makers outside the Belgian market because the recommendations on insider trading restrictions formulated in the Belgian corporate governance code are in line with those of other European countries (e.g. the Netherlands and France) (FSMA, 2011). In addition, according to La Porta *et al.* (1998), countries like the Netherlands and France have similar institutional environments to Belgium as they are also French civil law countries.

The remainder of this chapter is organized as follows. Section 2 briefly discusses the Belgian corporate governance code and the recommended insider trading restrictions. Section 3 provides an overview of previous literature and develops our hypotheses. Next, section 4 describes the data which are used and section 5 outlines the research design. Section 6 contains descriptive statistics and the results of the empirical inquiry. Finally, section 7 concludes.

4.2. Background on the Belgian regulatory framework

The first official Belgian corporate governance code was introduced in December 2004 ("Code Lippens"). Later, in March 2009, the 2004 Code was updated in the wake of new corporate crises which brought to light pitfalls in the existing corporate governance guidelines. The update, "Code Daems" (further denoted in this study as the 2009 Code), also incorporated the publication of new European Directives and changes in Belgian legislation and in corporate governance best practices in other EU countries.

The Belgian corporate governance code is composed of nine principles which are each supplemented by several provisions and guidelines. These principles are general statements on good corporate governance practices. They are broadly defined and therefore applicable to all companies irrespective of their specificities. The corporate governance provisions, on the other hand, describe how companies should implement these principles. Companies are expected to comply with the provisions or explain why they are not being applied, *i.e.* the "comply or explain" principle.[1] Finally, guidelines provide some practical guidance to companies as to how they should implement and interpret the corporate governance provisions. Companies can however deviate from the guidelines without further justification as they are not subject to the "comply or explain" principle.

Corporate governance rules concerning transactions in company stock and trading by insiders in particular fall under principle 3 of the 2009 Code which states that "all directors shall demonstrate

[1] Since 2010, the "comply or explain"-principle has been incorporated in the Belgian legislation. Consequently, companies are legally bonded to indicate where they deviate from the 2009 Code and why (Law 6 April 2010 on the reinforcement of corporate governance in listed companies).

integrity and commitment" (Corporate Governance Committee, p. 15). Specifically, provision 3.7 posits that "the board shall take all necessary and useful measures for effective and efficient execution of the Belgian rules on market abuse.[2] In this respect it should at least adhere to the provisions and guidelines laid down in Appendix B" (Corporate Governance Committee, p. 15). In this appendix, the code prescribes companies to draw up a Dealing Code including rules on the execution and disclosure of insider transactions. From a more practical point of view, a first guideline in the appendix suggests that companies should impose black-out periods around the announcement of financial results and other important events in which insiders cannot trade. A second guideline advises companies to appoint a compliance officer who should make sure that insiders comply with the company Dealing Code. A third guideline suggests that the compliance officer should be at least notified by insiders of their trading intentions before they execute a transaction. Finally, a fourth guideline proposes that all insider transactions should be made public by the company.

4.3. Literature review and hypothesis development

4.3.1. Determinants of policy stringency

Following prior studies, we formulate various hypotheses regarding the firm-level determinants of the stringency of corporate insider trading policies. We derive our hypotheses from prior empirical work on the determinants of corporate governance in general (e.g. Klapper and Love, 2004; Durnev and Kim, 2005) and from other empirical studies focusing on corporate insider trading policies (e.g. Bettis *et al.*, 2000; Roulstone, 2003). Firm characteristics are expected to drive differences in corporate governance practices as they help form a company's contracting environment. In particular, these characteristics affect the risk of minority expropriation and consequently the trade-off between costs and benefits related to governance practices (Himmelberg *et al.*, 1999). Accordingly, the optimal stringency level of insider trading restrictions may therefore be lower in companies with a low risk of minority expropriation and vice versa.

[2] An overview of the Belgian rules on market abuse can be found on the FSMA-website : http://www.fsma.be/nl/Supervision/fm/ma/mm/wetteksten/wetgeving.aspx.

Company Size

It is well-documented in previous literature that larger companies are more visible and attract more attention from financial analysts and investors (e.g. O'Brien and Bhushan, 1990; Watts and Zimmerman, 1986). As a consequence, they are subject to a higher level of public scrutiny and may therefore be more inclined to impose stricter rules on their insiders. This tendency for a stricter monitoring may furthermore be amplified since large companies are likely to have a greater number of insiders and consequently a greater number of insider trades, making insider trading a more prominent issue (Bettis *et al.*, 2000). According to Roulstone (2003) it is also easier for larger companies to monitor and restrict insider trading as they have more organizational resources. Based on these previous findings, we therefore expect that corporate insider trading policies will be more strict in larger companies. We formulate our first hypothesis as follows:

> ***Hypothesis 1:*** *Ceteris paribus, the stringency of corporate insider trading policies is positively related to the size of the company.*

Asset Tangibility

The composition of a company's asset structure and more specifically the proportion of (in)tangible assets, may influence management decisions on corporate governance practices. Companies with relatively more "soft" assets, like intangibles, research and development and short-term assets such as inventory, may face higher agency problems as soft assets are harder to monitor compared to tangible, long-term assets like property, plant and equipment. In addition, the need for a stricter monitoring of insiders may be further augmented in companies with a larger proportion of intangibles as incentives for insider trading are especially high in these companies. In particular, companies with more intangible assets face greater uncertainty with regard to their fundamental value which in turn allows insiders to have greater informational benefits and gives rise to more profitable trading opportunities (Dierkens, 1991; Smith and Watts, 1992). Companies with more intangible (tangible) assets may thus

be more (less) inclined to augment the stringency of their trading policies. Following this rationale, we formulate our hypothesis as follows:

Hypothesis 2: *Ceteris paribus, the stringency of corporate insider trading policies is negatively related to the tangibility of a company's assets.*

Growth Opportunities

A company's growth opportunities may influence company choices on corporate governance practices by increasing the need for external capital (Doidge *et al.*, 2004; Klapper and Love, 2004; Black *et al.*, 2006; Chen *et al.*, 2010). Particularly, in an attempt to raise equity or debt capital at more favorable terms, companies will improve their governance practices to lower the cost of capital. An important driver of this cost is the level of information asymmetry. Companies may reduce this asymmetry for example by improving their disclosure practices (Welker 1995; Lang and Lundholm, 1996) but also by monitoring their insiders more strictly (Choy and Silvers, 2009). By imposing various restrictive insider trading policies, companies show their commitment to reduce the risks of wealth expropriation by insiders and of trading against informed counterparties. Following this reasoning, we formulate our hypothesis as follows:

Hypothesis 3: *Ceteris paribus, the stringency of corporate insider trading policies is positively related to a company's growth opportunities.*

Financial Structure

According to the findings of previous studies, a company's financial structure may impact corporate governance quality in two ways. First, as debt yields are determined by the likelihood that a company fails to meet its commitment of debt repayment and by the degree of protection that is offered to creditors, creditors are likely to offer better credit terms to better governed companies (Bhojraj and Sengupta, 2003). In support of this reasoning, Anderson *et al.* (2004) for example found that the cost

of debt financing is lower in companies where more independent directors are sitting in the board of directors. Similarly, Klock *et al.* (2005) documented that the use of antitakeover measures also lowers the cost of debt. More levered firms may thus be motivated to ameliorate their corporate governance practices in an attempt to reduce the cost of debt. In addition, a request for better corporate governance mechanisms may also originate from creditors themselves. In particular, they may demand the establishment of certain safeguarding procedures and mechanisms in order to prevent misuse of company resources and protect their investment (Goncharov *et al.*, 2006). We believe that the implementation of restrictions on insider trading may help improve a company's governance practices as it disciplines insiders and reduces agency risks (Choy and Silvers, 2009). The enforcement of black-out periods as well as restrictions on short-term and speculative trading may for example reduce incentives of investing in high-risk projects aimed at short-term returns. Based on this reasoning, we formulate the following hypothesis:

> ***Hypothesis 4:*** *Ceteris paribus, the stringency of corporate insider trading policies is positively related to the proportion of external capital.*

Cross-Listing

According to the so-called bonding hypothesis developed in prior empirical studies (e.g. Coffee, 1999; Coffee, 2002), cross-listing on foreign stock exchanges often imposes additional regulatory requirements. Investigating the effect of cross-listing on the overall corporate governance quality, Klapper and Love (2004) and Durnev and Kim (2005) provided evidence that companies from emerging markets who cross-list on a U.S. stock exchange tend to have a better overall corporate governance quality. Based on these findings, we expect that Belgian companies which cross-list on stock exchanges with more rigorous governance systems compared to the home country will be compelled to adopt more stringent insider trading policies in order to comply with the higher level of investor protection. In particular, we expect cross-listing in the U.S. or U.K. to especially influence the stringency of trading policies imposed by Belgian listed companies because trading restrictions in

these countries are more extensive and more strongly enforced compared to Belgium (Agrawal and Chadha, 2005; FSMA, 2011). Based on these arguments, we formulate our hypothesis as follows:

> ***Hypothesis 5:*** *Ceteris paribus, the stringency of corporate insider trading policies is positively related to a cross-listing on a U.S. or U.K. stock exchange.*

Ownership Structure

Prior studies report mixed evidence on the impact of a company's ownership structure on its overall corporate governance quality. The evidence seems to suggest that the presence of large shareholders can incite as well as prevent companies from adopting stricter corporate governance mechanisms (Durnev and Kim, 2005; Black *et al.*, 2006; da Silveira *et al.*, 2009). On the one hand, one could argue that large shareholders may be opposed to better corporate governance practices because actions like increasing minority voting rights and restricting trading by insiders are not necessarily in their best interest. In particular, large shareholders may be affected by corporate insider trading policies because they are included in the range of application as a consequence of their large share ownership or because they often use their power to obtain representation on the board in order to get access to inside information. By trading on this information, they are able to gain superior trading profits relative to other shareholders which in turn compensates them for their monitoring activities and for the risk of holding an undiversified portfolio (Bhide, 1993; Demsetz, 1986).

On the other hand, if better corporate governance practices are valued by the capital market, this increases the value of the firm and thus the value of the ownership stake of all shareholders (Drobetz *et al.*, 2009). Obviously, large shareholders proportionally benefit the most from a higher valuation by the capital market. Furthermore, companies with a concentrated ownership structure that wish to reduce the high agency cost ensuing from the risk of expropriation of minority shareholders may do this by improving their overall corporate governance quality. A more stringent monitoring of trading by insiders may certainly contribute to the amelioration of corporate governance practices. Accordingly, it can be expected that companies where shares are closely held may be compelled by

their large shareholders to improve their corporate governance in general and strengthen the monitoring of insider trading in particular. These arguments lead to the following hypothesis:

Hypothesis 6: *Ceteris paribus, the stringency of corporate insider trading policies is related to the level of ownership concentration.*

Corporate Governance Structure

Following prior studies on the determinants of corporate governance quality, we believe that the overall governance quality and consequently the quality and stringency of insider trading policies will be higher in companies with better corporate governance structures. The quality of these structures is generally derived from the size and composition of the board and the presence of specialized committees and functions which support the board in their monitoring activities (e.g. an internal audit function, and a nomination, remuneration and/or audit committee).

Board Size Using the number of board members as a measure for board size, Drobetz *et al.* (2009) found that larger boards decrease the overall corporate governance quality. Large boards often fail to perform their monitoring and control duties because they are faced with an increased problem of director free-riding (Drobetz *et al.*, 2009). Similarly, Lipton and Lorsch (1992) and Jensen (1993) argue that the effectiveness of large boards may be lower as the emphasis in the communication between board members tends to shift from truth and frankness to politeness and courtesy. An additional problem related to large boards is the higher potential of conflicting groups of stakeholders sitting on the board (e.g. employees, creditors, representatives of large stakeholders), which again has an adverse influence on the decision-making process. Based on this rationale, we formulate the following hypothesis:

Hypothesis 7: *Ceteris paribus, the stringency of corporate insider trading policies is negatively related to the number of board members.*

Board composition With regard to the composition of the board, prior studies use the proportion of independent and/or non-executive board members[3] as proxies for good governance (e.g. Bhagat and Black, 2002; Barucci and Falini, 2005; Petracci, 2011). Researchers as well as regulators believe that the presence of more independent and non-executive directors should help improve the monitoring of management decisions and board activities (Chen and Jaggi, 2000). These directors must prevent that board decisions are solely meeting executive's interests. In support of this assumption, Chhaochharia and Grinstein (2009) documented a strong decrease in the level of executive compensation after the Sarbanex-Oxley act had introduced the obligation of a majority of independent directors. Chen and Jaggi (2000) reported a positive association between the representation of independent board members and the comprehensiveness of financial disclosures. Similarly, Donnelly and Mulcahy (2008) provided evidence of a positive relation between the number of non-executives sitting on the board and the level of voluntary disclosures. Furthermore, relating to insider trading policies, Petracci (2011) found that the occurrence of black-out periods is higher in companies where more independent directors are sitting on the board. These findings lead to the following hypotheses:

Hypothesis 8: *Ceteris paribus, the stringency of corporate insider trading policies is positively related to the proportion of independent directors on the board.*

Hypothesis 9: *Ceteris paribus, the stringency of corporate insider trading policies is positively related to the proportion of non-executive directors on the board.*

A third important governance characteristic of the board is the separation of the functions of CEO and chairman of the board. The chairman of the board is involved in, among other things, the monitoring of the company management, setting the agenda of board meetings, nominating managers including the CEO and deciding upon executive compensation (Petra, 2005). Obviously, execution of these functions by the same person may thus bring about conflicts of interests. Regulators and academics

[3] Independent directors are non-executive directors which meet with several additional criteria. For example, they may not be related to an executive director or receive any remuneration apart from a compensation related to their function as board member. A complete overview of the independence criteria for directors of Belgian listed companies is provided in Appendix A of the 2009 Belgian code on corporate governance (Corporate Governance Committee, 2009, p. 27)

therefore strongly advise that the CEO should not serve as chairman of the board. Based on this reasoning, we formulate the following hypothesis:

Hypothesis 10: *Ceteris paribus, the stringency of corporate insider trading policies is positively related to the separation of the functions of CEO and chairman of the board.*

Internal Audit Function One of the most important features of a company's governance structure in supporting the company board is the function of internal auditor. The internal auditor is involved in all aspects of corporate governance as he is (jointly) responsible for improving the efficiency of operations, augmenting the reliability of financial reporting, deterring and investigating fraud, safeguarding assets and assuring compliance with laws and regulations. Obviously, the internal auditor may therefore be directly involved in the prevention and reporting of insider trading (Curtis and Mwangi, 2007). He may assist in assuring that corporate insiders comply with the national rules on insider trading and market abuse as well as with trading policies formulated by the company itself. Based on the above discussion, we formulate the following hypotheses:

Hypothesis 11: *Ceteris paribus, the stringency of corporate insider trading policies is positively related to the presence of an internal auditor in a company.*

4.3.2. Influence of policy stringency on insider trading profits

Corporate governance codes were created to mitigate the agency problems between corporate insiders on the one hand and outsiders on the other hand. In particular, corporate governance best practices are intended to improve the way in which a company is monitored and managed, enhance transparency on company practices towards outsiders and to lower the risk of minority expropriation. By ameliorating the quality of their corporate governance, companies show commitment to their stakeholders to act in their best interest. An interesting question set against this background is whether these improvements are indeed effective. Although various studies have examined the impact of the overall corporate

governance quality on general performance measured in terms of stock returns (e.g. Drobetz *et al.*, 2004; Fernández-Rodríguez *et al.*, 2004), operating performance (e.g. Goncharov *et al.*, 2006) and access to external capital (e.g. Klapper and Love, 2004), few studies have examined the impact of insider trading policies on insiders' profits. By introducing these policies, companies aim to limit the opportunities for insiders to benefit from their potential inside knowledge. As a result of the different trading restrictions, insiders are then compelled to adjusted their trading behavior in terms of timing, frequency and volume, which will in turn affect the resultant returns. The first study to specifically focus on the effect of corporate governance practices related to insider trading was a paper by Bettis *et al.* (2000). This paper investigated the effectiveness of the imposition of black-out periods in U.S. companies by examining the impact on insider trading frequency and profitability. They showed that insider trading activity was significantly reduced during black-out periods compared to periods in which trading was allowed. Moreover, the profitability of insider trades appeared higher during the allowed trading period than during black-out periods. The authors argued that insiders potentially had to obtain permission to trade during the black-out periods, and that this permission would only be granted if a trade was liquidity motivated. A later study by Jagolinzer *et al.* (2011) expanded Bettis *et al.* (2000) and found that black-out periods are not effective by themselves but only if companies also impose *ex ante* approval of trades by a general counsel. Contrary to Bettis *et al.* (2000), they documented higher trading returns during black-out periods compared to during non-restricted trading periods. *Ex ante* approval of insider trades by a general counsel however significantly lowered returns during black-out periods. A final study on the effectiveness of black-out periods was performed by Petracci (2011). Focusing on the Italian stock market, this paper concluded that the lack of strong enforcement mechanisms for which Italy is notorious (see La Porta *et al.*, 1998; Barucci *et al.*, 2006; Bajo *et al.*, 2009) results in insiders ignoring any trading restrictions. No significant difference in the number of trades or number of active insiders was found when comparing black-out periods with non-restricted periods.

Building on these prior studies, we wish to expand the understanding of the effect of corporate trading policies on insider trading profitability. As opposed to previous research, we do not focus on one or

two aspects but look into the effect of the full set of trading restrictions imposed on insiders. In addition, we take into account the strictness of the corporate policies and hypothesize that, if stricter policies are imposed and insiders have less freedom in choosing when and how they trade, trading profits will be lower. We formulate our hypothesis as follows.

Hypothesis 12: *Ceteris paribus, the profitability of insider trading is negatively related to the stringency of corporate insider trading policies.*

4.4. Sample selection

4.4.1. Corporate insider trading policies

Data on the corporate insider trading policies imposed by Belgian listed companies were obtained upon request from the FSMA. In 2010, the FSMA performed a comparative study on the corporate insider trading policies imposed by all 127 companies which were listed on Euronext Brussels on 6 September 2010 (FSMA, 2011). These policies are included in the so-called "Dealing Codes" prescribed by the Belgian Corporate Governance Code. In a first stage, the FSMA consulted the company websites to search for Dealing Codes. A small proportion of companies, however, did not make their codes publically available. These companies were contacted by the FSMA and asked to send a copy of their code to the FSMA or confirm that they did not have a Dealing Code. Using this combination of web search and direct request, the FSMA was able to collect data on the Dealing Codes of the complete Belgian stock market. Three companies were however deleted from the sample. First, one company which was in state of liquidation at the time of the survey was filtered out. Second, after analyzing the codes, the FSMA decided to eliminate two additional companies from the sample. A first company, *i.e.* PCB, was excluded because all forms of trading in securities and other financial instruments are prohibited which made comparison with other companies difficult. A second company, *i.e.* the Belgian National Bank, was removed because it imposes different sets of rules on different kinds of insiders which again hampered comparison with the Dealing Codes of other

companies which are uniform across all insiders. In addition, the sample was further reduced from 124 to 109 companies when analyzing the determinants of the stringency of the imposed restrictions due to missing data on the explanatory variables.

4.4.2. Insider trading data

Data on insider trading in Belgium was obtained upon request from the FSMA. The FSMA is responsible for making all insider transactions publicly available. Insiders therefore have to report their transactions to the FSMA within five business days after the execution. The initial database contained 4284 transactions reported by insiders of 102 different companies from January 2010 through April 2012. In line with previous studies, this sample was reduced based on several selection criteria intended to focus on transactions which are most likely driven by a profit objective. First, we deleted all transactions involving options, warrants or scripts. This approach is consistent with, for example, Lakonishok and Lee (2001) and Huddart and Ke (2007). In particular, regarding the exercise of options, Ofek and Yermack (2000) found that the exercise-event is strongly correlated with the subsequent sale of the underlying security. Huddart and Ke (2007) therefore argue that these transactions should be excluded from the sample in order to avoid double counting.

Second, we excluded all insider trades which are not open market purchases and sales. On the one hand, we expect that the majority of over-the-counter transactions are transactions between insiders of the same company. Hence, it can be assumed that these insiders possess a similar amount of inside information and do not have an informational benefit when carrying out these inter-insider trades. On the other hand, Finnerty (1976) also argues that the negotiated stock price of private transactions can differ substantially from the quoted stock price. Consequently, as the estimation of the insiders' abnormal profits is based on market-determined prices, these estimated profits can deviate strongly from the actual profits gained in private transactions.

Third, we filtered out transactions which were reported to the FSMA before their execution. As the FSMA immediately makes all reported transactions public on its website, outside investors are

informed about these transaction and insiders will no longer be able to earn abnormal trading profits as stock prices immediately incorporate the information once it is made public (Givoly and Palmon, 1985).

Fourth, we deleted transactions which were not reported in euro. This approach is consistent with other insider trading studies and intends to prevent bias in the calculation of abnormal returns due to the evolution of the underlying currency. In particular, the abnormal returns calculated in insider trading studies are a measure of the advantage insiders have in terms of superior inside knowledge or because they are more familiar with their company and its environment. However, when transactions in a foreign currency are transformed into euro transactions, the evolution of the underlying currency influences the magnitude of the abnormal returns and thus the measurement of the profits earned by insiders. As the currency evolution is *a priori* unknown to insiders, the calculated abnormal returns may give a biased picture of the informational advantage of insiders.

If more than one transaction is executed on the same day by (an) insider(s) from the same company, we calculated net transactions. In a first step, we take the sum of the trade size of all purchases and sales respectively. Next, we deduct the total value of sold securities from the total value of purchased securities. Furthermore, we deleted net transactions which were less than 20 trading days apart in order to filter out noise due to successive trades. In particular, if no adjustment for event-clustering was made, cumulative abnormal returns would be biased as they would not only incorporate the price reaction to the transaction in question, but also to other trades carried out later within the event window. The latter adjustments for netting and event-clustering are consistent with the insider trading literature (e.g. Jaffe, 1974; Seyhun, 1986; Friederich *et al.*, 2002; Fidrmuc *et al.*, 2006; Betzer and Theissen, 2009).

Application of the above filters reduced the insider trading sample to 416 insider trades executed in 81 different companies. All companies were included in the FSMA study on corporate insider trading policies. When analyzing the effect of the stringency of the trading restrictions on insiders' abnormal

returns, 37 additional transactions were deleted due to missing data on the control variables. This resulted in a final sample of 379 insider trades.

4.4.3. Firm-level data

Firm-level data are used as explanatory variables in our analysis on the determinants of the company-specific stringency index and as control variables in our analysis on the effect of the stringency level on insiders' abnormal returns. The firm-level data were obtained from various sources. In particular, company size, asset tangibility, growth opportunities and leverage were collected from Worldscope. Information on ownership concentration was retrieved from the *Belfirst* database of *Bureau Van Dijk Electronic Publishing*.[4] The market-to-book ratio and data on cross-listing were gathered from Datastream. Data on the presence of an internal audit function and on board size and structure was collected by hand from the annual reports our sample companies.[5] Finally, information on trade size was provided in the insider trading database.

4.5. Methodology

4.5.1. Stringency index

For the development of the stringency index we use the data from the FSMA study on the Dealing Codes of Belgian listed companies (FSMA, 2011). This study analyzes the Dealing Codes effective in 2010 and provides a detailed and comprehensive overview of restrictions imposed on insider trading by companies listed on Euronext Brussels. The study provides information on whether companies implement the recommendations stated in the Belgian corporate governance code and how they do this. In particular, the study first concentrated on the three guidelines listed in the appendix of the Belgian code. These recommend that companies should impose black-out periods in which insiders

[4] The *Belfirst* database of *Bureau van Dijk Electronic Publishing* is a database that contains detailed information on the financial statements of Belgian companies. The information is obtained from financial statements deposited at the National Bank of Belgium. More information about *Bureau van Dijk Electronic Publishing* can be found on www.bvdep.com.
[5] All Belgian listed companies are obliged to include a corporate governance statement in their annual reports.

cannot trade, appoint a compliance officer who supervises the compliance with the company Dealing Code and require insiders to report their trading intentions to the compliance officer. Regarding the black-out period, the FSMA registered the length of the black-out period around the announcement of annual and interim (*i.e.* half-yearly and/or quarterly) financial results and whether companies leave the option of imposing additional black-out periods around the announcement of other important events which may contain price-sensitive information. With regard to the compliance officer, the study indicates whether a compliance officer was appointed or not. Finally, with respect to the notification of trading intentions, it was documented if and when this notification was required. In particular, insiders may have to notify the compliance officer before they execute a transaction, after they have executed a transaction or both before and after a transaction.

In a second step, the FSMA also screened the Dealing Codes for potential incidental restrictions besides those recommended by the Belgian corporate governance code. First, the FSMA documented whether companies subject their insiders to a "clearance"-mechanism. This mechanism implies that insiders should ask permission to trade from a compliance officer. By requiring clearance to trade, the compliance officer is not only notified of the trading intentions, he can also decide whether or not a transaction may be executed. Hence, this mechanism provides the compliance officer with additional resources to ensure that insiders do not violate internal and external trading restrictions.

Second, the study recorded whether companies impose restrictions on short-term trading. If a company imposes such a restriction, it was registered whether the company only advises against short-term trading or whether it prohibits insiders to execute transactions within one, three or six months from each other. In particular, this restriction implies that if an insider purchases or sells shares of the company, he may not resell or repurchase those shares within the imposed period.

Finally, the FSMA also screened the Dealing Codes for restrictions on the trading of options and/or short selling. They documented whether companies impose no restrictions on the trading of options and short selling, only forbid one of the two or forbid both.

Using this information on which restrictions are imposed by Belgian listed companies and how strict they are, a company-specific stringency index was constructed as follows: first, for each restriction, we rank the different policies from the least to the most stringent. A detailed overview of the different polices and the assigned scores is provided in Appendix 4.A. For example, regarding the notification of trading intentions to the compliance officer, the policy of requiring no notification at all was classified as the least stringent and received a score of zero. If companies request their insiders to notify the compliance officer after they had already executed a transaction, they received a score of one. Furthermore, a score of two was appointed to companies that require their insiders to inform the compliance officer before executing a transaction and finally, a score of three was awarded when notification before and after a transaction was demanded. This approach is based on an unweighted scoring mechanism to determine the strictness each policy. The use of unweighted scores has been encouraged in previous studies, especially in the disclosure literature (e.g. Cooke, 1991; Ahmed and Nicholls, 1994; Meek *et al.*, 1995). It is generally argued that assigning weights would introduce subjectivity into the scoring and that weighted scores may not correspond with reality as perception may differ across different interested parties. Furthermore, prior studies have also shown that results are not affected if weighted or unweighted scores are used (e.g. Chow and Wong-Boren, 1987).

In a second step, the scores on each restriction are standardized following the suggestion of Krajnc and Glavič (2005) and Barrios and Komoto (2006). Specifically, the assigned policy score is divided by the highest policy score of each restriction respectively in order to obtain a score between zero and one for each restriction.[6] Finally, we sum the standardized scores to obtain a total stringency index for each company.

[6] The standardization formula is defined as follows: $\frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$. However, as the minimum value is equal to zero for all policies, this formula is reduced to: $\frac{\text{actual value}}{\text{maximum value}}$.

4.5.2. Determinants of the stringency index

To analyze the firm-level determinants of the stringency of corporate insider trading policies, we estimate the following regression model using two different estimation techniques *i.e.* ordinary least squares and Tobit. The latter is used because our stringency index is a censored variable with a minimum of zero and a maximum of nine. Both regressions are estimated using robust standard errors. Consistent with prior studies on corporate governance determinants we included a control variable for the company's industry in order to control for differences in asset structure, accounting practices, government regulation and competitiveness between industries (Durnev and Kim, 2005; Black *et al.*, 2006; da Silveira *et al.*, 2009; Drobetz *et al.*, 2009). However, to preserve degrees of freedom, we follow the approach of Bettis *et al.* (2000) and Petracci (2011) and only control for financial companies. These authors argue that due to the nature of their operations, financial companies may adopt insider trading restrictions which may differ substantially from other industries. Our regression model is defined as follows:

$$\begin{aligned} StringencyIndex_j = {} & \alpha + \omega_1 FirmSize_j + \omega_2 AssetTangibility_j + \omega_3 GrowthOpportunities_j \\ & + \omega_4 Leverage_j + \omega_5 Crosslisting_j + \omega_6 OwnershipConc_j \\ & + \omega_7 BoardSize_j + \omega_8 IndepDirectors_j + \omega_9 NonExecDirectors_j \\ & + \omega_{10} CEODuality_j + \omega_{11} InternalAudit_j + \omega_{12} Financial_j + \varepsilon_j \end{aligned} \quad (1)$$

With:

$StringencyIndex_j$ = the company-specific stringency index of firm *j*. This index is based on the content of the Dealing Codes operative in 2010.

$FirmSize_j$ = natural log of the market capitalization of firm *j* at the beginning of the fiscal year 2010.

$AssetTangibility_j$ = net property, plant and equipment scaled by total assets of firm *j* at the beginning of the fiscal year 2010.

$GrowthOpportunities_j$ = net sales growth of the previous year (*i.e.* fiscal year 2009).

$Leverage_j$ = debt-to-asset ratio of firm *j* at the beginning of the fiscal year 2010.

Cross-listing$_j$ = a dummy variable equal to one if firm *j* cross-listed on a U.S. or U.K. stock exchange during the year 2010 and zero otherwise.

OwnershipConc$_j$ = percentage ownership held by the largest shareholder at the beginning of the fiscal year 2010.

BoardSize$_j$ = natural log of the number of board members during fiscal year 2010.

IndepDirectors$_j$ = percentage of independent directors on the board during fiscal year 2010.

NonExecDirectors$_j$ = percentage of non-executive directors on the board during fiscal year 2010.

CEODuality = a dummy variable equal to one if the functions of CEO and chairman of the board are executed by a different person during fiscal year 2010 and zero otherwise.

InternalAudit$_j$ = a dummy variable equal to one if a company has an internal audit function during fiscal year 2010 and zero otherwise.

Financial$_j$ = a dummy variable equal to one if a firm is a financial company according to the Industry Classification Benchmark (ICB) adopted by Euronext Brussels and zero otherwise.

4.5.3. Insider trading profits

In the second part of this paper, we investigate whether more stringent insider trading restrictions are indeed effective in reducing the profitability of insiders' transactions. To determine the profitability of insider trades, we apply event study methodology and calculate the cumulative abnormal returns over a 21-day period starting from the transaction date of each insider trade. For this, we first calculate the abnormal return of each net transaction of firm *j* on day *t* as the difference between the actual return on day *t* and the estimated return day *t.* Following Buysschaert *et al.* (2004), the latter is calculated using a standard market model (MacKinlay, 1997) or a market model adjusted for thin trading (Dimson, 1979) depending on the liquidity of the underlying security. The issue is that as some stocks on the Belgian market are infrequently traded, their stock prices recorded at the end of a time period may include adjustments to news events occurring earlier in that period. Consequently, when a standard market model is used for those stocks, a problem of non-synchronous trading arises due to a mismatch between the return of these stocks and the return of the market index. To address this problem, the

aggregated coefficients method of Dimson (1979) includes lagged, leading and contemporaneous beta coefficients in order to provide unbiased beta estimates for thinly traded securities. Following a suggestion by Friederich *et al.* (2002), we apply the Dimson-adjustment to stocks with the highest number of daily zero returns. More specifically, firms are first sorted in ascending order based on the number of daily zero returns during the estimation and event window. Next, the ordinary market model is applied to firms belonging to the first three quartiles (with the lowest number of zero return days), while the Dimson-adjusted model is used to calculate betas for firms in the bottom quartile (with the highest number of zero return days). Applying the adjustment to all stocks would lead to an overestimation of the betas of actively traded securities. Consistent with Buysschaert *et al.* (2004), we add one leading and three lagged coefficients to the market model for Belgian, thinly traded securities.

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt} \qquad \text{Standard market model,} \qquad (2)$$

$$R_{jt} = \alpha_j + \sum_{k=-3}^{+1} \beta_{jk} R_{m,t+k} + \varepsilon_{jt} \qquad \text{Dimson-adjusted market model,} \qquad (3)$$

where R_{jt} is the daily stock return for firm j on day t adjusted for stock splits, stock dividends and issues; R_{mt} and $R_{m,t+k}$ are the daily value-weighed and dividend-adjusted returns of the market index on day t and day $t+k$ respectively. Our benchmark index R_m is the Brussels All Shares Return Index.

The abnormal return on a transaction in stock of firm j at day t, AR_{jt}, is then calculated as follows:

$$AR_{jt} = R_{jt} - \hat{\alpha}_j - \hat{\beta}_j R_{mt} \qquad \text{Standard market model,} \qquad (4)$$

$$AR_{jt} = R_{jt} - \hat{\alpha}_j - \sum_{k:=-3}^{+1} \hat{\beta}_j R_{m,t+k} \qquad \text{Dimson-adjusted market model,} \qquad (5)$$

where $\hat{\alpha}_j$ and $\hat{\beta}_j$ are estimated by means of an OLS regression over an estimation window of 160 trading days, going from day -160 to day -1. Since our results are reported for a pooled sample including both purchases and sales, the abnormal returns for insider sales are multiplied by minus one.

Insiders profit when securities outperform the market after a buy transaction and when stocks underperform the market after a sales transaction.

Finally, to calculate the cumulative abnormal return, the abnormal returns from day 0 to day 20 are summed:

$$CAR_{ij(0,20)} = \sum_{t=0}^{+20} AR_{jt} \ , \tag{6}$$

where $CAR_{ij(0,20)}$ represents the cumulative abnormal return over 21 trading days for a particular event *i* of firm *j*.[7] The event-window of 21 trading days is justified by the general failure of previous studies to report significant abnormal returns over shorter event-windows (e.g. Jaffe, 1974; Seyhun, 1986; Del Brio *et al.*, 2002). That is, shorter time periods seem unable to reflect the informational benefits of insiders. On the other hand, choosing a longer event-window could increase noise from other corporate events influencing stock prices.

To empirically investigate whether more stringent insider trading restrictions reduce the profitability of insider trading, we estimate the following regression using ordinary least squares and heteroskedasticity robust standard errors which are clustered at firm-level (Rogers, 1993):

$$CAR_{ij(0,20)} = \alpha + \omega_1 Stringency\ Index_j + \boldsymbol{\gamma x}_j + \varepsilon_{ij} \ , \tag{7}$$

with:

$CAR_{ij(0,20)}$ = the cumulative abnormal return over 21 trading days for a particular event *i* of firm *j*.

$StringencyIndex_j$ = the company-specific stringency index of firm *j*. This index is based on the content of the Dealing Codes operative in 2010.

x = a vector of control variables. Based on prior research (e.g. Seyhun, 1986; Rozeff and Zaman, 1998; Lakonishok and Lee, 2001; Del Brio and Perote, 2007; Betzer and Theissen, 2009; Chang and Corbitt, 2012), we included the following control variables: *TradeSize* equal to the eurovalue of the net transactions divided by the market value of the company at the beginning of the fiscal year

[7] Obviously, a particular firm can have more than one insider trading event during the sample period.

expressed in percentage, *FirmSize* equal to the log of the market capitalization of the company at the beginning of the fiscal year expressed in millions of euros, *MarketToBook* equal to the ratio of the market value of the company divided by the book value of equity at the beginning of the fiscal year expressed in percentage, *Leverage* equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage, *Sale* which is a dummy variable equal to one for net sale transactions and zero otherwise, *OwnershipConc* which is equal to the percentage ownership held by the largest shareholder at the beginning of the fiscal year, *Cross-listing* which is a dummy variable equal one if a company is cross-listed on a foreign stock exchange in a particular year and zero otherwise and, finally, two year dummies which capture changes in a company's environment, like changes in the institutional environment and the general condition of the economy (*Year2011* and *Year2012)*.

4.6. Results

4.6.1. Descriptive statistics on the stringency index and its determinants

The final sample of 109 companies consists of 101 companies who have drawn up a Dealing Code in which corporate insider trading restrictions are formulated and 8 companies which do not impose any restrictions at all. In Appendix 4.A., each restriction documented by the FSMA is listed, accompanied by the number of firms that adopt the restriction. First, the table in Appendix 4.A. shows that most companies adopt black-out periods around the announcement of annual and interim financial results. Usually, trading by insiders is restricted for a period of at least one month before the announcement of these results. With regard to black-out periods around the announcement of other important events, the table shows that fewer companies adopt this restriction. In particular, about half of the companies comply with this recommendation. Regarding the appointment of a compliance officer, the displayed frequencies indicate that 93 companies or 85% of the sample follow this recommendation. With respect to the notification of transactions, 24 companies (*i.e.* 22%) do not require any notification at all. If notification is required, most companies ask their insiders to inform them about their transactions before and after the execution. A clearance mechanism which requires insiders to ask

permission to trade is adopted by a minority of companies. Comparable results are found for restrictions on short-term trading. However, if a restriction is formulated, most companies prohibit the reselling or repurchasing of shares for a period as long as six months. Finally, restrictions on option trading and short selling are least adopted. Merely 5 companies prohibit short selling, while 17 companies forbid insiders to trade options. In conclusion, this discussion indicates that there is a substantial variation in the compliance with insider trading restrictions as well as the strictness of the adopted policies.

Some additional descriptive statistics on the stringency index and its determinants are presented in Table 4.1. This table indicates that the mean (median) standardized stringency index is equal to 4.11 (4.14). The standard deviation is equal to 1.96. Furthermore, the table shows that none of the sample companies has adopted the most stringent policy for all insider trading restrictions as the maximum value of the stringency index is equal to 7.67. Regarding the explanatory variables, Table 4.1. indicates that the average company size is equal to 12.34 million euros. The median being 12.19 million euros. The smallest company in the sample has a market capitalization of 8.09 million euros, while the largest has a market capitalization of 17.87 million euros. On average, 32.67% of a company's total assets is property, plant and equipment, while the median is equal to 18.02%. Companies also have an average growth in net sales of 21.51%, representing a company's growth opportunities. The mean (median) debt-to-asset ratio is 24.55% (23.39%). Table 4.1. furthermore indicates that 6% of the sample companies is cross-listed in the U.S. or U.K. The largest shareholder on average has an ownership stake of 33.99%, the median being 30.07%. The median (mean) number of board members is equal to 8 (8.78). With respect to the composition of the board, Table 4.1. indicates that, on average, 40.71% of the board members are independent, while the median is equal to 40%. Similarly, there is a high representation of non-executive directors as the mean (median) proportion is equal to 77.59% (83.33%). The functions of CEO and chairman of the board are also split by the majority of companies (87%). An internal audit function has been put into place in 57% of the sample companies. Finally, Table 4.1. shows that 31% of our sample companies are classified as financial companies by the ICB classification system.

Table 4.1. Descriptive statistics on the stringency index and its determinants

	Mean	Median	Std. Dev.	Min	Q1	Q3	Max
Dependent variable							
StringencyIndex	4.11	4.14	1.96	0.00	3.10	5.33	7.67
Explanatory variables							
FirmSize	12.34	12.19	1.75	8.09	11.26	13.26	17.87
AssetTangibility	32.67	18.02	32.18	0.00	6.45	47.66	99.13
GrowthOpportunities	21.51	-4.11	162.67	-99.98	-19.60	9.33	1,385.81
Leverage	24.56	23.39	18.34	0.00	7.74	37.37	73.62
Cross-listing	0.06	0.00	0.23	0.00	0.00	0.00	1.00
OwnershipConc	33.99	30.07	19.21	0.29	18.25	50.00	90.84
BoardSize	2.13	2.08	0.34	1.10	1.95	2.30	3.14
IndepDirectors	40.71	40.00	13.77	11.11	33.33	50.00	83.33
NonExecDirectors	77.59	83.33	17.00	0.00	70.00	88.89	100.00
CEODuality	0.87	1.00	0.34	0.00	1.00	1.00	1.00
InternalAudit	0.57	1.00	0.50	0.00	0.00	1.00	1.00
Control variable							
Financial	0.31	0.00	0.47	0.00	0.00	1.00	1.00

Notes: Descriptive statistics on the stringency index and its determinants (N=109). *StringencyIndex* represents the standardized company-specific stringency index. *FirmSize* is equal to the natural log of the market capitalization of the company at the beginning of the fiscal year expressed in millions of euros. *AssetTangibility* is equal to net property,plant and equipment scaled by total assets at the beginning of the fiscal year expressed in percentage. *GrowhtOpportunities* is equal to the previous year's growth in net sales expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Cross-listing* is a dummy variable equal to one if a company cross-listed on a U.S. or U.K. stock exchange in 2010 and zero otherwise. *OwnershipConc* is equal to the percentage ownership of the largest shareholder at the beginning of the fiscal year. *BoardSize* is equal to the natural log of the number of board members. *IndepDirectors* is equal to the percentage of the number of independent directors. *NonExecDirectors* is equal to the number of non-executive directors. *CEODuality* is a dummy variable equal to one if the functions of CEO and chairman of the board are executed by a different person and zero otherwise. *InternalAudit* is a dummy variable equal to one if a company has established an internal audit function and zero otherwise. *Financial* is a dummy variable equal to one if a company is a financial company according to the ICB classification and zero otherwise.

4.6.2. Determinants of the stringency of insider trading policies

Table 4.2. shows Spearman and Pearson correlation coefficients between the stringency index and potential firm-level determinants of the stringency of insider trading restrictions. The univariate analyses show that, although the correlations on the explanatory variables generally have the expected signs, the stringency index is only significantly related to the dummy variables representing CEO duality and financial companies for the Spearman correlations and to the number of independent board members and CEO duality for Pearson correlations. Companies thus seem to adopt more stringent insider trading policies when the CEO does not serve as chairman of the board, when more independent directors are sitting on the board and when they are non-financial companies.

Table 4.2. Spearman and Pearson correlation coefficients

	Stringency Index	Firm Size	Asset Tangibility	Growth Opp.	Leverage	Cross-listing	Ownership Conc	Board Size	Indep Directors	NonExec Directors	CEO Duality	Internal Audit	Financial
StringencyIndex		0.07	0.08	0.06	0.15	-0.02	-0.02	0.11	0.19*	0.10	0.23*	0.16	-0.16
FirmSize	0.02		-0.06	-0.12	0.10	0.14	-0.03	0.57*	0.02	0.20*	0.18	0.29*	0.05
AssetTangibility	0.10	-0.07		0.06	0.50*	-0.07	0.02	0.01	0.17	0.01	0.11	0.05	0.25*
GrowthOpp.	0.13	0.03	0.07		-0.01	0.01	0.06	-0.02	0.17	0.09	0.05	-0.14	0.21*
Leverage	0.12	0.07	0.45*	0.09		-0.18	-0.01	0.30*	0.02	0.18	0.21*	0.19	0.22*
Cross-listing	0.00	0.10	-0.06	0.13	-0.20*		-0.14	0.04	0.16	0.15	-0.03	-0.03*	-0.08
OwnershipConc	0.00	-0.09	0.02	0.04	0.02	-0.15		-0.03	-0.10	-0.09	-0.06	-0.11	-0.13
BoardSize	0.12	0.47*	0.10	0.12	0.32*	0.05	-0.08		-0.18	0.46*	0.15	0.37*	0.00
IndepDirectors	0.14	0.01	0.12	0.07	0.05	0.11	-0.11	-0.15		0.13	0.26*	-0.12	-0.01
NonExecDirectors	0.03	0.25*	0.01	0.21*	0.19*	0.15	-0.10	0.50*	0.03		0.24*	0.15	-0.06
CEODuality	0.21*	0.20*	0.08	-0.05	0.21*	-0.03	-0.08	0.17	0.26*	0.23*		0.05	0.02
InternalAudit	0.18	0.28*	0.15	-0.06	0.19*	-0.03	-0.14	0.37*	-0.16	0.23*	0.05		-0.17
Financial	-0.22*	0.07	0.03	0.19	0.22*	-0.08	-0.12	0.03	0.03	-0.03	0.02	0.02	

Notes: Spearman (below diagnoal) and Pearson (above diagonal) correlations (N=109). *StringencyIndex* represents the standardized company-specific stringency index (N=109). *FirmSize* is equal to the natural log of the market capitalization of the company at the beginning of the fiscal year expressed in millions of euros. *AssetTangibility* is equal to net property,plant and equipment scaled by total assets at the beginning of the fiscal year expressed in percentage. *GrowhtOpportunities* is equal to the previous year's growth in net sales expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Cross-listing i*s a dummy variable equal to one if a company cross-listed on a U.S. or U.K. stock exchange in 2010 and zero otherwise. *OwnershipConc* is equal to the percentage ownership of the largest shareholder at the beginning of the fiscal year. *BoardSize* is equal to the natural log of the number of board members. *IndepDirectors* is equal to the percentage of independent directors on the board. *NonExecDirectors* is equal to the percentage of non-executive directors on the board. *CEODuality* is a dummy variable equal to one if the functions of CEO and chairman of the board are executed by a different person and zero otherwise. *InternalAudit* is a dummy variable equal to one if a company has established an internal audit function and zero otherwise. *Financial* is a dummy variable equal to one if a company is a financial company according to the ICB classification and zero otherwise. * denotes two-tailed significance at the 0.05 level.

In Table 4.3. regression results on the determinants of the company-specific stringency index are reported. We use an OLS regression and also check the robustness of our results using a Tobit regression as the stringency index is a censored variable with a minimum value of zero and a maximum value of nine. We do not expect any multicollinearity problems as the Variance Inflation Factors (VIF's) are well below the recommended cutoff of 10 (Chatterjee and Hadi, 2006).[8] In addition, Pearson correlations between the stringency index and the explanatory variables are below the 0.7-limit suggested by Kervin (1992).

Results using both estimation methods are comparable, as shown by models 1 and 2. In particular, both models in Table 4.3. support hypothesis 3 and confirm that companies with more growth opportunities adopt more stringent insider trading policies. This finding confirms the results of previous studies which argue that companies with more growth opportunities are often in need of external financing and will therefore improve their governance in an attempt to raise capital at more favorable terms (e.g. Klapper and Love, 2004).

With regard to the influence of a company's governance structure, Table 4.3. shows that the limitations imposed on trading by company insiders are more stringent in companies where a larger proportion of the board members are independent directors (hypothesis 8). Accordingly, this findings confirms the result of prior studies that board independence is crucial to ascertain that management and board activities are monitored effectively (Chen and Jaggi, 2000).

Furthermore, the control variable for financial companies indicates that insider trading policies in these companies are significantly less stringent compared to non-financial companies. Probably this is due to the fact that Belgian financial companies already have to comply with an additional and more stringent set of legal requirements and requirements imposed by external bodies like the FSMA. Accordingly, the need to impose further additional restrictions is probably lower in financial companies.

[8] Variance Inflation Factors are available from the authors upon request.

Table 4.3. Regression results on determinants of policy stringency

	Expected sign	Model 1: OLS regression		Model 2: Tobit regression	
Variables		Coef.	s.e.	Coef.	s.e.
FirmSize	+	-0.019	0.16	0.014	0.17
AssetTangibility	-	0.001	0.01	0.001	0.01
GrowthOpportunities	+	0.001*	0.00	0.001*	0.00
Leverage	+	0.012	0.01	0.013	0.01
Cross-listing	+	-0.249	0.87	-0.363	0.94
OwnershipConc	?	-0.002	0.01	-0.002	0.01
BoardSize	-	0.393	0.91	0.363	0.96
IndepDirectors	+	0.023*	0.01	0.026**	0.02
NonExecDirectors	+	-0.004	0.02	-0.005	0.02
CEODuality	+	0.921	0.74	0.946	0.77
InternalAudit	+	0.453	0.43	0.479	0.44
Financial	?	-0.818*	0.42	-0.846*	0.45
Constant	?	1.815	1.64	1.316	1.73
		Observations	109	Observations	109
		R^2	0.14	Log Likelihood	-220.50
		R^2 adj.	0.04	Pseudo R^2	0.04
		F-stat.	1.92	*F*-stat.	1.86
		P-value	0.04	P-value	0.05

Notes: OLS and Tobit regression results on the determinants of the company-specific stringency index (N=109). *StringencyIndex* represents the standardized company-specific stringency index. *FirmSize* is equal to the natural log of the market capitalization of the company at the beginning of the fiscal year expressed in millions of euros. *AssetTangibility* is equal to net property, plant and equipment scaled by total assets at the beginning of the fiscal year. *GrowhtOpportunities* is equal to the previous year's growth in net sales. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Cross-listing* is a dummy variable equal to one if a company cross-listed on a U.S. or U.K. stock exchange. *OwnershipConc* is equal to the percentage ownership of the largest shareholder at the beginning of the fiscal year. *BoardSize* is equal to the natural log of the number of board members. *IndepDirectors* is equal to the percentage of independent directors on the board. *NonExecDirectors* is equal to the percentage of non-executive directors. *CEODuality* is a dummy variable equal to one if the functions of CEO and chairman of the board are executed by a different person and zero otherwise. *InternalAudit* is a dummy variable equal to one if a company has established an internal audit function and zero otherwise. *Financial* is a dummy variable equal to one if a company is a financial company according to the ICB classification and zero otherwise. Significance levels are two-tailed when "Expected sign" is a "?" and one-tailed otherwise, with *** < 0.01,** < 0.05, * < 0.10.

4.6.3. Effect of policy stringency on insider trading profitability

In order to investigate whether more stringent insider trading policies are indeed effective in restricting insiders to benefit from their privileged access to information, we regress the cumulative abnormal return of insider trades on the company-specific stringency index. In addition, we include several control variables which have been shown to affect the magnitude of insiders' abnormal returns. OLS regression results in Table 4.4. (Model 1) show a negative coefficient on the stringency index. The

coefficient is however not significant and no support for hypothesis 12 is thus found.[9] Consequently, our results seem to indicate that the efforts of companies to more strictly monitor their insiders do not result in lower abnormal gains on insider trading.

Regarding the control variables, our results are consistent with prior insider trading studies. In particular, Table 4.4. shows that abnormal returns are lower in larger companies. Previous studies argue that information asymmetry is lower in large companies as they are followed by more financial analysts (Lang and Lundholm, 1996; Barth *et al.*, 2001) and have more media coverage (Fang and Peress, 2009). Furthermore, sales transactions by Belgian insiders are more profitable than purchases. Due to the highly concentrated ownership structure in Belgian companies (La Porta *et al.*, 1998; Faccio and Lang, 2002), insiders probably refrain from selling shares for fear of losing corporate control. They will only sell when they have strong negative beliefs about the company perspectives. Finally, we included year-dummies to capture changes in a company's environment, like changes in the institutional environment and in the general condition of the economy.

A potential issue when investigating the relationship between the abnormal returns gained by corporate insiders and the strictness of the policies that companies impose on their insiders may be the direction of causality. As previously argued, more stringent insider trading restrictions may reduce abnormal trading gains. However, the magnitude of insiders' abnormal gains may in its turn also prompt companies to adjust the stringency level of their restrictions. To address this potential endogeneity problem, we re-estimate the relation between insider trading returns and the stringency index by means of a two stage least squares regression (2SLS). The first stage corresponds to equation (1) in which we define the determinants of the company-specific stringency index. The predicted values of the stringency index are then used in the second stage which corresponds to equation (7) and investigates the impact of the stringency level on insiders' abnormal returns.

[9] Similar regression results are found when abnormal returns are estimated solely using the standard market model and when an estimation window of 250 trading days is used for the estimation of $\hat{\alpha}_j$ and $\hat{\beta}_j$ (see equations 4 and 5).

Results using two stage least squares are reported in Model 2 of Table 4.4. and are consistent with the results based on OLS. The Hansen (1982) J test supports the hypothesis that the proposed instruments are valid instruments (p-value : 0.56). In order to test whether the stringency index is endogenous, we use the Wooldrigde (1995) robust score test since we have used robust standard errors clustered at firm-level. This test is however strongly insignificant (p-value: 0.67) and the null hypothesis of the stringency index being exogenous cannot be rejected. As a consequence, preference is given to the OLS estimation which is the most efficient estimator in absence of endogeneity.

Table 4.4. Regression results on the effect of policy stringency on insider trading profitability

	Expected	Model 1: OLS regression		Model 2: 2SLS regression	
Variables	sign	Coef.	s.e.	Coef.	s.e.
Stringency	-	-0.079	0.24	-0.183	0.38
TradeSize	+	-1.542	0.70	-1.574	0.70
FirmSize	-	-0.597**	0.33	-0.616**	0.34
MarketToBook	?	0.110	0.14	0.099	0.13
Leverage	-	0.044	0.02	0.046	0.02
Sale	+	1.994**	1.00	2.023**	0.97
OwnershipConc	?	-0.005	0.03	-0.002	0.03
Cross-listing	-	-0.083	1.28	-0.006	1.34
Year2011	?	2.117**	1.00	2.134**	1.00
Year2012	?	-1.649	1.48	-1.639	1.46
Constant	?	2.084	1.97	2.454	2.49
		Observations	379	Observations	379
		R^2	0.05	R^2	0.05
		R^2 adj.	0.02	R^2 adj.	0.02
		F-stat.	3.58	χ^2 -stat.	35.73
		P-value	0.00	P-value	0.00

Notes: OLS and 2SLS regression results for a pooled sample of net purchases and sales (N=379). Abnormal returns for net sales transactions are multiplied by minus one. $CAR_{ij(0,20)}$ is equal to the event-specific cumulative abnormal return measured using a standard market model or a Dimson-adjusted market model depending on the number of zero returns. *StringencyIndex* represents standardized company-specific stringency index. *TradeSize* is equal to the eurovalue of the net transactions divided by the market value of the company at the beginning of the fiscal year expressed in percentage. *FirmSize* is equal to the log of the market capitalization of the company expressed in millions of euros at the beginning of the fiscal year. *MarketToBook* is equal to the ratio of the market capitalization of the company divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Sale* is a dummy variable equal to one for net sale transactions and zero otherwise. *OwnershipConc* is equal to the ownership of the largest shareholder at the beginning of the fiscal year. *Cross-listing* is a dummy variable equal to one if a company cross-listed on at least one foreign stock exchange in a particular year and zero otherwise. *Year2011* is a dummy variable equal to one for transactions executed during fiscal year 2011 and zero otherwise. *Year2012* is a dummy variable equal to one for transactions executed during fiscal year 2012 and zero otherwise. Standard errors are adjusted for firm-clustering and heteroskedasticity. Significance levels are two-tailed when "Expected sign" is a "?" and one-tailed otherwise, with ***<0.01,** < 0.05, * < 0.10.

Finally, in an additional analysis we examine whether the diminishing effect of the stringency level of insider trading policies on insiders' abnormal returns differs between small and large companies. For smaller companies it may be more difficult to ensure a strong enforcement of their policies due to resource constraints (Roulstone, 2003). To examine this proposition, we estimate the interaction effect between our stringency index and a dummy variable equal to one for the smallest companies in our sample. Results are reported in Table 4.5. and confirm that the lack of efficiency of the insider trading policies is especially outspoken in smaller companies.

Table 4.5. Regression results on the differential effect of policy stringency on insider trading profitability in small companies

	Expected sign	Model 3: OLS regression		Model 4: 2SLS regression	
Variables		Coef.	s.e.	Coef.	s.e.
Stringency	-	-0.159	0.26	-0.214	0.38
TradeSize	+	-1.698	0.76	-1.718	0.76
FirmSize	-	-0.266	0.39	-0.269	0.39
MarketToBook	?	0.123	0.14	0.118	0.13
Leverage	-	0.041	0.02	0.042	0.02
Sale	+	1.886**	0.95	1.899**	0.92
OwnershipConc	?	-0.011	0.03	-0.010	0.03
Cross-listing	-	-0.422	1.29	-0.389	1.33
Year2011	?	2.291**	0.97	2.303**	0.96
Year2012	?	-1.324	1.34	-1.313	1.32
Small*Stringency	+	0.529**	0.27	0.539**	0.25
Constant	?	0.399	2.34	0.559	2.81
		Observations		Observations	
		R^2	379	R^2	379
		R^2 adj.	0.06	R^2 adj.	0.06
		F-stat.	0.03	χ^2 -stat.	0.03
		P-value	3.53	P-value	40.01

Notes: OLS and 2SLS regression results for a pooled sample of net purchases and sales (N=379). Abnormal returns for net sales transactions are multiplied by minus one. $CAR_{ij(0,20)}$ is equal to the event-specific cumulative abnormal return measured using a standard market model or a Dimson-adjusted market model depending on the number of zero returns. *StringencyIndex* represents standardized company-specific stringency index. *TradeSize* is equal to the eurovalue of the net transactions divided by the market value of the company at the beginning of the fiscal year expressed in percentage. *FirmSize* is equal to the log of the market capitalization of the company expressed in millions of euros at the beginning of the fiscal year. *MarketToBook* is equal to the ratio of the market capitalization of the company divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio at the beginning of the fiscal year expressed in percentage. *Sale* is a dummy variable equal to one for net sale transactions and zero otherwise. *OwnershipConc* is equal to the ownership of the largest shareholder at the beginning of the fiscal year. *Cross-listing* is a dummy variable equal to one if a company cross-listed on at least one foreign stock exchange in a particular year and zero otherwise. *Year2011* is a dummy variable equal to one for transactions executed during fiscal year 2011 and zero otherwise. *Year2012* is a dummy variable equal to one for transactions executed during fiscal year 2012 and zero otherwise. *Small* is a dummy variable equal to one for companies belonging to the 25-percentile. Standard errors are adjusted for firm-clustering and heteroskedasticity. Significance levels are two-tailed when "Expected sign" is a "?" and one-tailed otherwise, with ***<0.01,** < 0.05, * < 0.10.

4.7. Conclusion

This paper focused on the restrictions that companies impose on insider trading in addition to the legal requirements. In particular, we based our inquiry on a study of the insider trading restrictions formulated in the corporate governance codes of Belgian listed companies. This study revealed that self-regulation of corporate governance practices led to significant differences in the stringency of the restrictions that companies impose on their insiders. Using this insight, this study examines whether company characteristics explain differences in the stringency level. Our results indicate that more stringent policies are adopted by companies with more growth opportunities and in companies that cross-list on stock markets with more rigorous governance systems. Furthermore, the strictness of the policies also seems to depend on the governance structures that are put in place. A higher representation of independent directors who are likely to act in the interest of minority groups instead of executives both has a positive impact on the stringency of insider trading policies.

In the second part of our paper, we question the effectiveness of the stringency of the trading restrictions and test whether transactions in companies with more stringent restrictions render lower abnormal returns to insiders. Our results, however, indicate that the stringency level of trading restrictions does not influence the magnitude of the abnormal returns gained by insiders. This lack of efficiency is especially outspoken in smaller companies.

Our research results may be of interest to policy makers as they provide evidence that companies make use of the self-regulation principle by adjusting their insider trading policies to their own contracting environment. Nonetheless, our result seem to indicate that this is no guarantee for success. Further research is however necessary to determine whether trading restrictions are not effective because companies have not chosen the optimal policy or because the policies are not strongly enforced.

4.8. References

Agrawal, A., & Chadha, S. (2005). Corporate Governance and Accounting Scandals. *Journal of Law and Economics*, 48(2), p.371-406.

Ahmed, K., & Nicholls, D. (1994). The Impact of Non-Financial Company Characteristics on Mandatory Disclosure Compliance in Developing Countries: The Case of Bangladesh. *International Journal of Accounting*, 29(1), p.62-77.

Anand, A. I., Milne, F., & Purda, L. (2006). *Voluntary Adoption of Corporate Governance Mechanisms*. Working paper.

Anderson, R. C., Mansi, S. A., & Reeb, D. M. (2004). Board Characteristics, Accounting Report Integrity, and the Cost of Debt. *Journal of Accounting and Economics*, 37(3), p.315-342.

Bajo, E., Bigelli, M., Hillier, D., & Petracci, B. (2009). The Determinants of Regulatory Compliance: An Analysis of Insider Trading Disclosures in Italy. *Journal of Business Ethics*, 90(3), p.331-343.

Barrios, E., & Komoto, K. (2006). Some Approaches to the Construction of a Sustainable Development Index for the Philippines. *International Journal of Sustainable Development & World Ecology*, 13(4), p.277-288.

Barth, M. E., Kasznik, R., & McNichols, M. F. (2001). Analyst Coverage and Intangible Assets. *Journal of Accounting Research*, 39(1), p.1-34.

Barucci, E., Bianchi, C., & Manconi, A. (2006). Internal Dealing Regulation and Insiders' Trades in the Italian Financial Market. *European Journal of Law and Economics*, 22(2), p.107-119.

Barucci, E., & Falini, J. (2005). Determinants of Corporate Governance in the Italian Financial Market. *Economic Notes*, 34(3), p.371-405.

Bettis, J. C., Coles, J. L., & Lemmon, M. L. (2000). Corporate Policies Restricting Trading by Insiders. *Journal of Financial Economics*, 57(2), p.191-220.

Betzer, A., & Theissen, E. (2009). Insider Trading and Corporate Governance: The Case of Germany. *European Financial Management*, 15(2), p.402-429.

Bhagat, S. & Black B. (2002). The Non-Correlation between Board Independence and Long-Term Firm Performance. *Journal of Corporation Law*, 27(2), p.231.

Bhide, A. (1993). The Hidden Costs of Stock Market Liquidity. *Journal of Financial Economics*, 34(1), p.31-51.

Bhojraj, S., & Sengupta, P. (2003). Effect of Corporate Governance on Bond Ratings and Yields: The Role of Institutional Investors and Outside Directors. *Journal of Business*, 76(3), p.455-475.

Black, B. S., Jang, H., & Kim, W. (2006). Predicting Firms' Corporate Governance Choices: Evidence from Korea. *Journal of Corporate Finance*, 12(3), p.660-691.

Buysschaert, A., Deloof, M., & Jegers, M. (2004). Equity Sales in Belgian Corporate Groups: Expropriation of Minority Shareholders? A Clinical Study. *Journal of Corporate Finance*, 10(1), p.81-103.

Chang, M., & Corbitt, R. (2012). The Effect of Cross-Listing on Insider Trading Returns. *Accounting and Finance*, 52(3), p.723-741.

Chatterjee, S., & Hadi, A. S. (2006). *Regression Analysis by Example* (4rd ed.). New York, NY: Wiley.

Chen, C. J. P., & Jaggi, B. (2000). Association between Independent Non-Executive Directors, Family Control and Financial Disclosures in Hong Kong. *Journal of Accounting and Public Policy*, 19(4–5), p.285-310.

Chen, W.-P., Chung, H., Hsu, T.-L., & Wu, S. (2010). External Financing Needs, Corporate Governance, and Firm Value. *Corporate Governance: An International Review*, 18(3), p.234-249.

Chhaochharia, V., & Grinstein, Y. (2009). CEO Compensation and Board Structure. *Journal of Finance*, 64(1), p.231-261.

Chow, C. W., & Wong-Boren, A. (1987). Voluntary Financial Disclosure by Mexican Corporations. *Accounting Review*, 62(3), p.533-541.

Choy, H. L., & Silvers, R. N. (2009). *The Effect of Firm-Imposed Insider Trading Restrictions on Cost of Equity Capital*. Working paper.

Coffee, J. C. (1999). Future as History: The Prospects for Global Convergence in Corporate Governance and Its Implications. *Northwestern University Law Review*, 93(3), p.641-707.

Coffee, J. C. (2002). Racing Towards the Top?: The Impact of Cross-Listings and Stock Market Competition on International Corporate Governance. *Columbia Law Review*, 102(7), p.1757-1831.

Cooke, T. E. (1991). An Assessment of Voluntary Disclosure in the Annual Reports of Japanese Corporations. *International Journal of Accounting*, 26(3), p.174-189.

Corporate Governance Committee. (2009). *The 2009 Belgian Code on Corporate Governance*. www.corporategovernancecommittee.be

Curtis, M. B., & Mwangi, J. (2007). *Insider Trading from the Internal Auditor's Perspective*. Dallas Chapter of the Institute of Internal Auditors. IIA Research Foundation. Available at: http://dallasiia.org/ResearchComm/06-07.pdf.

da Silveira, A. D. M., Leal, R. P. C., Barros, L. A. B. d. C., & Carvalhal-da-Silva, A. L. (2009). Evolution and Determinants of Firm-Level Corporate Governance Quality in Brazil. *Revista de Administração*, 44, p.173-189.

Del Brio, E. B., Miguel, A., & Perote, J. (2002). An Investigation of Insider Trading Profits in the Spanish Stock Market. *Quarterly Review of Economics and Finance*, 42(1), p.73-94.

Del Brio, E. B., & Perote, J. (2007). What Enhances Insider Trading Profitability? *Atlantic Economic Journal*, 35(2), p.173-188.

Demsetz, H. (1986). Corporate Control, Insider Trading, and Rates of Return. *American Economic Review*, 76(2), p.313-316.

Dierkens, N. (1991). Information Asymmetry and Equity Issues. *Journal of Financial and Quantitative Analysis*, 26(2), p.181-199.

Dimson, E. (1979). Risk Measurement When Shares Are Subject to Infrequent Trading. *Journal of Financial Economics*, 7(2), p.197-226.

Doidge, C., Karolyi, G. A., & Stulz, R. M. (2004). Why Are Foreign Firms Listed in the U.S. Worth More? *Journal of Financial Economics*, 71(2), p.205-238.

Doidge, C., Karolyi, G. A., & Stulz, R. M. (2007). Why Do Countries Matter So Much for Corporate Governance? *Journal of Financial Economics*, 86(1), p.1-39.

Donnelly, R., & Mulcahy, M. (2008). Board Structure, Ownership, and Voluntary Disclosure in Ireland. *Corporate Governance: An International Review*, 16(5), p.416-429.

Drobetz, W., Gugler, K., & Hirschvogl, S. 2009. The Determinants of German Corporate Governance Ratings. *The Modern Firm, Corporate Governance and Investment*. 361-381.

Drobetz, W., Schillhofer, A., & Zimmermann, H. (2004). Corporate Governance and Expected Stock Returns: Evidence from Germany. *European Financial Management*, 10(2), p.267-293.

Durnev, A. R. T., & Kim, E. H. (2005). To Steal or Not to Steal: Firm Attributes, Legal Environment, and Valuation. *Journal of Finance*, 60(3), p.1461-1493.

Faccio, M., & Lang, L. H. P. (2002). The Ultimate Ownership of Western European Corporations. *Journal of Financial Economics*, 65(3), p.365-395.

Fang, L., & Peress, J. (2009). Media Coverage and the Cross-Section of Stock Returns. *Journal of Finance*, 64(5), p.2023-2052.

Fernández-Rodríguez, E., Gómez-Ansón, S., & Cuervo-García, Á. (2004). The Stock Market Reaction to the Introduction of Best Practices Codes by Spanish Firms. *Corporate Governance: An International Review*, 12(1), p.29-46.

Fidrmuc, J. P., Goergen, M., & Renneboog, L. (2006). Insider Trading, News Releases, and Ownership Concentration. *Journal of Finance*, 61(6), p.2931-2973.

Finnerty, J. E. (1976). Insiders and Market Efficiency. *Journal of Finance*, 31(4), p.1141-1148.

Friederich, S., Gregory, A., Matatko, J., & Tonks, I. (2002). Short-Run Returns around the Trades of Corporate Insiders on the London Stock Exchange. *European Financial Management*, 8(1), p.7-30.

FSMA. (2011). *Vergelijkende Studie Omtrent Dealing Codes Van Genoteerde Vennootschappen*. Studies en documenten: nr. 39. Available at: www.fsma.be.

Givoly, D., & Palmon, D. (1985). Insider Trading and the Exploitation of inside Information: Some Empirical Evidence. *Journal of Business*, 58(1), p.69-87.

Gompers, P., Ishii, J., & Metrick, A. (2003). Corporate Governance and Equity Prices. *The Quarterly Journal of Economics*, 118(1), p.107-156.

Goncharov, I., Werner, J. R., & Zimmermann, J. (2006). Does Compliance with the German Corporate Governance Code Have an Impact on Stock Valuation? An Empirical Analysis. *Corporate Governance: An International Review*, 14(5), p.432-445.

Hansen, L. P. (1982). Large Sample Properties of Generalized Method of Moments Estimators. *Econometrica*, 50(4), p.1029-1054.

Himmelberg, C. P., Hubbard, R. G., & Palia, D. (1999). Understanding the Determinants of Managerial Ownership and the Link between Ownership and Performance. *Journal of Financial Economics*, 53(3), p.353-384.

Huddart, S. J., & Ke, B. (2007). Information Asymmetry and Cross-Sectional Variation in Insider Trading. *Contemporary Accounting Research*, 24(1), p.195-232.

Jaffe, J. F. (1974). Special Information and Insider Trading. *Journal of Business*, 47(3), p.410-428.

Jagolinzer, A. D., Larcker, D. F., & Taylor, D. J. (2011). Corporate Governance and the Information Content of Insider Trades. *Journal of Accounting Research*, 49(5), p.1249-1274.

Jensen, M. C. (1993). The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems. *Journal of Finance*, 48(3), p.831-880.

Kervin, J. B. (1992). *Methods for Business Research*. New York, NY: Harper Collins.

Klapper, L. F., & Love, I. (2004). Corporate Governance, Investor Protection, and Performance in Emerging Markets. *Journal of Corporate Finance*, 10(5), p.703-728.

Klock, M. S., Mansi, S. A., & Maxwell, W. F. (2005). Does Corporate Governance Matter to Bondholders? *Journal of Financial and Quantitative Analysis*, 40(4), p.693-719.

Krajnc, D., & Glavič, P. (2005). A Model for Integrated Assessment of Sustainable Development. *Resources, Conservation and Recycling*, 43(2), p.189-208.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and Finance. *Journal of Political Economy*, 106(6), p.1113-1155.

Lakonishok, J., & Lee, I. (2001). Are Insider Trades Informative? *Review of Financial Studies*, 14(1), p.79-111.

Lang, M. H., & Lundholm, R. J. (1996). Corporate Disclosure Policy and Analyst Behavior. *Accounting Review*, 71(4), p.467-492.

Lipton, M., & Lorsch, J. W. (1992). A Modest Proposal for Improved Corporate Governance. *Business Lawyer*, 48(1), p.59-77.

MacKinlay, A. C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature*, 35(1), p.13-39.

Meek, G. K., Roberts, C. B., & Gray, S. J. (1995). Factors Influencing Voluntary Annual Report Disclosures by U.S., U.K. And Continental European Multinational Corporations. *Journal of International Business Studies*, 26(3), p.555-572.

O'Brien, P. C., & Bhushan, R. (1990). Analyst Following and Institutional Ownership. *Journal of Accounting Research*, 28, p.55-76.

Ofek, E., & Yermack, D. (2000). Taking Stock: Equity-Based Compensation and the Evolution of Managerial Ownership. *Journal of Finance*, 55(3), p.1367-1384.

Petra, S. T. (2005). Do Outside Independent Directors Strengthen Corporate Boards? *Corporate Governance*, 5(1), p.55-64.

Petracci, B. (2011). Trading When You Cannot Trade: Blackout Periods in Italian Firms. *International Review of Law and Economics*, 31(3), p.196-204.

Rogers, W. (1993). Quantile Regression Standard Errors. *Stata Technical Bulletin*, 2(9), p.19-22.

Roulstone, D. T. (2003). The Relation between Insider-Trading Restrictions and Executive Compensation. *Journal of Accounting Research*, 41(3), p.525-551.

Rozeff, M. S., & Zaman, M. A. (1998). Overreaction and Insider Trading: Evidence from Growth and Value Portfolios. *Journal of Finance*, 53(2), p.701-716.

Seyhun, H. N. (1986). Insiders' Profits, Costs of Trading, and Market Efficiency. *Journal of Financial Economics*, 16(2), p.189-212.

Smith, C. W., & Watts, R. (1992). The Investment Opportunity Set and Corporate Financing, Dividend, and Compensation Policies. *Journal of Financial Economics*, 32(3), p.263-292.

Watts, R., & Zimmerman, J. (1986). *Positive Accounting Theory*: Englewood Cliffs, NJ: Prentice-Hall.

Welker, M. (1995). Disclosure Policy, Information Asymmetry, and Liquidity in Equity Markets. *Contemporary Accounting Research*, 11(2), p.801-827.

Wooldridge, J. M. (1995). *Score Diagnostics for Linear Models Estimated by Two Stage Least Squares*. Oxford: Blackwell.

4.9. Appendix 4.A.

Insider Trading Restrictions and the Different Policies Adopted by Companies

Restrictions and policies	Assigned score	Number of firms adopting the policy
1. Black-out periods around the announcement of annual financial results		
a. no black-out period	0	11
b. black-out period but not specified	1	5
c. black-out period 1 week before publication of annual financial results	2	0
d. black-out period 15 days before publication of annual financial results	3	4
e. black-out period 1 month before publication of annual financial results	4	46
f. black-out period 1.5 months before publication of annual financial results	5	4
g. black-out period 2 months before publication of annual financial results	6	23
h. black-out period starts when the annual financial statements are closed	7	16
2. Black-out periods around the announcement of interim financial results		
a. no black-out period	0	11
b. black-out period but not specified	1	6
c. black-out period 1 week before publication of interim financial results	2	1
d. black-out period 15 days before publication of interim financial results	3	7
e. black-out period 1 month before publication of interim financial results	4	62
f. black-out period 1.5 months before publication of interim financial results	5	3
g. black-out period 2 months before publication of interim financial results	6	4
h. black-out period starts when the interim financial statements are closed	7	15
3. Additional black-out periods around the announcement of other important events		
a. no	0	55
b. yes	1	54
4. Appointment of a compliance officer		
a. no	0	16
b. yes	1	93

Restrictions and policies	Assigned score	Number of firms adopting policy
5. Notification of transactions		
a. no notification	0	24
b. notification after transaction was executed	1	8
c. notification before transaction is executed	2	24
d. notification before and after executing transaction	3	53
6. Clearance - mechanism		
a. no clearance or advise required before transaction may be executed	0	63
b. clearance or advise required before transaction may be executed	1	46
7. Restriction on short-term trading		
a. no restriction	0	61
b. short-term trading is advised against	1	7
c. prohibition on short-term trading : term not defined	2	12
d. prohibition on short-term trading : term of 1 month	3	2
e. prohibition on short-term trading : term of 3 months	4	3
f. prohibition on short-term trading : term of 6 months	5	24
8. Restriction on trading of options		
a. no restrictions	0	92
b. prohibition to trade options	1	17
9. Restrictions on short selling		
a. no restrictions	0	104
b. prohibition to engage in short selling	1	5

CHAPTER 5:

CONCLUSION

The goal of this dissertation was to provide insight into the trading activity of insiders of Belgian listed companies and the gains they earned through these transactions. In particular, it examines how insiders' trading profits were affected by the occurrence of the financial crisis. Furthermore, it also studies the relationship between the magnitude of insider trading profits and the quality of company communication. Finally, it offers insight into determinants of company specific corporate governance policies on insider trading and the effectiveness of these policies in preventing unfair enrichment by insiders.

In this final chapter, I will summarize and highlight the main findings of this dissertation. Furthermore, I will discuss the academic contributions and policy implications. This conclusion ends with a discussion of limitations and potential avenues for future research.

5.1. Main findings

This dissertation analyzed insider trading in Belgium and more specifically the profitability thereof. The first paper focused on whether the profitability of insider trading was affected by the occurrence of the financial crisis, whereas the second and third paper focused on how the quality of a company's corporate governance practices may contribute to the reduction of insider trading profitability. In particular, the second paper examined whether higher-quality reporting by companies enhances the level-playing field and consequently adds to the prevention of unfair enrichment by insiders. The third paper studied how companies themselves may add to the limitation of insider trading profits by imposing additional restriction on insider trading outside current legislation.

The first dissertation paper focused on whether insiders were able to earn higher abnormal gains during the recent financial crisis. Such a financial crisis creates a chaotic financial environment in which investors react more nervously to news and experience more difficulties in ascertaining the fundamental value of companies. This then raises the question whether this uncertain investment environment enlarged the opportunities of insiders to exploit their informational benefits or whether the current legislation was able to prevent this. The Belgian stock market provided an interesting environment to test this proposition as it was especially vulnerable to the financial crisis given the importance of financial institutions on the Belgian market. Our research results showed that, while Belgian insiders were generally able to earn excess returns, the magnitude of their abnormal profits was substantially higher during the years of the financial crisis. Consequently, our findings indicated that the highly uncertain and volatile stock markets exacerbated the information asymmetry between insiders and other market participants and created additional opportunities for insiders to gain excess returns. In addition, given that the financial crisis originally harmed bank and insurance companies the most, we also addressed the question whether insiders of these companies proportionally benefited more than other insiders. However, we did not find evidence supporting this proposition.

The second dissertation paper examined whether high-quality corporate communication contributes to reducing insider trading profitability and information asymmetry. Information is regarded as high-quality if it is precise, transparent, timely and relevant (Brown and Hillegeist, 2007). In this paper, we proxied the quality of corporate communication using disclosure scores that were assigned by financial analysts and fund managers who are familiar with the peculiarities and demands of the companies' investor community. One of the advantages of using these scores is that they are more objective than researcher-assigned scores. Consistent with expectations, we found that high-quality communication limits the profitability of insider trading. Moreover, we reported evidence on the communication channels that contribute most to the reduction of information asymmetry between insiders and outsiders and the resulting insider trading gains. In particular, we documented that, although disclosures in mandatory annual reports have some impact, voluntary disclosure channels,

such as investor relation programs and press releases, are the most effective channels to reduce information asymmetry.

The third paper focused on the restrictions that companies impose on insider trading in addition to legal requirements. We based our inquiry on a study by the Financial Services and Markets Authority (FSMA) of the insider trading policies formulated in the corporate governance codes of Belgian listed companies. This study revealed that the self-regulation principle, which is typical of corporate governance practices, led to significant differences in the stringency of the restrictions that companies impose on their insiders. Using this insight, we examined whether company characteristics explain differences in the stringency level. Research results indicated that more stringent policies are adopted by companies with more growth opportunities. These companies are often in need of external financing and improve their governance practices in an attempt to raise capital at more favorable terms. Furthermore, the strictness of the policies also seemed to depend on the governance structures that are put in place as a higher level of board independence also resulted in more stringent restrictions on trading by insiders. In particular, a higher representation of independent directors who are likely to act in the interest of minority groups instead of executives has a positive impact on the stringency of insider trading policies. In the second part of the paper, we questioned the effectiveness of the stringency of the trading restrictions and tested whether transactions in companies with more stringent restrictions render lower abnormal returns to insiders. Our results, however, indicated that the stringency level of trading restrictions does not influence the magnitude of the abnormal returns gained by insiders. This lack of efficiency is especially outspoken in smaller companies.

5.2. Academic contributions

This dissertation contributes to several streams of literature. The main contributions of this dissertation are situated in the *insider trading literature*. A first, general contribution of this dissertation is that it adds to the emerging literature on insider trading in Europe. Early studies investigating insider trading mainly focused on the U.S. stock market (e.g. Jaffe, 1974; Finnerty, 1976; Seyhun, 1986; Lin and

Howe, 1990; Lakonishok and Lee, 2001; Jeng *et al.,* 2003). However, given the differences in the business and institutional context between U.S., Asian and European companies (La Porta *et al.*, 1997; La Porta *et al.*, 1998), results of these studies are not necessarily generalizable to other stock markets. Studies by Beny (1999) and Cheuk *et al.* (2006) have, for example, found that the level of law enforcement and the development of stock markets are important determinants of insider trading profitability. As a consequence, academics later also shifted their focus towards emerging Asian stock markets, while European markets were largely left uncovered. Examples of Asian studies are Chiang *et al.* (2004) (Taiwan), Wong *et al.* (2010) (Malaysia) and Cheuk *et al.* (2006) (Hong Kong). Research on European markets was lagging behind until recently as insider trading studies are generally based on databases of transactions reported to a supervisory authority. These reported transactions provide an abundance of data on the trading behavior of insiders. In the U.S., insiders have been obliged to report their trading activity to the SEC since 1934. A similar reporting duty was only imposed in Europe since 2003 by the introduction of the European Directive on insider trading and market manipulation (Directive 2003/6/EC). Studies on European stock markets have been performed for Germany (Betzer and Theissen, 2009), Spain (Del Brio *et al.,* 2002), Poland (Wisniewski and Bohl, 2005), the U.K. (Gregory *et al.,* 1994; Fidrmuc *et al.*, 2006), Italy (Bajo and Petracci, 2006) and the Netherlands (Degryse *et al.,* 2009). To the best of my knowledge, no prior studies have focused on the Belgian stock market. Further expanding the research on European stock markets may however provide valuable insights as institutional differences may also be prevalent between European countries (La Porta *et al.,* 1997; La Porta *et al.,* 1998).

A second contribution to the insider trading literature is the improvement of insight into the potential drivers of insider trading profitability. While ample evidence exists on the effect of trade and company characteristics like transaction size, trading intensity, company size and market-to-book and debt-to-equity ratios, knowledge on the effects of economy-wide or country-specific characteristics and of corporate governance related characteristics is limited. Aiming to address this gap, the first paper studied the effect of the financial crisis, the second paper examined the impact of corporate

communication quality and finally, the third paper explored the effect of company-specific insider trading restrictions.

Regarding potential economy-wide or country-specific determinants, prior studies have explored how insider trading profits are affected by differences in the institutional environment such as the level of law enforcement (e.g. Beny, 1999; Wisniewski and Bohl, 2005), investor protection (Fidrmuc *et al.*, 2011) and stock market characteristics, *i.e.* emerging versus developed stock markets (e.g. Bhattacharya *et al.*, 2000; Cheuk *et al.*, 2006). No prior studies have however provided evidence on whether the occurrence of a financial crisis enlarges the opportunities of insiders to exploit their informational benefits. Results of our inquiry identified crisis periods as an important additional driver of insider trading profitability.

Given the large emphasis of researchers and practitioners on the importance of good corporate governance in managing the information asymmetry problem, also insider trading research started to consider corporate governance related variables. Accordingly, studies have looked into the effect of ownership concentration (Fidrmuc *et al.*, 2006; Del Brio and Perote, 2007; Betzer and Theissen, 2009), type of controlling shareholder (Betzer and Theissen, 2009), board composition (Chang *et al.*, 2005) and executive compensation (Zhang *et al.*, 2005). Nevertheless, while it is generally acknowledged that comprehensive, transparent and timely disclosures are essential elements of good corporate governance (Bushman and Smith, 2001; Mitton, 2002; Mallin, 2002; OECD, 2004; Patel and Dallas, 2002), no prior study has, to the best of our knowledge, thoroughly investigated the effect of the quality of corporate disclosures on insider trading returns. In the second dissertation paper, we examined this relation by relating professional analyst disclosure scores to the profitability of insider trading. Analysts are regarded as the primary and most influential users of corporate communication as they communicate with companies on a daily basis (e.g. Schipper, 1991; Hirst *et al.*, 1995; Revsine *et al.*, 2004; IASB, 2005). This puts them in a privileged position to objectively evaluate the quality of corporate disclosures. Hence, we believe that the analyst disclosure scores provide a more direct and objective measure of corporate communication quality compared to previously used measures such as voluntary adoption of international reporting standards (Betzer and Theissen, 2009), news coverage

(Frankel and Li, 2004) and value relevance (Frankel and Li, 2004). In addition, the analyst disclosure scores include an individual assessment of the quality of annual reports, press releases, websites and investor relation activities. This allowed us to assess whether the effect of the quality of communication differs across alternative communication channels. Furthermore, a general advantage of using an externally-developed disclosure rating is that these do not involve judgment by the researcher(s) in question. This facilitates the verification of research results and the application of the rating in other research designs (Healy and Palepu, 2001). Researchers also only have access to published information and lack knowledge of disclosures distributed through unpublished channels like analyst meetings and conference calls (Healy and Palepu, 2001).

In the third paper of this dissertation, we again focused on the importance of good corporate governance by examining the effectiveness of company-specific insider trading policies. These policies are restrictions on insider trading imposed by companies and fall within the scope of corporate governance mechanisms. The policies include the requirement of *ex ante* approval of insiders' transactions, restrictions on option trading, on short selling, on short-term trading and on trading around news announcements. Prior research on the effectiveness of these policies is limited. To the best of our knowledge only three papers have addresses this issue (Bettis *et al.*, 2000; Jagolinzer *et al.*, 2011; Petracci, 2011). In addition, no prior study has considered the combined impact of all insider trading policies imposed by companies. Different policies may however complement each other or may be used as substitutes (Jagolinzer *et al.*, 2011). Accordingly, not taking into account the joint impact of all policies may give a biased view on the effectiveness of the trading policies. We therefore constructed a stringency index which took the strictness of all company-imposed policies into account.

Next to contributing to the insider trading literature, this dissertation also adds to other streams of literature. First, the financial crisis-study contributes to the *literature on the efficiency of stock markets during financial crises*. Prior studies by Cheong *et al.* (2007) and Lim *et al.* (2008) focused on Asian stock markets during the 1997 financial crisis and found evidence of increased inefficiency. We confirmed and generalized their findings by evaluating the efficiency of the highly developed Belgian stock market during another financial crisis.

Second, the paper on corporate disclosure quality contributes to the academic *literature on the relation between disclosure quality and information asymmetry* by using insider trading profitability as a proxy for information asymmetry rather than, for example, bid-ask spreads or the probability of informed trading. The use of this proxy is well-established in the empirical literature (e.g. Frankel and Li, 2004; Chang *et al.*, 2005) and supported by theoretical work (Kyle, 1985). Furthermore, the majority of prior disclosure studies is based on U.S. data (Healy and Palepu, 2001). Re-examining the disclosure - information asymmetry relation for a sample of Belgian listed companies may thus provide valuable new insights as the Belgian institutional setting differs from the U.S. Furthermore, we were also the first to investigate the disclosure - information asymmetry relation in a French civil law country using disclosure scores assigned by professional financial analysts and which rate the quality of different communication channels.

Finally, the third paper has multiple contributions to the *corporate governance literature*. First, we add to this literature investigating firm-level differences in corporate governance practices. Based on the seminal work of La Porta *et al.* (1998), prior research on corporate governance has primarily focused on how institutional differences provoke a different approach towards corporate governance at country-level (e.g. Doidge *et al.*, 2007). Nonetheless, as prior studies have shown, corporate governance practices also differ substantially between companies located within the same country (e.g. Klapper and Love, 2004; Black *et al.*, 2006). Research into the firm characteristics that motivate companies to invest in higher-quality corporate governance is however rather limited (e.g. Klapper and Love, 2004; Durnev and Kim, 2005). Moreover, to the best of our knowledge, only two studies have specifically analyzed how company characteristics affect corporate insider trading policies (Jagolinzer *et al.*, 2011; Petracci, 2011). We expand this line of research in two ways. On the one hand, we do not focus on a single aspect of corporate restrictions like black-out periods or *ex ante* approval of insider trades. Instead, we consider the full set of policies that a company imposes on its insiders. In addition, in contrast to previous studies which are mere compliance studies and only consider whether a policy was adopted or not, we also take into account the stringency of the adopted policy. As the policies on insider trading are part of corporate governance practices, companies have

the freedom to choose the practices they believe are best for them. The "comply or explain" principle which is typical of corporate governance recommendations implies that (national) corporate governance codes broadly formulate some guidelines and that companies customize the elaboration to their specific characteristics and environment. Consequently, it can be expected that companies exhibit substantial differences in the restrictions they impose on their insiders. Finally, our study also contributes to the literature examining the effectiveness of corporate governance practices. A company which chooses to improve its corporate governance practices intends to mitigate agency problems and commits itself to act in the best interest of its stakeholders. If governance practices are effective and stakeholders acknowledge a company's efforts, this should be reflected in higher market valuation (Goncharov *et al.*, 2006), better operating performance (Gompers *et al.*, 2003) and easier access to external capital (Klapper and Love, 2004). Obviously, with regard to insider trading policies, we expect a direct impact on insiders' behavior and the magnitude of their trading profits.

5.3. Practical implications

The findings presented in the three studies also have several practical implications.

First, this dissertation study confirmed the general finding of previous studies that insider trading is profitable. Results of the first paper even indicated that the occurrence of the financial crisis enlarged the opportunities of insiders to exploit their informational benefit and led to a further deterioration of the financial market efficiency. This result provides valuable insight to regulators with respect to the effectiveness of the current legislation. As a result of the financial crisis, initiatives for regulatory reforms have already been taken at the national as well as international level. In Belgium, the legislation on the imposition of administrative fines has for example been altered in order to increase the efficiency of the procedure and enlarged the dissuasive effect of administrative sanctions (FSMA, 2012). At the level of the European Union, a new European Securities and Markets Authority (ESMA) was established in 2011 to help coordinate the supervision of financial markets across member states

(European Commission, 2009).[1] One of the most important shortcomings in financial supervision exposed by the financial crisis was that national supervision models have been lagging behind financial globalization and failed to adequately deal with the integrated and interconnected nature of European financial markets. The European Union has therefore constructed a European System of Financial Supervision which comprises three European supervisory authorities, *i.e.* the European Banking Authority (EBA), the European Insurance and Occupational Pensions Authority (EIOPA) and the European Securities and Markets Authority (ESMA). Accordingly, the European Commission intends to integrate supervision in order to ensure a level-playing field. Furthermore, regulators are currently transforming the existing European directive on market abuse into a European regulation (European Commission, 2011a). Given that regulations prescribed by the European Union are directly applicable in member states and no translation into national legislation is needed as with European directives, the European Commission hopes to increase the effectiveness of the market abuse legislation. In particular, an evaluation of the current 2003 Directive has indicated that the numerous options left to member states have led to an incoherent approach towards market abuse and the undermining of the effectiveness of the directive. The new regulation will, amongst other things, increase the power of competent authorities like the FSMA by giving them the permission to access private premises and seize documents when necessary and by allowing them to acquire data on telephone and data traffic. Furthermore, the concept of "inside information" will be more broadly defined such that the prohibition against insider trading may apply even if the information is not precise enough for the issuer to be under the obligation to disclose it. Examples of such information provided by the European Commission include: the state of contract negotiations, terms provisionally agreed in contract negotiations, the possibility of the placement of financial instruments, conditions under which financial instruments will be marketed, or provisional terms for the placement of financial instruments. Under the new regulation it will also be clarified that transactions whereby the manager pledges or lends his shares also have to be reported to a competent authority and made

[1] The European Securities and Markets Authority (ESMA) has officially been established by European Regulation No 1095/2010 and is operative since 1 January 2011.

publicly available.[2] Finally, a new directive on the enforcement of criminal sanctions in case of market abuse is also being formulated at the level of the European Union (European Commission, 2011b). Currently, insiders abuse differences in national legislation by speculating on where it would be most advantageous to commit certain crimes.

The results of the second paper on disclosure quality may also be of interest to regulators for the findings generally underlined the importance of high-quality communication as an instrument to prevent information inequities and unfair enrichment by privileged insiders. Interestingly, however, our results showed that whereas regulators primarily focus on annual reports and backward-looking financial statements information, this communication channel is not the most effective in reducing the level of information asymmetry. By contrast, investor relation activities, which are used to communicate timely and forward-looking information on a voluntary basis, appeared to be most effective. We believe that this finding is relevant for regulators and may shed new light on the discussion concerning the shift towards more or less regulation of markets.

Finally, the third paper on corporate governance policy may be of interest to policy makers as it provided evidence that companies make use of the self-regulation principle by adjusting their insider trading policies to their own contracting environment. Nonetheless, our result seemed to indicate that this is no guarantee for success as the insider trading policies did not seem effective in reducing insiders' trading profits. Further research is however necessary to determine whether trading restrictions are not effective because companies have not chosen the optimal policy or because the policies are not strongly enforced.

5.4. Limitations and avenues for future research

The final section sets out to discuss the main limitations of this doctoral research and suggest some avenues for future research.

[2] A full overview of the regulatory reforms included in the new Market Abuse Regulation is provided on the website of the European Union http://ec.europe.eu.

First, an overall limitation of this research is that we used a sample of *reported insider transactions*. Although, insiders are obliged to report all transactions, they may still refrain from reporting for fear of criminal or administrative prosecutions. However, on the other hand, the FSMA also monitors whether insiders report their transactions and has the authority to impose administrative sanctions in case of non-reporting. Still, transactions are not *ex post* added by the FSMA to the database if they detect unreported transactions. Obviously, non-reporting by insiders is more likely when transactions are based on inside information. Nonetheless, we were still able to provide evidence that insiders reap higher trading profits compared to the average investor. In addition, other insider trading studies are faced with the same limitation as the vast majority of studies is based on a sample of reported insider transactions (e.g. Seyhun, 1986; Rozeff and Zaman, 1998; Lakonishok and Lee, 2001; Bajo and Petracci, 2006; Cheuk *et al.*, 2006).

A second, general limitation of this research is the restriction of our sample to *Belgian listed companies*. The Belgian stock market is a rather small stock market. As a consequence, our sample of reported insider trades is smaller than in most other studies, especially compared to studies focusing on the U.S. stock market. However, we believe that the external validity of our research is warranted as the Belgian institutional environment bears a strong resemblance to the environment of other continental European countries with a French-based civil law system. According to La Porta *et al.* (1997, 1998), the Belgium legal and institutional environment is similar to the French, Dutch, Spanish, Italian and Portuguese environment. Consequently, we may assume that the results of our inquiry are, to some extent, generalizable to these economies.

A third limitation of our research is the significant reduction of our sample due to the application of several *filter criteria* which were consistently used throughout the three papers. Although these criteria are in line with the insider trading literature, they led to an extensive reduction in the number of observations. Especially the application of non-contaminated event windows reduced our sample size considerably. In addition, concerns may be raised that the application of the filters may have led to sample selection issues. We checked the representability of our samples by comparing several firm characteristics of the companies included in the samples with the population of companies in the

insider trading database.[3] Results of this comparison are included in Appendix 5.A. and show that, despite the application of these filters, the firm characteristics of the population companies and sample companies are highly comparable. Only in the second paper, the smallest companies appear to have been dropped from the sample. Probably this can be explained by the fact that companies need to qualify for screening by the Belgian Association of Financial Analysts (BVFA) in order to be retained in the sample. However, in order to qualify for screening, companies have to be followed by a financial analyst which could explain why smaller listed companies are not represented in this sample. Related to this observation, there is also a higher proportion of cross-listed companies included in the second study, probably because larger companies are more likely to cross-list on a foreign stock exchange. Other firm characteristics are comparable for the sample used in second paper and the population of insider trades in 2009. Furthermore, we also compared the distribution of the number of transactions, the number of shares trades and the transaction value on company-level (Appendix 5.B.).[4] In sum, the comparison indicates that the relative proportions are generally comparable between the population and the samples used in the different papers. Finally, we also checked the robustness of our regression analyses if no adjustment for non-contaminated event windows is applied. In general, results are similar to our original analyses.

Fourth, the *disclosure scores of the Belgian Association of Financial Analysts* (BVFA) used in the second paper are only awarded to a subsample of Belgian listed companies. Annually, the BVFA approximately rates 50 listed companies. Although the use of this disclosure score consequently limits our sample, we believe that our sample is still representable for the Belgian stock market as the BVFA score, unlike other analysts' scores, does not only rate the communication quality of large companies but also from small companies. In 2007, for example, the sample of screened companies consisted of 18 members of the Belgian blue-chip index (*i.e.* Bel20-index), 18 mid caps and 13 small caps. The comparison of the firm characteristics in Appendix 5.A. confirms that, although the smallest companies were dropped from our sample, smaller companies are still represented. Furthermore, the use of analyst disclosure scores is well-established in prior literature and has several advantages over

[3] As each sample-year consists of a different set of companies, we compared the last full-year subsample included in each paper with the population of insider trades in the respective year.
[4] Distributions were compared before netting transactions within the same company on the same day.

researcher-developed scores. First, externally-developed disclosure ratings do not involve judgment by the researcher(s) in question. This facilitates the verification of research results and the application of the rating in other research designs (Healy and Palepu, 2001). Furthermore, unlike researchers, analysts also have access to unpublished and sometimes informal information disclosed during analyst meetings and conference calls (Healy and Palepu, 2001). Analysts are also regarded as the primary and most influential users of corporate communication as they communicate with companies on a daily basis (e.g. Schipper, 1991; Hirst *et al.*, 1995; Revsine *et al.*, 2004; IASB, 2005). This gives them the expertise and experience to objectively evaluate the quality of corporate disclosures.

A final limitation of this dissertation is that we do not have insight into the *underlying mechanisms and decision-making processes within companies*. This limitation especially applies to the second paper on disclosure quality and the third paper on corporate insider trading policies. Consequently, further research using *interviews or case-study evidence* is necessary to ameliorate insight into these processes. Regarding the third paper, these studies may also help to explain the lack of effectiveness of the insider trading policies. On the one hand, these policies may be merely used as window-dressing to find favor with outside investors without being thoroughly enforced. On the other hand, companies may also have failed to adopt the optimal policy given their contracting environment.

Another interesting avenue for future research is to *evaluate the effectiveness of the different policies separately*. From regulators' point of view, evidence on which policies are most effective in reducing insider trading profitability may provide valuable insight into the usefulness of transforming these policies into legislation. A study by Betzer and Theissen (2009), for example, provided evidence that introducing trading bans around earnings announcements would significantly decrease insiders' trading profits in Germany. The FSMA database on insider trading policies put at our disposal is however much broader and provides an overview of all policies imposed by companies. As such it may be interesting to compare the effectiveness of the different policies.

Finally, it may also be interesting to evaluate the efficiency of the Belgian stock market in the post-financial crisis period. When our study on the impact of the financial crisis on insider trading

profitability was conducted, we did not have sufficient data to address this question. However, in the wake of the financial crisis several regulatory reforms have already taken place or will take place in the future (see *supra*). An interesting question is then whether the adapted legislation is able to address the shortcomings of the prior legislation. Accordingly, lower or even insignificant insider trading profits should found in the post-crisis period.

5.5. References

Bajo, E., & Petracci, B. (2006). Do What Insiders Do: Abnormal Performances after the Release of Insiders' Relevant Transactions. *Studies in Economics and Finance,* 23(2), p.94-118.

Beny, L. N. (1999). *A Comparative Empirical Investigation of Agency and Market Theories of Insider Trading*. Working paper. Available at

Bettis, J. C., Coles, J. L., & Lemmon, M. L. (2000). Corporate Policies Restricting Trading by Insiders. *Journal of Financial Economics,* 57(2), p.191-220.

Betzer, A., & Theissen, E. (2009). Insider Trading and Corporate Governance: The Case of Germany. *European Financial Management,* 15(2), p.402-429.

Bhattacharya, U., Daouk, H., Jorgenson, B., & Kehr, C. H. (2000). When an Event Is Not an Event: The Curious Case of an Emerging Market. *Journal of Financial Economics,* 55(1), p.69-101.

Black, B. S., Jang, H., & Kim, W. (2006). Predicting Firms' Corporate Governance Choices: Evidence from Korea. *Journal of Corporate Finance,* 12(3), p.660-691.

Brown, S., & Hillegeist, S. A. (2007). How Disclosure Quality Affects the Level of Information Asymmetry. *Review of Accounting Studies,* 12(2-3), p.443-477.

Bushman, R. M., & Smith, A. J. (2001). Financial Accounting Information and Corporate Governance. *Journal of Accounting and Economics,* 32(1-3), p.237-333.

Chang, M., Hillman, R., & Watson, I. D. (2005). Are Corporate Governance Mechanisms Effective in Reducing Insider Trading Profits? *Company and securities law journal,* 23(3), p.165-180.

Cheong, C. W., Hassan Shaari Mohd Nor, A., & Isa, Z. (2007). Asymmetry and Long-Memory Volatility: Some Empirical Evidence Using GARCH. *Physica A: Statistical and Theoretical Physics,* 373, p.651-664.

Cheuk, M.-Y., Fan, D. K., & So, R. W. (2006). Insider Trading in Hong Kong: Some Stylized Facts. *Pacific-Basin Finance Journal,* 14(1), p.73-90.

Chiang, M.-H., Hwang, L.-J., & Wu, Y.-C. (2004). Insider Trading Performance in the Taiwan Stock Market. *International Journal of Business,* 3(3), p.239-256.

Degryse, H., De Jong, F., & Lefebvre, J. (2009). *An Empirical Analysis of Legal Insider Trading in the Netherlands*. Working paper. Available at

Del Brio, E. B., Miguel, A., & Perote, J. (2002). An Investigation of Insider Trading Profits in the Spanish Stock Market. *Quarterly Review of Economics and Finance,* 42(1), p.73-94.

Del Brio, E. B., & Perote, J. (2007). What Enhances Insider Trading Profitability? *Atlantic Economic Journal,* 35(2), p.173-188.

Doidge, C., Karolyi, G. A., & Stulz, R. M. (2007). Why Do Countries Matter So Much for Corporate Governance? *Journal of Financial Economics,* 86(1), p.1-39.

Durnev, A. R. T., & Kim, E. H. (2005). To Steal or Not to Steal: Firm Attributes, Legal Environment, and Valuation. *Journal of Finance,* 60(3), p.1461-1493.

European Commission. (2009). *Proposal for a Regulation of the European Parliament and of the Council Establishing a European Securities and Markets Authority*. Available at http:\\ec.europe.eu.

European Commission. (2011a). *Proposal for a Regulation of the European Parliament and of the Council on Insider Dealing and Market Manipulation (Market Abuse).* Available at http:\\ec.europe.eu.

European Commission. (2011b). *Proposal for a Directive of the European Parliament and of the Council on Criminal Sanctions for Insider Dealing and Market Manipulation*. Available at http:\\ec.europe.eu.

Fidrmuc, J. P., Goergen, M., & Renneboog, L. (2006). Insider Trading, News Releases, and Ownership Concentration. *Journal of Finance,* 61(6), p.2931-2973.

Fidrmuc, J. P., Korczak, A., & Korczak, P. (2011). *Why Are Abnormal Returns after Insider Transactions Larger in Better Investor Protection Countries?* Working paper. Available at www.ssrn.com.

Finnerty, J. E. (1976). Insiders and Market Efficiency. *Journal of Finance,* 31(4), p.1141-1148.

Frankel, R., & Li, X. (2004). Characteristics of a Firm's Information Environment and the Information Asymmetry between Insiders and Outsiders. *Journal of Accounting and Economics,* 37(2), p.229-259.

FSMA. (2012). *Annual Report 2011*. Available at www.fsma.be.

Gompers, P., Ishii, J., & Metrick, A. (2003). Corporate Governance and Equity Prices. *Quarterly Journal of Economics,* 118(1), p.107-156.

Goncharov, I., Werner, J. R., & Zimmermann, J. (2006). Does Compliance with the German Corporate Governance Code Have an Impact on Stock Valuation? An Empirical Analysis. *Corporate Governance: An International Review,* 14(5), p.432-445.

Gregory, A., Matatko, J., Tonks, I., & Purkis, R. (1994). UK Directors' Trading: The Impact of Dealings in Smaller Firms. *Economic Journal,* 104(422), p.37-53.

Healy, P. M., & Palepu, K. G. (2001). Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature. *Journal of Accounting and Economics,* 31(1-3), p.405-440.

Hirst, D. E., Koonce, L., & Simko, P. J. (1995). Investor Reactions to Financial Analysts Research Reports. *Journal of Accounting Research,* 33(2), p.335-351.

IASB. (2005). *International Financial Reporting Standards.* International Accounting Standards Board, London. Available at

Jaffe, J. F. (1974). Special Information and Insider Trading. *Journal of Business,* 47(3), p.410-428.

Jagolinzer, A. D., Larcker, D. F., & Taylor, D. J. (2011). Corporate Governance and the Information Content of Insider Trades. *Journal of Accounting Research,* 49(5), p.1249-1274.

Jeng, L. A., Metrick, A., & Zeckhauser, R. (2003). Estimating the Returns to Insider Trading: A Performance-Evaluation Perspective. *Review of Economics and Statistics,* 85(2), p.453-471.

Klapper, L. F., & Love, I. (2004). Corporate Governance, Investor Protection, and Performance in Emerging Markets. *Journal of Corporate Finance*, 10(5), p.703-728.

Kyle, A. S. (1985). Continuous Auctions and Insider Trading. *Econometrica*, 53(6), p.1315-1335.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1997). Legal Determinants of External Finance. *Journal of Finance*, 52(3), p.1131-1150.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and Finance. *Journal of Political Economy*, 106(6), p.1113-1155.

Lakonishok, J., & Lee, I. (2001). Are Insider Trades Informative? *Review of Financial Studies*, 14(1), p.79-111.

Lim, K.-P., Brooks, R. D., & Kim, J. H. (2008). Financial Crisis and Stock Market Efficiency: Empirical Evidence from Asian Countries. *International Review of Financial Analysis*, 17(3), p.571-591.

Lin, J.-C., & Howe, J. S. (1990). Insider Trading in the OTC Market. *Journal of Finance*, 45(4), p.1273-1284.

Mallin, C. (2002). The Relationship between Corporate Governance, Transparency and Financial Disclosure. *Corporate Governance: An International Review*, 10(4), p.253-255.

Mitton, T. (2002). A Cross-Firm Analysis of the Impact of Corporate Governance on the East Asian Financial Crisis. *Journal of Financial Economics*, 64(2), p.215-241.

OECD. (2004). *OECD Principles of Corporate Governance*. Paris: OECD. Available at www.oecd.org.

Patel, S. A., & Dallas, G. (2002). *Transparency and Disclosure: Overview of Methodology and Study Results - United States*. Working paper. Available at

Petracci, B. (2011). Trading When You Cannot Trade: Blackout Periods in Italian Firms. *International Review of Law and Economics*, 31(3), p.196-204.

Revsine, L., Collins, D. W., & Johnson, W. B. (2004). *Financial Reporting and Analysis*. Upper Saddle River, NJ: Prentice Hall.

Rozeff, M. S., & Zaman, M. A. (1998). Overreaction and Insider Trading: Evidence from Growth and Value Portfolios. *Journal of Finance*, 53(2), p.701-716.

Schipper, K. (1991). Commentary on Analysts' Forecasts. *Accounting horizons*, 5(4), p.105-121.

Seyhun, H. N. (1986). Insiders' Profits, Costs of Trading, and Market Efficiency. *Journal of Financial Economics*, 16(2), p.189-212.

Wisniewski, T. P., & Bohl, M. T. (2005). The Information Content of Registered Insider Trading under Lax Law Enforcement. *International Review of Law and Economics*, 25(2), p.169-185.

Wong, E. S. K., Fatt, C. K., & Yap, P. (2010). Disclosure and Corporate Governance of Insider Trading: The Malaysian Perspectives. *African Journal of Business Management*, 4(9), p.1883-1893.

Zhang, W., Cahan, S. F., & Allen, A. C. (2005). Insider Trading and Pay-Performance Sensitivity: An Empirical Analysis. *Journal of Business Finance & Accounting*, 32(9-10), p.1887-1919.

5.6. Appendix 5.A.

Table 5.1. Respresentability of the samples used in papers 1 and 2

Population (subsample 2009)								
	N	Mean	s.d.	Min	Q1	Median	Q3	Max
FirmSize	75	5.11	2.05	0.24	3.79	5.07	6.41	10.17
MarketToBook	78	1.58	3.07	0.20	0.60	0.99	1.48	26.28
Leverage	76	23.25	19.29	0.00	4.68	20.69	34.52	76.64
OwnershipConc	74	0.24	0.43	0.00	0.00	0.00	0.00	1.00
Cross-listing	72	0.63	0.49	0.00	0.00	1.00	1.00	1.00
Paper 1 : Financial crisis (subsample 2009)								
	N	Mean	s.d.	Min	Q1	Median	Q3	Max
FirmSize	54	5.27	1.89	1.41	4.08	5.16	6.40	10.19
MarketToBook	54	1.35	1.36	0.20	0.60	1.00	1.52	7.84
Leverage	54	22.30	20.25	0.00	4.10	17.84	31.50	76.64
OwnershipConc	54	0.33	0.48	0.00	0.00	0.00	1.00	1.00
Cross-listing	50	0.70	0.46	0.00	0.00	1.00	1.00	1.00
Paper 2 : Communication quality (subsample 2009)								
	N	Mean	s.d.	Min	Q1	Median	Q3	Max
FirmSize	27	6.12	1.76	3.61	4.74	5.48	7.20	10.19
MarketToBook	27	1.59	1.80	0.31	0.56	0.98	1.52	7.84
Leverage	27	25.15	19.79	0.00	7.60	25.27	40.63	76.64
OwnershipConc	26	0.23	0.43	0.00	0.00	0.00	0.00	1.00
Cross-listing	27	0.81	0.32	0.00	1.00	1.00	1.00	1.00

Notes: Descriptive statistics on company-level. *FirmSize* is equal to the log of the market value of company *j* at the beginning of fiscal year expressed in millions of euros. *MarketToBook* is equal to the ratio of the market value of company *j* divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio of company *j* at the beginning of the fiscal year expressed in percentage. *Ownership* is a dummy variable equal to one if company *j* has a concentrated ownership structure and zero otherwise. *Cross-listing* is a dummy variable equal to one if company *j* is cross-listed on a foreign stock exchange in 2010.

Table 5.2. Respresentability of the sample used in paper 3

Population (subsample 2011)								
	N	Mean	s.d.	Min	Q1	Median	Q3	Max
FirmSize	78	5.95	1.84	1.81	4.79	5.80	6.98	11.13
MarketToBook	78	1.79	2.09	0.11	0.94	1.20	1.91	15.23
Leverage	79	24.62	19.09	0.00	8.93	23.42	39.52	78.35
OwnershipConc	79	0.27	0.44	0.00	0.00	0.00	1.00	1.00
Cross-listing	79	0.65	0.48	0.00	0.00	1.00	1.00	1.00

Paper 3 : Corporate policies (subsample 2011)								
	N	Mean	s.d.	Min	Q1	Median	Q3	Max
FirmSize	58	6.20	1.77	1.88	5.10	5.88	7.04	11.13
MarketToBook	58	1.65	1.88	0.31	0.73	1.08	1.76	10.09
Leverage	58	22.26	17.31	0.00	8.93	21.55	29.49	78.35
OwnershipConc	58	0.26	0.44	0.00	0.00	0.00	1.00	1.00
Cross-listing	58	0.62	0.49	0.00	0.00	1.00	1.00	1.00

Notes: Descriptive statistics on company-level. *FirmSize* is equal to the log of the market value of company *j* at the beginning of fiscal year expressed in millions of euros. *MarketToBook* is equal to the ratio of the market value of company *j* divided by the book value of equity at the beginning of the fiscal year expressed in percentage. *Leverage* is equal to the debt-to-asset ratio of company *j* at the beginning of the fiscal year expressed in percentage. *Ownership* is a dummy variable equal to one if company *j* has a concentrated ownership structure and zero otherwise. *Cross-listing* is a dummy variable equal to one if company *j* is cross-listed on a foreign stock exchange in 2011.

Table 5.3. Comparison of population and samples used in papers (number of transactions)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003888089	4Energy	12	0.18%	2	0.21%			3	0.64%
BE0003793107	AB InBev	251	3.86%	37	3.88%	32	6.31%	10	2.15%
BE0003877942	Ablynx	27	0.42%	5	0.52%			4	0.86%
BE0003696102	Accentis	4	0.06%	1	0.10%			2	0.43%
BE0003764785	Ackermans & van Haaren	26	0.40%	3	0.31%	3	0.59%	5	1.07%
BE0003851681	Aedifica	9	0.14%						
BE0974264930	Ageas	59	0.91%			1	0.20%		
BE0003755692	Agfa-Gevaert	40	0.62%	17	1.78%	17	3.35%	2	0.43%
BE0003868859	Alfacam	24	0.37%					2	0.43%
BE0003874915	Arseus	68	1.05%	3	0.31%	3	0.59%	8	1.72%
BE0161426185	Artwork Systems Group NV	3	0.05%						
BE0003856730	Ascensio	6	0.09%						
BE0003837540	Atenor	82	1.26%	10	1.05%	2	0.39%	4	0.86%
BE0003787042	Auximines	48	0.74%	7	0.73%			4	0.86%
BE0003008019	BNB-NBB	5	0.08%	1	0.10%				
BE0003892123	BSB	19	0.29%						
BE0003870871	Banimmo	68	1.05%	7	0.73%			3	0.64%
BE0003790079	Barco	44	0.68%	12	1.26%	12	2.37%	2	0.43%
BE0003678894	Befimmo	43	0.66%	10	1.05%	12	2.37%	1	0.21%
BE0974258874	Bekaert	274	4.22%	37	3.88%	37	7.30%	15	3.22%
BE0003810273	Belgacom	59	0.91%	6	0.63%	5	0.99%	9	1.93%
BE0020575115	Belreca	32	0.49%	10	1.05%			4	0.86%
BE0003723377	Beluga	105	1.62%	22	2.31%				
BE0003592038	Bois Sauvage	298	4.59%	17	1.78%	5	0.99%	9	1.93%
BE0003697118	Brantano	17	0.26%						
BE0003792091	Brederode	162	2.49%	26	2.73%			8	1.72%
BE0003817344	CMB	53	0.82%	12	1.26%	12	2.37%	8	1.72%

Table 5.3. (Continued) Comparison of population and samples used in papers (number of transactions)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003845626	CNP-NPM	80	1.23%						
BE0003825420	Campine	38	0.58%	7	0.73%			1	0.21%
BE0003304061	Cimescaut	9	0.14%	7	0.73%				
BE0003519270	CoBrHa	29	0.45%						
BE0003593044	Cofinimmo	6	0.09%	5	0.52%	5	0.99%		
BE0160342011	Coil	1	0.02%						
BE0974256852	Colruyt	55	0.85%	15	1.57%	15	2.96%	15	3.22%
BE0003786036	Connect Group	43	0.66%	1	0.10%				
BE0003819365	Cumerio	46	0.71%	8	0.84%	5	0.99%		
BE0974259880	D'Ieteren	104	1.60%	8	0.84%	8	1.58%	14	3.00%
BE0003789063	Deceuninck	56	0.86%	13	1.36%	11	2.17%	2	0.43%
BE0003624351	Deficom Group	111	1.71%	17	1.78%				
BE0003562700	Delhaize	138	2.12%	11	1.15%	11	2.17%	5	1.07%
BE0003821387	Devgen	88	1.35%	17	1.78%	5	0.99%	9	1.93%
BE0003796134	Dexia	125	1.92%	23	2.41%	23	4.54%		
BE0003776904	Dolmen	30	0.46%	5	0.52%				
BE0003762763	Duvel Moortgat	55	0.85%	11	1.15%	5	0.99%	10	2.15%
BE0003820371	EVS Broadcast	81	1.25%	23	2.41%	14	2.76%	15	3.22%
BE0003871887	Ecodis	5	0.08%						
BE0974266950	Econocom	142	2.19%	13	1.36%			21	4.51%
BE0003822393	Elia	3	0.05%						
BE0003843605	Emakina	27	0.42%						
BE0045646560	Epiq	6	0.09%	1	0.10%				
BE0003816338	Euronav	39	0.60%	20	2.10%	4	0.79%	3	0.64%
BE0003840577	Evadix	38	0.58%						
BE0003808251	Exmar	45	0.69%	16	1.68%	12	2.37%	6	1.29%
BE0003823409	Financière de Tubize	24	0.37%	6	0.63%				

Table 5.3. (Continued) Comparison of population and samples used in papers (number of transactions)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003215143	Floridienne	86	1.32%	15	1.57%			13	2.79%
BE0974265945	Fluxys	3	0.05%						
BE0003752665	Fountain Industries	1	0.02%						
BE0003797140	GBL	70	1.08%	7	0.73%	7	1.38%	6	1.29%
BE0003699130	GIMV	21	0.32%	7	0.73%	7	1.38%	9	1.93%
BE0003818359	Galapagos	53	0.82%	16	1.68%			8	1.72%
FR0004152221	Global Graphics	78	1.20%						
BE0003700144	Hamon & Cie	2	0.03%						
BE0003766806	IBA	78	1.20%	15	1.57%	10	1.97%	4	0.86%
BE0003756708	IRIS	6	0.09%					1	0.21%
BE0003689032	Ibt	41	0.63%	13	1.36%				
BE0132053365	Icos	3	0.05%	1	0.10%	1	0.20%		
BE0003599108	Immobel	3	0.05%	3	0.31%				
BE0160220738	Innogenetics	4	0.06%						
BE0003746600	Intervest Offices	61	0.94%	4	0.42%				
BE0003754687	Intervest Retail	1	0.02%	1	0.10%				
BE0003858751	Jensen Group	1	0.02%					1	0.21%
BE0003565737	KBC	221	3.40%	30	3.15%	30	5.92%	10	2.15%
BE0003867844	KBC Ancora	5	0.08%	2	0.21%			1	0.21%
BE0003880979	Keyware Technologies	108	1.66%	12	1.26%			11	2.36%
BE0003722361	Kinepolis	32	0.49%	7	0.73%	7	1.38%	5	1.07%
BE0003604155	Lotus Bakeries	44	0.68%	5	0.52%	1	0.20%	3	0.64%
BE0165385973	Melexis	2	0.03%	1	0.10%	1	0.20%		
BE0003859767	Metris	31	0.48%	5	0.52%	4	0.79%		
BE0003731453	Miko	15	0.23%	6	0.63%			2	0.43%
BE0003761757	Mitiska	34	0.52%	4	0.42%				
BE0003735496	Mobistar	10	0.15%	4	0.42%	4	0.79%		

Table 5.3. (Continued) Comparison of population and samples used in papers (number of transactions)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003853703	Montea	5	0.08%						
BE0974003262	Movetis	9	0.14%						
BE0003359610	Nord-Sumatra	5	0.08%						
BE0003876936	Nyrstar	59	0.91%	11	1.15%	11	2.17%	14	3.00%
BE0003785020	Omega Pharma	66	1.02%	10	1.05%	10	1.97%	2	0.43%
BE0003844611	Oncomethylome	9	0.14%	5	0.52%			1	0.21%
BE0003836534	Option	22	0.34%	11	1.15%	11	2.17%	1	0.21%
BE0003771855	Parc Paradisio	10	0.15%	3	0.31%				
BE0003807246	Picanol	61	0.94%	5	0.52%			13	2.79%
BE0003765790	Pinguin	25	0.38%	6	0.63%			1	0.21%
BE0003620318	Place Saint Gudule	1	0.02%						
BE0974255847	Polygone International	5	0.08%						
BE0003854719	Porthus	32	0.49%						
BE0003748622	Punch International	88	1.35%	18	1.89%			7	1.50%
BE0003855724	Punch Telematix	32	0.49%	6	0.63%				
BE0003730448	Quest for Growth	89	1.37%	24	2.52%	24	4.73%	4	0.86%
BE0003662732	Quick	3	0.05%						
BE0003815322	RHJ International	19	0.29%	2	0.21%			4	0.86%
BE0003899193	Real	10	0.15%						
BE0003899193	Realdolmen	26	0.40%					4	0.86%
BE0003656676	Recticel	53	0.82%	7	0.73%	7	1.38%	8	1.72%
BE0946620946	Rentabiliweb Group	13	0.20%						
BE0003707214	Resilux	12	0.18%	2	0.21%	2	0.39%	1	0.21%
BE0003720340	Retail Estates	7	0.11%	7	0.73%				
BE0003741551	Roularta	68	1.05%	20	2.10%	14	2.76%	3	0.64%
BE0003625366	Sapec	3	0.05%	1	0.10%				
BE0003900207	Sica Invest	23	0.35%						
BE0003898187	Sipef	77	1.19%	4	0.42%	4	0.79%	11	2.36%

Table 5.3. (Continued) Comparison of population and samples used in papers (number of transactions)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003500080	Socfin	1	0.02%						
BE0003717312	Sofina	46	0.71%	11	1.15%	1	0.20%	6	1.29%
BE0003545531	Solvac	15	0.23%	6	0.63%				
BE0003470755	Solvay	190	2.92%	25	2.62%	25	4.93%	13	2.79%
BE0003463685	Sucraf	7	0.11%						
BE0003773877	Systemat	5	0.08%	2	0.21%				
BE0003826436	Telenet	254	3.91%	27	2.83%	23	4.54%	24	5.15%
BE0003573814	Ter Beke	45	0.69%	6	0.63%			3	0.64%
BE0003555639	Tessenderlo	41	0.63%	9	0.94%	9	1.78%	1	0.21%
BE0974263924	Texaf	14	0.22%						
BE0003895159	Thenergo	1	0.02%						
BE0003804219	Think-Media	47	0.72%	15	1.57%				
BE0003846632	Thrombogenics	40	0.62%	6	0.63%	5	0.99%	3	0.64%
BE0003864817	Tigenix	30	0.46%	7	0.73%			4	0.86%
BE0003869865	Transics	1	0.02%						
BE0003739530	UCB	32	0.49%	7	0.73%	7	1.38%	10	2.15%
BE0003884047	Umicore	217	3.34%	7	0.73%	13	2.56%	26	5.58%
BE0003064574	Unibra	97	1.49%	23	2.41%				
BE0003878957	VGP	25	0.38%						
BE0003749638	VPK	7	0.11%	3	0.31%	1	0.20%	2	0.43%
BE0003839561	Van de Velde	74	1.14%	4	0.42%	4	0.79%	14	3.00%
BE0003882025	Vision IT Group	109	1.68%						
BE0003763779	WDP	46	0.71%	12	1.26%			2	0.43%
BE0003724383	Warehouses Estates Belgium	21	0.32%	4	0.42%			1	0.21%
BE0003806230	Zenitel	11	0.17%	1	0.10%			3	0.64%
BE0003827442	Zetes	13	0.20%	6	0.63%	5	0.99%	2	0.43%
	Total	6497	100%	953	100%	507	100%	466	100%

Table 5.4. Comparison of population and samples used in papers (number of securities traded)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003888089	4Energy	19,941	0.00%	9,227	0.03%			11,777	0.08%
BE0003793107	AB InBev	72,394,378	11.23%	12,576,205	45.18%	12,421,627	58.70%	2,294,042	15.41%
BE0003877942	Ablynx	1,096,996	0.17%	16,630	0.06%			43,000	0.29%
BE0003696102	Accentis	8,238,400	1.28%	113,400	0.41%			5,113,400	34.35%
BE0003764785	Ackermans & van Haaren	158,000	0.02%	9,000	0.03%	9,000	0.04%	30,800	0.21%
BE0003851681	Aedifica	1,152	0.00%						
BE0974264930	Ageas	9,863,028	1.53%			80,000	0.38%		
BE0003755692	Agfa-Gevaert	614,948	0.10%	159,125	0.57%	159,125	0.75%	20,000	0.13%
BE0003868859	Alfacam	1,147,462	0.18%					2,281	0.02%
BE0003874915	Arseus	10,048,324	1.56%	21,014	0.08%	21,014	0.10%	74,537	0.50%
BE0161426185	Artwork Systems Group NV	13,074,483	2.03%						
BE0003856730	Ascensio	247,117	0.04%						
BE0003837540	Atenor	2,015,076	0.31%	26,099	0.09%	525	0.00%	1,844	0.01%
BE0003787042	Auximines	22,122	0.00%	832	0.00%			1,151	0.01%
BE0003008019	BNB-NBB	50	0.00%	4	0.00%				
BE0003892123	BSB	119,792	0.02%						
BE0003870871	Banimmo	744,435	0.12%	54,980	0.20%			58,741	0.39%
BE0003790079	Barco	63,128	0.01%	9,260	0.03%	9,260	0.04%	5,250	0.04%
BE0003678894	Befimmo	11,112	0.00%	2,806	0.01%	3,618	0.02%	18	0.00%
BE0974258874	Bekaert	482,997	0.07%	31,328	0.11%	31,328	0.15%	63,237	0.42%
BE0003810273	Belgacom	3,076,856	0.48%	103,450	0.37%	77,450	0.37%	197,613	1.33%
BE0020575115	Belreca	120,878	0.02%	328	0.00%			4,286	0.03%
BE0003723377	Beluga	1,431,641	0.22%	16,954	0.06%				
BE0003592038	Bois Sauvage	394,171	0.06%	8,100	0.03%	414	0.00%	1,599	0.01%
BE0003697118	Brantano	121,395	0.02%						
BE0003792091	Brederode	1,750,440	0.27%	259,046	0.93%			137,923	0.93%
BE0003817344	CMB	1,901,519	0.30%	373,498	1.34%	373,498	1.77%	223,207	1.50%

Table 5.4. (Continued) Comparison of population and samples used in papers (number of securities traded)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003845626	CNP-NPM	3,752,631	0.58%						
BE0003825420	Campine	26,876	0.00%	5,603	0.02%			351	0.00%
BE0003304061	Cimescaut	158	0.00%	122	0.00%				
BE0003519270	CoBrHa	668	0.00%						
BE0003593044	Cofinimmo	2,895	0.00%	2,795	0.01%	2,795	0.01%		
BE0160342011	Coil	88,196	0.01%						
BE0974256852	Colruyt	61,911	0.01%	6,977	0.03%	6,977	0.03%	24,007	0.16%
BE0003786036	Connect Group	5,963,057	0.93%	1,366	0.00%				
BE0003819365	Cumerio	853,500	0.13%	109,000	0.39%	76,500	0.36%		
BE0974259880	D'Ieteren	8,363,080	1.30%	2,800	0.01%	2,800	0.01%	2,423,510	16.28%
BE0003789063	Deceuninck	4,563,818	0.71%	22,252	0.08%	19,717	0.09%	95,000	0.64%
BE0003624351	Deficom Group	86,006	0.01%	13,410	0.05%				
BE0003562700	Delhaize	1,023,128	0.16%	106,529	0.38%	106,529	0.50%	11,534	0.08%
BE0003821387	Devgen	2,187,675	0.34%	101,174	0.36%	8,001	0.04%	95,148	0.64%
BE0003796134	Dexia	204,243,678	31.69%	1,501,792	5.39%	1,501,792	7.10%		
BE0003776904	Dolmen	156,702	0.02%	21,615	0.08%				
BE0003762763	Duvel Moortgat	58,368	0.01%	7,620	0.03%	1,916	0.01%	2,552	0.02%
BE0003820371	EVS Broadcast	2,764,627	0.43%	390,073	1.40%	375,073	1.77%	448,838	3.02%
BE0003871887	Ecodis	4,334,987	0.67%						
BE0974266950	Econocom	4,691,064	0.73%	557,583	2.00%			521,573	3.50%
BE0003822393	Elia	10,000	0.00%						
BE0003843605	Emakina	804,528	0.12%						
BE0045646560	Epiq	30,546	0.00%	3,957	0.01%				
BE0003816338	Euronav	1,065,607	0.17%	524,814	1.89%	159,200	0.75%	19,003	0.13%
BE0003840577	Evadix	24,387	0.00%						
BE0003808251	Exmar	1,398,130	0.22%	256,230	0.92%	200,082	0.95%	309,159	2.08%
BE0003823409	Financière de Tubize	695,900	0.11%	104,204	0.37%				

Table 5.4. (Continued) Comparison of population and samples used in papers (number of securities traded)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003215143	Floridienne	952,449	0.15%	126,337	0.45%			3,202	0.02%
BE0974265945	Fluxys	210	0.00%						
BE0003752665	Fountain Industries	44,400	0.01%						
BE0003797140	GBL	9,860,925	1.53%	534,254	1.92%	534,254	2.52%	14,000	0.09%
BE0003699130	GIMV	45,505	0.01%	26,025	0.09%	26,025	0.12%	7,060	0.05%
BE0003818359	Galapagos	551,291	0.09%	56,290	0.20%			27,475	0.18%
FR0004152221	Global Graphics	467,464	0.07%						
BE0003700144	Hamon & Cie	1,534,512	0.24%						
BE0003766806	IBA	5,817,734	0.90%	255,900	0.92%	25,400	0.12%	8,840	0.06%
BE0003756708	IRIS	114,000	0.02%					1,000	0.01%
BE0003689032	Ibt	5,322,976	0.83%	147,033	0.53%				
BE0132053365	Icos	16,254	0.00%	3,500	0.01%	3,500	0.02%		
BE0003599108	Immobel	2,035	0.00%	2,035	0.01%				
BE0160220738	Innogenetics	5,707,200	0.89%						
BE0003746600	Intervest Offices	496,281	0.08%	36,807	0.13%				
BE0003754687	Intervest Retail	300	0.00%	300	0.00%				
BE0003858751	Jensen Group	100,000	0.02%					100,000	0.67%
BE0003565737	KBC	3,989,491	0.62%	363,957	1.31%	363,957	1.72%	91,950	0.62%
BE0003867844	KBC Ancora	6,540	0.00%	2,040	0.01%			2,000	0.01%
BE0003880979	Keyware Technologies	39,921,931	6.19%	509,053	1.83%			200,077	1.34%
BE0003722361	Kinepolis	639,702	0.10%	213,480	0.77%	213,480	1.01%	69,897	0.47%
BE0003604155	Lotus Bakeries	29,538	0.00%	5,450	0.02%	1,500	0.01%	555	0.00%
BE0165385973	Melexis	45,366	0.01%	17,699	0.06%	17,699	0.08%		
BE0003859767	Metris	767,051	0.12%	241,688	0.87%	232,388	1.10%		
BE0003731453	Miko	3,800	0.00%	1,250	0.00%			350	0.00%
BE0003761757	Mitiska	1,350,123	0.21%	211,089	0.76%				
BE0003735496	Mobistar	31,882,171	4.95%	66,556	0.24%	66,556	0.31%		

Table 5.4. (Continued) Comparison of population and samples used in papers (number of securities traded)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003853703	Montea	2,000	0.00%						
BE0974003262	Movetis	1,027,409	0.16%						
BE0003359610	Nord-Sumatra	105,539	0.02%						
BE0003876936	Nyrstar	2,225,807	0.35%	396,653	1.42%	396,653	1.87%	322,253	2.16%
BE0003785020	Omega Pharma	491,085	0.08%	727,713	2.61%	727,713	3.44%	410	0.00%
BE0003844611	Oncomethylome	143,221	0.02%	24,280	0.09%			2,066	0.01%
BE0003836534	Option	821,394	0.13%	120,394	0.43%	120,394	0.57%	25,000	0.17%
BE0003771855	Parc Paradisio	136,243	0.02%	7,019	0.03%				
BE0003807246	Picanol	280,475	0.04%	46,033	0.17%			69,487	0.47%
BE0003765790	Pinguin	2,474,523	0.38%	126,909	0.46%			1,451	0.01%
BE0003620318	Place Saint Gudule	70	0.00%						
BE0974255847	Polygone International	1,051,276	0.16%						
BE0003854719	Porthus	603,879	0.09%						
BE0003748622	Punch International	2,425,798	0.38%	111,898	0.40%			223,502	1.50%
BE0003855724	Punch Telematix	94,247	0.01%	16,330	0.06%				
BE0003730448	Quest for Growth	451,176	0.07%	69,374	0.25%	69,374	0.33%	19,442	0.13%
BE0003662732	Quick	2,400	0.00%						
BE0003815322	RHJ International	3,754,971	0.58%	38,000	0.14%			63,784	0.43%
BE0003899193	Real	1,025,000	0.16%						
BE0003899193	Realdolmen	1,546,241	0.24%					7,671	0.05%
BE0003656676	Recticel	2,359,557	0.37%	453,360	1.63%	453,360	2.14%	26,200	0.18%
BE0946620946	Rentabiliweb Group	1,422,988	0.22%						
BE0003707214	Resilux	2,960	0.00%	660	0.00%	660	0.00%	100	0.00%
BE0003720340	Retail Estates	92,653	0.01%	92,653	0.33%				
BE0003741551	Roularta	217,686	0.03%	145,553	0.52%	141,224	0.67%	5,000	0.03%
BE0003625366	Sapec	7,110	0.00%	1,100	0.00%				
BE0003900207	Sica Invest	28,942	0.00%						
BE0003898187	Sipef	49,828	0.01%	2,806	0.01%	2,806	0.01%	6,106	0.04%

Table 5.4. (Continued) Comparison of population and samples used in papers (number of securities traded)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003500080	Socfin	25,540	0.00%						
BE0003717312	Sofina	299,374	0.05%	44,809	0.16%	1,000	0.00%	19,309	0.13%
BE0003545531	Solvac	21,503	0.00%	2,506	0.01%				
BE0003470755	Solvay	885,754	0.14%	146,090	0.52%	146,090	0.69%	89,603	0.60%
BE0003463685	Sucraf	7,631	0.00%						
BE0003773877	Systemat	31,000	0.00%	11,000	0.04%				
BE0003826436	Telenet	113,872,364	17.67%	1,246,719	4.48%	1,202,797	5.68%	165,100	1.11%
BE0003573814	Ter Beke	155,928	0.02%	2,098	0.01%			2,250	0.02%
BE0003555639	Tessenderlo	84,417	0.01%	7,520	0.03%	7,520	0.04%	1,000	0.01%
BE0974263924	Texaf	37,377	0.01%						
BE0003895159	Thenergo	10,000	0.00%						
BE0003804219	Think-Media	220,341	0.03%	29,590	0.11%				
BE0003846632	Thrombogenics	1,110,550	0.17%	35,100	0.13%	34,350	0.16%	31,000	0.21%
BE0003864817	Tigenix	1,505,014	0.23%	159,470	0.57%			246,350	1.65%
BE0003869865	Transics	187,753	0.03%						
BE0003739530	UCB	1,929,610	0.30%	521,356	1.87%	521,356	2.46%	63,265	0.42%
BE0003884047	Umicore	2,167,070	0.34%	165,000	0.59%	178,600	0.84%	453,128	3.04%
BE0003064574	Unibra	1,439,144	0.22%	8,588	0.03%				
BE0003878957	VGP	1,734,276	0.27%						
BE0003749638	VPK	60,304	0.01%	2,366	0.01%	2,016	0.01%	28,954	0.19%
BE0003839561	Van de Velde	651,250	0.10%	4,450	0.02%	4,450	0.02%	22,535	0.15%
BE0003882025	Vision IT Group	4,463,491	0.69%						
BE0003763779	WDP	929,416	0.14%	114,214	0.41%			1,666	0.01%
BE0003724383	Warehouses Estates Belgium	169,394	0.03%	2,341	0.01%			1,431	0.01%
BE0003806230	Zenitel	3,443,118	0.53%	2,580,759	9.27%			225,069	1.51%
BE0003827442	Zetes	138,065	0.02%	22,105	0.08%	17,105	0.08%	977	0.01%
	Total	644,505,375	100%	27,838,761	100%	21,160,468	100%	14,885,896	100%

Table 5.5. Comparison of population and samples used in papers (transaction value)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003888089	4Energy	€ 90,074	0.00%	€ 46,125	0.01%			€ 52,636	0.02%
BE0003793107	AB InBev	€ 2,093,978,271	19.10%	€ 463,359,513	56.69%	€ 456,730,058	62.64%	€ 95,338,550	30.32%
BE0003877942	Ablynx	€ 7,538,675	0.07%	€ 94,388	0.01%			€ 189,075	0.06%
BE0003696102	Accentis	€ 168,170	0.00%	€ 5,670	0.00%			€ 105,670	0.03%
BE0003764785	Ackermans & van Haaren	€ 5,975,585	0.05%	€ 631,525	0.08%	€ 631,525	0.09%	€ 1,867,556	0.59%
BE0003851681	Aedifica	€ 41,254	0.00%						
BE0974264930	Ageas	€ 19,413,454	0.18%			€ 712,000	0.10%		
BE0003755692	Agfa-Gevaert	€ 5,250,270	0.05%	€ 1,889,492	0.23%	€ 1,889,492	0.26%	€ 68,100	0.02%
BE0003868859	Alfacam	€ 6,981,773	0.06%					€ 11,735	0.00%
BE0003874915	Arseus	€ 93,456,180	0.85%	€ 163,994	0.02%	€ 163,994	0.02%	€ 803,517	0.26%
BE0161426185	Artwork Systems Group NV	€ 150,356,552	1.37%						
BE0003856730	Ascensio	€ 11,728,292	0.11%						
BE0003837540	Atenor	€ 70,841,733	0.65%	€ 795,274	0.10%	€ 21,120	0.00%	€ 64,235	0.02%
BE0003787042	Auximines	€ 18,096,790	0.17%	€ 612,712	0.07%			€ 628,269	0.20%
BE0003008019	BNB-NBB	€ 162,504	0.00%	€ 12,100	0.00%				
BE0003892123	BSB	€ 1,217,915	0.01%						
BE0003870871	Banimmo	€ 12,299,639	0.11%	€ 954,538	0.12%			€ 712,677	0.23%
BE0003790079	Barco	€ 3,455,562	0.03%	€ 563,026	0.07%	€ 563,026	0.08%	€ 251,807	0.08%
BE0003678894	Befimmo	€ 450,772	0.00%	€ 199,570	0.02%	€ 241,147	0.03%	€ 891	0.00%
BE0974258874	Bekaert	€ 30,996,482	0.28%	€ 3,010,281	0.37%	€ 3,010,281	0.41%	€ 4,522,399	1.44%
BE0003810273	Belgacom	€ 43,864,521	0.40%	€ 3,144,835	0.38%	€ 2,300,381	0.32%	€ 4,953,284	1.58%
BE0020575115	Belreca	€ 10,530,423	0.10%	€ 23,794	0.00%			€ 358,370	0.11%
BE0003723377	Beluga	€ 5,384,984	0.05%	€ 110,678	0.01%				
BE0003592038	Bois Sauvage	€ 113,274,693	1.03%	€ 2,891,848	0.35%	€ 118,378	0.02%	€ 316,308	0.10%
BE0003697118	Brantano	€ 3,981,108	0.04%						
BE0003792091	Brederode	€ 35,527,433	0.32%	€ 4,816,272	0.59%			€ 2,392,493	0.76%
BE0003817344	CMB	€ 55,746,027	0.51%	€ 11,996,945	1.47%	€ 11,996,945	1.65%	€ 4,941,724	1.57%

Table 5.5. (Continued) Comparison of population and samples used in papers (transaction value)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003845626	CNP-NPM	€ 131,139,243	1.20%						
BE0003825420	Campine	€ 738,235	0.01%	€ 159,296	0.02%			€ 10,206	0.00%
BE0003304061	Cimescaut	€ 179,941	0.00%	€ 143,381	0.02%				
BE0003519270	CoBrHa	€ 987,753	0.01%						
BE0003593044	Cofinimmo	€ 393,009	0.00%	€ 377,707	0.05%	€ 377,707	0.05%		
BE0160342011	Coil	€ 321,033	0.00%						
BE0974256852	Colruyt	€ 5,764,270	0.05%	€ 1,186,463	0.15%	€ 1,186,463	0.16%	€ 1,247,614	0.40%
BE0003786036	Connect Group	€ 23,649,508	0.22%	€ 7,007	0.00%				
BE0003819365	Cumerio	€ 15,610,731	0.14%	€ 2,294,609	0.28%	€ 1,310,816	0.18%		
BE0974259880	D'Ieteren	€ 443,515,523	4.05%	€ 789,432	0.10%	€ 789,432	0.11%	€ 117,278,868	37.30%
BE0003789063	Deceuninck	€ 88,619,434	0.81%	€ 392,043	0.05%	€ 338,872	0.05%	€ 133,826	0.04%
BE0003624351	Deficom Group	€ 754,009	0.01%	€ 120,930	0.01%				
BE0003562700	Delhaize	€ 46,733,230	0.43%	€ 7,187,822	0.88%	€ 7,187,822	0.99%	€ 615,847	0.20%
BE0003821387	Devgen	€ 19,213,909	0.18%	€ 1,853,850	0.23%	€ 72,891	0.01%	€ 461,942	0.15%
BE0003796134	Dexia	€ 684,354,926	6.24%	€ 23,986,006	2.93%	€ 23,986,006	3.29%		
BE0003776904	Dolmen	€ 608,854	0.01%	€ 328,440	0.04%				
BE0003762763	Duvel Moortgat	€ 2,802,993	0.03%	€ 329,222	0.04%	€ 72,138	0.01%	€ 168,524	0.05%
BE0003820371	EVS Broadcast	€ 121,845,191	1.11%	€ 21,170,323	2.59%	€ 20,604,255	2.83%	€ 19,750,564	6.28%
BE0003871887	Ecodis	€ 20,870,284	0.19%						
BE0974266950	Econocom	€ 45,796,446	0.42%	€ 5,848,893	0.72%			€ 5,746,664	1.83%
BE0003822393	Elia	€ 275,786	0.00%						
BE0003843605	Emakina	€ 7,261,645	0.07%						
BE0045646560	Epiq	€ 61,390	0.00%	€ 7,914	0.00%				
BE0003816338	Euronav	€ 22,884,357	0.21%	€ 11,365,073	1.39%	€ 3,103,491	0.43%	€ 147,289	0.05%
BE0003840577	Evadix	€ 289,085	0.00%						
BE0003808251	Exmar	€ 20,054,638	0.18%	€ 3,394,984	0.42%	€ 2,139,928	0.29%	€ 1,865,884	0.59%
BE0003823409	Financière de Tubize	€ 19,357,077	0.18%	€ 3,089,576	0.38%				

Table 5.5. (Continued) Comparison of population and samples used in papers (transaction value)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003215143	Floridienne	€ 93,146,518	0.85%	€ 11,533,895	1.41%			€ 383,860	0.12%
BE0974265945	Fluxys	€ 504,597	0.00%						
BE0003752665	Fountain Industries	€ 702,963	0.01%						
BE0003797140	GBL	€ 805,874,563	7.35%	€ 41,967,475	5.13%	€ 41,967,475	5.76%	€ 778,489	0.25%
BE0003699130	GIMV	€ 1,795,181	0.02%	€ 1,015,850	0.12%	€ 1,015,850	0.14%	€ 267,623	0.09%
BE0003818359	Galapagos	€ 2,682,475	0.02%	€ 428,527	0.05%			€ 271,249	0.09%
FR0004152221	Global Graphics	€ 2,883,987	0.03%						
BE0003700144	Hamon & Cie	€ 44,590,804	0.41%						
BE0003766806	IBA	€ 111,506,381	1.02%	€ 5,331,798	0.65%	€ 268,914	0.04%	€ 72,636	0.02%
BE0003756708	IRIS	€ 6,902,220	0.06%					€ 36,650	0.01%
BE0003689032	Ibt	€ 4,166,524	0.04%	€ 808,199	0.10%				
BE0132053365	Icos	€ 151,211	0.00%	€ 106,144	0.01%	€ 106,144	0.01%		
BE0003599108	Immobel	€ 69,740	0.00%	€ 69,740	0.01%				
BE0160220738	Innogenetics	€ 40,096,410	0.37%						
BE0003746600	Intervest Offices	€ 14,463,849	0.13%	€ 1,075,696	0.13%				
BE0003754687	Intervest Retail	€ 9,525	0.00%	€ 9,525	0.00%				
BE0003858751	Jensen Group	€ 880,000	0.01%					€ 880,000	0.28%
BE0003565737	KBC	€ 207,599,125	1.89%	€ 12,098,350	1.48%	€ 12,098,350	1.66%	€ 1,908,590	0.61%
BE0003867844	KBC Ancora	€ 155,568	0.00%	€ 119,660	0.01%			€ 24,858	0.01%
BE0003880979	Keyware Technologies	€ 15,206,138	0.14%	€ 858,901	0.11%			€ 302,545	0.10%
BE0003722361	Kinepolis	€ 30,743,283	0.28%	€ 9,622,405	1.18%	€ 9,622,405	1.32%	€ 3,714,348	1.18%
BE0003604155	Lotus Bakeries	€ 4,434,193	0.04%	€ 1,102,870	0.13%	€ 378,900	0.05%	€ 240,024	0.08%
BE0165385973	Melexis	€ 648,138	0.01%	€ 249,733	0.03%	€ 249,733	0.03%		
BE0003859767	Metris	€ 8,294,542	0.08%	€ 3,129,385	0.38%	€ 3,079,165	0.42%		
BE0003731453	Miko	€ 182,230	0.00%	€ 67,032	0.01%			€ 18,438	0.01%
BE0003761757	Mitiska	€ 17,592,919	0.16%	€ 2,646,164	0.32%				
BE0003735496	Mobistar	€ 1,631,251,498	14.88%	€ 3,782,598	0.46%	€ 3,782,598	0.52%		

Table 5.5. (Continued) Comparison of population and samples used in papers (transaction value)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003853703	Montea	€ 63,902	0.00%						
BE0974003262	Movetis	€ 11,456,954	0.10%						
BE0003359610	Nord-Sumatra	€ 58,118,755	0.53%						
BE0003876936	Nyrstar	€ 17,408,980	0.16%	€ 2,894,651	0.35%	€ 2,894,651	0.40%	€ 2,879,346	0.92%
BE0003785020	Omega Pharma	€ 16,733,972	0.15%	€ 36,713,588	4.49%	€ 36,713,588	5.04%	€ 13,463	0.00%
BE0003844611	Oncomethylome	€ 1,395,880	0.01%	€ 250,143	0.03%			€ 8,853	0.00%
BE0003836534	Option	€ 1,280,624	0.01%	€ 433,473	0.05%	€ 433,473	0.06%	€ 17,250	0.01%
BE0003771855	Parc Paradisio	€ 2,381,085	0.02%	€ 116,099	0.01%				
BE0003807246	Picanol	€ 2,180,801	0.02%	€ 252,307	0.03%			€ 541,962	0.17%
BE0003765790	Pinguin	€ 34,339,652	0.31%	€ 2,002,113	0.24%			€ 11,608	0.00%
BE0003620318	Place Saint Gudule	€ 9,870	0.00%						
BE0974255847	Polygone International	€ 1,470,256	0.01%						
BE0003854719	Porthus	€ 6,514,585	0.06%						
BE0003748622	Punch International	€ 7,973,148	0.07%	€ 1,173,612	0.14%			€ 743,597	0.24%
BE0003855724	Punch Telematix	€ 210,492	0.00%	€ 33,701	0.00%				
BE0003730448	Quest for Growth	€ 3,419,073	0.03%	€ 491,751	0.06%	€ 491,751	0.07%	€ 92,691	0.03%
BE0003662732	Quick	€ 79,020	0.00%						
BE0003815322	RHJ International	€ 16,573,614	0.15%	€ 251,040	0.03%			€ 420,648	0.13%
BE0003899193	Real	€ 241,505	0.00%						
BE0003899193	Realdolmen	€ 936,305	0.01%					€ 112,034	0.04%
BE0003656676	Recticel	€ 18,965,909	0.17%	€ 4,447,215	0.54%	€ 4,447,215	0.61%	€ 125,680	0.04%
BE0946620946	Rentabiliweb Group	€ 9,693,454	0.09%						
BE0003707214	Resilux	€ 89,558	0.00%	€ 20,656	0.00%	€ 20,656	0.00%	€ 5,145	0.00%
BE0003720340	Retail Estates	€ 3,811,030	0.03%	€ 3,811,030	0.47%				
BE0003741551	Roularta	€ 7,153,848	0.07%	€ 5,426,995	0.66%	€ 5,187,072	0.71%	€ 106,953	0.03%
BE0003625366	Sapec	€ 730,483	0.01%	€ 116,040	0.01%				
BE0003900207	Sica Invest	€ 219,496	0.00%						
BE0003898187	Sipef	€ 9,248,736	0.08%	€ 128,322	0.02%	€ 128,322	0.02%	€ 334,752	0.11%

Table 5.5. (Continued) Comparison of population and samples used in papers (transaction value)

ISIN	Company name	Population		Paper 1: Financial crisis		Paper 2 : Communication quality		Paper 3 : Corporate policies	
BE0003500080	Socfin	€ 9,960,600	0.09%						
BE0003717312	Sofina	€ 18,571,073	0.17%	€ 3,276,058	0.40%	€ 84,958	0.01%	€ 1,307,927	0.42%
BE0003545531	Solvac	€ 2,524,855	0.02%	€ 282,234	0.03%				
BE0003470755	Solvay	€ 78,352,577	0.71%	€ 14,701,371	1.80%	€ 14,701,371	2.02%	€ 8,729,080	2.78%
BE0003463685	Sucraf	€ 55,679	0.00%						
BE0003773877	Systemat	€ 112,058	0.00%	€ 49,658	0.01%				
BE0003826436	Telenet	€ 2,570,738,352	23.45%	€ 18,836,140	2.30%	€ 18,118,875	2.49%	€ 4,602,463	1.46%
BE0003573814	Ter Beke	€ 8,724,121	0.08%	€ 102,180	0.01%			€ 117,472	0.04%
BE0003555639	Tessenderlo	€ 2,943,771	0.03%	€ 247,374	0.03%	€ 247,374	0.03%	€ 23,220	0.01%
BE0974263924	Texaf	€ 8,555,839	0.08%						
BE0003895159	Thenergo	€ 10,780	0.00%						
BE0003804219	Think-Media	€ 917,574	0.01%	€ 120,482	0.01%				
BE0003846632	Thrombogenics	€ 6,973,857	0.06%	€ 497,822	0.06%	€ 490,922	0.07%	€ 538,470	0.17%
BE0003864817	Tigenix	€ 4,245,352	0.04%	€ 554,033	0.07%			€ 504,624	0.16%
BE0003869865	Transics	€ 3,191,801	0.03%						
BE0003739530	UCB	€ 80,128,842	0.73%	€ 25,766,242	3.15%	€ 25,766,242	3.53%	€ 1,904,316	0.61%
BE0003884047	Umicore	€ 63,126,361	0.58%	€ 4,534,022	0.55%	€ 6,721,297	0.92%	€ 15,478,103	4.92%
BE0003064574	Unibra	€ 162,085,766	1.48%	€ 1,134,256	0.14%				
BE0003878957	VGP	€ 30,493,031	0.28%						
BE0003749638	VPK	€ 1,753,202	0.02%	€ 61,002	0.01%	€ 50,904	0.01%	€ 832,106	0.26%
BE0003839561	Van de Velde	€ 21,746,204	0.20%	€ 135,415	0.02%	€ 135,415	0.02%	€ 872,401	0.28%
BE0003882025	Vision IT Group	€ 33,242,740	0.30%						
BE0003763779	WDP	€ 33,249,047	0.30%	€ 5,019,264	0.61%			€ 56,192	0.02%
BE0003724383	Warehouses Estates Belgium	€ 2,454,085	0.02%	€ 88,705	0.01%			€ 64,395	0.02%
BE0003806230	Zenitel	€ 9,282,802	0.08%	€ 7,484,201	0.92%			€ 79,460	0.03%
BE0003827442	Zetes	€ 3,486,940	0.03%	€ 477,561	0.06%	€ 352,311	0.05%	€ 16,158	0.01%
	Total	€ 10,961,054,514	100.00%	€ 817,310,253	100%	€ 729,104,101	100%	€ 314,446,199	100%