**Aalto University
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Effects of continuous and voluntary disclosures on information asymmetry - Evidence from the financial crisis

Accounting

Master's thesis

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EFFECTS OF CONTINUOUS AND VOLUNTARY DISCLOSURES ON
INFORMATION ASYMMETRY

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ASYMMETRY Evidence from the financial crisis

Purpose of the study

I study the effect of continuous and voluntary disclosure levels on bid-ask spreads, share liquidity and analyst forecast dispersion, three measures indicating the level of information asymmetry in the securities markets, in the framework of the financial crisis in 2008. I aim at examining:

1. Which firm and market characteristics explain continuous and especially voluntary disclosure levels of a public company?
2. Do high continuous and voluntary disclosure levels reduce information asymmetry in the securities markets?

My paper adds to the small body of research on continuous and voluntary disclosure, where I see disclosure as an integral part of strategic Investor Relations. Previous research has mainly focused on disclosure levels' relations with share behaviour using annual reports and other regulatory disclosure as proxies. Continuous and voluntary disclosure is yet to be studied in more detail, especially in crisis situations.

Empirical study and data

To measure information asymmetry, I use bid-ask spreads, share liquidity and standard deviations of analyst forecasts for all firms listed in Nasdaq OMX Helsinki Stock Exchange in 2007-2008. I use stock exchange releases from this period as a proxy for continuous and voluntary disclosure levels. First, I explain these levels using an OLS regression analysis. Second, I look for evidence for a negative relation of continuous and voluntary disclosure with information asymmetry. I use an IV regression as a method for analysing the aforementioned relations where endogenous disclosure variables are instrumented by relevant firm and market variables.

Main results

I find firm size, growth, complexity and private debt to explain continuous disclosure and firm size, profitability, private debt, appreciation of IR and experience from the securities markets to explain voluntary disclosure. I use these variables as instruments for the disclosure levels in the IV regressions and gain both supporting and contrary evidence to hypotheses that continuous and voluntary disclosures reduce information asymmetry. Continuous disclosure narrows bid-ask spreads, both disclosure measures increase share liquidity but neither succeeds in decreasing the dispersion of analyst forecasts. Disclosure is not evidenced to play a greater role in the financial crisis.

Keywords: analyst forecast, bid-ask spread, continuous disclosure, financial crisis, information asymmetry, Instrumental Variable regression, Investor Relations, liquidity, OLS regression, voluntary disclosure

Tutkimuksen tavoitteet

Tutkin jatkuvan ja vapaaehtoisen tiedottamisen vaikutuksia osakkeen osto- ja myyntikurssin (bid-ask spread) erotukseen, likviditeettiin ja analyytikoiden konsensusennusteiden hajontaan (osakemarkkinoiden informaation epäsymmetrian mittareita). Tutkimuksessa, jonka teen 2008 talouskriisin viitekehyksessä, tarkastelen:

1. Mitkä yritys- ja markkinamuuttujat selittävät jatkuvan ja vapaaehtoisen tiedottamisen tasoja pörssiyrityksessä?
2. Alentavatko korkeat jatkuvan ja vapaaehtoisen tiedottamisen tasot informaation epäsymmetriaa osakemarkkinoilla?

Tutkimukseni lisää tietoutta vähäiseen tutkimukseen jatkuvasta tiedottamisesta. Tiedottamisen näen strategisen sijoittajaviestinnän (IR) olennaisena osana. Aiemmat tutkimukset ovat keskittyneet lähinnä tiedotustason ja osakekäyttäytymisen suhteeseen käyttäen otoksina säännöllisen tiedottamisen piiriin kuuluvia tilinpäätöksiä ja osavuosikatsauksia. Jatkuvaa ja vapaaehtoista tiedottamista ei ole vielä samoin tutkittu, etenkään kriisitilanteissa.

Empiirinen tutkimus ja aineisto

Informaation epäsymmetrian mittareina käytän kuukausimediaaneja päivätason osto- ja myyntitarjousten laajuuksista ja osakkeen likviditeetistä sekä analyytikoiden kuukausittaisten konsensusennusteiden keskihajontaa kaikille Nasdaq OMX Helsingin listayrityksille vuosilta 2007–2008. Jatkuvan ja vapaaehtoisentiedottamisen kokonaistason mittaamiseen käytän Proxyna pörssitiedotteita. Ensin, pyrin selittämään näitä tasoja OLS regression avulla. Sitten, etsin näyttöä tiedotustasojen ja informaation epäsymmetrian negatiiviselle suhteelle. Käytän tähän instrumenttimuuttujaregressiota (IV), jossa endogeeniset tiedotustasot estimoidaan selittävien yritys- ja markkinamuuttujien avulla.

Keskeisimmät tulokset

Yrityksen koko, kasvu, monimutkaisuus ja yksityinen velka selittävät jatkuvaa tiedottamista. Koko, kannattavuus, yksityinen velka, sijoittajaviestinnän arvostus ja osakemarkkinakokemus selittävät vapaaehtoista tiedottamista. Käytän näitä muuttujia eksogeenisten arvioiden tuottamiseksi tiedotustasoille IV-regressioissa ja saan sekä tukevia että vastakkaisia tuloksia hypoteeseille tiedotustasojen informaation epäsymmetriaa alentavista vaikutuksista. Jatkuva tiedotus pienentää bid-ask spreadia, molemmat tiedotustasot lisäävät likviditeettiä, mutta kumpikaan ei paranna konsensusennusteiden keskihajontaa. Lopulta en onnistu todistamaan tiedotustasojen olevan tärkeämpiä talouskriisissä.

Avainsanat: analyytikkoennuste, bid-ask spread, instrumenttimuuttujaregressio, jatkuva tiedottaminen, informaation epäsymmetria, likviditeetti, OLS regressioanalyysi, sijoittajaviestintä, talouskriisi, vapaaehtoinen tiedottaminen

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1. Introduction

1.1. Motivation

"We now expect the global economy to come to a virtual halt." This is what Olivier Blanchard, IMF (International Monetary Fund) Chief Economist said on 28th of January, 2009 after IMF had again updated their World Economic Outlook. "The crisis in financial markets - which began in 2007 among subprime mortgages in the United States but has to spread to other markets and to much of the rest of the world - has resulted in a global recession that also continues to worsen. Global output and trade fell sharply in the final months of 2008" (IMF1, 11.2.2009). Knowing the development of the crisis at the end of 2008, Dominique Strauss-Kahn, IMF Managing Director, stated the following on 21st of January that "So 2009 will not be a good year for the world economy, even if we see recovery at the beginning of 2010." (IMF2, 11.2.2009)

How do public companies respond to financial and economic crises and take into account the uncertainties that shareholders hold regarding their investments? Companies are indeed facing a threat of their share price plunging and investors bailing them. In order to minimize the prevailing uncertainty, companies need to find ways to ensure their shareholders that the company is still worth investing in. One way to influence the investors' uncertainty is information. (Poikolainen, 1996, 9) Public companies are subject to disclosure requirements ruled by laws and regulations. Companies are obliged to disclose all material information about their financial performance and future prospects in a timely manner, both on regular and on-going basis. Any information can be seen material if it can affect shareholders' investment decision. (Nasdaq OMX Helsinki Stock Exchange rules, 18.11.2009) Poikolainen (1996, 15) calls this kind of information "price-sensitive".

The duty to provide the investment community with information should be considered only as the minimum (Poikolainen 1996, 66). Mars et al. suggest that this minimum serves as a consumer protection policy for investors (2000, 28). Investor Relations (IR), that is, all communication between the company and the financial community, is a much larger concept involving also the creation and maintenance of relationships with relevant constituencies. (E.g. Mars et al. 2000, 34-39) IR's main objective can be seen as building trust and enabling reciprocal communication

between the company and the investment community (e.g. Kariola et al. 2004, 14-19, Mars et al. 2000, 26-27). Reaching these objectives might reduce investors' uncertainties and bring the company's market value as close to its real value as possible, as Ikäheimo and Mouritsen (2007) suggest in their paper. The authors see the role of IR having moved from pure marketing of company shares to more interactive intermediary role between the company management and the investors.

In today's investment world, investors are more sophisticated and active than ever and they demand for more information about the companies in which they have invested their money (Argenti 2007, 160). Different investment groups such as institutional portfolio managers or retail investors may have different needs when it comes to the amount, quality or channel of information (Argenti 2007, 162) but at the end, they all seek assurance that they are making the right and best investment decision. (Balling 1993, 127, Kariola et al. 2004, 20) Since limitations of foreign direct investments were abandoned in Finland in 1.1.1993, also Finnish listed companies needed to respond to investors' growing information needs and started adopting international disclosure policies such as quarterly reporting (Kariola et al. 2004, 27). Step by step, companies have launched more open disclosure policies including not only mandatory annual and interim reports but also on-going and voluntary disclosure, hereafter called as continuous disclosure, to satisfy the information needs of their investors and to keep up good relations. (Kariola et al., 2004, 26-27)

IR has been the fastest-growing communications activity since 1990's and has evolved from a support function that someone in the communications department or a manager's secretary would deal with to a core function of public companies. (Argenti, 2007, 54) Today, the owner of the IR responsibility is the CEO him-/herself alongside with the CFO and internal and/or external IR professionals. (Mars et al. 2000, 132) IR is a cross-functional activity ensuring fair disclosure and consistency in the provision of information (Mars, 22.9.2009). Furthermore, IR can be strategic and support a listed company's overall strategies as long as IR policies are created to meet the IR audiences' expectations.

1.2. Objectives and contribution

Investor Relations being a very practical topic, my research seeks linking it to disclosure, which I see as the fundamental basis for strategic IR. In this research paper, I aim at adding knowledge to the small body of research on continuous and voluntary disclosures' effects on information asymmetry, as demonstrated by certain share behavior. In particular, I study the effect of continuous and voluntary disclosure levels on bid-ask spreads, share liquidity and analyst forecast dispersion - three measures indicating the level of information asymmetry in the securities markets- in the framework of the financial crisis of 2008. First, I look for company and market factors that would explain the level of continuous and voluntary disclosure. Second, based on historical data, my objective is to examine whether a high level of continuous and voluntary disclosure is more successful in decreasing information asymmetry than a low level, and thus if this should be considered in listed companies' disclosure policies. Botosan (2006) argues that even if the majority of research on disclosure supports the assumption that higher disclosure can reduce information asymmetries, additional research is still needed to ensure whether full disclosure is justified as some research claims public and private information to complement each other, thus information asymmetry would be preferable to certain extent.

My research questions can be written in the following form:

1. Which firm and market characteristics explain continuous and voluntary disclosure levels in a public company?
2. Do high continuous and voluntary disclosure levels reduce information asymmetry in the securities markets?

I seek evidence for the usefulness of continuous and voluntary disclosure by examining their relation with information asymmetry using data from two consecutive years – one of positive and one of negative economic development. By examining the relations during a good and a bad year of financial and economic situation in the markets, evidence is sought whether disclosure levels are even more crucial in times of crisis. I could argue for the usefulness of continuous and voluntary disclosure as a part of company's strategic IR policy by detecting these relations. Especially, in the interesting framework of economic and financial crisis, research of this sort is scarce if not non-existent, which also justifies the need for this study.

In this research, the focus is not solely on the key determinants of disclosure policy even if the level of continuous and voluntary disclosure is attempted to be explained by several firm and market variables using ordinary least square (OLS) regression analyses. Moreover, I want to take the research one step further by concentrating on the outcomes of certain disclosure policies in form of desirable share behavior (i.e. low versus high continuous disclosure, good versus bad financial situation). To do so, I run instrumental variable (IV) regression analyses in two stages with two different proxies of disclosure level, instrumented by the explanatory firm and market variables, to test whether continuous disclosure explains the level of information asymmetry and how much purely voluntary disclosure adds to this development, in particular.

This paper does not provide comparison between the superiority of regulated or unregulated, hence voluntary, disclosure. For instance Kothari (2001) has reviewed thoroughly the existing research on accounting information effects on share prices with the main conclusion of regulated financial reports being able to provide new and relevant information to investors (Healy and Palepu 2001). Healy and Palepu (2001) nevertheless point out that research if this sort does not exist and so there is no evidence whether "regulation is superior to a free market approach to disclosure". Given this, I leave this discussion outside this research, take the existing regulated disclosure as given and focus on continuous and voluntary disclosure.

1.3. Structure

I have organized the paper as follows. In Chapter 2, I construct an institutional framework for the paper introducing disclosure as a part of strategic IR, the financial crisis of 2008 and the role of disclosure in crises. In Chapter 3, I present relevant theories on market inefficiencies and information asymmetry as well as previous research on disclosure to put forward hypotheses in Section 3.2.3. The methodology and data I use in my empirical research are described in the first part of Chapter 4 and the actual empirical research is conducted in the second part, where I also report the results. Finally, I summarize the key findings, draw conclusions, discuss the implications and limitations of this study and conclude the report by considering possible future research in Chapter 5.

2. Institutional framework

In this chapter, I construct an institutional framework to which the theoretical part and empirical research will build upon. I first define disclosure and the division between regular and continuous as well as mandatory and voluntary disclosure. As I see disclosure as the fundamental element of strategic Investor Relations (IR), I shortly define IR and its background. I then move on to looking at IR's role in a listed company's overall strategy. Finally, I look at disclosure, as a part of the strategic IR, in crisis situations in which it will eventually be examined in the empirical research.

2.1. Disclosure and Investor Relations

Disclosure is an old concept for public companies. According to Allen (2004, 5), the first public company was founded in 1814 in Massachusetts, United States, where a textile maker sold shares to ten associates to fund its expansion. As these associates got significant returns on their investment, this new funding method soon became popular. Approximately the first hundred years, public companies were free to operate without any regulation on this way of financing. Since those times, after the Roaring Twenties and the Crash of 1929, control has become much stricter. Securities and Exchange Commission (SEC) was founded and the Securities Acts were enforced in 1933 and 1934 defining what information the companies must disclose. (Allen, 2004, 5)

Allen states that "material information is all knowledge that would cause an ordinary person to make a decision to buy, sell, or hold a stock." This *materiality* is somewhat subjective because all companies are different and thus the information they hold differs. The author emphasizes that it is better to disclose more than less, for nondisclosure is hard to be in shareholders' interests. (2004, 5) In the USA, disclosure duties are divided into *structured disclosure*, referring to all mandatory disclosure that is done in certain times and *unstructured disclosure*, referring to information that should be disclosed on an on-going basis if it is material. (Cole, 2004, 6) More recently, Regulation Fair Disclosure (Reg FD) was enforced in the US in 2000 to ensure a level playing field for the whole investment community, making sure that individual investors have same access to all information than institutional investors or analysts. (Allen, 2004, 6-7) The law stipulates that if information is disclosed to the investment community, it has to be prior to this disclosed to the general public (Argenti, 2007, 159).

2.1.1. Regulated disclosure in Finland

The division between disclosures of different kinds is defined somewhat differently in Finland yet the requirement of materiality holds. As companies need to show their trustworthiness when it comes to their value, disclosure of information would happen even without regulation. However, without proper stock exchange regulation and disclosure requirements, investors would not be sufficiently protected and disclosure might be somewhat misleading, random, insufficient or biased. The internationalization of the stock markets has also contributed to a better and harmonized stock exchange regulation in Europe. (Poikolainen, 1996, 10)

Legislative framework for the Finnish listed companies' disclosure requirements are set by the following authorities (e.g. Roine, 2001, 36):

1. The Securities Market Act
2. The Companies Act
3. The Accounting Act
4. Co-operation act
5. The decisions of the Ministry of Finance
6. The regulations and guidelines of the Financial Supervision Authority
7. The self-regulation of the Nasdaq OMX Helsinki Stock Exchange and the Finnish Association of Securities Dealers

As Finland is part of the European Union, all national laws are also in line with the EU level regulation. To meet the objective of *fair disclosure*, information must be correct, meaningful, clear and not misleading. As a general rule, the information should also be disclosed in a timely manner, that is, without unnecessary delay. The ultimate goal is to guarantee an equal, *fair*, distribution of information. (Nasdaq OMX Helsinki, 18.11.2009) Mars reckons (22.9.2009) the disclosure duty is very well regulated in Finland and, as the Securities Market Act is fairly new (original from 1989), it is clear and easy to comply. According to Mars, this makes trading on *insider information* virtually impossible.

2.1.2. Regular, continuous and voluntary disclosure

Regular disclosure

The content and disclosing schedule of regular disclosure is defined in the rules of the Nasdaq OMX Helsinki (Nasdaq OMX Helsinki, 18.11.2009). A listed company must disclose its financial reports according to the laws and other regulations. In summary, annual financial statements and interim reports make up this part of disclosure. However, instead of an interim report, a company may choose to publish a quarterly management review. In addition to the regular reports prepared by the companies, also the auditor's report is part of regular disclosure duties.

Continuous disclosure

As Poikolainen conceptualizes it, disclosure should be continuous and based on the same criteria over time in spite of new information being positive or negative (1996, 18-19). Thus, disclosure stands for more than regular publications. In addition, public companies need to provide the public with information in line with the requirements of materiality and timeliness. (Roine, 2001, 54) Roine (2001, 54) points out that this requirement does not strictly necessitate that the disclosed information will cause a change in the share price. It suffices that, objectively, the information can be considered relevant in the pricing of the security. Thus, information to be disclosed on an on-going basis is (combined from Nasdaq OMX Helsinki, 18.11.2009, Poikolainen 1996, 16-17 and Mars et al. 2000, 70-71):

- changes in the financial performance and position
- invitation to Annual General Meetings (AGM)
- decisions made by the AGM and the board of directors concerning the financial statements, share issues, dividends or public offerings
- organizational restructurings
- significant nominations and share-based incentives
- significant mergers and acquisitions
- creation of a new Group relation
- other significant business operations
- significant decisions made by authorities concerning the listed company

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- flagging (when a shareholder's ownership goes above/below or reaches certain threshold)
- changes in the certificate of incorporation
- changes in information disclosed earlier

In practice, stock exchange releases ensure an immediate and widely-spread distribution of material information to all stakeholders and can be used as a tool for continuous disclosure. As stock exchange releases can be disclosed at any time of the year, I see this channel of disclosure all in all to consist of continuous disclosure even if part of the releases are disclosed on mandatory and another part on voluntary basis, as is explained below in more detail.

Voluntary disclosure

Depoers (2000) calls voluntary disclosure all data concerning subsidiaries and the group going beyond the compulsory information for shareholders. The description is somewhat vague but clear at the same time. All information that has not been made mandatory by laws is voluntary, whether it is of quantitative or qualitative kind. Poikolainen warns about marketing-style disclosure in the stock exchange, which should not be used as a marketing channel. However, the author notes that the most common reason for such "unnecessary" disclosure is lack of knowledge whether certain information should be disclosed. (1996, 20) I reckon that materiality is somewhat subjective and thus some event or operation may cross the threshold of disclosure for one company but not for another. Hence, continuous disclosure may be included in the category of mandatory or voluntary disclosure and this is taken into account in the empirical part, as well. This is in line with Roine's aforementioned argument on relevancy in pricing of the security to be a sufficient criterion to disclose a piece of information (2001, 54) which implies that stock exchange disclosure also includes voluntary releases.

Mars (22.9.2009) argues that consistency over time and despite the financial performance is much more important than how much a company discloses beyond the mandatory requirements. (also Kariola et al. 2004, 99) According to Mars, each listed company has a *disclosure culture* created by internal criteria on what and how much is disclosed. Mars explains that for instance analysts learn to interpret the disclosure cultures and know which weight to give for a stock exchange release disclosed by a company with a closed or open disclosure culture. In short, the voluntary part of disclosure seems to leave companies with a freedom to create their own disclosure culture. In spite of the call for consistency and avoidance of marketing via stock exchange, several IR professionals

are of the opinion that sole compliance of disclosure requirements is not enough to meet investors' information needs and should rather be considered as minimum (Poikolainen 1996, 66) or a basis for a more open IR policy (Mars et al. 2000, 29).

2.1.3. Overview of Investor Relations

Background

Investor Relations' origins are in the Unites States. First, the activity was called financial public relations, later changing to stockholder relations and finally to investor relations, as it is for the most part called today (Mars et al. 2000, 11-13). The USA and soon also other Anglo-Saxon countries started developing IR function in the early 1980's and have since had a strong investor focus in disclosure. (Rappaport 1998, 1, Kariola et al. 2004, 11 and 26-27) In Finland, IR was first called stock exchange disclosure (*pörssitiedottaminen*) (Kariola et al. 2004, 11) and nowadays either investor communication (*sijoittajaviestintä*) or investor relations (*sijoittajasuhteet*). IR entered Finland in the first part of 1990's mostly as a result of the opening of Finnish stock market to foreign investors. Foreign direct investments (FDI) had been limited until 1.1.1993 but when the borders were opened, along came expectations of experienced investors used to more extensive disclosure. (Kariola et al. 2004, 26-27) Finnish firms began adopting international disclosure policies such as quarterly reporting. At the same time, the increase in professional financial analysts added to the pressure of disclosure, as well. Mars et al. (2000, 16) point out that, whereas in the US the stimulus to develop IR were all investors, in Finland it was initially analysts and institutional investors.

Definitions

The disclosure environment works as the foundation for a much larger *Investor Relations* (IR) function in publicly listed companies. IR enables investors to evaluate the company as an investment now and in the future (Kariola et al. 2004, 150). Trust and credibility are important and so the company must inform the investors about its current situation, objectives and policies based on facts. This will help the company to cope in the constantly changing markets. (Kariola et al. 2004, 19-20) Poikolainen (1996, 9) summarizes that disclosure of information is the price that

company pays for investors' trust. Ikäheimo and Mouritsen (2007) present National Investor Relations Institution's (NIRI) definition in 2003 as the starting point for their paper on IR:

> *"Investor relations are a strategic management responsibility that integrates finance, communication, marketing and securities law compliance to enable the most effective two-way communication between a company, the financial community, and other constituencies, which ultimately contributes to a company's securities achieving fair valuation."*

The authors point out that this definition "challenges the traditional view of financial disclosure activities as a one-directional information flow". They have created a model (see *Figure 1*) to explain the communicative role of IR between a company's fair and market values. I see this model to well illustrate the importance of trust-building. As investors hold uncertainties about a company's business activities and the company's managers are uncertain about the investors' trading activities, IR can reduce these uncertainties with communication activities such as voluntary disclosure.
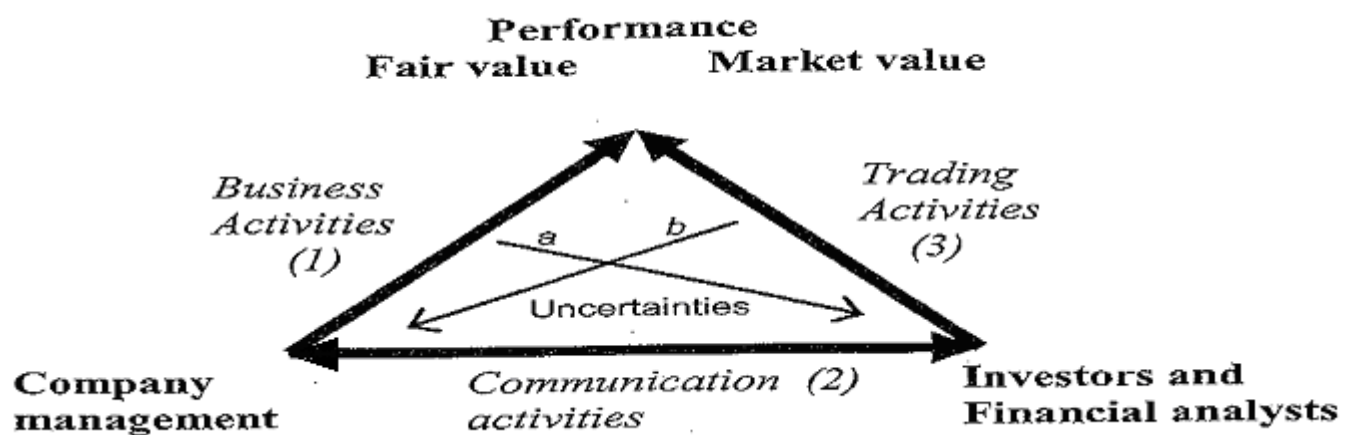
Figure 1: The communicative role of IR between fair and market value (Ikäheimo and Mouritsen, 2007)

Roine (2001, 11) reminds that everything counts for company reputation, both correct and incorrect information. Companies cannot fully have control over their public image but truthful communication, both financial and other, will help greatly in creating a successful company image. An *investment story* (also known as *a company story*, *a story* or *a company presentation* (see Roine 2001, Mars et al. 2000), which tells potential and current investors why the company is worth their investment, is pivotal in managing the company image among the investment community. The

company strategy is in the core of the story. (Roine, 2001, 64-65, Mars et al. 2000, 161-162) A proper investment story also tells on which grounds the company builds its future, what are its main products, objectives, markets, clients, competitors and stakeholders. Furthermore, the company should position itself against its rivals, explain its financial position, envisage its future prospects, list its strengths and reveal its dividend policy. (Poikolainen, 1996, 86-87)

Ikäheimo and Mouritsen (2007) argue that, whether the objective of IR is to lower information asymmetry (see more in section 3.1.3) build trust or attract new investors, as an activity it attempts "to construct monophonic communication with one head, one solid story and no leakages". This describes the need for a company to present itself consistently. According to Mars (22.9.2009), *consistency* indeed is the most important requirement when disclosing any information. In practice, this consistency comes into life through an *IR policy*, which is created to guide operations, create common rules and define responsibilities, roles and tasks in the field of IR (Jolly, 13.10.2009). An IR policy, however, should not bind the company to certain ways of action. Thus it should be constantly developed when the company, operational environment, ways of disclosure or audience expectations changes. (Roine, 2001, 75)

2.1.4. Investor Relations' strategic role

IR is a shared responsibility among communications, finance, accounting, auditing, legal matters and top executives, especially the CEO. Thus, IR can be seen as cross-functional (Mars, 22.9.2009). The majority of executives for newly listed firms indeed admit that the biggest change, when going public, is in the communication (Mars et al. 2000, 25). The larger the company, the more dispersed the IR function tends to be (Mars et al. 2000, 131). However, Mars emphasizes that the ultimate responsibility for fair disclosure lies upon the Investor Relations Officer (22.9.2009).

When it comes to the audiences of a company's IR activities, disclosure at the forefront, Roine takes a broad view. The author specifies that owners, personnel, partners, investors and social actors are all primary audiences, whereas media and analysts can be called secondary, supplementary audiences for publicly listed companies. (2001, 21) Especially analysts play a pivotal, intermediary role between the company and the end-users of information, namely the shareholders (Lang and Lundholm 1996). Furthermore, the role of the stock exchange and the Finnish Financial Supervision Authority (FFSA) is to oversee that disclosure requirements are met. In *Figure 2* below, the

disclosure environment with different primary and secondary audiences is illustrated in line with the two-way nature of communication mentioned before.
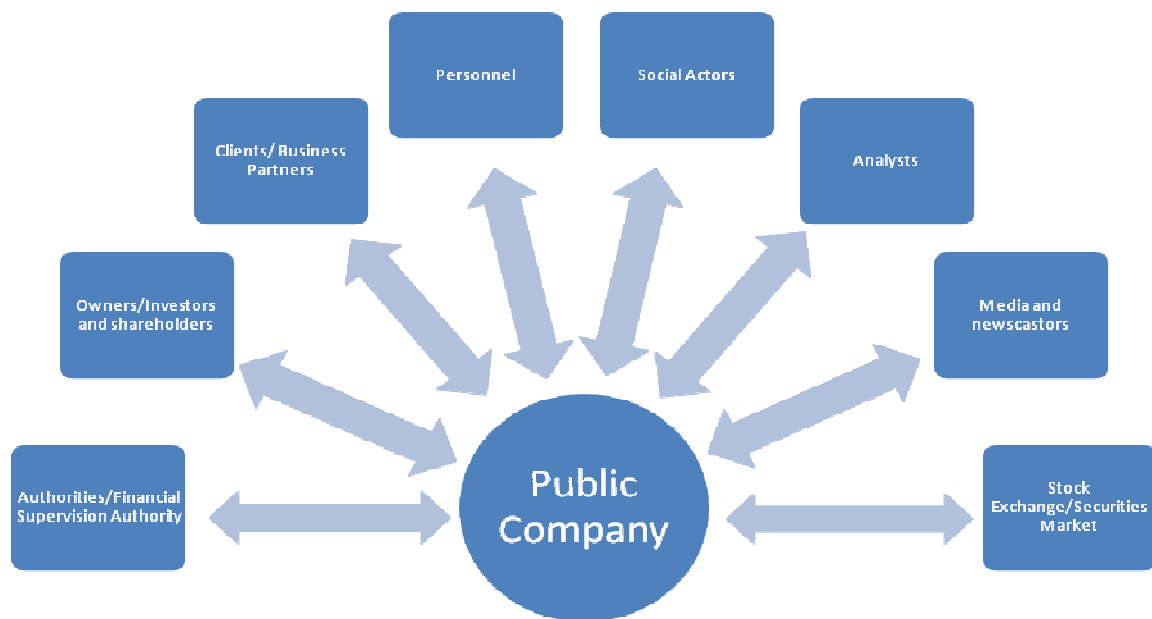
Figure 2: Audiences of a company's financial reporting (modified from Roine, 2000, 21)

Allen points out (2004, 15-16) that the nature of the company as an investment opportunity and its position dictate what sort of investors the company should be looking for. Shareholders with investment styles that match with the company's characteristics should be identified and targeted strategically. Mars et al. (2000, 134) highlight that IR is a target-oriented activity and thus each company decides what it wants to achieve through IR. Roine states that a company reputation has a clear financial value and can serve as a competitive edge. The author sees the main objectives of a company in the securities markets to be managing reputation, securing financing and lowering its price. (2001, 12) Also Kariola et al. (2004, 21-22) tell that the desirability of a company share depends greatly on how well the company is known among the investors and how well a company manages the information that affects investors' interest toward the company share. Argenti (2007, 160) encapsulates this ultimate objective to be competition for capital.

According to Mars, numbers are "the mirror of everything happening in a company" (22.9.2009). Thus, measurable objectives that have a link to the company strategy should be set for IR. Such objectives may be, among others (Mars et al. 2000, 45-47, Roine 2001, 59):

- reduced costs of financing

- increased company value in M&A situations and protection against hostile takeovers
- increased share liquidity and reduced share volatility
- increased protection against fall in share price via broad owner base
- better visibility, interest and reputation among the investment communities

The placing of IR function I the organization may influence its possibility to contribute to the company business strategy (Argenti, 2007, 57). In Mars' opinion IR should report directly to the CFO as IR focuses on the financials, whereas the communication is mainly a tool. However, also Mars reckons that IR can alternatively report to corporate communications as long as it co-operates closely with the finance team (22.9.2009). Based on these views, it becomes clear that IR should reside high in hierarchy, maybe even be a member of the executive board. At the end, access to information both from the top management and from the securities markets is what counts. The best case scenario would then be that both parties, the company and the investment community, gain as the investors are able to make even better decisions and the company management gets constant feedback from the investors to create long-term shareholder value and adjust its business strategies.

Timing of disclosure can be strategic, as well. Research evidence exists that complex companies disclose bad news after trading hours and/or on Fridays to let the market process the information. This strategy has turned out to be successful because it has increased trading volumes. (Doyle et al. 2009) Furthermore, to gain better coverage and visibility, a company can strategically schedule its result briefings on different dates as their competitors and thus gain better attendance (Roine, 2001, 89). However, if a company has a policy to hold briefings in context of financial announcements *continuity* is important. (Mars et al. 2000, 153)

To conclude, when a company creates its IR strategies, for instance for specific events such as a merger or an acquisition, the link to the business strategy and the pursuit of value creation should be kept in mind. (Argenti, 2007, 171) Companies' IR methods can vary as long as they comply with the rules and regulations. (Mars et al. 2000, 134) The set of IR activities should always be modified according to the company strategy, the company size and complexity as well as the investor structure. As mentioned in the previous section, IR is a target-oriented activity. Thus, in order to control the outcomes of IR, both qualitative or quantitative and printed or electronic materials can be created. (e.g. Mars et al. 2000, 42-44). Evidence exist that printed annual reports remain the single most important document to investors (e.g. Mars et al. 2000, 143). Despite of the main role

of annual reports, other documents and especially other channels of communication complement the traditional material. Continuous stock exchange releases ensure that information flow between the company and its audiences is on-going. Same flow is provided by separate web pages directed to investors. Despite the possibilities that electronic and printed material withhold, Jolly argues that the one most important IR tool are as a matter of fact personal relationships, hence "the actual investor relations" (13.10.2009). This makes sense as many authors have described the IR of today to be a two-way process enabling interaction and communication between the company and its multiple IR audiences (e.g. Ikäheimo and Mouritsen, 2007).

2.2. Crises and disclosure

To give disclosure a relevant context prior to discussing the previous research on disclosure and especially the empirical research, I will now introduce the concept of crisis and crisis communication and examine how crisis situations translate into a challenge for disclosure as the fundamental activity of strategic IR.

2.2.1. Crisis and crisis management

Often literature refers to *a crisis* that causes physical damage to people and/or property. For example Bland (1998, 5) gives a crisis the following definition:

> *A serious incident affecting, for example, human safety, the environment,*
> *and/or product or corporate reputation – and which has either received or*
> *been threatened by adverse publicity.*

Coombs and Holladay (2006) describe crisis as an incident that can destroy an organization by interfering with the operations and also worsening the company reputation. Using this broad definition as a basis, I reckon that the current financial shock, described more in detail in the next section, can be considered as a crisis of one kind. As Roine sees it, many crises affecting a company can become financial even if it was not initially. (2001, 80)

When does the company know that a negative incident has escalated into a crisis? As Bland concludes, one should not get stuck with a strict definition of a crisis but rather set a threshold for a crisis – an indication of risks of a crisis. Common features for any crisis are at least 1) someone is to blame, 2) something is at stake, and 3) someone finds out. (1998, 5-6) Furthermore, "perception is reality" and thus it is essential to realize that a company needs to identify and address people's concerns, not only the facts related to the incident (Bland, 1998, 16). Most companies, according to Bland (1998, 18), make the mistake of leaving *crisis communication* until it is too late and believing that communication is just about issuing facts and figures as it is not. Sitrick highlights that if a company in crisis wants the public to hear its side of the story, the company needs to tell it itself (Cole, 2004, 140).

Bland (1998, 1) tells that crisis handling as a specific management activity emerged only in the 1980's. The Johnson & Johnson's (J&J) Tylenol case, in which cyanide found in pain killers caused several deaths in the United States, is often referred as the classic case of *crisis management.* J&J handled the devastating crisis well by rapidly withdrawing all Tylenol off the store shelves, pulled off Tylenol advertising and set up crisis hotlines despite the considerable costs related to these activities. Furthermore, J&J was praised for its "swift and coordinated response and a demonstration of concern for the public that only strengthened its reputation as "the caring company"" (Argenti, 2007, 215). Bland emphasizes that the J&J management "only did the things that any responsible, well-managed company should do in a crisis", yet their crisis handling differed greatly and positively from the past where the management response would often be to "say and do nothing, put up a barricade of lawyers and hope that the problem would go away" (1998, 1). Bland points out that it is the crisis management, rather than the crisis itself, that can cause the reputation go up or down (1998, 22). Roine incites firms to regard crisis communication seriously because a ruined reputation can bring down any company. (2001, 80-81)

2.2.2. Financial crisis of 2008

The most recent financial and economic crisis can be called as the severest "shock in mature financial markets since the 1930s". The development started as early as in August 2007 as a result of the collapse of the US subprime mortgage market, which finally transformed into a full-fledged crisis in September 2008 when several important US financial institutions made an exit from the markets causing a drop in confidence in the financial markets globally. Having been first just a

headache of the financial institutions, the crisis spread causing global stress and wider macroeconomic impacts. The resilience of the non-financial sectors in the developed markets and the rapid growth of the emerging markets have not been sufficient to serve as a cushion against slowing down of global growth. As a result of virtually ceased economic growth, the crisis has caused "a series of bankruptcies, forced mergers and public interventions" as well as overall mistrust and significant economic slowdown around the world, finally ending up in a recession. Moreover, considerable changes in the inflation rates and appreciation of different currencies, risen interest rates and stricter lending have led to the world economy experiencing imbalances that further nourish the slow recovery from the slump, not to mention mass lay-offs and record high unemployment rates. (e.g. IMF3, 24.11.2009)

I will call the financial and economic crisis described above "the financial crisis". This economic situation creates a fruitful framework for disclosure research, enabling the examination of strategic IR policies in a real-time setting which has the potential to result in relevant results having in mind that crises tend to recur. What makes the financial crisis interesting in my opinion, is that the non-financial sectors are been affected despite their inexistent role in the initiation of the crisis. Thus, this crisis is coming from external sources instead of many other crises that derive from internal reasons such as the J&J case described earlier. Nevertheless, companies are affected and so they are put in a new situation where decisions have to be made in terms of activeness toward the crisis and crisis communication. As the crisis in question is of financial kind, I reckon that also investors have come to the forefront of the company actions and thus IR in particular faces a challenge in managing expectations and uncertainties.

2.2.3. Crisis communication and disclosure

To sum up the previous sections, crises vary in nature, intensity and width and affect a company's trustworthiness and reputation. Thus, crises are relevant to IR, especially due to their ability to increase risks and uncertainty. (Mars et al. 2000, 174) However, crises can also be considered as good occasions to learn and adjust ways of action. As said above, a crisis can cause a reputation go down, or up (Bland, 1998, 22). Therefore, a company itself seems to play the main role in shaping the direction of such reputation. Sitrick estimates that the difference between traditional IR and crisis IR can often be a single phone call between a company and a media representative dictating to

which direction the public attention will be drawn, and with which tone. Moreover, crisis IR is about solving problems, preferably before anyone knows about them. (Cole, 2004, 142-143)

A problem with crisis management, as Bland recalls, is that the better a company does it, the lesser will the public notice. This does not motivate management to invest time and money on proactive crisis management as stakeholders, especially shareholders, cannot perceive the direct value of such activity. However, if a company would make the public aware of these actions made to protect the company reputation, one of its most valuable long-term assets, they would pass as more acceptable. (1998, 12) Thus, this is more of a communications issue than an issue of whether crisis management should be done in the first place. Indeed, Poikolainen states that disclosure is an essential part of successful crisis management (1996, 76). The author demands for disclosure on all stages of an emergency that could turn into a crisis. (1996, 71) Argenti points out that clear communication objectives should be set for potential crises (2007, 228).

The audiences in a crisis, according to Bland, are the people and organizations who are affected by the crisis, can affect the company, are involved in the crisis or need to know about it (1998, 31). Taking the financial crisis in observation, shareholders, both individual and institutional, are one of the groups financially affected by the crisis and need to know. Thus, even if the level of disclosure should remain respectful to the chosen disclosure culture, the increased uncertainty may justify an augmented disclosure level even for companies with a closed disclosure culture. Therefore, I reckon exhaustive yet consistent disclosure of information to be justified in a crisis.

Bland argues that the longer the company keeps the public in the dark about the state of affairs the greater the crisis evolves. A company should remember that it must communicate what the audiences want and need to hear, not what the company wants to communicate. (1998, 27) Thus, in the financial crisis, even if a company would not like to comment on bad performance and risen risks, the shareholders would most likely want to hear about them. In addition to audience-focus, important values in crises are also honesty, speed and openness, as wrong information and hiding may only prolong the crisis handling. (Roine, 2001, 81) Mars et al. claim that trust-building ways of action in crises may return the dropped stock prices back to normal relatively rapidly. Such actions are, in addition to Roine's list, accurate (*paikkansapitävä*), credible, consistent, humane and responsible. (2000, 173) In fact, I reckon the list is very much similar to good IR in general.

To conclude, most crisis and crisis communications literature focus on the crisis as defined in the beginning of this chapter. Thus, too little evidence exists on how a financial, sudden and continuous, crisis should be taken into account in disclosure as the fundamental part of strategic IR. To respond to this lack of evidence, in the empirical part of this paper, disclosure is studied during the financial crisis to learn more about best practices of disclosure in crises.

3. Theoretical framework

3.1. Disclosure and market inefficiencies

This is the theoretical part of the study. I bring along a theoretical context that links to the institutional settings of disclosure, strategic IR and the financial crisis. Based on evidence from previous studies, I put forward hypotheses at the end of this chapter.

3.1.1. Market efficiency theory

Theory of market efficiency implies that the share prices on the market place react fully and instantaneously to all information available (Fama, 1991). The efficiency theory can be divided into two. *Allocative efficiency* implies that each company's stock price reflects perfectly its risk and return expectations, whereas *information efficiency* relates to the ability of securities markets to react fully to any new information. (Kariola et al., 2004, 68-69) Testing the information efficiency is traditionally divided into three levels by Fama in 1970 (1991):

1. Weak-form tests (How well do past returns predict future returns?)
2. Semi-strong-form tests (How quickly do security prices reflect public information?)
3. Strong-form tests (Do any investors have private information that is not fully reflected in market prices?)

Market efficiency theory is no doubt just a starting point for examining the functioning of the markets. Perfectly efficient securities markets do not exist for instance due to private information and trading costs. (E.g. Fama, 1991) These inefficiencies are examined in the following section.

3.1.2. Uncertainty reduction theory

The *Uncertainty Reduction Theory* (URT) (Berger and Calabrese, 1975) has been used as a framework for extensive research in organizational communication. The theory suggests that high levels of uncertainty lead to search for information and increased communication results in

decreased uncertainty. Thus, "URT suggest that when individuals, groups, or organizations experience uncertainty, they are motivated to seek information to reduce uncertainty (Deci, 1975). (Kramer, 1999) I reckon this theory compliments well the theories of information asymmetry and agency problem as a fundamental argument for high disclosure levels. By choosing to disclose more, rather than less, listed companies can consciously manage the uncertainties prevailing in the securities markets at least to some extent. However, Kramer (1999) presents that in situations where information comes unexpectedly, uncertainty can in fact increase (Planalp and Honeycutt, 1985). The way this could be translated in the context of the financial crisis and the securities markets is that a crisis and its implications are often sudden and increase uncertainties among investors. Here, listed companies can provide the uncertain investment community with a steady flow of information to reduce some of that uncertainty and ensure trust toward them. The empirical study in this paper will show whether stock exchange releases are a good way to create this flow.

3.1.3. Evidence for market inefficiency

There are several factors causing inefficiency in the markets that have already been conceptualized. An infamous theory on the market inefficiency was presented as early as in 1970 by George A. Akerlof in his seminal paper *The market for "lemons"*. His theory describes a simple situation of used cars' market where the buyer can never fully know whether the car salesman is telling the truth and providing the customer with all the knowledge he/she has about the quality and the real value of the car. If good and bad cars are sold at the same price, vendor prefers to sell bad cars but if buyer suspects that bad cars are sold without full disclosure of the quality, he/she reduces the price he/she is willing to pay, which at the end further encourages the vendor to provide the buyers with bad cars only. This event can be called as quality uncertainty and the market mechanism. (Akerlof, 2005, 1-27)

By this example, Akerlof adequately describes the uncertainty prevailing in all markets and for the first time introduces the theory of *information asymmetry*. In the securities market context, this means that if shareholders are uncertain about the company telling the full and fair truth about all material issues concerning the company performance and future prospects, they are willing to offer less for the share. Thus, information asymmetry may lead to undesirable share price levels that do not reflect the true value of the company. As said before, the objective of strategic IR is to ensure that the market value of the share is as close to the real value of the share as possible, for instance

by enabling two-way communication between the company and the investors for accurate value creation based on past, present and future performance (Ikäheimo and Mouritsen 2007). Therefore, the company has an incentive to ensure that the shareholders can make informed investment decisions.

Evidence exists that markets are inefficient due to the *agency problem*, which is linked to the problem of information asymmetry. Already Holmstrom argued (1979) that agency problem is partially due to information asymmetry and thus by voluntarily increasing disclosure, the agent and the principal would both be better off (Baek et al. 2009). In practice, agency problem occurs when an investor lets the firm manage the money it has invested and the self-interested entrepreneur then does not act to the investor's best interest but to his/her own interest for instance by paying excessive compensations and in this way deteriorates the investor's fortune (Healy and Palepu 2001). Healy and Palepu (2001) explain there are several solutions to the agency problem, optimal contracts that encourage disclosure and align investors' and entrepreneurs' interest being one of them and board of directors and information intermediaries such as analysts being another. The researchers pinpoint that whether these different ways truly eliminate agency problems and decrease information asymmetry is an empirical question. As many others, also Healy and Palepu (1993) have used the theory of information asymmetry between managers and shareholders as the fundamental underlying assumption in disclosure research.

Many acknowledged researchers base their research on disclosure on the theory of information asymmetry. For instance Healy and Palepu (2001) argue that "demand for financial reporting and disclosure arises from information asymmetry and agency conflicts between managers and outside investors". Also Lundholm and Van Winkle (2006) start off their paper by creating a framework where "the primary goal of voluntary disclosure is reduction of information asymmetry between managers and investors". This assumption is not only intuitive but empirical evidence exists that disclosure of accounting information reduces information asymmetry (e.g. Kim and Verrecchia 1994, Schadewitz 1994). One way to measure the information asymmetry is to study the bid-ask spreads and trading volumes as Schadewitz (1994) does, hypothesizing the degree of information asymmetry and the bid-ask spread being positively related. In his empirical study, the researcher also shows that trading volumes and market liquidity are negatively related around announcement dates of interim reports. (1994) Furthermore, evidence is sought for a hypothesis that high disclosure level and disclosure quality decrease information asymmetry, acknowledging also that firm size is known to be related to disclosure levels.

Interesting about the results of Schadewitz's (1994) empirical research is that the bid-ask spreads decrease after the announcement and thus information asymmetry decreases, as hypothesized, yet for some time only. The changes in the information asymmetry seem to be of temporary kind. It could be concluded that even if disclosure level and quality lower the information asymmetry, they only achieve this to a certain extent and eventually the information asymmetry starts increasing again as is seen in Schadewitz's (1994) study as increasing bid-ask spreads the further the time from the announcement date. Furthermore, the results do not fully support the hypothesis that higher disclosure level would decrease information asymmetry. In some results, the bid-ask spreads even increase whereas the trading volume and liquidity decrease. It is as the market had it difficult setting the price in line with the new information provided in the announcement. Maybe this is due to surprises in the information but the results suggest that the market reacts negatively to the information and are not able to process it to the company's advantage. (1994)

Lennox and Park (2006) put forward a hypothesis that managers are likely to give out an earnings forecast if investors consider the earnings informative and more specifically, if the managers believe that the response to the forecast will be strong. In the research, the researchers get support to their hypothesis and show that in the past companies have indeed disclosed earnings forecasts to lower information asymmetry and that the magnitude of the past Earnings Response Coefficients (ERC) is positively related to the probability of new earnings forecast issuances. As earnings forecasts are not a mandatory part of disclosure, they can be considered as a voluntary mean to lower information asymmetry. However, some incentive exists also not to disclose even significantly positive earnings forecast. In case the true earnings would shortfall from the forecast, managers take a risk of litigation processes and may thus not disclose after all (Lennox and Park 2006).

An incentive to lower information asymmetry exists when some part of the investors are able to trade on the information to which the others do not have access. This causes share price, and also liquidity, to decrease as inside information is sensed to exist and investors have additional costs when trying to acquire this private information. Supporting evidence for earnings forecasts' lowering effect on the information asymmetry have also found Ajinkya and Gift 1984, Kasznik and Lev 1995, Frankel et al. 1995 and Coller and Yohn 1997. (Lennox et al. 2006)

I could suggest that maybe continuous high level of disclosure in form of on-going and voluntary disclosure would be better than occasional high level of disclosure as in interim reports or other more occasional disclosure. This suggestion raises the question whether continuous providing of information could keep the information asymmetry permanently at a lower level. If a company has a high level of continuous disclosure, would their bid-ask spreads be lower and trading volumes higher on average at all times? This would imply that if information asymmetry is held at a lower level constantly, the changes in bid-ask spreads or trading volumes around an announcement would not be as strong. If the information asymmetry was lower and this would lead to narrower bid-ask spreads and higher trading volumes, continuous disclosure could be seen beneficial. Evidence could be then provided to support the importance of high disclosure levels and a disclosure policy supporting on-going and voluntary disclosure.

To conclude, Diamond (1985) and Diamond and Verrecchia (1991) argue that a company can upgrade the collective welfare of its shareholders by making information public. Otherwise, investors must collect costly private information for their investment decisions and only some of the investors succeed in exploiting this information. Diamond (1985) reveals that by disclosing information, the firm makes "investors' beliefs more homogenous, thereby reducing the magnitude of investors' speculative positions." This gives the impression that when the information comes from the firm itself and is the same for all, the information asymmetries between the firm and the investors, and especially between different investors, get smaller. *Figure 3* illustrates this negative correlation between the disclosure level and information asymmetry.
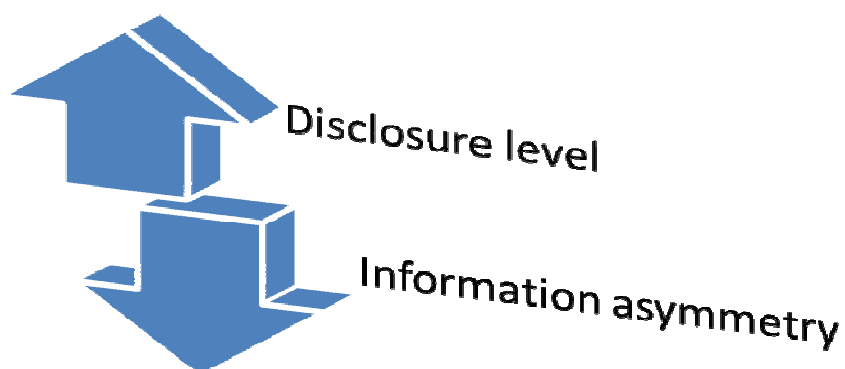
Figure 3: The expected negative correlation between disclosure level and information asymmetry

3.2. Disclosure and share behavior

In this chapter, I will present previous academic literature on disclosure in more detail. Especially, the effect of disclosure on share prices, share price reactions and abnormal earnings around announcements and disclosure effects on the cost of equity capital are mainstream research. The following chapter will present the most central research on these subjects in a relevant manner for this study – by detecting the arguments and evidence for and against high levels of disclosure.

3.2.1. Previous research on disclosure

Disclosure research can be seen to have started from Cerf's research in 1961 (Reporting and investment decisions, The University of California Press) when he created a disclosure index of things that could be found in annual reports and then picked a sample of firms' annual reports. Cerf proved firm size, listing status and number of shareholders to have positive relations with the disclosure level. Singhvi and Desai (1971, An empirical analysis of the quality of corporate financial disclosure) extended Cerf's research by adding three other firm characteristics to the research setting, namely earning margins, rate of return and CPA firm size. They got supporting evidence, as well, with an R²-value reaching 0.434. However, listing status by itself seemed to explain 88% of the total. The history of explaining the reasons for disclosure levels with firm and market characteristics is already quite long. The way in which disclosure level is measured has changed, however, starting solely from annual reports in 1970's and moving into other aspects of disclosure such as interim reporting or analyst meetings. Already Buzby (1975) recognized the existence of voluntary disclosure but examined it only in annual reports and as a part of the weights given to different explanatory variables (zero being given to voluntary and four to very relevant information). Buzby does not reckon the possible importance of voluntary disclosure in the disclosure palette any further.

The theoretical literature for explaining the effects of information is widespread. Botosan (2006) explains the arguments of information effects to be divided in two main categories. First, information is seen to reduce the cost of equity capital by reducing shareholder's *estimation risk* which refers to the additional element of risk investors experience due to uncertainty about the parameters of a share's return. The second theory on information effects focuses on information's power to reduce information asymmetry. Both are mainstream research directions that have resulted

in a magnitude of evidence and counter-evidence. Lundholm and Van Winkle (2006) summarize existing research on voluntary disclosure and view the reduction of information asymmetry between managers and investors to be the ultimate goal of voluntary disclosure. However, the authors do not reckon there is a choice between disclosure and non-disclosure but rather between disclosing now or later as the investors will one way or the other be informed even on the bad news about the company. As discussed earlier in the paper, in order not to let rumors spread or false information to affect investors' investment decisions, a firm has an incentive to disclose its private, correct, information especially in crises. As Lundholm and Van Winkle (2006) conceptualize, it is better to disclose even bad news as outside investors believe that a failure to disclose means that management withholds the worst possible news.

The studies on relations between disclosure and the cost of equity capital has long been a mainstream in disclosure research. Despite the extent of research efforts put to evidence that disclosure has a direct, or at least an indirect, lowering effect on the equity costs, the results are still somewhat mixed. The cost of equity capital is defined as the "minimum rate of return equity investors require for providing capital to the firm […], comprised of the risk free rate of interest […] and a premium for the firm's *non-diversifiable risk* […]" yet an on-going debate exists on whether estimation risk actually is non-diversifiable. (Botosan, 2006) One of the challenges in this research may be the fact that the cost of equity capital is not observable as such due to its future-oriented nature. As Botosan (2006) points out, the cost of equity is at times called as the 'expected' cost of equity. The continuous interest on finding further evidence to this disputed concern is a sign of the topic's importance and continuous topicality.

Whereas Botosan and Plumlee (2002) themselves find high level of disclosure to lower the cost of equity, timeliness of disclosure was found to have a contrary effect. This seems indeed strange as timeliness could be thought to be in shareholders' favor and thus investors would not expect a higher return due to timely disclosure. Even if Botosan and Plumlee's (2002) results are not in line with the disclosure theory about timeliness, the authors confirm that many managers are of this opinion in practice. Timeliness might raise the cost of equity via greater share price volatility. I could suggest here that companies that disclose a new piece of information first might indeed experience stronger price reactions than, for instance, other companies in the same industry that disclose the same news after them and thus the market might react only moderately to the lagging disclosure. As mentioned earlier, the surprise factor of disclosure causes greater reactions and thus early-mover may face greater volatility than its followers.

Lang and Lundholm (1996) who study the relation between a firm's disclosure and analyst following and forecast accuracy argue that the difference in analyst forecasts is much more likely to derive from the informativeness of a firm's disclosure policy than from different interpretations. If analysts are not provided with sufficient information directly from the firm, they look for "non-firm-provided information" on which to base their forecasts. This may result in worse forecasts than had the analysts based their estimations purely on first-hand information from the firm. This argument supports full disclosure, especially as financial analysts can be seen to play a pivotal role in the securities markets as an intermediary between firms and investors. On the other hand, there are also contradictory results about the negative relation of disclosure level and cost of equity capital. Even Botosan and Plumlee (2002) notice that the type of disclosure affects the relation. Their research shows that especially high level of disclosure in annual reports lowers significantly the cost of equity capital. However, they do not get statistically significant evidence for the negative relation between other publications and cost of equity capital nor investor relations disclosure and cost of equity capital.

Kanto and Schadewitz (1994) point out that firms report more in terms of quantity and frequency than before and this might be due to a change in investment behavior being more focused on the short-term. They mention that it is not self-explanatory that higher level of disclosure would be any better than lower level of disclosure. Their research aims to adding to the knowledge about disclosure policies by focusing on interim reports, which at the time of the study was still a fairly new phenomenon in Finland. The researchers get support to a hypothesis that firms with more equity financing disclose more than those more financed by debt (see also e.g. Gelb and Strawser 2004). The capital structure dictates the disclosure level to shareholders as companies with a lot of debt can disclose directly to banks.

Kanto and Schadewitz (1994) also find evidence to a hypothesis that growth is positively related to disclosure levels. Growth potential was estimated by book-to-market ratio. This is justified by the assumption of inside information. If managers know that the company share is undervalued and that the company has great growth potential, they have incentives to inform more and thus increase the disclosure levels. Growth and especially growth potential are seen as good news to the investment community. Also a straight-forward percentage change in total sales was used to measure growth which turn out to be positively and considerably related to disclosure levels in Kanto et Schadewitz's (1994) study. The researchers also evidence that changes in legislation affected firms'

disclosure policies and augmented the level of disclosure. I could however assume that in today's capital markets, disclosure regulation is the same for all and thus the changes in the legislation may increase the level of disclosure altogether but hardly cause any considerable differences between firms.

According to Healy and Palepu (2001), voluntary disclosure research concentrates on the information role of disclosure in capital markets. It thus takes the viewpoint of stock market motives to disclosure in comparison to the positive accounting theory, which aims at explaining "management accounting choices when there are agency costs and information asymmetry". The researchers reckon these two main areas of research on managers' reporting decisions complement each other and find management motives for voluntary disclosure an interesting empirical question. I acknowledge that there is room for further research in this area and thus consider the motives for voluntary disclosure as a medicine for information asymmetries in the market place in this study both in the institutional framework and empirical part.

Several different theories have been presented on voluntary disclosure decisions and are reviewed by Healy and Palepu (2001). For instance, firms that want to raise more equity have been noticed to voluntarily disclose more to reduce information asymmetry and this way to lower the cost of capital. Also firms with bad news who might face litigations risks are proven to pre-disclose more voluntarily in order to explain away the bad performance and this way to show they are on investors' side. However, the results on this litigation theory are mixed. Motives of voluntary disclosure related to stock options and other executive compensations are mentioned, as well. Noe (1999) reports that management forecasts are positively associated with insider trading in the firm's share (Healy and Palepu 2001). Baek et al. (2009) have recent evidence that the level of managerial ownership is positively related to the level of voluntary disclosure. One hypothesis put forward by Trueman in 1986, but yet to be proven, is that talented managers would voluntarily disclose more to show others their talent. On the contrary, the threat of losing competitive advantage has been said to restrain the management from disclosing additional information. (Healy and Palepu 2001)

Suijs (2007) conceptualizes different equilibriums in voluntary disclosure policies under the assumption that the firm does not know the investor response to disclosed information. The researcher looks at disclosure levels among and across industries and claims that more profitable firms or industries would have less to gain by disclosing and, on the contrary, firms with low expected returns would disclose more often earnings forecasts. Suijs (2007) explains that firms

often seek disclosing average and withholding extremely good and bad news due to their uncertainties of the investor response to such news. However, he admits that, in general, firms looking for external financing disclose more voluntarily in order to attract capital (see also e.g. Ruland et al. 1990, Frankel et al. 1995). Another reason is also that investors tend to interpret non-disclosure as a sign of withheld bad news rather than non-existent private information. This is in line with Skinner's paper (1994) where disclosure of bad news is seen to have a stronger reaction on the market than positive news indeed due to the interpretation of bad news being held and not disclosed in a timely manner. However, Skinner (1994) argues that managers have incentives to disclose even bad news voluntarily as the aforementioned activity of withholding bad news can lead to reputational costs and law suits following major share price plummeting after the announcement date. Furthermore, being seemingly open and honest is probably better viewed by outsiders than substantial corrections of previously disclosed figures.

Depoers (2000) studies voluntary disclosure within French listed firms focusing on the proprietary costs as the main explanatory variable to disclosure policy. He sees voluntary disclosure to have both negative and positive effects resulting from extended voluntary information provision and describes the disclosure policy as a trade-off between the two. He uses commonly used parameters in explaining the level of voluntary disclosure in annual reports such as firm size, extent of foreign activities, ownership structure, leverage, size of auditing, proprietary costs related to competition and labor pressure. He reports size, foreign activity and proprietary costs to be statistically significantly related to voluntary disclosure levels.

According to Einhorn (2007), the motivation for voluntary disclosure to the investment community has conventionally been explained by "[…] the wish of the firm's management to inflate the investors' expectations about the value of the firm and thereby maximize the price at which the firm's stocks are traded in the capital market". The researcher reckons there are several theories why managers still withhold information, the uncertainty of investors about the underlying reasons why managers disclose a piece of information being potentially one of them. By speculating on the reasons to disclose or withhold (see more in Einhorn 2007), the researchers brings well forward how the voluntary part of disclosure is dependent on managers' decisions, which are made based on the potential advantages (i.e. reducing information asymmetry and cost of equity) and disadvantages (costs). However, Einhorn (2007) states that also the mandatory disclosure environment has an effect on the discretionary disclosure strategies of a company.

Einhorn (2007) claims that sellers (companies) should disclose all material information because buyers (shareholders, analysts and other market influencers) interpret the withholding of information as bad news. If shareholders think the company is not telling the truth, they are willing to pay less for its shares. This explanation brought to the framework of disclosure seems to fully follow the idea presented in Akerlof's *Market for lemons* (2005). As high share price is attractive from company viewpoint, it gives justification for full disclosure. However, Einhorn (2007) lists the reasons not to disclose as:

- the costs of disclosure
- the uncertainty of investors about the endowment of the firms with the information
- the uncertainty of investors about the reporting objective of managers

Sometimes managers may even desire the share price to decrease due to upcoming stock option awards for the managers (Yermack 1997, Aboody and Kasznik 2000) and for this reason postpone the disclosure of good news and disclose bad news earlier. However, this action does not necessarily affect the overall level of disclosure but rather has implications for individual managers' wealth. (Einhorn 2007) Furthermore, Mars (22.9.2009) argues that in practice, and under the existing securities market regulation, this sort of behavior seems impossible. Among other reasons not to disclose can be seen also that there is a trade-off between the disclosure levels and competitive edge, as Healy and Palepu state (2001). They reckon that high disclosure levels are good in lowering the uncertainty related to information but by making all inside information public, some of competitive edge is lost. I reckon that in industries where competition is fierce or competitive edge is based on some technological breakthrough, a company management may be more hesitant to aim at full disclosure despite its positive effects on information asymmetry or cost of equity, for instance.

Rogers et al. (2008) studied disclosure levels for a sample of companies between 1996-2005 that went through lawsuits and found out that the level of disclosure was reduced after such litigations. The researchers got evidence that the plaintiffs would negatively react to post-litigation voluntary disclosure even if it was done in good faith. In addition to reduction in disclosure level, also the quality of disclosure was inferior, providing less quantitative information, fewer earnings-related announcements and wider earnings-forecast ranges. However, Rogers et al. (2008) point out how companies have an incentive to aim at full disclosure in order to avoid potential litigants to accuse the company for withholding material information. This can be seen to be in line with the theory of

information asymmetry and higher estimation costs mentioned earlier due to possibility of inside information.

Diamond and Verrecchia (1991), despite their extensive evidence on the lowering effect of disclosure on the cost of capital, found out special circumstances where reduced information asymmetry has the opposite effect due to rapid exit from market making. The authors explain that reduced information asymmetry reduces the volatility of order imbalances and thus also the willingness of large traders to take up large, risk-premium orders. From this viewpoint, institutional investors would benefit of small, positive information asymmetry. Nevertheless, the benefits gained from full disclosure and the enhanced liquidity outweigh this benefit.

Ohlson (1979) talks about a firm's disclosure environment, which consists, among others, of the frequency of financial reports, the provision of supplementary data and description of accounting policies. He gains strong evidence for an assumption that disclosure leads to increased variability in stock price (also Beaver 1968, May 1971, and Patell and Wolfson 1979). This result seems to be in contradiction with the market efficiency and information asymmetry theories as the market should be able to transmit any new information to the stock prices and if full and fair disclosure exists, the stock price should not vary that much. However, Ohlson arguments that "the disclosure of information precipitates the need for a revaluation in the asset" (1979), which seems logical. Furthermore, the empirical researches above have focused on regular disclosure, that is, around announcements of annual or quarterly earnings or disclosure just before call option expiration date. This might explain some of the increased variability as information is been withheld and then expected, creating a greater need for this revaluation. On the contrary, I reckon that if disclosure was continuous and evenly spread, the stock price variability might be lower around the aforementioned periods, as the need to revaluate would be lower around individual announcements.

An interesting argument is presented by Kim and Verrecchia (1994) that higher disclosure level of public information could actually increase information asymmetry because informed (i.e. professional) investors may be able to turn public disclosure with high precision into private information better than uninformed investors (Botosan 2006). From this viewpoint, full disclosure would not be completely preferable but lower precision of public information may better serve the investment community as a whole.

To conclude, disclosure research has been approached from various angles yet there is room for further evidence to be gained in order to either understand better issues where mixed results have been gained such as disclosure or timing effects on cost of equity or the benefits of full disclosure. In this paper, I look at the benefits of high continuous and voluntary disclosure levels and thus join the group of researchers seeking evidence to justify full disclosure. As the regulated part of disclosure can be assumed the same for all, I reckon that by looking at the voluntary portion of disclosure, I can better detect differences in the disclosure cultures of different companies or industries. Furthermore, I touch upon the issue of timing of disclosure. This is done in the empirical part where I test whether the concentration of disclosure has a negative impact on information asymmetry.

As Lundholm and Van Winkle (2006), for instance, I also see the reduction of information asymmetry to be the ultimate goal when management does decisions on increasing disclosure. I reckon that whereas increases in regulated disclosure derive from new laws and regulations, increases in voluntary disclosure levels are management decisions. If the management sees the benefits of high disclosure level to outweigh the possible sacrifices to be made, it can decide to provide the investment community with more public information. Furthermore, even if the ultimate goal of the management was to reduce information asymmetries and this way the cost of equity capital, there seems to be many other desirable outcomes from increased disclosure such as better analyst forecast accuracy, reduced risk of law suits, explaining away bad news or increased share liquidity. The management of a public company indeed has several motives to decide on their disclosure culture as the part of strategic IR activities.

3.2.2. Effects of disclosure levels on bid-ask spreads, share liquidity and analyst forecast dispersion

Prior research exists already on the effects of disclosure on the proxies of information asymmetry, namely bid-ask spreads, share liquidity and analyst consensus. The difference of this study to the previous is the focus on continuous, and especially on voluntary disclosure, new sort of proxy for measuring disclosure levels and examination of this proxy's effect on share behavior in the light of the financial crisis.

<u>Bid-ask spread</u>

Welker documented in 1995 a negative association between disclosure levels and relative bid-ask spreads (Botosan and Plumlee 2002). Botosan and Plumlee themselves do not look into bid-ask spreads but study the relation between disclosure levels and cost of equity capital gaining support to their negative relation, depending on the type of disclosure, though. However, this result can be seen to relate to bid-ask spreads as, for example Amihud and Mendelson suggested in 1986 that securities with wider bid-ask spreads pay more for equity capital due to investors requiring a better returns as a compensation for added transaction costs (Botosan and Plumlee 2002).

Thus, "[d]isclosing information allows firms to reduce the adverse selection component of the bid-ask spread, thereby reducing their cost of equity capital." (Botosan and Plumlee 2002) Moreover, also Greenstein and Sami (1994), Welker (1995) and Healy et al. (1999) all report declining bid-ask spreads resulting from different sort of increased disclosure practices. Results of same sort have gained also Leuz and Verrecchia (2000) as well as Mogh (2005) who study the effects on spread for companies who have adopted new accounting standards with higher disclosure requirements such as IAS or SFAS. (Botosan 2006)

<u>Share liquidity</u>

Diamond and Verrecchia (1991) prove that "[p]olicies that reduce information asymmetry of information will increase the liquidity of the market for a firm's securities". On one hand, liquidity indicates the level of information asymmetry but additionally it is desirable because it attracts larger traders such as institutional investors which make large trades and can lower the cost of equity. The authors argue that market breadth dictates the security price for large companies who are dependent on large traders. This is due to a need for liquidity of the company shares. Healy, Hutton, and Palepu (1999) find that "firms which increase their disclosure level experience increases in […] stock liquidity" (Botosan and Plumlee 2002). Kim and Verrecchia (1994) see the connection between information asymmetry, increasing bid-ask spreads and decreasing liquidity.

In other words, high disclosure level increases share liquidity resulting from information asymmetry. Schadewitz explains (1994) that trading activity resembles the behavior of bid-ask spreads as high disclosure normally causes more trading activity than low disclosure. This indicates that "trading is largely driven by information processing around the time of an announcement […]"

and so I could suggest that continuous disclosure may enhance share liquidity by providing new information for processing on an on-going fashion. In practice, Kariola et al. (2004, 21) state that trading on shares often picks up when a company discloses information on its results or other activities.

Dispersion of analyst forecasts

Lang and Lundholm (1996) state that analysts play a key role on the securities markets by providing information to "brokers, money managers and institutional investors". Evidence exists that financial analysts add value in the capital market, for instance, by improving market efficiency (Healy and Palepu 2001). The financial analysts base their evaluations on information provided directly by the firm in form of annual and other published information as well as IR activities, and so the firm has a great possibility in affecting the accuracy of analyst estimates. Lang and Lundholm (1996) study the relations between disclosure informativeness and analyst following, forecast dispersion and accuracy. The researchers get a strongly negative coefficient between the forecast dispersion and disclosure which means that higher disclosure decreases dispersion among analyst forecasts. The authors analyze that the "result is consistent with additional disclosure reducing the divergence of beliefs across analysts by increasing the precision of their shared information". Poikolainen (1996, 85) also comments that if analyst consensus constantly differs from a company's own estimates and results, something is wrong and interaction needs to be intensified.

Lang and Lundholm (1996) state that by adding disclosure, companies can reduce information asymmetries. Kimborough (2005) gets similar results of reduced correlation in analyst errors after a firm initiates conference calls, which is also a tool for voluntary disclosure (Landholm and Van Winkle 2006). Gilson et al. (2000) on the other hand find that analysts who specialize by industry give out more accurate forecasts than those who do not specialize (Healy and Palepu 2001), which implies that more focused collection of information from public and private sources may contribute to the understanding of the disclosure.

3.2.3. Hypotheses

In line with the results gained by Greenstein and Sami (1994), Welker (1995) and Healy et al. (1999) all reporting declining bid-ask spreads resulting from different sort of increased disclosure

practices, I write a hypothesis to test the relation of bid-ask spreads and disclosure when the disclosure level has a new kind of proxy as measured by the amount of stock exchange releases describing the level of continuous and voluntary disclosure. As I reckon continuous and voluntary disclosure to be tools to increase public disclosure, I expect their level to have a negative impact on bid-ask spreads. Thus, a hypothesis will be written in the following form:

H1: The levels of continuous and voluntary disclosure and bid-ask spreads are negatively related

As a result of encouraging evidence on the positive relation between disclosure levels and share liquidity, as shown, among others, by Diamond and Verrecchia in 1991 and Healy et al. in 1999, in the context of continuous and voluntary disclosure, I write the second hypothesis can be written as follows:

H2: The levels of continuous and voluntary disclosure and share liquidity are positively related

Based on this strong evidence of disclosures' effect on analyst forecasts by Lang and Lundholm (1995) and Kimborough (2005) and information, I can expect to find supporting evidence for the negative relation of the continuous disclosure level and the dispersion of analyst forecasts. Some research has used this measure to indicate the estimated cost of equity capital (Botosan, 2006), but in line with Lang and Lundholm (1996), I use it as a measure of information asymmetry. A third hypothesis can thus be written in the following form:

H3: The levels of continuous and voluntary disclosure and dispersion of analyst forecasts are negatively related

Resulting from this study's emphasis on the importance of disclosure in times of crisis, to which I could find a great amount of support in existing literature, I put forward a hypothesis whether companies have imbedded this importance in their disclosure policies in the financial crisis of 2008:

H4: The importance of the levels of continuous and voluntary disclosure is higher in crises

I seek evidence for an assumption that companies, which have had a high level of continuous or voluntary disclosure in 2008, in other words applied an open disclosure culture, have succeeded

better in lowering the information asymmetries as indicated by bid-ask spreads, share liquidity and dispersion of analyst forecasts than companies with low continuous and voluntary disclosure.

To all four hypotheses, I seek evidence by conducting an empirical quantitative research using Ordinary Least Square and Instrumental Variable regression analyses. These methods as well as the underlying assumptions and data are described in the next chapter before presenting and analyzing the results of the study.

4. Empirical Research

4.1. Methodology and data

In this chapter, I will present the methods of multivariate regression analyses to be used in the empirical research run in STATA *for MS Windows*. Moreover, I justify each variable chosen to the regression models, write down regression models, and describe the data retrieval and sample selection processes.

4.1.1. OLS and IV regression analyses

Ordinary Least Square regression (OLS)

The first research objective is to look for explanatory variables that cause a change in the levels of continuous disclosure and voluntary disclosure as a specific element of continuous disclosure. I reckon that it is pivotal to understand what defines certain levels of disclosure before examining their effect on information asymmetry. An OLS regression analysis is an appropriate method to look for causal effects between dependent and independent variables to be able to examine the statistical significance of the impact of each independent variable given the others and to find the best fit for a model. Thus, the assumption is that the relationship between the dependent variable and the explanatory variables is linear. This assumption can be justified in many ways, first being the fact that various relationships have been proved linear, also in previous research related to disclosure. A multivariate instead of a univariate regression analysis enables incorporating several explanatory variables to the model, as it can be assumed that continuous disclosure has more than one single cause. (Lewis-Beck, 1980, 13 and 47) The firm- and market variables chosen to explain disclosure levels are based on previous theoretical and empirical research yet are now applied to explain continuous and voluntary, instead of regular, disclosure levels.

Prior to the OLS regressions where two measures of continuous disclosure are explained, a Pearson correlation matrix is produced to evaluate linear correlations between all variables as well as to depict possible problems of *multicollinearity*. The variables and their measurement are justified in the sub-section 4.1.2., whereas the data used in the regression analyses is described in 4.1.3. In

addition to the research objective of explaining the levels of continuous and voluntary disclosure, the OLS regression analysis will be exploited in finding the best instrument variables for the second stage regression analyses presented under "Instrumental Variable regression (IV)".

Problem of endogeneity

To regress the measures of information asymmetry on continuous or voluntary disclosure, I face a potential problem of the latter being an endogenous variable. *Endogeneity* refers to, among others, a problem where a variable is correlated with the error terms of the dependent variable. In short, as X causes Y, also Y might cause X. Thus, an endogenous variable in a simple OLS regression model might distort the results, as the assumption in OLS regression is that variables do not correlate with the error term. Using OLS to estimate disclosure effects on information asymmetry would thus decrease the reliability of the results and make interpretations difficult. This problem can be by-passed using an estimation of the endogenous variable created by exogenous instrument values. Once these instrument variables are exogenous, the estimation of the originally endogenous variable is also exogenous.

The instrument values Z chosen to calculate an exogenous estimation for the endogenous continuous disclosure must be exogenous themselves. That is, they should meet the following two conditions:

1. They explain the endogenous independent variable with statistical significance: $COV(Z, X) \neq 0$
2. They do not correlate with the error term: $COV(Z, \varepsilon) = 0$

The first condition is tested by the OLS regressions described earlier with the objective of explaining continuous and voluntary disclosure by firm- and market variables, that is, the potential instrumental variables. Variables gaining statistical significance, as shown by t –values, can be chosen as instrumental variables for continuous disclosure in the regressions explaining bid-ask spreads, share liquidity and dispersion of analyst forecasts. The second condition cannot be tested as there is no unbiased estimator for ε available. I must thus assume that is the case in order for the model to be legitimate.

Instrumental Variable regression (IV)

In order to explain the relations between continuous disclosure and information asymmetry, under a suspicion of continuous disclosure being an endogenous variable, I use an Instrumental Variable (IV) regression analysis called a generalized method of moments (Stata command GMM) to conduct the empirical research. This is a two-stage least square method (2SLS), a statistical technique, which enables both studying relations between independent and dependent variables despite problematic endogenous variables and corrects the variables for robustness. For this purpose, a simple ordinary least square (OLS) regression is incapable. Thus, an IV regression solves the problem of endogenous variables and can be seen as an extension to OLS, that is, to linear regression analysis. (Statistics Solutions, Inc., 10.11.2009) All software for statistical analysis does not conduct IV regression analyses automatically. However, STATA *for MS Windows* is able to treat the IV regression model set as one despite the two stages of the analysis. Thus, STATA is chosen for this study as it will simultaneously replace the endogenous variables with instrumented exogenous estimations and conduct the two stages of the regressions, as explained below (modified from Statistics Solutions Inc., 10.11.2009):

1. In the first stage, a new variable is created for the endogenous variable using instruments

2. In the second stage, the model-estimated values from stage one are used in place of the actual values of the problematic predictor to compute an OLS model for the response of interest Y

4.1.2. Variables and models

Six 2SLS regression models need to be created to explain all three measures of information asymmetry, bid-ask spreads, share liquidity and the dispersion of analyst forecasts, both using continuous and voluntary disclosure as the main explanatory variable. For all three models, a step-by-step approach is used in practice either by adding or deleting variables from the model, or by replacing them with more accurate measures. For instance, Lim et al. (2007) conduct stepwise regressions of this sort "by deleting one by one each of the highly correlated independent variables". Also in this way, *robustness* of the final results will be better ensured.

In some previous studies, weights have been defined for different explanatory variables. The weights have, for instance, been defined based on what analysts consider important in annual reports as did Singhvi and Desai (1971) (Buzby 1975). Also Buzby (1975) himself used this method by sending out questionnaires to analysts. A problem turned out to be a low rate of replies which might disturb getting reliable weights for the variables. Furthermore, analysts are secondary users in the financial markets and in this way do not represent the opinion of the final users, the investors. Weights should be gathered among those who actually cause the instantaneous changes in share behavior. However, getting reliable and considerable results from investors is also difficult. As continuous disclosure level is a new area of disclosure research, weights cannot be created based on previous literature. I will thus not give weights to the different firm- and market- specific variables ,but instead, previous research is examined carefully to include the most promising explanatory variables in a sufficiently exhaustive manner.

Explanatory variables in the OLS regressions

Firm size is widely known to correlate positively with disclosure levels (E.g. Raffournier 1995). Botosan and Plumlee (2002), among others, get evidence to support this "size effect". In their research, firm size has a strong negative relation with the cost of equity capital. In other words, bigger companies have lower costs of equity capital. Lang and Lundholm (1996) got similar results when examining the relations between firms and analyst following. Diamond and Verrecchia (1991) also have gotten results supporting large companies benefitting the most from reduced information asymmetry, especially if the cost of disclosure is proportional to the firm size, or less. Depoers (2000) reckons that large firms attract highly skilled individuals and use sophisticated management reporting systems that positively enhances corporate disclosure.

Buzby (1975) sums up reasons for the positive relation between disclosure level and the firm size:

1. High price of providing information
2. Complexity of larger firms' business which requires more information for internal use
3. More efficient exploitation of the securities markets by large firms for external financing (Singhvi and Desai 1971)
4. Incentive of smaller firms to keep competitive advantage compared to the large firms in the same industry by disclosing less

5. More careful observation of large firms by the government agencies where better disclosure would prevent any negative attention

Based on such prevailing consensus of the size effect on disclosure levels, I claim that firm size explains also continuous and voluntary disclosure levels. Firm size can be measured in many ways. Buzby (1975) used value of assets but suggests that net sales might be even a better measure. I will thus test both sales and assets as has been used by Raffournier (1995), and also the market capitalization (Schadewitz, 1994) at the end of the year as three alternative measures for firm size. Natural logarithms are calculated for each of the three measures to smooth out extremes and make company sizes more comparable.

Already Buzby (1975) and later also Depoers (2000) point out the *complexity of business* to possibly lead to higher voluntary disclosure. Depoers explains that the number of subsidiaries or activities tend to grow when a firm grows and hence the amount of information increases, as well. On the same way, Mars (22.9.2009) suggests that the complexity of operations may result in an increased need to explain the business to investors. Resulting from both empirical evidence and an expert opinion, I assume the complexity of business to increase continuous and voluntary disclosure levels. In order to test the relation between the disclosure levels and the complexity of business, a measure is created by calculating the number of primary segments of the respective companies. According to IFRS 8, companies need to disclose key financial data for their key segments based on the way that the company management views the business. In practice, the primary segments are identified either according to business units or geographic areas. Thus, if a company's business is complex, it has several segments that account for minimum of 1/10 of the business. On the other hand, if the company claims to manage its operations as a whole, it is seen to have only one segment. Segments are used in this research as I reckon they are easy to attain yet comparable and descriptive. However, I acknowledge that other feasible options of measuring complexity exist such as the extent of mergers and acquisitions (M&A) activities. Suijs (2007) for instance discusses that a merger or acquisition has considerable effect on investors' future expectations and thus a firm with high M&A activity has incentives to voluntarily disclose more information to ensure its investors.

Through "a signaling effect", *growth* and *profitability* can be expected to increase the level of continuous disclosure. Miller (2002) argues that companies who are performing well want to let investor know their potential. Raffournier (1995) argues that the positive relation between

profitability and voluntary disclosure is "obvious" but admits that previous empirical research actually reports this relation to disappear when other variables are added to the model, which I find a curious phenomenon. Growth, on the other hand, was reported to have a positive relation with disclosure in Kanto and Schadewitz (1994). In line with previous argumentation and evidence, I reckon that the signaling effect of growth and profitability could explain higher levels of continuous and voluntary disclosure. Profitability is measured as both ROA (net income/total assets) and ROE (net income/common equity) to test for robustness. Growth, on the other hand, is measured as growth of sales between 2006-2007 and 2007-2008.

The amount of *private debt* is assumed to influence a company's disclosure policy in a decreasing fashion by the simple argument that the capital structure dictates the disclosure level to shareholders as companies with a lot of debt can disclose directly to banks and other financial institutions and this way have less incentives to disclose costly public information. Gelb and Strawser (2004) indeed argue that a low level of public disclosure and higher level of private debt are related and get indirect evidence in form of positive relation between the proportion of public debt and disclosure levels. Kanto and Schadewitz (1994) get support to the hypothesis that firms with more equity financing disclose more than those financed more by debt.

To offer a contradicting view, Mazumdar and Sengupta (2005) detect a negative relation between disclosure levels and the cost of private debt. To put in other words, the amount of private debt could positively correlate with disclosure levels. The researchers claim that financial institutions have incentives to narrow the loan spread if the borrower discloses more voluntarily to public for two reasons. First, by getting more public information, the lender might save in the costs of gaining costly private information from other sources. Secondly, more the borrower discloses voluntarily, less there is uncertainty of whether the borrower is withholding relevant information. Thus, in line with the information asymmetry theory, the lender would save in agency costs if the borrower discloses more voluntarily and would therefore be favorable for lowering the cost of offered private debt.

Despite the powerful argumentation, Mazumdar and Sengupta's admit that it is not as straightforward as it seems as the lowering effect on cost of private debt depends on the medium of disclosure. The researchers reckon that additional voluntary disclosure, augmenting the overall disclosure quality in mandatory disclosure, influence the loan spreads more than via other media. I thus draw the conclusion that Mazumdar and Sengupta's argument is not applicable as such in this

paper where the level of continuous and voluntary disclosure is measured by the number of stock exchange releases, and not as a level of disclosure in annual reports, for instance. Therefore, I assume that the amount of private debt correlates negatively with the level of continuous and voluntary disclosure. This variable is calculated as a ratio between the amount of debt from financial institutions and the total assets. Also Mazumdar and Sengupta (2005) refer to bank loans as private debt contracts.

Two characteristics of ownership may have an impact on the disclosure levels, namely *foreign ownership* and *concentration of ownership*. As the Finnish securities markets were gradually opened to Foreign Direct Investments (FDI) as of the 1980's, the experienced international institutional investors put strong pressure on Finnish public companies to disclose interim reports which was not the custom before. (Kariola et al. 2004, 26-27). Mars et al. (2000, 19) describe the increase of foreign ownership to have been a catalyst for investments in IR. Raffournier (1995) points out that firms with multiple stock exchange listings have been proven to disclose more for instance by Cooke (1989 and 1992). The listing status has been thus used as a variable indicating the level of international operations. However, this measure is not applicable to the sample used in this research as only one company listed in Nasdaq OMX Helsinki, namely Nokia Corporation, is also listed elsewhere. Based on these facts, I assume that the percentage of foreign shareholders affects the disclosure level in an increasing way. Mars (22.9.2009) also believes this is the case for the reason that when the investors are spread abroad, the company must disclose more to keep all equally informed in line with the fair disclosure requirement.

On one hand, if owners of a company are not equal in terms of power as shown by the size of their stake in the company, the more uncertainty may grow among the retail investors that the largest owners are privileged with private information. (Mars, 22.9.2009) Information asymmetry can thus be seen to grow along the concentration of ownership and to reduce the asymmetry, a company should disclose more. However, in line with Mars' (22.9.2009) previous argument of the width of the investor base - less information is needed to keep all equally informed - a concentrated ownership logically results in lower level of disclosure to suffice. Therefore, I assume the direction of the effect on continuous disclosure to be negative and will test this assumption in the first part of the empirical study. The concentration of ownership is calculated as the sum of percentages of shares owned by the ten largest investors.

The number of *years in the stock exchange* is added as an explanatory variable to the regression. The aim is to take this idea of differences in companies' listing experiences and test whether companies that have been listed for a longer time disclose more than more recently listed. Kariola et al. (2004, 73-89) state that the biggest difference in a company's environment when it gets listed happens in disclosure duties and only few companies have professional IR people helping the executives in this task before listing. Thus, more experienced listed companies might be able to produce more information to the market than a firm that is still climbing the learning curve and trying to fulfill all mandatory disclosure requirements, as the stock markets cannot be simulated beforehand (Kariola et al., 2004, 21). Furthermore, data availability is much better for listed companies and in general the entire IR function is seen to be part of listed companies' activities. In spite of lack of previous research evidence on the relation of experience from securities markets and the levels of continuous and voluntary disclosure, I suggest this relation to be positive.

Kariola et al. (2004, 91) have sketched a stairway with four steps to describe a listed company's IR experience:

1. learning
2. creating own ways of action
3. rationalization
4. search for efficiency

Especially in the second phase, IR activities seem to increase significantly, whereas in phase three, the growth of activities stops and finally starts to decline in phase four. The authors point out there is not a common pattern or schedule for moving up these ladders because the experience gained depends on a company's own strategic choices as well as on the dynamics and interaction of the securities markets. The stock market experience is thus challenging to measure. I set it as a dummy variable. Companies with less than 10 years of listing experience get 0, those with experience between 10 and 19 years get 1 and finally, companies that have been listed over 19 years get 2. According to Botosan and Plumlee (2002), this sort of rank regressions are appropriate when the actual values of the measures are uninformative themselves, when outliers are a significant concern or when the distribution of the variables unknown or not normal. Here, I reckon that the ranking between experienced and inexperienced listed companies is more relevant than the actual number of years in the stock exchange of each individual company in the sample.

IR function dummy is added to test whether the fact that a company appreciates IR function to the extent that is has an IR responsible as a member of the executive board (also known as the management team) affects increasingly to continuous disclosure. Firms with an IR person among the top executives potentially have better access to all information. This assumption is based on Mars' argument of IR having a crucial cross-functional role as "a police and a coach" of disclosure inside a company (22.9.2009). I am convinced that by having access to top executives as well as to the investment community, IR responsible has the best potential to provide the public with more voluntary disclosure. Thus, if a company has an IR person in the company executive board, it gets value 1, if not, it gets 0.

A research conducted by the Financial Analysts' Federation showed that disclosure levels may vary from *industry* to another. First of all, information of many sorts may be more industry-related than just company-related and thus all companies in the same industry may have to, or choose to, disclose the same piece of information. I could imagine this sort of information to be for instance material chances in prices of materials specific for an industry. Mazumdar and Sengupta (2005) also state that the extent of disclosure vary by industry. This might derive from a so called "institutionalization effect" (Dye and Sridhar 1995) of disclosure where one company discloses something voluntarily and others in the same industry follow the example. If this sort of "fad and fashion" effect exists, differences in disclosure levels by industry could be detected.

Dye and Sridhar (1995) talk about "herding" effect and prove that when the number of firms in an industry disclosing a piece of information increases, *ceteris paribus*, the probability that the rest of the firms in the industry, having received the same information, will disclose it in later periods increases, as well. The authors suggest that if all firms in the industry have received the information but do not disclose, investors believe that there is no new information. However, evidence shows that the more there are firms in the industry with the information, the probability that one of them discloses increases. This would put the others in a bad situation as the investors would learn that there was new information but it was not disclosed. The authors suggest though that both equilibriums exist; the one where all disclose or none disclose even if firms have private information. I reckon that both behaviors can be seen as herding effects and I anticipate that differences between industries will detected in this study. To test the potential institutionalization effect, an industry dummy is added to the regression. The dummies are put in six categories based on the general industry classification of Thomson Financials.

Dependent variables in the OLS regressions = Explanatory variables in the IV regressions

The *level of continuous disclosure* is at the core of this study. Continuous disclosure is used as the explanatory variable in reducing information asymmetry instead of annual or interim reports to differ from earlier research on disclosure. In this study, continuous disclosure in considered as the combination of continuous mandatory and voluntary disclosure. The disclosure level is measured as the number of stock exchange releases disclosed in Finnish in Nasdaq OMX Helsinki during 2007-2008 by each company. Thus, stock exchange releases are all in all considered to be continuous rather than regular disclosure. The decision to use stock exchange releases as a proxy for IR activities is simple: to enable comparability across time and between companies. Basically, stock exchange releases seem like the only reasonable way to put all companies on the same line (Mars, 22.9.2009).

Kariola et al. (2004, 94-95) argue that a company's releases get more attention when they are disclosed via the stock exchange. Even if the stock exchange should not be used as a marketing channel, according to the authors this has often been the case, especially in hypes. Poikolainen (1996, 44) sees that disclosure via the stock exchange is faster than through conventional media. Stock exchange information is "screened, analyzed and reacted upon very quickly". Roine remembers news in *Kauppalehti* in 2000 to tell that listed companies have disclosed too marketing-style stock exchange releases with little relevancy to share pricing. The Helsinki Stock Exchange held discussions with companies and the disclosure policies were improved accordingly. (2001, 60) Despite these events in the practice, it is interesting to test whether the companies with high continuous, and especially voluntary, disclosure level succeed in lowering the information asymmetries prevailing in the securities markets. Furthermore, if this is the case, there are also other means of increasing continuous disclosure levels than stock exchange releases.

Two different measures are created for the level of continuous disclosure. The first measure is coarser as all stock exchange releases despite the content are included, only different language versions are deleted to avoid duplication. Thus, only stock exchange releases with a language code FI is included. For instance, a stock exchange release with language indication "EN, FI, SE" is included, whereas "DE, EN, SE" is not. The second measure is much finer and focuses on the part of continuous disclosure that varies more across companies and is of voluntary kind. Thus, all clearly mandatory disclosure that refers to regular disclosure such as annual and interim reports, or preliminary earnings announcements, is deleted. Also continuous mandatory disclosure, which is

assumed not to be material and "boring" as such (Mars, 22.9.2009), is removed from the sample. For instance, the announcements of a company acquiring its own stock is a repetitive continuous disclosure that hardly affects share behavior as the Companies Act restricts the firm from acquiring more than five percent of all shares outstanding and the shares must be purchased in a manner that does not cause unusual market movements. (Kariola et al., 2004, 71) Also flagging announcements, invitations or decisions of Annual General Meetings (AGM) are left outside the sample.

An exemplary list of the types of stock exchange releases selected to and deleted from the voluntary disclosure level proxy is presented in Appendix 1. Thus, the remaining set of stock exchange releases represent the combination of mandatory continuous releases and voluntary releases that cannot be, without too high subjectivity, separated from each other. The reason for inclusion can also be that based on stock exchange release title, it is impossible to evaluate whether the information disclosed is material or not, as is the case with acquisitions, for instance. The division between these two categories is thus a fine line and depends on materiality of the information. For instance, disclosure on a divestment can be categorized as on-going mandatory or voluntary disclosure depending on how material this activity has been. (Jolly, 19.10.2009)

The level of continuous disclosure is expected to reduce the information asymmetry based on the theories and previous empirical research on disclosure effects presented earlier. More accurately, the level of continuous disclosure in assumed to decrease bid-ask spreads, increase share liquidity and result in better analyst forecast consensus. Kim and Verrecchia (1994) show that earnings announcements may actually result in opposite reactions because some receivers of new public information are able to make superior judgments based on the disclosure than others which results in information asymmetry of some sort. Therefore, the authors suggest that information asymmetry in some cases may be greater in times of announcements than outside these periods. Schadewitz (1994) also notices that individual announcements achieve to narrow down bid-ask spreads (information asymmetry) only temporarily. I might suggest that continuous disclosure weakens the changes in information asymmetry compared with individual announcements. By disclosing sufficiently and on an on-going basis, a company might be able to keep the level of information asymmetry lower at all times and not only occasionally.

Other control variables in the IV regressions

It is interesting to study whether the fact that stock exchange releases are published evenly throughout the year, rather than in bulks, affects the information asymmetry. A Herfindahl-Hirschmann- index (HHI) will be applied to compliment the levels of continuous and voluntary disclosure and to evaluate the *concentration of disclosure*. Originally, HHI was created to study the concentration of the markets but is applicable to study concentration of other kind, as well. The concentration will be studied on a monthly level. The index is computed as a sum of squared monthly portions of stock exchange releases of yearly disclosure. The higher the HHI value, the more concentrated the disclosure is. The mathematical formula is put in the following form:

$$HHI = \sum_{i=1}^{n} (\Pi_i)^2$$,

where

Π_i = the proportion of stock exchange releases published in month i,

n = number of months (12)

Number of analysts following the firm may have an effect on information asymmetry. Lang and Lundholm (1996) talk about "desirable public attention" via analysts. For example, some institutional investors only invest in firms that are followed by analysts and so firms may increase the informativeness of their disclosure in order to attract more analyst following. The authors evidence that companies that have more informative disclosure policies have more analysts following the firm. According to Diamond and Verrecchia (1991), large firms are dependent on institutional investors as they make large trades and thus ensure sufficient share liquidity. Share liquidity on the other hand is desirable because it may increase the share price.

Thus, disclosure is expected to get higher in those companies where share liquidity is crucial and the analyst following is needed to attract a broad market. As the level of continuous disclosure most likely explains the amount of analysts following the firm and not vice versa, this measure is not used as an explanatory variable in the first stage regression but rather in the second stage to explain the level of information asymmetry. The reasoning goes as follows. The more there are analyst forecasts, more likely the analyst consensus is to be accurate. The more there are analysts, the more there are large institutional investors and thus more liquid the share is. Also, the more accurate the

analyst forecasts are, the smaller the bid-ask spreads can be expected to be, too. (Ikäheimo, 9.11.2009)

Dependent variables in the IV regressions

Bid-ask spread can be used as a measure indicating the level of information asymmetry in the securities market. Healy, Hutton, and Palepu (1999) find that firms which increase their disclosure level experience increases in stock performance, institutional ownership, analyst following, and stock liquidity. For example, Amihud and Mendelson (1986) suggest that the cost of equity capital is greater for securities with wider bid-ask spreads because investors require a higher return to compensate for added transaction costs. Disclosing information allows firms to reduce the adverse selection component of the bid-ask spread, thereby reducing their cost of equity capital. Kim and Verrecchia (1994) demonstrate that higher information asymmetry increases bid-ask spreads. Schadewitz argues the same (1994) on the basis of Glosten and Milgroms study in 1985. The two parties causing the spread are market makers and traders. As Schadewitz views it, the dealer should widen the bid-ask spread when suspecting that the information advantage possessed by informed traders has increased (Venkatesh and Chiang, 1986).

Share liquidity is another measure for information asymmetry. Diamond and Verrecchia (1991) prove that "[p]olicies that reduce information asymmetry of information will increase the liquidity of the market for a firm's securities". On one hand, liquidity indicates the level of information asymmetry but additionally it is desirable because it attracts larger traders such as institutional investors which make large trades and can lower the cost of equity. Kim and Verrecchia (1994) see the connection between information asymmetry, increasing bid-ask spreads and decreasing liquidity. In other words, low disclosure level reduces liquidity resulting from information asymmetry. Schadewitz explains (1994) that trading activity resembles the behavior of bid-ask spreads as high disclosure normally causes more trading activity than low disclosure. This indicates that "trading is largely driven by information processing around the time of an announcement […]" and so I could suggest that continuous disclosure may enhance liquidity by providing new information for processing on an on-going fashion. In practice, Kariola et al. (2004, 21) state that trading on shares often picks up when a company discloses information on its results or other activities.

Dispersion of analyst forecasts is yet another measure for information asymmetry. It is expected to enhance along with disclosure level as stated in the third hypothesis. As presented in the theoretical part of the paper, Lang and Lundholm (1996) gain significant evidence that the dispersion among individual analyst forecasts is smaller if a firm's disclosure policy is informative. The authors state that in this way companies can reduce information asymmetries. The consensus measure is calculated as the standard deviation of the analysts' monthly recommendations. To boot, Mars states having used this measure in practice to evaluate whether the markets have sufficient amount of information at a certain time (22.9.2009).

Tables 1-4 summarize the independent and dependent variables used in the regression analyses. The name, description, measure and data source are provided for each of the variables. Furthermore, for all variables that are used as explanatory variables in the regression models, also the effect I expect them to have on the dependent variables is marked on the right-hand column.

Table 1: Summary of independent variables in the Ordinary Least Square regression analyses

Variable name	Description	Measure	Data source	Anticipated effect on disclosure
SIZE_LNSALES	Firm size, option 1	Natural logarithm of total sales at year end	Thomson Financials	+
SIZE_LNASSET	Firm size, option 2	Natural logarithm of total assets at year end	Thomson Financials	+
SIZE_LNMARKETCAP	Firm size, option 3	Natural logarithm of market capitalisation at year end	Thomson Financials	+
COMPLEX	Complexity of business operations	Number of primary segments	Financial Statements	+
GROWTH	Growth rate	[sales in year n - sales in year(n-1)]/sales(n-1)	Thomson Financials	+
PROFIT_ROA	Profitability, option 1	Net income / total assets	Thomson Financials	+
PROFIT_ROE	Profitability, option 2	Net income / total equity	Thomson Financials	+
DEBT	Amount of private debt	Debt from financial institutions/total assets	Financial Statements	-
FOREIGN	Foreign ownership	Percentage of shares owned by foreign investors at year end	Financial Statements	+
LARGE_OWN	Concentration of ownership	Percentage of shares owned by 10 largest investors at year end	Financial Statements	-
IR	Importance of IR in the company	Dummy: 0 if no IR responsable in the management team, 1 if IR responsable in the management team	Financial Statements	+
EXPERIENCE	Experience of securities markets	Dummy: 0 for <10 years, 1 for 10-19 years and 2 for >19 years in the stock exchange	Nasdaq OMX Helsinki	+
INDUSTRY	Industry	Dummy based on General industry classification: 01 Industrial; 02 Utility; 03 Transportation; 04 Banks/Savings and Loan; 05 Insurance; 06 Other Financial	Thomson Financials	

Table 2: Summary of dependent variables in the Ordinary Least Square regression analyses

Variable name	Description	Measure	Data source	Anticipated effect on BIDASK	Anticipated effect on LIQUIDITY	Anticipated effect on DISPERSION
CONTDISC	Proxy for continuous disclosure level	Sum of all stock exchange releases disclosed per month in Finnish in Nasdaq OMX Helsinki	hand-collected from Nasdaq OMX Helsinki corporate website	-	+	-
VOLUNTARY	Proxy for voluntary disclosure level	Sum of voluntary stock exchange releases disclosed per month in Finnish in Nasdaq OMX Helsinki	Hand-collected from all continuous stock exchange releases	-	+	-

Table 3: Summary of independent variables in the Instrumental Variable regression analyses

Variable name	Description	Measure	Data source	Anticipated effect on BIDASK	Anticipated effect on LIQUIDITY	Anticipated effect on DISPERSION
CONTDISC	Proxy for continuous disclosure level	Sum of all stock exchange releases disclosed per month in Finnish in Nasdaq OMX Helsinki	hand-collected from Nasdaq OMX Helsinki corporate website	-	+	-
VOLUNTARY	Proxy for voluntary disclosure level	Sum of voluntary stock exchange releases disclosed per month in Finnish in Nasdaq OMX Helsinki	Hand-collected from all continuous stock exchange releases	-	+	-
IA_CONTDISC	Comparison on the regression coefficients of the two sample years when continuous disclosure level in the model	Interaction term: year dummy*CONTDISC				
IA_VOLUNTARY	Comparison on the regression coefficients of the two sample years when voluntary disclosure level in the model	Interaction term: year dummy*VOLUNTARY				
HH_CONTDISC	Concentration of continuous disclosure within a year	Herfindahl-Hirschmann-index (HHI): sum of the 12 months of (monthly continuous disclosure/total annual continuous disclosure)^2 $HHI = \sum_{i=1}^{n}(\Pi_i)^2$		+	-	+
HH_VOLUNTARY	Concentration of voluntary disclosure within a year	Herfindahl-Hirschmann-index (HHI): sum of the 12 months of (monthly voluntary disclosure/total annual voluntary disclosure)^2 $HHI = \sum_{i=1}^{n}(\Pi_i)^2$		+	-	+
ANALYST	Analyst following	Number of recommendations published by analysts per month	I/B/E/S History	-	+	-
YEAR	Year dummy 2008	Dummy: 0 for year 2007, 1 for year 2008				

Table 4: Summary of dependent variables in the Instrumental Variable regression analyses

Variable name	Description	Measure	Data source
BIDASK	Bid-ask spread as an indicator of information asymmetry	Monthly medians of daily bid-ask spreads (lowest approved selling price - highest wanted purchase price)	calculated from Datastream's daily data
LIQUIDITY	Share liquidity as an indicator of information asymmetry	Monthly medians of daily trading volumes in shares/number of outstanding shares on the same day	calculated from Datastream's daily data
DISPERSION	Dispersion of analyst forecasts as an indicator of information asymmetry	Standard deviation of analysts' monthly recommendations	directly from I/B/E/S History

After the identification and introduction of the different independent and dependent variables, the regression models can be written in the following way:

<u>OLS regression models</u>

CONTINUOUS = α + β1* SIZE_LNSALES/SIZE_LNASSET/SIZE_LNMARKETCAP+ β2*COMPLEX + β3*GROWTH + β4*PROFIT_ROA/PROFIT_ROE + β5*DEBT + β6*FOREIGN + β7*LARGE_OWN + β8*IR + β9*EXPERIENCE + β10*INDUSTRY + ε

VOLUNTARY = α + β1* SIZE_LNSALES/SIZE_LNASSET/SIZE_LNMARKETCAP+ β2*COMPLEX + β3*GROWTH + β4*PROFIT_ROA/PROFIT_ROE + β5*DEBT + β6*FOREIGN + β7*LARGE_OWN + β8*IR + β9*EXPERIENCE + β10*INDUSTRY + ε

<u>IV regression models</u>

BID-ASK = α + β1*CONTDISC + β2*IA_CONTDISC + β3*HH_CONTDISC + β4*ANALYST + β5*YEAR + ε

BID-ASK=α + β1*VOLUNTARY + β2*IA_VOLUNTARY + β3*HH_VOLUNTARY + β4*ANALYST + β5*YEAR + ε

LIQUIDITY = α + β1*CONTDISC + β2*IA_CONTDISC + β3*HH_CONTDISC + β4*ANALYST + β5*YEAR + ε

LIQUIDITY = α + β1*VOLUNTARY + β2*IA_VOLUNTARY + β3*HH_VOLUNTARY + β4*ANALYST + β5*YEAR + ε

DISPERSION = α + β1*CONTDISC + β2*IA_CONTDISC + β3*HH_CONTDISC + β4*ANALYST + β5*YEAR + ε

DISPERSION = α + β1*VOLUNTARY + β2*IA_VOLUNTARY + β3*HH_VOLUNTARY + β4*ANALYST + β5*YEAR + ε

4.1.3. Data description

The disclosure level will be measured by the number of stock exchange releases disclosed by each firm in Nasdaq OMX Helsinki during the two-year research period of 2007 and 2008. I have at least three justifications for the decision to use this particular sample. First, years 2007 and 2008 are very different in terms of economic situation which will make the comparison over time empirically interesting. Second, years 2007 and 2008 are the most recent years with available data for the entire period. Such a fresh data will in a way ensure the uniqueness of this research. Third, Leuz and Verrecchia (2000) discuss the reasons behind mixed evidence in previous studies on disclosure effects on information asymmetry and come to the conclusion that so many of them have used data

from listed companies in the United States where "the disclosure environment is already rich". For this reason, the researchers chose only German companies for their sample where disclosure levels were anticipated to be more heterogeneous. In the same way, I justify the Finnish sample as the Finnish securities market is still relatively young in terms of disclosing information, especially in a continuous and voluntary manner.

I collect data for the empirical study from several sources. In detail, data retrieval is conducted with the help of Thomson Financials, I/B/E/S History and Datastream as well as the sample company financial statements and annual reports when not available in the aforementioned databases. Furthermore, supplementary data is gained from the sample company websites, Nasdaq OMX Helsinki (Bergström, 11.11.2009) and an interview and an e-mail questionnaire to two IR professionals (Mars 22.9.2009, Jolly 19.10.2009). Bid-ask spreads and share liquidity will be first calculated for every day when the Nasdaq OMX Helsinki stock exchange was active in 2007-2008 and then medians are calculated on a monthly basis. The dispersion of analyst forecast on the other hand is also a monthly measure but a standard deviation of analyst recommendations for the month in question.

At the starting point, the sample consists of all companies listed in Nasdaq OMX Helsinki in 2007-2008 as stated by Thomson Financials database. Hence, the amount of companies is 124. However, two of the companies, namely SRV Group Oyj and Panostaja Oyj, were not listed for the entire time (1.1.2007-31.12.2008) and will thus be eliminated from the sample. Furthermore, five companies have a differing financial calendar from the rest of the companies, and so to ensure comparability of the sample, these companies (Efore Oyj, Takoma Oyj, Turkistuottajat Oyj, Vaahto Group PLC Oyj and Viking Line Abp) are removed from the sample. After the abovementioned changes, 117 companies remain in the sample, comprising 234 company years.

In *Tables 5-7*, fundamental information is provided on all variables to be used in the regression analyses. This exercise is conducted to get a general idea of the extent of the sample (number of observations) as well as to make sure that the standard deviations are not too high to disable reliable comparison. For instance, natural logarithms were calculated for each measure of firm size due to this problem. Despite the natural logarithms or exclusion of first and last percentage of values (1-99% included in the samples), certain variables have a somewhat significant range such as CONTDISC, ANALYST or BIDASK. However, I reckon this to characterize the nature of the variables and companies in Nasdaq OMX Helsinki and not to be of distortive kind.

Table 5: Characteristics of independent variables in the OLS regression analyses

Variable	Obs	Mean	Std. Dev.	Min	Max
SIZE_LNSALES	2740	19.298	1.982	14.553	23.433
SIZE_LNASSET	2752	19.360	1.952	15.177	24.200
SIZE_LNMARKETCAP	2752	18.951	1.841	14.951	24.024
COMPLEX	2752	2.605	1.372	1	7
GROWTH	2740	0.153	0.304	-0.578	1.546
PROFIT_ROA	2752	0.042	0.096	-0.387	0.259
PROFIT_ROE	2752	0.068	0.304	-2.418	0.492
DEBT	2752	0.163	0.147	0	0.555
FOREIGN	2752	0.057	0.110	0	0.652
LARGE_OWN	2752	0.515	0.215	0.028	0.938
IR	2808	0.077	0.267	0	1
EXPERIENCE	2808	1.209	0.694	0	2

Table 6: Characteristics of dependent variables in the OLS regression analyses and independent variables in the IV GMM regression analyses

Variable	Obs	Mean	Std. Dev.	Min	Max
CONTDISC	2752	3.168	3.543	0	21
HH_CONTDISC	2808	0.144	0.036	0.094	0.266
IA_CONTDISC	2752	1.733	3.327	0	21
VOLUNTARY	2752	0.672	0.942	0	4
HH_VOLUNTARY	2700	0.321	0.258	0.034	1
IA_VOLUNTARY	2752	0.373	0.776	0	4
ANALYST	2752	6.972	6.576	0	29
YEAR	2808	0.500	0.500	0	1

Table 7: Characteristics of dependent variables in the IV GMM regression analyses

Variable	Obs	Mean	Std. Dev.	Min	Max
BIDASK	2752	1.862	2.600	0.059	20
LIQUIDITY	2752	0.186	0.252	0.001	1.261
DISPERSION	2041	0.892	0.343	0	1.530

The maximum number of observations for a variable is 2808 and observations vary among the variables from 2041 to 2080 due to two main reasons. First, there is a lack of observations such as in the case of ANALYST or DISPERSION as not every sample firm is followed by analysts at all or dispersion of analyst forecasts could not be calculated unless there is a minimum of two recommendations given for a specific firm each month. Second, the first and last percentage of each observation was deleted from the sample as instructed to be done when using a two-stage least square regression method. Depending on the variable, these two percentages are the same or

different observations than as explained in the first reason. Furthermore, it is important to reckon that even if the total number of observations is 2808, these observations are put in monthly clusters when running the regression analyses such as medians in the case of BIDASK or LIQUIDITY, standard deviation in the case of DISPERSION and sums in the case of CONTDISC and VOLUNTARY. The different measures were explained in *Tables 1-4* earlier.

The higher standard deviation for analyst following (ANALYST 6.576) might be simply explained by the strong relation of firm size and interest among analysts. CONTDISC range indicates that the level of continuous disclosure varies greatly between the companies (from 0 to 21 stock exchange releases per month). However, none of the firms have a totally concentrated disclosure as even the highest Herfindahl-Hirschman Index (HHI) does not exceed 0.266 yet the difference from the lowest score (0.094) is manifold.

4.2. Empirical research and results

In this section of the empirical part, I will concentrate mainly on reporting and analyzing the results gained from the quantitative analyses, namely Pearson correlation matrix, OLS regression analyses and IV regression analyses.

4.2.1. Pearson correlation test

First Pearson's correlation matrix is conducted to get an initial idea of possible linear relations between the variables and also to detect any correlations that could be potentially harmful in the regression model deteriorating the reliability of the regression analyses. (E.g. Leppälä R., 2000, 18 / *Ohjeita tilastollisen tutkimuksen toteuttamiseksi SPSS for Windows –ohjelmiston avulla*, Tampereen yliopisto) However, a VIF (Variance Inflation Factor) and 1/VIF (tolerance) tests are conducted after the regression analyses to evaluate possible multicollinearity problems in more detail.

Appendix 2 illustrates the results of Pearson's correlations between all dependent and independent variables indicating both the direction and strength of the relations, their statistical significance as well as the number of observations used in each univariate analysis. The results show that continuous and voluntary disclosure levels are negatively correlated with bid-ask spreads (-0.05446** and -0.08711***, respectively) and positively correlated with share liquidity (0.13009***

and 0.21085***, respectively). These relations are in line with the hypotheses 1 and 2, whereas the disclosure levels' correlation with the dispersion of analyst forecasts does not reach statistical significance. Further analysis in form of regression analysis is thus needed to seek further evidence of whether I accept hypotheses 1 and 2 and reject the hypothesis 3. Interestingly, the same pattern is to be detected in the univariate relation of number of analysts and the three measures of information asymmetry. Indeed, when the number of analysts following the firm increases, the bid-ask spreads get significantly narrower (-0.48884***) and share liquidity increases (0.74347***). However, the relation of analysts and dispersion of analyst forecasts is at a first glance surprisingly positive (0.23978***). Nevertheless, using common sense it is normal that the dispersion might be greater if the number of analysts is more than two where the number of different forecasts is greater than two, as well, and so the dispersion of the consensus is likely to occur.

The two disclosure proxies, namely all continuous disclosure and voluntary disclosure, are expectedly positively correlated (0.26150***), as are also the different measures for firm size (0.90927***, 0.83479*** and 0.89098***) and profitability (0.84129***). However, these measures were created to test for robustness of the regression models and will not be used simultaneously. Hence, no problem of multicollinearity occurs. When it comes to correlations between the levels of disclosure and the independent variables of the OLS regression model, both consistencies and inconsistencies are to be found in terms of original assumptions. The different measure of firm size (with CONTDISC 0.10971***, 0.11939***, 0.08590*** and with VOLUNTARY 0.23168***, 0.25606***, 0.17981***, respectively) as well as complexity of business activities (with CONTDISC 0.06474*** and with VOLUNTARY 0.14832***) are in positive correlations with both continuous and voluntary disclosure levels. On the other hand, the amount of private debt (-0.04892** and -0.04175**) as well as the concentration of ownership (-0.07906*** and -0.13615***) are both, as anticipated, negatively correlated with the disclosure proxies.

However, both growth (-0.03507*) and profitability (ROA -0.12525***, ROE -0.10072***) have negative correlation with voluntary disclosure and thus are against my assumption on the signaling effect. Furthermore, the relations of growth and profitability with continuous disclosure are not statistically significant and the same applies for the relation of foreign ownership and voluntary disclosure as well as IR dummy and both disclosure proxies. Also the extent of foreign ownership (-0.03319*) seems to have a negative impact on continuous disclosure levels, which is also the opposite of my initial assumption. Finally, the experience dummy (0.05443** and 0.13566***) shows the expected positive relation with both disclosure measures.

When looking for first signs of concentration of disclosure, both Herfindahl-Hirschman indices make bid-ask spreads widen (0.11499*** and 0.13105***) and share liquidity decrease (-0.25377*** and -0.22854***) as expected. However, these two variables seem to be decreasing the dispersion of analyst forecasts (-0.07797*** and -0.11413***) rather than increasing it, which I find very particular at this stage. Disappointingly, very little can be said about the interaction terms, that is the difference of years 2007 and 2008, as only the relations between IA_CONTDISC and BIDASK (0.04424**) and IA_VOLUNTARY and LIQUIDITY (0.09732***) reach statistical significance. However, both correlations are positive and thus first encouraging indications can be detected of the importance of disclosure in crises. To conclude, all the phenomena described briefly above are intriguing (see Appendix 2) and require further analysis in the next stages of the research.

4.2.2. Regression analyses

OLS regression analyses

Table 8: Ordinary Least Square regression analysis (Y = CONTDISC)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5
SIZE_LNSALES	0.096 (2.12)**				
SIZE_LNASSET		0.114 (2.47)**		0.098 (2.09)**	0.160 (4.26)***
SIZE_LNMARKETCAP			0.064 (1.23)		
COMPLEX	0.140 (2.50)**	0.131 (2.37)**	0.158 (2.84)***	0.126 (2.31)**	0.107 (1.91)*
GROWTH	-0.314 (-1.53)	-0.360 (-1.76)*	-0.349 (-1.71)*	-0.432 (-2.08)**	-0.406 (-2.12)**
PROFIT_ROA	-0.854 (-1.36)	-0.888 (-1.27)	-1.093 (-1.43)		
PROFIT_ROE				0.019 (0.09)	
DEBT	-1.416 (-3.06)***	-1.381 (-3.03)***	-1.396 (-3.00)***	-1.060 (-2.29)**	-0.759 (-1.73)*
FOREIGN	-0.168 (-0.31)	-0.172 (-0.32)	-0.083 (-0.15)	-0.220 (-0.40)	
LARGE_OWN	-0.445 (-1.20)	-0.485 (-1.29)	-0.545 (-1.46)	-0.659 (-1.79)*	
IR	-0.096 (-0.43)	-0.148 (-0.67)	-0.161 (-0.72)	-0.213 (-0.99)	
EXPERIENCE	-0.018 (-0.15)	-0.023 (-0.20)	0.001 (0.01)	-0.003 (-0.03)	
_CONS	1.506 (1.66)*	1.202 (1.31)	2.142 (2.09)**	1.520 (1.64)	-0.066 (-0.09)
N	2444	2424	2448	2436	2541
R-squared	0.0165	0.0178	0.0154	0.0167	0.0152
F -value	*5.58****	*5.95****	*5.01****	*5.64****	*12.30****

*** Statistically significant at level 0,01

** Statistically significant at level 0,05

* Statistically significant at level 0,10

The results of the OLS regression analyses are presented in *Table 8*. Altogether five OLS models were run using the coarser continuous disclosure measure as the dependent variable and are showing encouraging results. First, Model 1 shows statistically significant evidence for firm size (SIZE_LNSALES), complexity (COMPLEX) and private debt (DEBT). All of these variables have the expected effect on disclosure levels. That is, both firm size and complexity of business increase continuous disclosure, whereas higher proportion of private debt decreases it. Especially private debt seems to have a considerable negative effect on disclosure, which confirms the prior evidence that firms with less public shareholders can provide them directly with information and will thus disclose less publicly. All of these three results are in line with previous research and now further confirms the positive effect of complexity of business on disclosure levels.

Next, results of same sort are found in Models 2 and 3, with the exception of growth becoming statistically significant at level 0,10. In these, the measures for firm size and profitability are changed to test for robustness. However, growth, as already detected in Pearson's univariate analysis, seems to decrease the level of continuous disclosure, which is opposite to my initial assumption and previous research. I reckon this might be related to higher risks of growth companies than companies in mature stages, which would then be demonstrated as prudence in disclosure. Even if growth would be perceived as positive by the investment community, a firm may prefer to keep a low profile on the details as the positive outcomes of growth efforts can take a longer time to materialize and thus the management does not want to keep hopes up if they are not convinced of the future performance.

Then, Model 4 shows again evidence for the same variables as before, yet the concentration of ownership becomes statistically significant at level 0,10 and has the expected lowering effect on continuous disclosure. Hence, the less there are shareholders, the less the firm needs to disclose to keep them informed. This results provides first, even if careful, evidence on the relation of ownership structure and continuous disclosure levels. Finally, Model 5 is created by taking into account only those variables which gained statistical significance to see whether the explanatory value of the model stays the same, enhances or get worse. Here, all variables stay statistically significant but the R2-value decreases slightly, which might be a sign of some interdependencies between the control variables. Out of the explanatory variables, profitability, foreign ownership, IR and experience do not attain any statistical significance.

Five additional OLS models were run with industry dummies and the results are presented in Appendix 3. All models attain statistical significance yet only some of the industries seem to cause an effect on the level of continuous disclosure. In Model 3, Industry 2 (Utility, 1.083*) and Industry 5 (Insurance, 1.283*) have positive effects on continuous disclosure at a statistical significance level of 0.10, whereas in Model 5, Industry 4 (Banks/savings and Loans, -0.743**) and Industry 6 (Other Financial, -0.417**) cause negative impacts on disclosure levels at a statistical significance level of 0.05. Insurance industry seems to have the most visible herding effect where being a company in this industry pushes to disclose more on continuous basis. On the other hand, Banks/savings and Loans industry experiences a herding effect of contrary kind. Based on these results, a conclusion of an institutionalization effect of some extent can be drawn, as conceptualized earlier by several researchers.

To conclude, the best explanatory value is found by Model 2 with R2-value reaching 0,0178 and F-value 5.59. R2 is not very high, which indicates that the chosen variables succeed in explaining only a fraction of the changes in the level of continuous disclosure. Possible first hand reasons to this could be missing explanatory variables or inappropriate proxy of continuous disclosure. However, the variables that gained statistical significance showed for the most part supporting evidence for the initial assumptions. Therefore, I can draw the conclusion, in line with previous research, but using the new proxy, that firm size and complexity of business activities affect a firm's decision to disclose higher levels of public information on a continuous basis. Furthermore, the financing structure of a company seems to also play a pivotal role in the disclosure decision. That is, the more the company is financed by private debt, such as loans from financial institutions, the less the management feels obliged to publish information continuously to public audiences. Reasons aside of the seemingly obvious lack of incentive could be for instance the cost of producing public disclosure as well as willingness to protect competitive edge, as Healy and Palepu (1993) suggest.

Table 9: Ordinary Least Square regression analysis (Y = VOLUNTARY)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
SIZE_LNSALES	0.118 (9.37)***				0.120 (11.74)***	0.129 (12.82)***	0.134 (13.71)***	0.117 (11.40)***	
SIZE_LNASSET		0.114 (8.87)***		0.119 (9.13)***					
SIZE_LNMARKETCAP			0.089 (6.59)***						
COMPLEX	0.024 (1.51)	0.026 (1.68)*	0.044 (2.76)*	0.026 (1.65)*					
GROWTH	0.026 (0.41)	0.000 (0.00)	-0.023 (-0.36)	0.002 (0.04)					
PROFIT_ROA	-1.804 (-8.23)***	-1.671 (-7.64)***	-2.041 (-8.72)***		-1.994 (-8.93)***	-1.858 (-8.49)***	-1.626 (-8.16)***		-1.779 (-7.95)***
PROFIT_ROE				-0.519 (7.25)***					
DEBT	-0.530 (-4.18)***	-0.597 (-4.69)***	-0.504 (-3.94)***	-0.500 (-3.90)***	-0.436 (-3.53)***	-0.367 (-2.98)***		-0.088 (-0.74)	-0.560 (-4.47)***
FOREIGN	0.001 (0.01)	0.025 (0.16)	0.089 (0.57)	0.101 (0.64)					
LARGE_OWN	-0.000 (-0.00)	-0.018 (-0.18)	-0.079 (-0.78)	-0.069 (-0.67)					
IR	0.338 (4.69)***	0.225 (3.57)***	0.251 (3.47)***	0.194 (2.75)***	0.317 (4.75)***				0.225 (3.32)***
EXPERIENCE	0.092 (3.22)***	0.074 (2.50)**	0.104 (3.53)***	0.084 (2.82)***	0.095 (3.55)***				
_CONS	-1.659 (-6.63)***	-1.561 (-6.22)***	-1.075 (-4.14)***	-1.694 (-6.67)***	-1.634 (-8.54)***	-1.677 (-8.72)***	-1.853 (-10.09)***	-1.563 (-8.00)***	0.829 (24.80)***
N	2442	2422	2446	2433	2588	2588	2632	2631	2656
R-squared	0.1056	0.1037	0.0875	0.0982	0.1033	0.0933	0.0901	0.0568	0.0314
F -value	30.19***	29.02***	24.97***	27.72***	52.00***	76.44***	114.39***	65.14***	24.15***

*** Statistically significant at level 0,01

** Statistically significant at level 0,05

* Statistically significant at level 0,10

The results of OLS models ran to explain the level of voluntary disclosure are presented in *Table* 9. Nine different OLS models were ran for voluntary disclosure levels as the dependent variable. This was to find the best fit by testing robustness of the different measures as well as the best combination of variables. The R2-values rise considerably higher here than in the regressions with the coarser disclosure proxy. Model 1 captures the most explanatory value with R2 reaching 0.1056 with high statistical significance with five out of nine explanatory variables being statistically significant, namely the firm size (SIZE_LNSALES), profitability (PROFIT_ROA), DEBT, IR and EXPERIENCE. All others, except for profitability, cause the claimed effect on voluntary disclosure levels. In other words, firm size (SIZE_LNSALES), IR and EXPERIENCE all impact positively the decision of voluntary disclosure, whereas the private debt hinders it. The particularity in the result is

the negative effect of profitability on the voluntary disclosure level. Indeed, profitability has a lowering impact on disclosure of -1.804 at the statistical significance level of 0.01. This result indicates that there would not be any desire for a signaling effect for companies with better performance. Furthermore, this result is in clear contradiction with Miller's (2002) and Raffournier's (1995) perceptions and thus no conclusions can be drawn other than the effect of profitability on the level of disclosure in general becomes mixed, whereas the effect of profitability on voluntary disclosure levels is evidenced here to have a negative effect. This result is very interesting and would require further evidence.

Furthermore, interestingly foreign ownership does, as was the case with continuous disclosure, not have an effect whatsoever on disclosure levels and neither has growth or concentration of ownership. When it comes to foreign ownership, the reason could be incompatibility of the audience with the medium of disclosure, that is, the stock exchange releases published in Finnish in Nasdaq OMX Helsinki. As a matter of fact, not all releases even had an equivalent in other languages, which may explain why even a high percentage of foreign shareholders does not have an effect on the level of such voluntary disclosure. Here, I might have better looking at other IR media such as the IR-section of company websites. When it comes to concentration of ownership, what might have been true for continuous disclosure, which contains also the mandatory on-going disclosure, is not necessarily valid for voluntary stock exchange releases. In other words, the decision of voluntary disclosure is not necessarily linked to the number of shareholders and their accumulated need of additional information.

On the other hand, the experiments with IR and experience dummies prove successful as both variables cause a positive effect on voluntary disclosure at a significance level of 0.01. These results give preliminary evidence that the appreciation of IR activities as well as the experience of the firm from the securities market play an important role when deciding on disclosure above the mandatory levels. As it seems that in companies where IR function is both well-established and highly appreciated, the continuous and voluntary disclosure levels are higher and so I might hereby carefully anticipate that is supporting evidence is found in the next stage of the research for the hypotheses, public firms ought to take these results into account.

All full models (Models 1-4) gain similarly high explanatory levels, which I reckon to indicate that there is very little robustness in the model and all alternative measures for firm size and profitability are legitimate. However, firm size gets highest coefficients when using the natural logarithm of

sales, whereas profitability seems to influence the voluntary disclosure levels considerably more when using return on assets instead of return on equity. When deleting those variables from the models, which did not gain statistical significance (Models 5-9), the explanatory value of the models as a whole declines. Thus, there seems to be interdependencies between the different statistically significant and insignificant explanatory variables that cause this phenomenon.

Again, another set of OLS regression models were run with the addition of industry dummies to gain evidence for institutionalization effect. These results are found in Appendix 3. Most of the industries seem to cause either a positive or a negative effect on the levels of voluntary disclosure with very high statistical significance. In more detail, Industries 2 (Utility) and 5 (Insurance) clearly have negative coefficients at statistical significance levels between 0.05-0.01, whereas Industry 4 (Banks/Savings and Loan) only reaches statistical significance in Model 5 also causing a negative effect on voluntary disclosure levels. On the other hand, Industry 6 (Other Financial) has a positive coefficient with statistical significance level of 0.01, yet only in Model 1. These results are similar to those with all continuous disclosure where Utility and Insurance industries disclose more than Banks/Savings and Loan as well as Other Financial. Could this be due to the stricter disclosure rules concerning financial institutions, which define more rigorously which information is to be disclosed? This might also explain why companies in the financial sector disclose less voluntarily. Results gained in Appendix 3 strengthens the evidence from continuous disclosure that the so called "herding effect" of companies operating in the same industry is true. Furthermore, this seems to be the case even more when it comes to deciding on purely voluntary disclosure.

As a final remark to this section, I have managed to find evidence for more than half of my initial assumptions on the underlying reasons for levels of continuous and voluntary disclosure, especially for the latter. Based on these results, the instrumental values that will be used to estimate the disclosure levels in the IV regression analyses are chosen among those variables which demonstrated the strongest statistical significance on their effects on disclosure. In practice, to calculate an exogenous estimate for continuous disclosure, SIZE_LNASSET, COMPLEX, GROWTH and DEBT are allocated to the IV regression models. With the same logic, SIZE_LNSALES, PROFIT_ROA, DEBT, IR and EXPERIENCE are exploited in giving an estimate for voluntary disclosure. As the explanatory value of these variables is now proven to be significant, I can move on to testing how well continuous and voluntary disclosure succeeds in lowering information asymmetries in the securities markets. At this stage, also the variables for evaluating the differences caused by the financial crisis are added to the equations.

IV regression analyses

The results of the IV regression analyses are presented in *Tables 10, 12 and 14* for continuous disclosure and the three measures of information asymmetry, whereas *Tables 11, 13 and 15* show the results of the regression analyses when voluntary disclosure is used as the disclosure proxy. In the models to follow, I have taken the contrary step-by-step approach to the OLS regressions where I start off with only one explanatory variable and then one by one add additional variables. This is to better see the effect of each variable in the equation. Furthermore, in the IV regression models, where the disclosure level variable is an estimation derived from the instruments, R2-values are not calculated and become less significant. To arrive at proving or rejecting my hypotheses, I look for statistical significance of the explanatory values and the sign of the coefficients, that is, the direction of the impact on information asymmetry.

Table 10: Instrumental Variable regression analysis (Y=BIDASK, Instrumented variable=CONTDISC, Instruments=SIZE_LNASSET, COMPLEX, GROWTH, DEBT)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5
CONTDISC	-2.045 (-6.51)***	-0.943 (-11.47)***	-0.852 (-10.38)***	-0.655 (-9.95)***	-2.773 (-4.03)***
IA_CONTDISC		0.757 (11.18)***	0.680 (10.16)***	0.567 (10.63)***	2.743 (4.02)***
HH_CONTDISC			4.212 (2.60)***	-0.119 (-0.09)	-9.090 (-2.01)**
ANALYST				-0.127 (-17.76)***	-0.060 (-1.94)*
YEAR					-6.580 (-3.50)***
_CONS	7.816 (7.83)***	3.210 (19.62)***	2.444 (7.65)***	3.534 (12.98)***	10.533 (4.73)***
N	2520	2520	2520	2502	2502
Wald chi2	*Wald chi2(1)* 42.33***	*Wald chi2(2)* 131.52***	*Wald chi2(3)* 147.37***	*Wald chi2(4)* 480.07***	*Wald chi2(5)* 99.68***

*** Statistically significant at level 0,01
** Statistically significant at level 0,05
* Statistically significant at level 0,10

In Models 1-5, a strong negative impact can be reported on bid-ask spreads when continuous disclosure levels increase. Indeed, even in Model 1, the exogenous estimate of continuous disclosure level alone arrives at narrowing the bid-ask spreads considerably. However, the positive coefficients of the interaction term, indicating the difference between the two sample years, shows discouraging results from the viewpoint of *H4*. In other words, in the financial crisis year 2008, the impact of continuous disclosure levels on bid-ask spreads is negative and statistically significant. That is, a high level of continuous disclosure has not been able to narrow the bid-ask spreads in the crisis in the same way, and it actually widens the spreads more than during the non-crisis year 2007. At this stage, it suffices to say that choosing the context of financial crisis to study the impacts of disclosure on information asymmetry proves interesting from the viewpoint of literature versus evidence. New knowledge can be gained by studying the differences in share behavior over time.

The concentration of disclosure, as measured by the HHI, gives mixed results. In Model 3, when only the estimation of continuous disclosure, the interaction term and the HHI measures are included, HH_CONTDISC has a particularly strong widening effect on bid-ask spreads at the statistical significance level of 0.01. This direction of impact is in line with my assumption that more the disclosure is spread unevenly around the year, less it succeeds in lowering the information asymmetry, here namely in narrowing the bid-ask spreads. Nevertheless, HH_CONTDISC does not reach statistical significance in Model 3 and in Model 4, the coefficient in fact changes the sign to negative. On the contrary, the increasing number of analysts following the firm seem to consistently narrow the spreads, which is in line with previous research. As the year dummy 2008 has a negative sign, it supports the results gained with the interaction term. In other words, in the financial crisis of 2008, the narrowing impact of continuous disclosure on bid-ask spreads is considerably weaker. The narrowing effect of high continuous disclosure level on bid-ask spread is taken away by the financial crisis. To conclude, a high level of continuous disclosure, even if much cannot yet be said on the impact of the concentrations of such disclosure or its particular role in the crises, is effective in narrowing the bid-ask spreads.

Table 11: Instrumental Variable regression analysis (Y=BIDASK, Instrumented variable=VOLUNTARY, Instruments= SIZE_LNSALES, PROFIT_ROA, DEBT, IR, EXPERIENCE)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5
VOLUNTARY	-2.290 (-11.00)***	-5.777 (-8.01)***	-9.041 (-5.31)***	-0.217 (-0.37)	1.742 (2.72)***
IA_VOLUNTARY		4.593 (7.48)***	6.799 (5.19)***	0.311 (0.71)	-1.791 (-2.97)***
HH_VOLUNTARY			-5.061 (-4.40)***	0.446 (1.08)	2.010 (4.14)***
ANALYST				-0.140 (-18.08)***	-0.151 (-18.86)***
YEAR					2.123 (4.96)***
_CONS	3.421 (18.18)***	3.799 (14.43)***	6.943 (6.68)***	2.352 (6.96)***	0.003 (0.62)
N	2568	2568	2460	2440	2440
Wald chi2	*Wald chi2(1)* 120.93***	*Wald chi2(2)* 77.55***	*Wald chi2(3)* 37.32***	*Wald chi2(4)* 790.81***	*Wald chi2(5)* 600.51***

*** Statistically significant at level 0,01

** Statistically significant at level 0,05

* Statistically significant at level 0,10

Results of voluntary disclosure's effects on bid-ask spreads differ seemingly from those of continuous disclosure. Even if in Models 1-4, a higher level of voluntary disclosure seems to be narrowing the spreads, in the final full model (Model 5), the sign of the coefficient actually turns positive, which needs to be interpreted as a factor of widening bid-ask spreads. Could it be so that voluntary public information is causing noise in the securities markets rather than decreasing the information asymmetry? As I might conceptualize this, due to its discretionary nature, voluntary disclosure is of very heterogeneous kind. This sort of disclosure may be more difficult to be used as a basis of investment decisions and the risk of misinterpretation of such information grows. As the investors may find it difficult to re-value a share when a new piece of voluntary disclosure arrives, it may well cause confusion in the pricing of the share, which could then be detected as widening bid-ask spreads.

Then, when considering the Model 5, which contains the estimation of voluntary disclosure levels and all the control variables, the concentration of disclosure and the number of analyst have an effect in line with my original assumptions. That is, here the concentration of the voluntary stock exchange releases cause the bid-ask spreads to widen, whereas the number of analysts, as was the case with continuous disclosure earlier, succeeds narrowing the spreads. At this stage, very strong conclusions on the ability of voluntary disclosure to reduce information asymmetry cannot be drawn and so I need to compare the results with the IV regression analyses run using the other two indicators of information asymmetry.

Furthermore, when compared to the results gained with continuous disclosure levels, in the case of voluntary disclosure, no evidence that a higher disclosure level would have a stronger role in the financial crisis can be noticed either. In practice, in Model 5 the interaction term has a negative coefficient and the year dummy 2008 has a positive coefficient at statistical significance levels of 0.01, but the sign of the main explanatory variable, that is, the level of voluntary disclosure is positive. Thus, lower levels of voluntary disclosure during the crisis have narrowed the bid-ask spreads better than higher levels. Perhaps the importance of voluntary disclosure in the ensemble of disclosure efforts is not appreciated in times of greater uncertainty. I suggested that voluntary disclosure could provide the investment community with valuable supplementary insights of top management thinking, yet research evidence now shows the contrary. Altogether, importance of continuous nor voluntary disclosure in the crisis cannot be described relevant based on these results.

Table 12: Instrumental Variable regression analysis (Y=LIQUIDITY, Instrumented variable=CONTDISC, Instruments= SIZE_LNASSET, COMPLEX, GROWTH, DEBT)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5
CONTDISC	0.349 (6.41)***	0.100 (12.66)***	0.092 (11.74)***	0.025 (5.43)***	0.079 (3.41)***
IA_CONTDISC		-0.081 (-12.58)***	-0.076 (-11.73)***	-0.023 (-6.12)***	-0.080 (-3.46)***
HH_CONTDISC			-0.661 (-4.23)***	-0.158 (-2.01)**	0.081 (0.55)
ANALYST				0.027 (34.72)***	0.025 (19.79)***
YEAR					0.185 (2.92)****
_CONS	-0.890 (5.22)***	-0.026 (2.02)**	0.081 (2.79)***	-0.026 (-1.68)*	-0.207 (-2.85)***
N	2500	2500	2500	2484	2484
Wald chi2	*Wald chi2(1)* 41.10***	*Wald chi2(2)* 162.13***	*Wald chi2(3)* 200.00	*Wald chi2(4)* 1530.00 ***	*Wald chi2(5)* 1103.32 ***

*** Statistically significant at level 0,01

** Statistically significant at level 0,05

* Statistically significant at level 0,10

Table 12 shows the results for the IV regressions where the focus was on studying the effect of continuous disclosure levels on share liquidity. The evidence is very encouraging, as CONTDISC has a positive sign and gains statistical significance at level 0.01 in all models. Thus, a conclusion that increasing amount of continuous disclosure succeeds in stimulating trade activity and lowering information asymmetry can be drawn. In practice, continuous flow of new information to the securities markets gets investors to start trading more. In line with this logic, the concentration of disclosure is negative as assumed. This indicates that not only the level of continuous disclosure, but also the even distribution of disclosure makes shares more liquid. Unfortunately in the full model (Model 5), HH_CONTDISC however does no longer get statistical significance.

Other observations can be made on the positive effect of analyst following on share liquidity. To interpret this result, I state that the more there are analyst following the firm, who are giving

recommendations, the more there most likely are large institutional investors, which can impact greatly on share liquidity when engaging in trading. Finally, when it comes to the interaction term and year dummy 2008, differences between the two sample years can de detected with high statistical significance. In year 2008, the impact of continuous disclosure on share liquidity was lower as indicated by the positive coefficient of the year dummy 2008 and by the consistently negative coefficient of the interaction term. To conclude, even if continuous and evenly spread disclosure enhances share liquidity, it manages to do so less in times of crises.

Table 13: Instrumental Variable regression analysis (Y=LIQUIDITY, Instrumented variable=VOLUNTARY, Instruments= SIZE_LNSALES, PROFIT_ROA, DEBT, IR, EXPERIENCE)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5
VOLUNTARY	0.431 (14.58)***	0.888 (9.33)***	1.414 (5.72)***	0.334 (3.67)***	0.227 (2.75)***
IA_VOLUNTARY		-0.687 (-8.51)***	-1.035 (-5.46)***	-0.247 (-3.63)***	-0.199 (-2.55)**
HH_VOLUNTARY			0.801 (4.73)***	0.179 (3.07)***	0.133 (2.12)**
ANALYST				0.025 (18.04)***	0.027 (27.57)***
YEAR					0.103 (1.87)*
_CONS	-0.111 (-6.16)***	-0.162 (-5.03)***	-0.662 (-4.39)***	-0.193 (-3.89)***	-0.188 (-2.62)***
N	2536	2536	2428	2410	2410
Wald chi2(5)	*Wald chi2(1)* 212.62***	*Wald chi2(2)* 119.22	*Wald chi2(3)* 55.19***	*Wald chi2(4)* 872.57***	*Wald chi2(5)* 1336.13 ***

*** Statistically significant at level 0,01
** Statistically significant at level 0,05
* Statistically significant at level 0,10

Table 13 shows the equivalent data for voluntary disclosure level and its effect on share liquidity. The results are in line with the previous and show that higher levels of voluntary disclosure also encourage investors to engage in trading. Furthermore, the coefficients are even greater and the

statistical significance persists in all models. I thus suggest that voluntary disclosure has even more significant impact on share liquidity than continuous disclosure altogether. Perhaps disclosure of this kind is appreciated by the investment community as it creates trust between the firm and the shareholder. However, the interaction term remains negative and the year dummy 2008 positive, and so the impact of voluntary disclosure on share liquidity diminishes in crisis situations, as it did in the case of continuous disclosure levels, as well. Nevertheless, the negative impact of the interaction term does not completely deteriorate the positive effect of voluntary disclosure on share liquidity.

The particularity of these analyses is the sign of the HH_VOLUNTARY coefficients, which are positive. A result of this sort suggests that irregularly published voluntary stock exchange releases increase the share liquidity better than if the disclosure was more evenly spread throughout the year. Could the reason be that also the liquidity might be concentrated around the voluntary disclosure clusters? If this is the case, then voluntary disclosure still succeeds in increasing liquidity in spite of the timing of the disclosure. One or the other, individual announcement dates and their effect on share behavior were left out of the scope of this research even if this sort of study could be interesting. Finally, analyst following increases share liquidity most likely for the same reasons as already observed in the case of continuous disclosure.

Table 14: Instrumental Variable regression analysis (Y=DISPERSION, Instrumented variable=CONTDISC, Instruments= SIZE_LNASSET, COMPLEX, GROWTH, DEBT)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5
CONTDISC	0.186 (3.58)***	0.076 (5.32)***	0.070 (4.87)***	0.036 (2.55)**	0.168 (3.09)***
IA_CONTDISC		-0.061 (-5.36)***	-0.056 (-4.89)***	-0.030 (-2.68)***	-0.170 (-3.12)***
HH_CONTDISC			-0.376 (-1.45)	0.006 (0.03)	0.704 (1.66)*
ANALYST				0.010 (7.27)***	0.006 (2.32)**
YEAR					0.490 (3.02)***
_CONS	0.283 (1.60)	0.773 (26.25)***	0.837 (16.34)***	0.736 (15.07)***	0.248 (1.31)
N	1957	1957	1957	1957	1957
Wald chi2	Wald chi2(1) 12.83***	Wald chi2(2) 28.83***	Wald chi2(3) 30.92***	Wald chi2(4) 96.37***	Wald chi2(5) 54.15***

*** Statistically significant at level 0,01

** Statistically significant at level 0,05

* Statistically significant at level 0,10

Table 15: Instrumental Variable regression analysis (Y=DISPERSION, Instrumented variable=VOLUNTARY, Instruments= SIZE_LNSALES, PROFIT_ROA, DEBT, IR, EXPERIENCE)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5
VOLUNTARY	0.233 (8.09)***	0.428 (6.93)***	0.623 (5.32)***	0.362 (3.42)***	0.180 (1.80)*
IA_VOLUNTARY		-0.328 (-6.46)***	-0.454 (-5.14)***	-0.266 (-3.40)***	-0.159 (-1.69)*
HH_VOLUNTARY			0.316 (3.48)***	0.158 (1.99)**	0.048 (0.53)
ANALYST				0.008 (4.11)***	0.010 (7.02)***
YEAR					0.089 (1.18)
_CONS	0.734 (29.72)***	0.725 (25.91)***	0.524 (6.66)***	0.610 (9.57)***	0.671 (7.05)***
N	1958	1958	1898	1898	1898
Wald chi2	*Wald chi2(1)* 65.46***	*Wald chi2(2)* 51.72***	*Wald chi2(3)* 36.84***	*Wald chi2(4)* 79.77***	*Wald chi2(5)* 112.09***

*** Statistically significant at level 0,01

** Statistically significant at level 0,05

* Statistically significant at level 0,10

In *Tables 14* and *15*, the results of the IV regression analyses with the third indicator of information asymmetry, dispersion of analyst forecasts, are presented. Opposite to the analyses in *Tables 10-13*, I find no supporting evidence to Hypothesis 3. Indeed, both the continuous and voluntary disclosure levels seem to be worsening the analyst consensus rather than enhancing it, and with statistical significance levels from 0.10 to 0.01. I could consider at least two possible reasons for this phenomenon. First, analysts may not use information of this sort when preparing forecasts, and so the changes in disclosure levels would not affect the dispersion. However, as the results show above, the impact of disclosure is statistically significant, even though contrary to the hypothesis, this reasoning proves invalid. Second, due to its heterogeneous and unpredictable nature, continuous and voluntary disclosure may cause a challenge to analysts rather than provide them with additional, useful information. In other words, regulated disclosure, which is published in according to a pre-announced schedule and which respects a certain format might be easier to turn into meaningful, even private, information, whereas discretionary information might prove more

difficult. Thereby, analysts' interpretations of this sort of disclosure may be more subjective and dispersed.

Despite the contrary results of voluntary disclosure, during the financial crisis of 2008, the disclosure levels have managed to reduce the dispersion better than in 2007, as can be seen from the negative, statistically significant, coefficients of the interaction terms. Furthermore, the HHI indexes also show expected results as the concentration of disclosure has caused the forecast dispersion to grow. This means that if the disclosure, despite the difficulties in interpreting the actual information, arrives evenly, analysts manage making better sense out of it. Nevertheless, this variable only reaches statistical significance occasionally and thus the results are not very reliable. Analyst following also, even if only very moderately, increases forecast dispersion, which I find peculiar. However, as mentioned earlier, if there are more than two analysts following the firm, the probability that the dispersion is greater grows. This might be due to the large differences in analyst following. In fact, the range of number of analysts in the sample is from zero to 29.

4.2.3. Other tests

Variance Inflation Factor for multicollinearity (VIF)

In order for the causal estimates of the multivariate regression analysis to be unbiased, none of the explanatory variables should be perfectly correlated with another. This would cause *multicollinearity* and reaching one solution to the analysis would fail. Too high multicollinearity would produce unreliable parameter estimates. Bivariate correlations are often evaluated to notice any correlations equal or above .80. (Lewis-Beck, 1980, 58-60) As the Pearson's test earlier indicated, the sole variables having such strong multicollinearity were the ones for measuring firm size, profitability and the level of disclosure, which however were not used in the same regression models and thus the multicollinearity problem is not present.

In addition, a VIF test can be conducted between the explanatory variables used in the same regression models to become certain that there is no disturbingly high multicollinearity. This, together with a 1/VIF test for tolerance levels, is run with Stata.

Table 16: Testing for multicollinearity (VIF and 1/VIF) of the independent variables in Ordinary Least Square regression analyses (Model 1 Y=CONTDISC and Model 1 Y=VOLUNTARY)

Variable	VIF	1/VIF
SIZE_LNSALES	1.54	0.647468
COMPLEX	1.37	0.73197
GROWTH	1.07	0.937698
PROFIT_ROA	1.15	0.871081
DEBT	1.13	0.882354
FOREIGN	1.08	0.930229
LARGE_OWN	1.27	0.787528
IR	1.13	0.884251
EXPERIENCE	1.26	0.791747
Mean VIF	**1.22**	

As VIF factors stay at a moderate level ranging between 1.07-1.54 and do not go beyond 10, there does not seem to be any multicollinear variables in the regression model CONTDISC = _CONS + $\beta 1$*SIZE_LNSALES + $\beta 2$*COMPLEX + $\beta 3$*GROWTH + $\beta 4$*PROFIT_ROA + $\beta 5$*DEBT + $\beta 6$*FOREIGN + $\beta 7$*LARGE_OWN + $\beta 8$*IR + $\beta 9$*EXPERIENCE + ε. Also the tolerance levels, as indicated by 1/VIF, are well above the threshold of 0.10. Both tests are run for all the regression models that are used in this paper and are presented in Appendix 4. In summary, none of the VIF or 1/VIF values indicate multicollinearity between the explanatory variables in any of the regression models.

Hausman test for exogeneity

I also want to get evidence for my assumption that continuous disclosure is endogenous and thus the IV GMM regression analysis was the best possible method to be applied. The presence of endogeneity can be tested with a *Hausman test for exogeneity*. In this test, I compare the results of an OLS regression:

BIDASK = $\beta 0$ + $\beta 1$*CONTDISC + $\beta 2$*IA_CONTDISC + $\beta 3$*HH_CONTDISC + $\beta 4$*ANALYST + $\beta 5$*YEAR + ε

and an IV regression:

BIDASK = $\beta 0$ + $\beta 1$*(CONTDISC = Z1 + Z2 + Z3) + $\beta 2$*IA_CONTDISC + $\beta 3$*HH_CONTDISC + $\beta 4$*ANALYST + $\beta 5$*YEAR + ε

If the estimates in both regressions are same or close to each other, endogeneity is not a problem and thus using OLS model would suffice, and would even be better as it is said to be more efficient than an IV regression. In the Hausman test for exogeneity, instruments are assumed valid. The Hausman test for exogeneity is conducted with all three dependent variables, namely bid-ask spreads, share liquidity and dispersion of analyst forecasts when continuous disclosure level is instrumented with firm-and market variables evidenced to explain this level with statistical significance.

Table 17: Hausman test for exogeneity (Y=BIDASK, Instrumented=CONTDISC, Instruments=SIZE_LNASSET, COMPLEX, GROWTH, DEBT)

	COEFFICIENTS			
	(b) **2SLS**	**(B)** **OLS**	**(b-B)** **Difference**	**sqrt (diag(V_b-V_B))** **S.E.**
CONTDISC	-2.888	0.007	-2.895	0.723
IA_CONTDISC	2.858	-0.015	2.872	0.718
HH_CONTDISC	-10.357	0.198	-10.556	4.653
ANALYST	-0.056	-0.190	0.134	0.033
YEAR	-6.940	0.907	-7.847	2.016

b = consistent under Ho and Ha; obtained from ivregress

B = inconsistent under Ha, efficient under Ho; obtained from regress

Test: Ho: difference in coefficients not systematic

$$chi2(5) = (b-B)'[(V\_b-V\_B)^{(-1)}](b-B) \quad = \quad 18.35$$
Prob>chi2 =   0.0***

The Hausman test compares the coefficients of each variable when the regression analysis is conducted as an OLS regression, where CONTDISC is not an estimation of the instruments but the actual measure, and when the analysis is done using a 2SLS regression, hence here the IV technique. If the differences are statistically significant, as demonstrated by Prob>chi2, endogeneity is indeed present and the use of 2SLS regression analysis is justified. From *Table 17*, I can directly draw some conclusions that the differences are indeed seemingly significant. Furthermore, as Prob>chi2 = 0.00***, the difference (b-B) is statistically significant and the use of IV regression analysis to avoid the endogeneity problem is legitimate. The other two tests for LIQUIDITY and DISPERSION are presented in Appendix 5. The same is valid for these two tests, that is, the continuous disclosure is endogenous, for these two models.

Outliers

An assumption when using a two-stage least square regression analysis, such as IV, is that outliers are deleted from the samples (Statistics Solutions, Inc., 10.11.2009). Thus, only values between 1-99% of all variables are included in the sample. The reasoning is that observations differing from the sample averages in an unusual fashion may have a distracting effect on the reliability of the results. In order to avoid this problem of so called *outliers*, only observations between 1-99% of the initial sample are taken into account from each variable to smooth out the distribution of values.

Heteroscedasticity

In order to test for heteroscedasticity, that is, for the equal distribution of residual values, I take advantage of the robust –option of *Stata for MS Windows*. In addition to excluding possible outliers as in the section above, I let Stata to correct any abnormally high residuals when running the OLS regressions. As stated on UCLA website (UCLA, 27.3.2010), "Robust regression is a compromise between deleting […] points, and allowing them to violate the assumptions of OLS regression."

5. Conclusions

5.1. Summary

With this paper, I aim at broadening existing research on continuous and especially voluntary disclosure in couple of ways. First, I create and empirically test a new self-constructed proxy for measuring the level of continuous and voluntary disclosure of the companies listed in Nasdaq OMX Helsinki. Second, I analyze the relation of several firm and market characteristics and these disclosure levels. Then, I research the effect of continuous and voluntary disclosure levels on certain share behavior indicating the amount of information asymmetry in the securities markets. My objective was to find supporting evidence for the importance of high continuous and voluntary disclosure levels in reducing information asymmetries which prevail in the stock market in forms of wide bid-ask spreads, low share liquidity and dispersed analyst forecasts. Finally, I further consider these effects in the context of the financial crisis of 2008 with the aim of evidencing that continuous and voluntary disclosure are even more important in times of crisis.

Table 18: Summary of hypotheses

Hypotheses	
H1	*The levels of continuous and voluntary disclosure and bid-ask spreads are negatively related*
H2	*The levels of continuous and voluntary disclosure and share liquidity are positively related*
H3	*The levels of continuous and voluntary disclosure and dispersion of analyst forecasts are negatively related*
H4	*The importance of the levels of continuous and voluntary disclosure is higher in crisis*

The hypotheses that I put forward after the review of relevant theories and literature, are summarized in *Table 18*. Briefly, I managed to gain supporting evidence for Hypotheses *H1* and *H2* but not for *H3* nor for H4 and so I must reject these two latter hypotheses. On the contrary to my hypothesis, higher continuous and voluntary disclosure levels rather widened the dispersion of analyst forecasts than enhanced their consensus (*H3*). Furthermore, despite the supporting evidence gained for the negative relation between the continuous disclosure levels and bid-ask spreads and for the positive relation between both types of disclosures and share liquidity, these lowering effects on information asymmetry were diminished in the financial crisis (*H4*). Based on previous literature, both on strategic IR and disclosure, I found sufficiently indications that high disclosure

levels have several positive implications, and even more so in crisis situations to put forward *H4*. However, the empirical evidence in this paper indicates that theory and practice are in contradiction in this matter.

All in all in this study, I found particularly interesting the reported negative relations of disclosure levels and information asymmetry. Therefore, I decided to look further into this relation and try to find evidence whether this relation continues to exist even if the type of disclosure would change. In other words, as I found previous research on continuous and voluntary disclosure to be scarce, I created a proxy to measure these levels having the aim of testing their effects on information asymmetry in view.

Based on the results gained in the OLS regression analyses, I was able to detect firm and market variables that explain the level of continuous and voluntary disclosure at statistically significant levels. Despite the moderate R2-values in the case of continuous disclosure, I conclude that some of the same variables, that previous researchers had used when explaining levels of more conventional disclosure such as annual or interim reports, are valid in explaining also continuous and voluntary disclosure. Hence, firm size, complexity, amount of private debt and growth explain the level of all continuous disclosure (mandatory and voluntary) at statistically significant levels. The same applies for firm size, profitability, amount of private debt, appreciation of IR function and experience from the securities markets for the voluntary disclosure levels. Nevertheless, some of these results were mixed and contrary to previous evidence, as analyzed in the previous sections, for which reasons making conclusions on them needs to be prudent.

However, two dummy variables which had not been used in previous literature but tested here were IR and EXPERIENCE. Their effect on voluntary disclosure levels was encouragingly high. Based on this, I suggest that as more experienced listed companies have a more open disclosure culture than less experienced, there is a lesson to be learned here. Clearly these firms that have been operating in the securities markets for a longer time know better the benefits of high voluntary disclosure and less experienced firms could thus learn from them in this matter. Furthermore, as firms where IR function is better appreciated disclose more voluntarily, having an IR responsible in the management team allows the person in this crucial cross-functional role to have the best possible access to information both from the securities markets and from the top executives. This will enable the IR function to better use the voluntary part of disclosure as a tool and also the company to have the IR function support the overall strategy.

Once having discovered which variables explain disclosure levels at statistical significance level, I focused on the main objective of this study, namely in testing the relations between continuous and voluntary disclosure and information asymmetry. In two out of three cases I got supporting evidence that higher continuous and voluntary disclosure levels succeed in reducing information asymmetry. In practice, continuous disclosure clearly narrows bid-ask spreads but voluntary disclosure only occasionally, both disclosure types increase share liquidity but neither manages to enhance analyst forecast consensus, and in fact, even make the dispersion worse. All three measures had been used as indicators of information asymmetry in previous literature and so the results gained in this paper add both to the consensus and contradiction of research in this area. It must, however, be kept in mind that many underlying elements were new in this study, such as the way in which disclosure was measured, the sample (both the time period and the geographic area), the method of two-stage regression analysis and also the control variables and context of financial crisis. Therefore comparison to exiting evidence needs to be made with great attention and conclusions cannot be drawn in too a straightforward fashion. Nevertheless, I can say that when a public company decides on a more open disclosure policy, *ceteris paribus*, it will most likely see benefits of such action in form of lower bid-ask spreads, that is, better informed investors who find it easy to price the company share on the market as well as better share liquidity, that is, enhanced confidence and more institutional investors engaging in trading with the company share. In this way IR activities indeed become strategic as the company can consciously manage its disclosure levels to see desired effects in the securities markets.

Furthermore, even if supporting evidence was not gained of the importance of continuous and voluntary disclosure in the financial crisis, I would like to underline the importance of a consistent and honest disclosure policy in general. In order to gain or maintain the investor confidence and company reputation, a company management can decide on a more open disclosure culture and in practice this can be realized via increased levels of voluntary disclosure. However, in order to enhance the accuracy of analyst forecast, most likely disclosure of other kind, or less disclosure, would be better. Based on these results I may conclude that consistency in disclosure policies truly is a good guideline for public companies. Finally, for the reasons mentioned above, I reckon that increased disclosure on continuous basis is desirable and companies can change, as long as they stay consistent, their IR policy by altering the amount of voluntary disclosure they produce in form of stock exchange releases or via other media. It must also be mentioned that crisis disclosure decisions need to be carefully weighed as crises tend to recur and no "one size fits all" solutions are available when it comes to crisis disclosure.

5.2. Discussion and limitations

The financial crisis, which started in mid-2007 has long-lasting effects on global economy and investor confidence. Earlier, I derived many reasons from theories, empirical as well as business literature for extensive, or even full, disclosure. I reckon it is important to learn from the crisis and prepare for the future this way as crises tend to recur. With this paper, I believe to have added to the scarce body of literature on continuous and voluntary disclosure's effect on information asymmetry, moreover in the financial crisis. The results were not in line with my initial hypothesis yet they provided some valuable knowledge of the dynamics of the securities markets in crisis. Therefore, I will discuss here some of the results considering also what was left out of the scope, what could have been included and what are some of the limitations that might have deteriorated the reliability of the results in this study.

Greenstein and Sami (1994), Welker (1995) and Healy et al. (1999) have all reported declining bid-ask spreads resulting from different sort of increased disclosure practices (Botosan 2006.) The results gained in this study show complimentary supporting evidence of this relation when such disclosure practice is in fact stock exchange releases published on continuous basis. However, no new evidence on the effect of purely voluntary disclosure on bid-ask spreads could be provided. Same way, the share liquidity had been found to increase as a result of higher disclosure earlier, among others, by Diamond and Verrecchia (1991), Healy et al. (1999), Kim and Verrecchia (1994) and Schadewitz (1994), and so do the results in this study. Therefore, a company willing to increase the liquidity of its share on the market can, for instance, employ a more open disclosure policy and add its voluntary disclosure to reach this objective. The reasons why I did not gain supporting evidence on the negative effect of continuous and voluntary disclosure levels on dispersion of analyst forecasts are unclear. Both Lang and Lundholm (1996) and Kimborough (2005) have reported strong negative relations between these two variables. Earlier I considered the heterogeneous contents and formats as well as unpredictable timing of stock exchange releases to be possible reasons for the opposite effect discovered in this study. I reckon this might very well be a valid explanation as the information value of voluntary disclosure is more subjective than that of regular disclosure. Furthermore, unpredictably arriving stock exchange releases may interfere with analysts' forecasting schedule and provide the forecasts with more noise than accuracy.

It should be kept in mind that a high disclosure level does not guarantee high disclosure quality or adequacy of information. Disclosure level has often been used as a measure of disclosure quality but it hardly is synonymous. As a matter of fact, disclosure level could be seen only as one of the explanatory variables for disclosure quality, having a positive or negative relation with it depending on other factors. Schadewitz and Vieru (1994), who have studied disclosure quality effects on share returns and risk, mention that empirical verification on the effects of disclosure quality on share behavior is scarce. The fundamental question about disclosure quality is whether it affects the share prices.

Furthermore, Lundholm and Van Winkle (2006) quite accurately pose one of the underlying questions in the attempt to lower information asymmetry by providing voluntary disclosure: "Does voluntary disclosure actually provide credible information to the market?" I see that in order to build a more holistic picture of the true effects of disclosure on share behavior, one ought to include both disclosure level and quality to the equation. Only the volume of the stock exchange releases was assumed to cause an effect on information asymmetry in this paper and that is a handicap of some sort to the interpretation of the results. The portion of the effect on information asymmetry that might have been caused by the pure quality of the contents of the stock exchange releases was ignored. I see this as a deteriorating factor on the value of the results, even if it can be mentioned that the study follows the tradition of disclosure research of often considering only one of these elements at a time. Furthermore, disclosure quality is difficult to measure objectively, and so including it to the study would not have automatically guaranteed better reliability.

Another limitation in this study is related to an assumption made with the bid-ask spreads. Bid-ask spreads are not completely explained by information asymmetry, that is information costs but also by inventory holding and order processing costs unrelated to information asymmetry. Thus, these costs should be controlled in order to get more reliable results on the relations between disclosure levels and bid-ask spreads. However, these components are apparently "computationally" difficult and thus only few (E.g. George et al.1991, Stoll 1989) have tried to control them. Another limitation concerning bid-ask spreads is *self-selection bias.* "Managers select disclosure practices in response to specific incentives." This was revealed by Leuz and Verrecchia's (2000) study. Bid-ask spreads are in general lower for companies listed in New York Stock Exchange and London Stock Exchange than firms quoted in Germany which deteriorates the comparability. (Botosan 2006) Due to self-selection bias, Botosan (2006) calls voluntary changes in disclosure endogenous which can cause problems to the reliability of research outcomes. Again, only few researchers have tackled the

issue of self-selection bias due to the difficulty of modeling. In this study, all sample firms are collected from the same stock exchange and thus the problem of comparability should not be an issue. However, endogeneity of the disclosure policies is left to little attention and as bid-ask spreads seem to be of different levels depending on the listing status, generalization of the results gained in this research to other securities markets should be made with caution.

As presented by Suijs (2007), accounting research on corporate disclosure policy often refers to seminal papers by Grossman (1981) and Milgrom (1981) on the following assumptions made to justify full disclosure: (i) disclosure is costless, (ii) investors know that the firm has private information, (iii) the firm can credibly disclose its private information, (iv) all investors respond to the firm's disclosure decision in the same way and (v) the firm knows how investors will respond to disclosure of its private information. Suijs (2007) continues that empirical results have revealed that full disclosure is often not practiced as such, and so researchers have sought explaining reasons for non-disclosure by dropping at least one of the aforementioned assumptions as the one (i) of costlessness of disclosure. Indeed, also Lundholm and Van Winkle (2006) state that a "rich area of recent development in the accounting literature describes situations where there are costs to disclosure […]". The authors refer to costs of production of disclosure, of lost competitive advantage and political or legal costs.

I reckon that as disclosure costs, these costs might have served well as an explanatory variable for the level of continuous and voluntary disclosure. Furthermore, I see that the costs might be an exogenous and hence an appropriate instrument for disclosure level in the IV regressions as the costs related to the disclosure hardly affect the share behavior directly. A purely exogenous instrument would be useful in ameliorating the reliability of the IV regression analysis by not having interfering relations with the residuals. However, even if the cost of disclosure would theoretically be a valid variable in the regression models, it does not assure its measurability. I reckon that problems of accuracy, reliability and comparability would have been inevitable had I sought using this measure in my research. The cost of disclosure as an instrument however generated food for thought.

As Healy and Palepu reckon (2001), it is difficult to measure the full extent of voluntary disclosure as many previous papers have used proxies such as management forecasts or some self-constructed measures. The researchers state that self-constructed measures have been used in an increasing manner in examining voluntary disclosure but they hardly capture exactly what intended and thus

are somewhat "noisy" measures. I therefore acknowledge that stock exchange releases as a proxy for voluntary disclosure most likely captures only a part of voluntary disclosure. The measure also includes some level of subjectivity due to researcher's own judgment used when creating the proxy, which inevitably makes replication more challenging and results less reliable. Nevertheless, I see that using stock exchange releases is a new alternative proxy for voluntary disclosure, which has not been exploited before even though I find it to be appropriate due to the major role the stock exchanges play in the provision of information in the market place. Also the fact that the voluntary disclosure is provided via the stock exchange may add to the credibility of the information provided as the stock exchange has means to control the disclosure quality and give warnings, if needed.

Limitation of this paper is that I did not consider the costs of continuous and voluntary disclosure in relations to the incentives of disclosure. Providing information is clearly not free of charge and hence the disadvantages of such disclosure can be measured in terms of costs (see e.g. Depoers 2000). In order to fully justify the high levels of continuous and/or voluntary disclosure from economic viewpoint, one needs to further consider whether the advantages discovered in my research outweigh the disadvantages. This more practically oriented problematic was left outside the explicit framework of this research to first be able to ensure the existence of relations between continuous and voluntary disclosure and positive share behavior, which succeeds in reducing information asymmetries. However, the costs were implicitly dealt with by the size variable as larger firms tend to have better resources to produce disclosure and firm size was evidenced to explain disclosure levels at statistically significant levels.

5.3. Considerations for future research

Deriving from the previous discussion on the limitations of this paper, I can draw up several ideas for follow-up research. First, weighing the benefits and costs of disclosure would be interesting and practically meaningful. Indeed, firms investing money in IR activities and disclosure might find it difficult to measure whether the gains outweigh the costs of such efforts. I reckon that empirical evidence of this sort would be in demand. To continue from this research subject, one could also fine-tune the self-constructed measures of continuous disclosure, as these first constructions might have been too coarse, or test completely new ones such as a proxy on electronic IR materials.

Second, Healy and Palepu (2001) after their review on existing research on continuous disclosure recognize still existing gaps on this field of research. The authors claim that there is not enough evidence why firms engage in voluntary disclosure. I reckon that this paper has added to the scarce body of research giving evidence to why publicly listed companies would have incentives to attain a high voluntary disclosure level yet more can be done. Whereas this paper looked directly at the incentives of high continuous and voluntary disclosure from viewpoint of desirable share behavior, the subject could be approached from management viewpoint. Interviews or questionnaires could be conducted with IR responsibles, company management and/or analysts to examine how aware they are about their own disclosure policies and their effects on share behavior and investor reactions.

Third, it would be highly interesting to be able to define the role of quality for continuous and voluntary disclosure, for instance by creating certain criteria for high-quality stock exchange releases and measuring the quality of such disclosure. This would imply looking at the content of the releases in more detail. Jolly (13.10.2009), for instance, defines the characteristics of a good quality stock exchange release to be:

- informativeness
- relationship to value of share
- clear, readable, easy-to-understand language
- brings out the background and context
- persons available to give further information

Furthermore, Jolly calls for consistency, transparency, speed, clarity and compliance with the company objectives and forecasts (13.10.2009). As Schadewitz et al. (1994) explain, disclosure quality is priced in the market. Thus, managers ought to take this into consideration in the disclosure policies. Good disclosure quality may have a signaling effect implying the investors that the company operations are doing well and that the managers know well the state of the company and are ready to take responsibility of their estimates which would in turn lower uncertainty and grow confidence among investors. I reckon that a study of this kind could be feasible and complimentary to the study conducted in this paper.

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Appendices

APPENDIX 1: Examples of stock exchange releases included in and excluded from the samples

Examples of stock exchange releases included in the samples

Tiedotteen otsikko	Tiedoteluokka
L&T RECOILIN REGENEROINTILAITOKSEN VALMISTUMINEN SIIRTYY KEVÄÄSEEN	Pörssitiedote
Nokia nostaa arviota vuoden 2007 toisen vuosineljänneksen matkaviestinmarkkinaosuudestaan	Pörssitiedote
Nokia Capital Markets Day 2007	Pörssitiedote
Euroopan komissio jatkaa Nokian suunnitellun NAVTEQ-yrityskaupan käsittelyä	Pörssitiedote
Kymenlaakson ja Kemijärven yt-neuvottelut päättyneet	Pörssitiedote
FINNAIR ALOITTAA LENNOT SOULIIN	Pörssitiedote
FINNAIRIN AASIAN-LIIKENNE JATKUU VAHVANA	Pörssitiedote
SAMMON YRITYSVASTUURAPORTTI JULKAISTU	Vuosikertomus
Stora Enso tehostaa ja investoi	Pörssitiedote
Kauko-Telkon myynti Aspolle toteutui	Pörssitiedote
STANDARD & POOR'S VAHVISTI AAA-LUOTTOLUOKITUKSEN KUNTARAHOITUKSELLE	Pörssitiedote
TULIPALO VIIVÄSTYTTÄÄ NESTE OILIN UUDEN DIESELTUOTANTOLINJAN KÄYNNISTYSTÄ	Pörssitiedote

Examples of stock exchange releases excluded from the samples

Tiedotteen otsikko	Tiedoteluokka
Omien osakkeiden osto 19.02.2007	Muutokset omien osakkeiden omistuksessa
Arvopaperimarkkinalain 2 luvun 10 §:n mukainen ilmoitus	Suurimmat osakkeenomistajat -tiedote
Kutsu Nokia Oyj:n varsinaiseen yhtiökokoukseen	Yhtiökokouskutsu
Nokia on antanut Yhdysvaltojen SEC:lle vuotta 2006 koskevan Form 20-F:n	Pörssitiedote
Nokian 2007 ensimmäisen neljänneksen liikevaihto €9,9 miljardia, osakekohtainen tulos €0,25	Neljännesvuosikatsaus
KONE Oyj:n tilinpäätöstiedote vuodelta 2007	Tilinpäätöstiedote
Nokian yhtiökokouksen 2007 päätökset	Varsinaisen yhtiökokouksen päätökset
Biotie Therapies Oyj on julkistanut listalleottoesitteen	Listalleottoesite
Alma Media Oyj: Evli Pankki liputtaa omistusmuutoksia	Pörssitiedote
Nokian Renkaiden vuosikooste vuodelta 2007	Pörssitiedote

APPENDIX 2: Pearson's correlation matrix

	BIDASK	LIQUIDITY	DISPERSION	CONTDISC	IA_CONTDISC	HH_CONTDISC	VOLUNTARY	IA_VOLUNTARY	HH_VOLUNTARY	ANALYST
BIDASK	1.00000 2752									
LIQUIDITY	-0.35040*** 2697	1.00000 2752								
DISPERSION	-0.17950*** 2026	0.14224*** 2040	1.00000 2070							
CONTDISC	-0.05446** 2701	0.13009*** 2014	0.02016 2017	1.00000 2752						
IA_CONTDISC	0.04424** 2701	0.00635 2709	-0.02017 2017	0.72824*** 2752	1.00000 2752					
HH_CONTDISC	0.11499*** 2752	-0.25377*** 2752	-0.07797*** 2041	-0.12773*** 2752	-0.06569*** 2752	1.00000 2808				
VOLUNTARY	-0.08711*** 2696	0.21085*** 2698	0.07066** 1991	0.26150*** 2697	0.17948*** 2697	-0.26628*** 2752	1.00000 2752			
IA_VOLUNTARY	-0.02006 2696	0.09732*** 2698	0.03271 1991	0.18662*** 2697	0.41833*** 2697	-0.16173*** 2752	0.67077*** 2752	1.00000 2752		
HH_VOLUNTARY	0.13105*** 2644	-0.22854*** 2644	-0.11413*** 1981	-0.03218* 2645	-0.05041*** 2645	0.46997*** 2700	-0.34424*** 2644	-0.25421*** 2644	1.00000 2700	
ANALYST	-0.48884*** 2715	0.74347*** 2699	0.23978*** 2040	0.13357*** 2703	0.05621*** 2703	-0.27678*** 2752	0.20586*** 2699	0.14155*** 2699	-0.25680*** 2644	1.00000 2752

	BIDASK	LIQUIDITY	DISPERSION	CONTDISC	IA_CONTDISC	HH_CONTDISC	VOLUNTARY	IA_VOLUNTARY	HH_VOLUNTARY	ANALYST
YEAR	0.14684*** 2752	-0.06972*** 2752	-0.03791* 2041	0.08922*** 2752	0.52383*** 2752	-0.00724 2808	0.08114*** 2752	0.48252*** 2752	-0.14479*** 2700	0.00063 2752
SIZE_LNSALES	-0.57103*** 2700	0.62528*** 2686	0.28457*** 2036	0.10971*** 2692	0.04169** 2692	-0.24710*** 2740	0.23168*** 2684	0.17578*** 2684	-0.27094*** 2632	0.81324*** 2712
SIZE_LNASSETS	-0.53731*** 2720	0.61543*** 2698	0.25315*** 2036	0.11939*** 2702	0.03103 2702	-0.30850*** 2740	0.25606*** 2696	0.17317*** 2696	-0.35236*** 2644	0.78995*** 2727
SIZE_LNMARKETCAP	-0.57671*** 2726	0.60400*** 2698	0.19513*** 2024	0.08590*** 2704	-0.06220*** 2704	-0.19303*** 2752	0.17981*** 2696	0.05886*** 2696	-0.23205*** 2644	0.80655*** 2720
COMPLEX	-0.30137*** 2710	0.28696*** 2698	0.12524*** 2001	0.06474*** 2698	0.02520 2698	-0.08609*** 2752	0.14832*** 2701	0.11872*** 2701	-0.18158*** 2644	0.44403*** 2696
GROWTH	-0.18909*** 2684	-0.00591 2685	0.07498*** 2029	-0.02187 2685	-0.22903*** 2685	-0.06536*** 2740	-0.03507* 2685	-0.22009*** 2685	-0.02021 2632	-0.07917*** 2684
PROFIT_ROA	-0.19192*** 2703	0.07654*** 2696	-0.05084** 2017	0.02317 2696	-0.01760 2696	0.13630*** 2752	-0.12525*** 2700	-0.11482*** 2700	0.20122*** 2644	0.15632*** 2701
PROFIT_ROE	-0.29608*** 2699	0.12095*** 2696	-0.01370 2005	0.03140 2697	-0.00306 2697	0.10664*** 2752	-0.10072*** 2697	-0.09967*** 2697	0.13475*** 2644	0.19361*** 2700
DEBT	0.13899*** 2709	-0.18257*** 2696	-0.05210** 2037	-0.04892** 2696	0.02103 2696	0.02240 2752	-0.04175** 2699	-0.00060 2699	0.02901 2644	-0.18467*** 2701

	BIDASK	LIQUIDITY	DISPERSION	CONTDISC	IA_CONTDISC	HH_CONTDISC	VOLUNTARY	IA_VOLUNTARY	HH_VOLUNTARY	ANALYST
FOREIGN	-0.05654** 2696	-0.10745*** 2698	0.00497 2019	-0.03319* 2698	-0.01183 2698	-0.05655*** 2752	-0.00549 2696	0.00873 2696	-0.08615*** 2644	-0.09349*** 2696
LARGE_OWN	0.27476*** 2715	-0.44005*** 2703	-0.03758* 2040	-0.07906*** 2705	0.02471 2705	0.25692*** 2752	-0.13615*** 2696	-0.06850*** 2696	0.20818*** 2644	-0.42958*** 2722
IR	-0.09095*** 2752	0.02091 2752	-0.05390** 2041	0.02255 2752	0.01893 2752	-0.10686*** 2808	0.02974 2752	0.02394* 2752	-0.12119*** 2700	0.06063*** 2752
EXPERIENCE	-0.14457*** 2752	0.15203*** 2752	0.06982** 2041	0.05443** 2752	0.04234** 2752	-0.07612*** 2808	0.13566*** 2752	0.11517*** 2752	-0.15033*** 2700	0.19987*** 2752
Industry_1	-0.06284*** 2752	0.05401** 2752	0.01258 2041	0.01226 2752	0.03518* 2752	-0.02333 2808	-0.03571* 2752	-0.00440 2752	0.05547*** 2700	0.01489 2752
Industry_2	-0.08944*** 2752	0.15045*** 2752	0.03096 2041	0.05169*** 2752	0.01989 2752	-0.00868 2808	-0.00470 2752	-0.02365 2752	-0.00558 2700	0.38645*** 2752
Industry_3	0.06461*** 2752	-0.08807*** 2752	0.01984 2041	-0.00621 2752	-0.02450 2752	0.09027*** 2808	0.07283*** 2752	0.01999 2752	-0.08174*** 2700	-0.05886*** 2752
Industry_4	0.02447 2752	-0.01661 2752	0.01996 2041	-0.00194 2752	-0.00717 2752	-0.04586** 2808	0.05524*** 2752	0.04683** 2752	-0.06120*** 2700	-0.05873*** 2752
Industry_5	-0.05879*** 2752	0.07789*** 2752	-0.03763* 2041	0.04632** 2752	0.02399 2752	-0.04767** 2808	-0.02126 2752	0.00022 2752	0.00790 2700	0.15139*** 2752
Industry_6	0.09252*** 2752	-0.10973*** 2752	-0.04782** 2041	-0.05124*** 2752	-0.04578** 2752	0.02005 2808	-0.01085 2752	-0.01636 2752	0.00322 2700	-0.19087*** 2752

	YEAR	SIZE_LNSALES	SIZE_LNASSET	SIZE_LNMARKETCAP	COMPLEX	GROWTH	PROFIT_ROA	PROFIT_ROE	DEBT	FOREIGN
YEAR	1.00000 2808									
SIZE_LNSALES	0.01471 2740	1.00000 2740								
SIZE_LNASSETS	0.00335 2752	0.90927*** 2712	1.00000 2752							
SIZE_LNMARKETCAP	-0.16167*** 2752	0.83479*** 2712	0.89098*** 2724	1.0000 2752						
COMPLEX	0.02632 2752	0.49631*** 2688	0.49897*** 2700	0.46822*** 2724	1.00000 2752					
GROWTH	-0.44993*** 2740	0.01559 2684	0.04175** 2684	0.08946*** 2684	0.09231*** 2684	1.0000 2740				
PROFIT_ROA	-0.11293*** 2752	0.15751*** 2684	0.10242*** 2696	0.31449*** 2696	0.02852 2696	0.18026*** 2684	1.00000 2752			
PROFIT_ROE	-0.06148** 2752	0.23753*** 2688	0.20994*** 2700	0.34328*** 2700	0.09627*** 2696	0.19937*** 2696	0.84129*** 2712	1.00000 2752		
DEBT	0.12082*** 2752	-0.15552*** 2684	-0.06824*** 2700	-0.20993*** 2708	-0.05468*** 2708	0.02054 2684	-0.22031*** 2708	-0.17580*** 2708	1.00000 2752	
FOREIGN	0.00839 2752	0.00398 2708	0.02396 2696	-0.00631 2700	-0.09495*** 2700	0.01639 2684	-0.05663*** 2696	0.05547*** 2696	0.12849*** 2700	1.00000 2752

	LARGE_OWN	IR	EXPERIENCE	Industry_1	Industry_2	Industry_3	Industry_4	Industry_5	Industry_6
LARGE_OWN	1.00000 2752								
IR	-0.12019*** 2752	1.00000 2808							
EXPERIENCE	-0.11617*** 2752	-0.20261*** 2808	1.00000 2808						
Industry_1	-0.06253*** 2752	-0.14361*** 2808	-0.12733*** 2808	1.00000 2808					
Industry_2	-0.06862*** 2752	-0.03807** 2808	0.05521** 2808	-0.30928*** 2808	1.00000 2808				
Industry_3	0.21135*** 2752	-0.04683** 2808	0.02896 2808	-0.38044*** 2808	-0.02139 2808	1.00000 2808			
Industry_4	-0.02402 2752	-0.03807** 2808	0.15021*** 2808	-0.30928*** 2808	-0.01739 2808	-0.02139 2808	1.0000 2808		
Industry_5	-0.09349*** 2752	0.02680 2808	0.10575*** 2808	-0.21775*** 2808	-0.01224 2808	-0.01506 2808	-0.01224 2808	1.00000 2808	
Industry_6	0.03456* 2752	0.25593*** 2808	0.01788 2808	-0.73695*** 2808	-0.0432** 2808	-0.04959*** 2808	-0.04032** 2808	-0.02838 2808	1.00000 2808

APPENDIX 3: OLS regression analyses with industries
OLS regression analysis with industries (Y = CONTDISC)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5
SIZE_LNSALES	0.089 (1.87)*				
SIZE_LNASSET		0.095 (1.88)*		0.074 (1.43)	0.149 (3.69)***
SIZE_LNMARKETCAP			0.020 (0.36)		
COMPLEX	0.148 (2.64)***	0.137 (2.43)**	0.179 (3.19)***	0.136 (2.45)**	0.087 (1.53)
GROWTH	-0.308 (-1.48)	-0.321 (-1.54)	-0.325 (-1.57)	-0.403 (-1.90)*	
PROFIT_ROA	-0.914 (-1.29)	-0.944 (-1.33)	-0.873 (-1.12)		
PROFIT_ROE				0.028 (0.13)	
DEBT	-1.400 (-2.95)***	-1.356 (-2.88)***	-1.375 (-2.87)***	-1.010 (-2.11)**	-0.331 (-0.75)
FOREIGN	-0.124 (-0.22)	-0.116 (-0.21)	0.002 (0.00)	-0.162 (-0.28)	
LARGE_OWN	-0.374 (-0.98)	-0.467 (-1.20)	-0.574 (-1.48)	-0.652 (-1.70)*	
IR	-0.186 (-0.85)	-0.166 (-0.76)	-0.183 (-0.84)	-0.232 (-1.11)	
EXPERIENCE	-0.040 (-0.34)	-0.016 (-0.14)	-0.005 (-0.05)	-0.000 (-0.00)	
INDUSTRY_2	0.933 (1.56)	0.831 (1.37)	1.083 (1.67)*	0.848 (1.40)	0.802 (1.33)
INDUSTRY_3	-0.008 (-0.02)	-0.034 (-0.09)	0.067 (0.18)	0.015 (0.04)	-0.180 (-0.51)
INDUSTRY_4	-0.212 (-0.58)	-0.594 (-1.59)	-0.162 (-0.43)	-0.460 (-1.23)	-0.743 (-2.17)**
INDUSTRY_5	1.164 (1.58)	0.978 (1.31)	1.283 (1.72)*	1.077 (1.44)	1.001 (1.36)
INDUSTRY_6	0.341 (1.34)	0.140 (0.57)	0.201 (0.82)	0.146 (0.60)	-0.417 (-2.17)**
_CONS	1.573 (1.64)	1.502 (1.49)	2.892 (2.66)***	1.917 (1.87)*	0.102 (0.14)
N	2444	2424	2448	2436	2608
R-squared	0.0193	0.0202	0.0182	0.0190	0.0167
F -value	*3.96****	*4.04****	*3.55****	*3.82****	*6.58****

*** Statistically significant at level 0,01
** Statistically significant at level 0,05
* Statistically significant at level 0,10

OLS regression analysis with industries (Y = VOLUNTARY)

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5
SIZE_LNSALES	0.131 (9.93)***				
SIZE_LNASSET		0.145 (10.28)***		0.148 (10.38)***	0.146 (13.05)***
SIZE_LNMARKETCAP			0.107 (7.47)***		
COMPLEX	0.018 (1.16)	0.003 (0.21)	0.031 (1.93)*	0.006 (0.37)	
GROWTH	0.022 (0.33)	0.030 (0.47)	-0.021 (-0.32)	0.026 (0.40)	
PROFIT_ROA	-1.783 (-8.02)***	-1.784 (-8.02)***	-2.147 (-8.90)***		-1.934 (-8.80)***
PROFIT_ROE				-0.543 (-7.57)***	
DEBT	-0.698 (-5.40)***	-0.763 (-5.88)***	-0.604 (-4.61)***	-0.665 (-5.08)***	-0.707 (-5.84)***
FOREIGN	-0.191 (-1.14)	-0.188 (-1.14)	-0.090 (-0.54)	-0.104 (-0.62)	
LARGE_OWN	-0.040 (-0.40)	-0.045 (-0.45)	-0.130 (-1.28)	-0.096 (-0.92)	
IR	0.271 (3.66)***	0.268 (3.62)***	0.245 (3.25)***	0.194 (2.66)***	0.238 (3.48)***
EXPERIENCE	0.093 (3.10)***	0.092 (3.06)***	0.110 (3.65)***	0.099 (3.28)***	0.082 (2.93)***
INDUSTRY_2	-0.340 (-2.12)**	-0.510 (-3.10)***	-0.432 (-2.48)**	-0.527 (-3.21)***	-0.500 (-3.06)***
INDUSTRY_3	0.417 (3.04)***	0.360 (2.59)***	0.426 (3.01)***	0.370 (2.63)***	0.410 (2.86)***
INDUSTRY_4	0.067 (0.40)	-0.358 (-1.95)*	0.020 (0.11)	-0.274 (-1.51)	-0.354 (-1.99)**
INDUSTRY_5	-0.805 (-5.21)***	-1.080 (-6.60)***	-0.868 (-5.37)***	-1.055 (-6.47)***	-1.070 (-6.69)***
INDUSTRY_6	0.215 (2.73)***	-0.071 (-0.93)	-0.011 (-0.14)	-0.041 (-0.54)	-0.028 (-0.49)
_CONS	-1.856 (-7.10)***	-2.034 (-7.53)***	-1.321 (-4.87)***	-2.146 (-7.82)***	-2.067 (-10.22)***
N	2442	2422	2446	2433	2604
R-squared	0.1202	0.1235	0.1018	0.1171	0.1277
F -value	*21.86****	*22.40****	*18.36****	*21.42****	*33.80****

*** Statistically significant at level 0,01

** Statistically significant at level 0,05

* Statistically significant at level 0,10

APPENDIX 4: Testing for multicollinearity (VIF and 1/VIF)

Testing for multicollinearity (VIF and 1/VIF) of the independent variables in Ordinary Least Square regression analyses (Model 2 Y=CONTDISC and Model 2 Y=VOLUNTARY)

Variable	VIF	1/VIF
SIZE_LNASSET	1.54	0.647889
COMPLEX	1.36	0.736606
GROWTH	1.06	0.941278
PROFIT_ROA	1.14	0.878853
DEBT	1.13	0.883518
FOREIGN	1.07	0.932534
LARGE_OWN	1.27	0.788027
IR	1.12	0.888972
EXPERIENCE	1.29	0.776056
Mean VIF	**1.22**	

Testing for multicollinearity (VIF and 1/VIF) of the independent variables in Ordinary Least Square regression analyses (Model 3 Y=CONTDISC and Model 3 Y=VOLUNTARY)

Variable	VIF	1/VIF
SIZE_LNMARKETCAP	1.7	0.586747
COMPLEX	1.34	0.744116
GROWTH	1.07	0.938614
PROFIT_ROA	1.24	0.80647
DEBT	1.14	0.874263
FOREIGN	1.07	0.935472
LARGE_OWN	1.29	0.7734
IR	1.13	0.887702
EXPERIENCE	1.27	0.788974
Mean VIF	**1.25**	

Testing for multicollinearity (VIF and 1/VIF) of the independent variables in Ordinary Least Square regression analyses (Model 4 Y=CONTDISC and Model 4 Y=VOLUNTARY)

Variable	VIF	1/VIF
SIZE_LNASSET	1.58	0.630944
COMPLEX	1.35	0.741002
GROWTH	1.07	0.930761
PROFIT_ROE	1.14	0.877998
DEBT	1.13	0.88587
FOREIGN	1.08	0.926448
LARGE_OWN	1.25	0.799257
IR	1.1	0.907789
EXPERIENCE	1.28	0.780358
Mean VIF	**1.22**	

Testing for multicollinearity (VIF and 1/VIF) of the independent variables in Ordinary Least Square regression analyses (Model 5 Y=CONTDISC)

Variable	VIF	1/VIF
SIZE_LNASSET	1.31	0.765205
COMPLEX	1.32	0.757904
GROWTH	1.01	0.992455
DEBT	1.01	0.991246
Mean VIF	**1.16**	

Testing for multicollinearity (VIF and 1/VIF) of the independent variables in Ordinary Least Square regression analyses (Model 5 Y=VOLUNTARY)

Variable	VIF	1/VIF
SIZE_LNSALES	1.15	0.869538
PROFIT_ROA	1.11	0.900544
DEBT	1.09	0.920766
IR	1.09	0.920282
EXPERIENCE	1.17	0.856997
Mean VIF	**1.12**	

Testing for multicollinearity (VIF and 1/VIF) of the independent variables in Instrumental Variable GMM regression analyses (Model 5 Y=BIDASK/LIQUIDITY/DISPERSION, X1=CONTDISC)

Variable	VIF	1/VIF
CONTDISC	4.87	0.205441
IA_CONTDISC	4.82	0.207399
HH_CONTDISC	3.38	0.296272
ANALYST	1.98	0.504833
YEAR	3.4	0.294277
Mean VIF	**3.69**	

Testing for multicollinearity (VIF and 1/VIF) of the independent variables in Instrumental Variable GMM regression analyses (Model 5 Y=BIDASK/LIQUIDITY/DISPERSION, X1=VOLUNTARY)

Variable	VIF	1/VIF
VOLUNTARY	2.78	0.359198
IA_VOLUNTARY	3.17	0.315913
HH_VOLUNTARY	1.49	0.670503
ANALYST	1.78	0.56202
YEAR	2.27	0.439784
Mean VIF	**2.3**	

The tests presented in the tables above were conducted with uncentered variance inflation factors. This option can be automatically run with Stata and it is often used to detect the collinearity of the regressors with the constant.

APPENDIX 5: Hausman test for exogeneity

Hausman test for exogeneity (Y=LIQUIDITY, Instrumented=CONTDISC, Instruments=SIZE_LNASSET, COMPLEX, GROWTH, DEBT)

	COEFFICIENTS			
	(b)	**(B)**	**(b-B)**	**sqrt (diag(V_b-V_B))**
	2SLS	**OLS**	**Difference**	**S.E.**
CONTDISC	0.072	0.005	0.066	0.023
IA_CONTDISC	-0.072	-0.007	-0.066	0.023
HH_CONTDISC	0.015	-0.357	0.371	0.136
ANALYST	0.025	0.028	-0.003	0.001
YEAR	0.166	-0.016	0.182	0.063

b = consistent under Ho and Ha; obtained from ivregress

B = inconsistent under Ha, efficient under Ho; obtained from regress

Test: Ho: difference in coefficients not systematic

$$\text{chi2}(5) = (b\text{-}B)'[(V\_b\text{-}V\_B)^{(-1)}](b\text{-}B) = 8.95$$
Prob>chi2 = 0.1*

Hausman test for exogeneity (Y=DISPERSION, Instrumented=CONTDISC, Instruments=SIZE_LNASSET, COMPLEX, GROWTH, DEBT)

	COEFFICIENTS			
	(b)	**(B)**	**(b-B)**	**sqrt (diag(V_b-V_B))**
	2SLS	**OLS**	**Difference**	**S.E.**
CONTDISC	0.171	0.001	0.170	0.056
IA_CONTDISC	-0.172	-0.002	-0.170	0.056
HH_CONTDISC	0.735	-0.196	0.931	0.350
ANALYST	0.005	0.013	-0.007	0.003
YEAR	0.498	-0.023	0.522	0.168

b = consistent under Ho and Ha; obtained from ivregress

B = inconsistent under Ha, efficient under Ho; obtained from regress

Test: Ho: difference in coefficients not systematic

$$\text{chi2}(5) = (b\text{-}B)'[(V\_b\text{-}V\_B)^{(-1)}](b\text{-}B) = 10.92$$
Prob>chi2 = 0.05**

Tables

Table 1: Summary of independent variables in the Ordinary Least Square regression analyses

Table 2: Summary of dependent variables in the Ordinary Least Square regression analyses

Table 3: Summary of independent variables in the Instrumental Variable regression analyses

Table 4: Summary of dependent variables in the Instrumental Variable regression analyses

Table 5: Characteristics of independent variables in the OLS regression analyses

Table 6: Characteristics of dependent variables in the OLS regression analyses and independent variables in the IV GMM regression analyses

Table 7: Characteristics of dependent variables in the IV GMM regression analyses

Table 8: Ordinary Least Square regression analysis (Y = CONTDISC)

Table 9: Ordinary Least Square regression analysis (Y = VOLUNTARY)

Table 10: Instrumental Variable regression analysis (Y=BIDASK, Instrumented variable=CONTDISC, Instruments=SIZE_LNASSET, COMPLEX, GROWTH, DEBT)

Table 11: Instrumental Variable regression analysis (Y=BIDASK, Instrumented variable=VOLUNTARY, Instruments= SIZE_LNSALES, PROFIT_ROA, DEBT, IR, EXPERIENCE)

Table 12: Instrumental Variable regression analysis (Y=LIQUIDITY, Instrumented variable=CONTDISC, Instruments= SIZE_LNASSET, COMPLEX, GROWTH, DEBT)

Table 13: Instrumental Variable regression analysis (Y=LIQUIDITY, Instrumented variable=VOLUNTARY, Instruments= SIZE_LNSALES, PROFIT_ROA, DEBT, IR, EXPERIENCE)

Table 14: Instrumental Variable regression analysis (Y=DISPERSION, Instrumented variable=CONTDISC, Instruments= SIZE_LNASSET, COMPLEX, GROWTH, DEBT)

Table 15: Instrumental Variable regression analysis (Y=DISPERSION, Instrumented variable=VOLUNTARY, Instruments= SIZE_LNSALES, PROFIT_ROA, DEBT, IR, EXPERIENCE)

Table 16: Testing for multicollinearity (VIF and 1/VIF) of the independent variables in Ordinary Least Square regression analyses (Model 1 Y=CONTDISC and Model 1 Y=VOLUNTARY)

Table 17: Hausman test for exogeneity (Y=BIDASK, Instrumented=CONTDISC, Instruments=SIZE_LNASSET, COMPLEX, GROWTH, DEBT)

Table 18: Summary of hypotheses

Figures

Figure 1: *The communicative role of IR between fair and market value (Ikäheimo and Mouritsen, 2007)*

Figure 2: *Audiences of a company's financial reporting (modified from Roine, 2000, 21)*

Figure 3: *The expected negative correlation between disclosure level and information asymmetry*