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The association between integrated reporting and information asymmetry

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Abstract

Traditional financial reporting seems to fail to capture the underlying economic implications of business innovations and economic changes in a timely manner. Therefore a new way of corporate reporting is introduced that is called integrated reporting. The new reporting system gives a holistic view of the company and integrates non-financial information with financial information into one report. However, does this report indeed capture the underlying economic implications of the business? This thesis examines whether integrated reporting is negatively associated with information asymmetry. For this purpose, I conduct a mean comparison test and secondly, I perform a regression analysis whether integrated reporting indeed has an impact on information asymmetry. Specifically, using a sample of 29 firms which use integrated reporting in the period between 2010 and 2015 and 32 non-integrated reporting firms, I examine whether these firms have lower bid-ask spreads and cumulative abnormal returns respectively. I find that the integrated reporting group has a significant lower bid-ask spread relative to the control group. Contradictory, I do not find supporting evidence that integrated reporting lowers the cumulative abnormal returns. Although additional tests show that after the release of the International Integrated Reporting Council Framework, the cumulative returns are lower relative to the control group. The findings suggest that integrated reporting is negatively associated with information asymmetry. This thesis contributes to the limited literature about integrated reporting and adds favourable insight for the IIRC and its adherents.

Keywords: Integrated Reporting, Information Asymmetry, International Integrated Reporting Council, Cumulative Abnormal Returns, Stock Liquidity, Spread, Integrated Thinking

Preface

The main idea of this study is my attempt to succeed for my study of Accounting, Auditing and Control (AAC) a master programme of the Erasmus School of Economics (ESE). The development of integrated reporting appealed to me. Since the International Integrated Reporting Council (IIRC) is more focused on the long-term creation of value. Especially where sustainability is inevitable I believe companies have to keep up with times, whereby integrated reporting is the mean to an end. With this thesis, I ambition to contribute to the current body of knowledge with respect to integrated reporting. Indeed, I hope to catch interest among researchers, professors and students.

Lastly, I am grateful to have Prof. drs. R. van der Wal as my supervisor. I received helpful and critical remarks. Additionally, he stated strict deadlines which helped me to conduct my research efficiently.

Rotterdam, July 2017

Mello van den Akker

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1. Introduction

Traditional financial reporting seems to fail to capture the underlying economic implications of business innovations and economic changes in a timely manner (Healy and Palepu, 2001). There is a growing concern that annual reports are becoming less relevant to shareholders ((Financial Reporting Council (FRC), 2011). Nevertheless, companies provide more non-financial information yet, it appears that firms do not provide non-financial and financial information in an integrated manner. Hence, a better understanding of the firm his operation by shareholders is not achieved. Accordingly, the reporting requirements are changing and needs innovation. Therefore, a new way of corporate reporting is introduced which is called integrated reporting (IIRC, 2013).

Integrated reporting is in most countries implemented on a voluntary basis, it is only mandatory in South-Africa. Integrated reporting (IR) is in a phase of continuous development and received mixed reports about the strengths and weaknesses. For example, Fowler (2010), a well cited paper, harshly criticizes the shareholders-oriented view of integrated reporting. The IIRC adopted the criticism and released a framework in 2013. This framework is an opportunity for further development of a new way of corporate reporting.

That integrated reporting gained attention is reflected by the adoption of leading organizations like HSBC, Unilever, Deutsche Bank and Tata Steel. In addition, a recent report in 2014 commissioned by the six largest accounting firms (PwC, Deloitte, EY, KPMG, BDO and Grant Thornton), endorsed integrated reporting as a key innovation that makes corporate reporting more contributory to long-term investment. (IIRC, 2014)

Although its short existence, I am interested in how the market views integrated reporting. Therefore, the purpose of this thesis is to examine the association between integrated reporting and information asymmetry. More specifically, this thesis investigates how integrated reporting is associated with the level of abnormal returns and stock liquidity, in order to answer the following research question:

RQ: How is integrated reporting associated with information asymmetry?

I gradually substantiate arguments in order to answer the research question. First, this thesis describes theories that discusses information asymmetry. Accordingly, I discuss the operation of integrated reporting in order to understand how this potentially affects information

asymmetry. Hence, a critical assessment of literature contributes to this understanding, whereby critical papers are offset against compliantly papers. Lastly, this thesis describes the operationalization of the dependent variable (Information asymmetry) in order to formulate hypotheses.

This thesis operationalizes information asymmetry by two models. In accordance with prior literature information asymmetry is captured by stock liquidity. Hence, stock liquidity is operationalized by taking the average spread during the event window. The event window is the day before, the day on the release date of the report and the day after. Here the hypothesis is formulated as follows: H1: *Firms which use integrated reporting are negatively associated with the average spread during the event window.*

Prior literature indicates that cumulative abnormal returns capture information asymmetry as well. Subsequently, I look at the sum of the cumulative abnormal returns during the event window. Accordingly, the second hypothesis is stated as follows: H2: *Firms which use integrated reporting are negatively associated with the cumulative abnormal returns during the event window.*

This thesis attempts to answer this question by using 29 companies which use integrated reporting (treatment group), the control group consists of 32 companies respectively. These are all Northern-American listed companies. I extract data whether firms use integrated reporting from a Global Reporting Initiative (GRI) report. The sample period starts in 2010 till 2015. The short sample period is due to its fairly new consistence.

I use two models to empirically test the hypotheses. The stock liquidity model uses the average spread as the dependent variable, whereby the independent variable of interest is integrated reporting (IR). This is a dummy variable which takes the value of 1 if a firm uses integrated reporting. Since this thesis is an archival/observation study I use control variables to correct for endogeneity. The cumulative abnormal returns model uses the CAR3 as dependent variable. The independent variable and control variables are the same as aforementioned.

The univariate analysis, which compares the mean of the treatment and control group, shows a significant p-value for the spread. Hence, the spread for the treatment group is significantly lower than the spread for the control group. The results of the multivariate analysis correspond with the univariate analysis. Accordingly, the p-value of the IR variable is negatively associated with the spread and is statistical significant. Hence a confirmatory answer to the first hypothesis is achieved, thus rejecting the corresponding null hypothesis.

The results of the univariate analysis of the cumulative abnormal return model does not show significant results, thus the means of the cumulative abnormal returns do not significantly differ from each other. The multivariate analysis however predicts a positive association between IR and cumulative abnormal returns and is statistical significant. Therefore, I do not find supporting evidence to reject the second null hypothesis.

The aforementioned results are not in line with my expectations. Indeed, the multivariate analysis shows contradictory results. Hence, I compare which model has a better fit wherefore I still can formulate an answer to the research question. These tests suggest that the stock liquidity model has a better fit. Especially, because the stock liquidity model shows a much higher R-squared than the cumulative abnormal returns model. This makes the stock liquidity model more reliable and valid. Indeed, only the stock liquidity model shows corresponding results for the uni- and multivariate analysis. Therefore, I put more weight on the results of the aforementioned model. Lastly, the results of robustness tests confirm the aforementioned inference.

Additionally, I test with a difference-in-difference model whether the release of the IIRC framework in 2013 has impact on the dependent variables. I find supporting evidence that the release of the IIRC framework lowers the cumulative abnormal returns for integrated reporting firms relative to the control group and is statistical significant. However, I do not find evidence that the IIRC framework lowers the spread plus it is not statistical significant. Since this is additional testing I do not make inferences about these results. Nevertheless, these results provide an indication for future research.

For this research setting Integrated reporting reduces information asymmetry by retrieving a lower average bid-ask spread. Unfortunately, I do not find supporting evidence that integrated reporting lowers the cumulative abnormal returns. According to this research setting, integrated reporting does not enable investors to make better expectations about stock returns. However, this potentially is due to model misspecification since abnormal returns can be explained by many variables. Embracing these limitations, I proceed drawing inferences from the stock liquidity model. Conclusively, the output of the analyses suggest that integrated reporting is negatively associated with information asymmetry.

This research contributes to accounting literature in several ways. First, the methodology of this study contributes to the existing body of knowledge since academic research about integrated reporting lacks empirically research. Subsequently the results confirm supportive literature about integrated reporting. Considering the integrated thinking of

non-financial information and financial information suggests a reduction in information asymmetry.

While prior literature focusses on the quality of the integrated report, this study extends the understanding of how integrated reporting in general is associated with the spread and cumulative abnormal returns.

The sample of this study limits to Northern-American companies. According to the results of the random effects model, this study could be generalized to a broader sample. Hence it can motivate researchers to investigate the association of integrated reporting with information asymmetry in a European setting.

Another limitation is the cumulative abnormal returns model which lacks explanatory variables. This model has a low R-squared and therefore needs to be improved. I suggest using other independent variables that capture integrated reporting. Especially since I only used a dummy variable to capture integrated reporting. It us up to future research to thoroughly investigate this matter.

Thus, this thesis attempts to contribute to the debate on integrated reporting especially, since it has received criticism over the years. I find supporting evidence that integrated reporting lowers information asymmetry. Subsequently, integrated thinking should be considered as a must for companies nowadays. Accordingly, this integrated thinking enables investors and stakeholders to make better assessments of the economic performance of companies which use integrated reporting in comparison to non-integrated reporting firms. Secondly, for instance the International Accounting Standards Board (IASB) or other legislative councils which relate to accounting, could consider whether the adoption of integrated reporting is mandatory. Although, integrated reporting is in development this thesis shows that the IIRC is pointing into the right direction. Indeed, a reduction of information asymmetry is expedient to all stakeholders, managers and investors and thereby should be encouraged.

This thesis proceeds as follows; the upcoming section elaborates on the background of IR and literature about the operation of integrated reporting. In addition, it assesses critical and supportive papers concerning integrated reporting. Subsequently, this section describes the operationalization of information asymmetry along with hypotheses development. Section 3 describes the research design. Section 4 presents the sample selection. Section 5 presents the uni- and multivariate analysis along with robustness and additional tests. Lastly section 6 deals

with the conclusion and section 7 discusses limitations of the study conducted and suggests possible avenues for further research.

2. Background information and hypotheses development

This chapter discusses the relevant theory and concepts that relate to integrated reporting. Integrated reporting provides information to the public that emphasizes the way the company creates value over time. The interplay of reporting information to the market with the way the market adopts this information is complex. For example, when a firm is completely transparent in the way they create value, investors expect to make better predictions regarding stock returns. To justify this inference, this chapter gives insight into applicable theories. In addition, it discusses all matters of integrated reporting, such as the content elements, guiding principles, supporting evidence and criticism. Finally, this chapter discusses the operationalization of information asymmetry simultaneously with hypothesis development.

2.1 Theoretical background

The International Integrated Reporting Council (hereafter the IIRC) state on their website that there are significant information gaps with current financial reports. Organizations as the IMF and the World Bank are calling for a greater focus on risks and future development. The IIRC state that the integrated report is created to enhance the information flow and transparency of business. This report provides a more effective allocation of capital by the market which results in better long-term investment returns. (IIRC, Integrated reporting, 2017).

The theoretical aspect here is the ‘information gap’. This gap links to the agency theory, adverse selection and the efficient market hypothesis. It is not just the primary goal of integrated reporting to reduce the information gap, but also to increase the decision usefulness for the investors. Hence, this links to the value relevance theory. There are applicable theories that can help while making inferences, such as earnings quality and financial reporting quality. However, I limit myself to the aforementioned theories. I assume that these theories are most applicable when making inferences regarding information asymmetry.

2.1.1 Agency theory

I use the agency theory because it is a well-known concept which forms the basis in explaining information asymmetry. According to Jensen and Meckling (1976) the agency theory is explained as follows: "a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent. If both parties to the relationship are utility maximizers there is good reason to believe that the agent will not always act in the best interests of the principal. The *principal* can limit divergences from his interest by establishing appropriate incentives for the agent and by incurring monitoring costs designed to limit the aberrant activities of the agent. In addition, in some situations it will pay the *agent* to expand resources (bonding costs) to guarantee that he will not take certain actions which would harm the principal or to ensure that the principal will be compensated if he does take such actions. However, it is generally impossible for the principal or the agent at zero cost to ensure that the agent will make optimal decisions from the principal's viewpoint." Therefore, cost will be incurred due to information asymmetry among the principal and agent. (Jensen & Meckling, 1976. p.308).

Since ownership and control of the company is separated, the relationship between shareholders and the manager of a company fits the definition of a pure agency relationship. Managers, who are insiders, have an information advantage over their outsiders. Therefore, shareholders and debtors of the company want detailed reports about the company to monitor the performance of the company and the manager. The IIRC (2017) state that they reduce the information gap by their integrated report. Therefore, it is important to check whether this statement is correct.

Akerlof (1970) takes a different perspective regarding information asymmetry. He addresses the 'lemons' problem. Healy and Palepu (2001) gives the following example to clarify this problem: "consider a situation where half the business ideas are ''good' and the other half are 'bad'. Both investors and entrepreneurs are rational and value investments conditional on their own information. If investors cannot distinguish between the two types of business ideas, entrepreneurs with 'bad' ideas will try to claim that their ideas are as valuable as the 'good' ideas. Realizing this possibility, investors will value both good and bad ideas at an average level. Therefore, the capital market will rationally undervalue some good ideas and overvalue some bad ideas relative to the information available to entrepreneurs." (Healy & Palepu, 2001). This example clarifies the potential problem than can be resolved by integrated

reporting. Keep in mind that the primary purpose of integrated reporting is to explain to stakeholders how organizations create value over time to help investors distinguish 'bad' from 'good' investments. Ultimately, this reduces the "lemons" problem.

2.1.2 Adverse selection

Investors trade based on their subset of information. Due to different subsets of information among investors there is a difference between the bid and ask price. Stoll (2000) finds evidence for this spread and talks about friction in the market. Stoll (2000) refers to the informational view that builds on the work of Glosten and Milgrom (1985), Kyle (1985) and Copeland & Galai (1983). The informational view of the spread has two intellectual branches. One branch views the spread as the value of the free trading option offered by those who post the quotes. Posting and removing quotes takes time, therefore suppliers of immediacy provide free options to speedy trainers. However, if information arrives before the quotes can be adjusted, the person who place his quote loses. The spread is to compensate the suppliers of immediacy for the option they grant to the rest of the market. The second branch assumes the presence of information asymmetry. Here the supplier of immediacy faces the risk that a bid or ask will is accepted by someone with superior information – adverse information. If informed traders have supporting information, they buy at the ask price. In addition, they sell at the bid if they have information that justifies a lower price. Accordingly, the spread in the bid-ask price is the value of the information lost to timelier or better informed traders.

According to Stoll (2000) adverse selection is linked to information asymmetry and can be measured by using the bid-ask spread. However, the bid-ask spreads consist of three components. That is inventory holding costs, order processing costs and asymmetric information costs. The asymmetric information costs, the adverse selection component, thus measure the proportion of the spread that the specialist can set due to their superior set of information. (Stoll, 2000)

2.1.3 The efficient market hypothesis

An important role of the capital market is the allocation of ownership of the economy's capital stock. To make this allocation efficiently, the market should provide accurate signals for resource allocation, as a result investors can make optimal investment decisions. Hence, the security prices should fully reflect all available information. There is a lot of theoretical and

empirical evidence about the theory of efficient market. I use the paper of Fama (1970) because this paper is often cited. Fama (1970) reviewed theoretical and empirical literature regarding the efficient market model. In response to this review he defined three levels of market efficiency. He distinguishes one from another by the capability of the capital market to process information as reflected in the stock prices. The *strong-form* state that investors or groups have monopolistic access to any information relevant for price formation. For instance, corporate insiders and specialists have monopolistic access to information. However, this type is a rather extreme description of the world. Therefore, this model is seen as a benchmark against which the importance of deviations from market efficiency can be judged. Accordingly, the *semi-strong* form expects that the market fully incorporates all obviously publicly information available (e.g., announcements of annual earnings, stock splits and annual reports) into their information set. In the *weak-form* tests, the information subset of interest is just past price (return) histories. Therefore, past information relevant to the firm is fully incorporated in the stock price. This form of market efficiency assumes that earnings of a company follows a random walk. (Fama, 1970)

The extent to which companies provide information to the market matters. Therefore, it is interesting to investigate how the information of the integrated report is reflected in the stock price. In section 2.5.2 I further elaborate on this matter.

2.1.4 Value relevance theory

The adoption of integrated reporting for companies is not mandatory. A possible motivation for a manager is that an integrated report links non-financial information to financial information which helps investors in the assessment of the valuation of the firm. The value relevance theory can add insight into the rationale behind the investors' assessment of certain accounting information in relation with stock returns.

Holthausen and Watts (2001) critically reviewed relevant papers about the relevance theory and whether inferences can be made for standard setters. Yet, I use this paper to add understanding in the value relevance theory. Holthausen and Watts (2001) describes three categories. Category 1 (relative association studies) compares the association between stock market values, or changes in values, and alternative bottom-line measures. For example, a study which compares stock returns under GAAP versus IFRS. Category 2 (incremental association studies) tests whether accounting numbers of interest helps explaining value or returns. For example, Venkatachalam (1996) examines whether accounting numbers can be put

into a valuation model in order to predict coefficient values. Hence, these studies help to create more reliable valuation models. Category 3 (marginal information content studies) investigates whether a particular accounting number adds value to the existing information set available to investors. Finally, value relevance theory describes whether certain accounting numbers, or choices of specific accounting standards are related with value changes in terms of stock returns. The term value can be widely interpreted.

Barth et al. (2001) state that an accounting amount is defined as value relevant if it has a predicted association with equity market values. Conducting tests for value relevance extends knowledge regarding the reliability and relevance of accounting amounts reflected in equity market values. Subsequently, reliability and relevance are two primary criteria which the FASB uses for choosing certain accounting standards in their Conceptual Framework. Academics use value relevance as the operationalization of these criteria. An accounting amount is value relevant if it has a predictive significant relation with share prices. In other words, an accounting amount reflects relevant information to the investor in valuing the firm and this amount is measured reliably enough to be reflected in share prices. (Barth, Beaver, & Landsman, 2001)

According to Holthausen and Watts (2001) this thesis can be described as a category 1 study. I compare companies who have an integrated report and who do not and how this is associated with the level of information asymmetry. However, I do not make inferences whether integrated reporting is more value relevant for stakeholders or not because it is not the purpose of this research.

2.1.5 Conclusion

Integrated reporting is conceived to reduce the information gap between principals and agents. This reduction should lead to a more efficient market with less friction. Hence according to the efficient market hypothesis, this reduction and increased efficiency is reflected in the stock price. Whereby the value relevance theory helps to understand how stock prices react to changes in accounting numbers.

2.2 Integrated reporting

This section gives a brief overview of the IIRC framework and its guiding principles and content elements as well.

According to Jensen and Berg (2012) there is an increasing demand for aggregating financial and non-financial information into one report. This report needs to provide a holistic view of the company and its future goals, connections between the financial performance, and social, ecological and economic activities. (Jensen & Berg, 2012). The International Integrated Reporting Council released such a report called the integrated report. The IIRC is established by the International Federation of Accountants, Global Reporting Initiative and the Prince's Accounting for Sustainability Project since 2010 (IIRC, The International Framework, 2013a). The purpose of this report is to explain providers of financial capital how an organization creates value over time.

The IIRC describes the integrated report as:

"*A process founded on integrated thinking that results in a periodic integrated report by an organization about value creation over time and related communications regarding aspects of value creation.*" (IIRC, 2013, p.34) In addition, "*organizations are using integrated reporting to communicate a clear, concise, integrated story that explains how all of their resources are creating value. Integrated reporting is heling business to think holistically about their strategy and plans, make informed decisions and manage key risks to build investor and stakeholder confidence and improve future performance*." (IR, 2016)

There are some important definitions that requires further elaboration. The IIRC defines integrated thinking as: "*the active consideration by an organization of the relationships between its various operating and functional units and the capitals that the organization uses or affects. Integrated thinking leads to integrated decision-making and actions that consider the creation of value of the short, medium and long term*." Hence, the value creation over time is the cornerstone of this integrated report. The IIRC demands disclosure about six types of capital; financial, manufactured, intellectual, human, social and relationship, and nature capital. The interaction between these six types of capital pillars presents to stakeholders how the company creates value over time and makes the non-financial information explicit (the linkage between non- and financial information).

2.2.1 IIRC Framework

The IIRC provides the public with a framework, which is released in 2013. This framework is principle based, it does not set hard KPI's. The preparation of an integrated report requires managerial judgement. Hereafter, I explain the seven guiding principles and eight content elements of this framework. This is necessary for a broader understanding of the fundament of the integrated report.

2.2.2 Guiding principles

The first principle is the strategic focus and the future orientation. This principle state that "*an integrated report should provide insight into the organization his strategy, and the ability to create value on the short, medium and long term*", IIRC (2013a). this helps providing future oriented information. (Mio C. , 2016)

The second principle is connectivity of information. This state that "*an integrated report should show a holistic picture of the combination, interrelatedness and dependencies between the factors that affect the organization his ability to create value over time*", IIRC (2013a). This principle is linked to integrated thinking.

The third principle is stakeholder relationships. This state that "*an integrated report should provide insight into the nature and quality of the organization his relationships with its key stakeholders*". An integrated report enhances transparency and accountability. These are essential for building trust in public.

The fourth principle is materiality. According to the Framework "*an integrated report should disclose information about matters that substantively affect the organization his ability to create value over the short, medium and long term*", IIRC (2013a). This plays a central role in the integrated report in order to reach conciseness. However, this principle is subject to judgement and the array of stakeholder is diminished. Hence, in this principle investors and providers of financial capital play a central role. (Mio C. , 2016)

The fifth principle is conciseness. An integrated report needs to include sufficient information in order to understand the organization's strategy, governance, performance and prospects. In short, the information contained in the integrated report needs to be relevant.

The sixth principle is reliability and completeness. "*An integrated report should include all material matters, both positive and negative and without material error*", IIRC (2013a). The organization needs to understand the importance of internal control and governance.

The seventh principle is consistency and comparability. In the integrated report "*the information presented in the integrated report should be presented: (i) on a basis that is consistent over time, (ii) in a way that enables comparison with other organizations to the extent it is material to the organization his own ability to create value over time*", IIRC (2013a)). Reporting policies are consistent with previous periods. Since, organizations create value in their own way, the IIRC framework tries to enhance the comparability by stating these principles and content elements.

2.2.3 Content elements

The IIRC framework addresses eight content elements. The first element is organization overview and external environment. An integrated report answers the question "*What does the organization do and what are the circumstances under which it operates?*" IIRC (2013a). This element discusses matters such as mission, vision, culture, ethics and values. The organization also needs to map the structure of the organization. In addition, this element explains how the external environment is influencing the organization.

The second element is governance. "*An integrated report should answer the question: How does the organization his governance structure support its ability to create value in the short, medium and long term?*" IIRC (2013a)

The third element is business model. This element answers the question "*What is the organization his business model?*" IIRC (2013a). This gives insight of how the organization creates value over time by transforming inputs into outputs. It is about inputs that relate to capital. The focus is not on all the inputs of the company, only that are material to the organization to create value over time.

The fourth element is risk and opportunities. "*An integrated report should answer the question: What are the specific risks and opportunities that affect the organization's ability to create value over time and how is the organization dealing with them?*", IIRC (2013a) An organization reports about key risks and opportunities that relate to organization's effect on continuation and availability of capitals over time.

The fifth element is strategy and resource allocation. An integrated report explains "*Where does the organization want to go and how does it intend to get there?*", IIRC (2013a) An organization reports the short-, medium- and long-term strategic objectives, and also what differentiates the company from its competitors.

The sixth element is performance. "*An integrated report should answer the question: To what extent has the organization achieves its strategic objectives for the period and what are the outcomes?*" IIRC (2013a)

The seventh element is outlook. Where an integrated report should answer the question to "*what challenges and uncertainties is the organization likely to encounter in pursuing its strategy, and what are the potential implications for its business model and future performance*?" IIRC (2013a) This answer is important for stakeholders in order to assess how the organization responds to uncertainties. This makes the company more predictable.

The eight element is basis of preparation and presentation. This organization should answer the question "*how does the organization determine what matters to include in the integrated report and how are such matters quantified of evaluated*?" IIRC (2013a).

The aforementioned principles and content elements emphasizes value creation. Furthermore, these principles and content elements enables a broad understanding of the organization his operation.

2.3 Supporting evidence for integrated reporting

At this point, the objective of integrated reporting is clear. Since the adoption of integrated reporting is only mandatory in South-Africa (Lee & Yeo, 2016), this section gives a brief motivation for companies to adopt integrated reporting according to contemporary literature.

According to (Owen, 2013), the focus of traditional financial reporting is mainly on the transactional part of business rather than the tactical or strategic part of business. The traditional financial report place emphasis on the recognition, measuring and valuing assets, liabilities, income and expenditure. Thus, it provides understanding of how the business create value in the short-term. Integrated reporting place emphasize on the value creation on the long-term. Integrated reporting requires a higher composition of qualitative date with quantitative data.

According to (Eccles & Saltzman, 2011) integrated reporting accompanies three benefits. A company achieves internal benefits, this include better internal resource allocation decisions, a greater engagement with the stakeholders and lower reputational risk. Eccles and Armbrester (2011) adds that it results in better risk management due to the integration of financial and non-financial data. Second, the external benefits. This include meeting the expectations of the mainstream investor, and ensuring that data vendors provides accurate

nonfinancial information of the company. The third is managing regulatory risk such as being prepared for a wave of global regulation, responding to request from Stock exchanges. As such, it brings together material nonfinancial and financial data in one place, and shows the relation between financial and nonfinancial metrics.

The IIRC (2011), Zhou et al. (2017), Eccles and Krzus (2010) and PwC (2014) adds lower cost of capital, enhanced reputation, increased transparency and information that is more attuned to investors. This is the consequence of more disclosure by a firm. Zhou et al. (2017) finds supporting evidence for firms with a higher level of alignment with the IR framework have lower costs of capital due to the acceptance by investors because of lower information risk. Hence Zhou et al. (2017) finds supporting evidence that integrated reporting matter to the capital markets. They find a negative association between 'newness' and 'connectivity' and forecast error. This suggests that an integrated report contains new information which helps to improve the accuracy of analyst forecast. However, there is weak evidence that the level of alignment is negatively associated with analyst earnings forecast dispersion.

2.4 Criticism on integrated reporting

Integrated reporting is in an immature phase of the existing body of knowledge. Hence, it is likely that integrated reporting is subject to flaws. There are several papers that criticize integrated reporting. I choose to elaborate on Flower (2015) because his work is frequently cited. His most prominent critique is the limited perception of the stakeholders. The integrated report is merely focused on the investors or providers of financial capital. He highlights this in several ways; first, the primary purpose of an integrated report is to explain firm's value creation to providers of financial capital. According to Flower (2015) the term 'value' needs to be interpreted in the interest of the providers of financial capital. Paragraph 2.6-2.8 in the IIRC 2013a makes clear that an integrated report should cover 'value to other' only to the extent that this is 'material to the organization's ability to create value for itself'. Again, according to Flower (2015), the term value should be interpreted as value for the investors.

Another point that highlights the investor perception is the way human capital is disclosed. The IIRC Framework describes human capital as 'people's competencies, capabilities and experience, and their motivation to innovate including their alignment and support for an organization's governance framework, risk management approach, and ethical values, ability to understand and implement an organization's strategy loyalties and

motivations for improving processes, goods and services' (IIRC, 2013a, paragraph 2.15). According to Flower (2015) this definition implies that people do not have intrinsic value. Their value depends on the contribution they make to the organization. This automatically excludes people who are not inputs to the firm's business model. For instance, the local community that is harmed by poisonous gasses of the firm are not taken into account. This highlights the limited orientation of the integrated report. Disclosing nature capital has the identical orientation. the IIRC only covers to the extent that it is an input to the firm's production process, it does cover the impact on the environment.

Nevertheless, the IIRC accepts the stewardship role of the firm in relation to elements of capitals that are not inputs to the production process. Only when this is imposed by law or contract the firm should disclose. The framework state 'were a stewardship responsibility is not imposed by law or regulation, the organization may nonetheless accept stewardship responsibility' (IIRC, 2013b, paragraph 3.21). Although the term 'may' is not obligatory.
The following criticism of Flower (2015) on this aspect highlights again the limited perception of stakeholders: "In my opinion, the above analysis makes it abundantly clear that the IIRC requires a firm to report on the effect on its activities on stakeholders, on society, and on environment only to the extent that there is a material impact on its own operations" (Flower, 2015, p.7) This opinion of Flower (2015) builds further on the opinion of Brown and Dillard (2014). They emphasize the primary focus on the shareholders and its neo-classical understanding of economics, the lack of orientation on human well-being, social justice and ecological integrity. (Brown & Dillard , 2014)

Hence, the IIRC advocates the 'business case'- by maximizing a firm's profits, the society will also benefit. (IIRC, 2010, p3). According to Flower (2015) this business case accepts the objective of the firm to make a profit for the benefit of its capital providers. Where the costs are being calculated from the perspective of its capital providers. Flower (2015) gives an example that elaborates this perspective even more: "if the firm's managers succeed in beating down the amount of wages paid to employees, this represents a reduction in the firm's costs – the loss suffered by employees is not taken into account" (Flower, 2015). This is contrary to creating a sustainable value for its stakeholders in general. (Flower, 2015)

In addition, Thomson (2015) adds that an integrated report should widen its orientation and shift its focus to its stakeholders rather than narrow corporate dialects. To come to this, Thomson (2015) calls for a deeper understanding of the sustainability programmatic. To achieve this, the IIRC need to construct a 'sustainable case'. (Thomson, 2015)

2.4.1 The refutation of the criticism

Mio (2016) tackles the primary criticism of Flower (2015) in her book. Flower (2015) his primary criticism refers to the most important and controversial IIRC principles: materiality. In the determination of materiality, the integrated report solely focuses on the providers of financial capital instead of all stakeholders. Paragraph 3.11 of the IIRC framework states that "it does not mean that an integrated report should attempt to satisfy the information needs of all stakeholders" (IIRC, 2013a) and, in defining materiality, the IIRC states: "a matter is material if it is of such relevance and importance that it could substantively influence the assessments of providers of financial capital with regard to the organization's ability to create value over the short, medium and long term" (IIRC, 2013b).

Mio (2016) believes that the IIRC approach should not be judged from a "static" perspective but from a "dynamic" one.

The static perspectives assume that in order to define materiality, companies consider whether the issue has an impact on the assessment of the financial capital provider. The static perspective does not consider possible subsequent actions by stakeholders and the relative responses of companies. Mio (2016) state that most scholars seem to rely on this perspective.

In defiance of the dynamic perspective which takes the subsequent possible actions of stakeholders and companies into consideration. Stakeholders can actively intervene if they believe that companies should not have excluded certain issues in the integrated report. This requires an active attitude by stakeholders.

According to Mio (2016) carefully reading of the IIRC framework raises doubt whether criticism about the limited target group is justified. Hence, choices for specific wording might have had political reasons. Indeed, the IIRC framework allows a Stakeholder or even Public Value oriented interpretation of the IIRC's concepts of value creation. (Mio, C. , 2016)

2.4.2 Revision of the criticism versus the supporting literature

The IIRC framework has attracted great attention among practitioners and scholars (Mio, 2016). Where giving priority to serve information to providers of financial capital is the most noticeable. However, Mio (2016) states that it's not the case. According to Mio (2016) criticisms should rely on the dynamic approach and that it is due to wording that the integrated report use financial capital providers as target users. Nonetheless, in my opinion these two

reasons are not sufficient. The IIRC should just embrace this criticism and revise their framework.

For instance, the IIRC can make a 'sustainable' case as suggested by Thomson (2015). In this case, they should operationalize the dynamic approach. The example regarding human capital is a good starting point. In this example, the IIRC should take harm of all people into consideration, not just which are relevant for providers of financial capital.

In my opinion just reporting accounting numbers is not the end, it's the meres that are the end. It is about how you justify the accounting numbers on the balance sheet. This is key for creating sustainable value to the company and its stakeholders where integrated reporting can offer the solution. However, the IIRC should improve their framework in accordance with the criticism.

2.5 Operationalization of information asymmetry

The research of Lee and Yeo (2016) is the predominant cause to link information asymmetry with integrated reporting. Lee and Yeo (2016) finds supporting evidence that firms which are more compliant with the integrated reporting framework, have higher external financing needs and higher firm valuations. This suggests that integrated reporting mitigates information asymmetry between corporate insiders and external providers of capital. Subsequently, (Stubbs & Higgins, 2014) bridges the gap between the level of information and the way firms use integrated reporting. Stubbs and Higgins (2014) finds evidence that integrated reporting has not resulted in a decrease in the level of information asymmetry. Because the supply of information is not required by the providers of financial capital for making investment decisions. In addition, there is a lack of understanding by mainstream providers of financial capital in the IR framework. In this section I elaborate on the proxies used by prior literature to capture the extent of information asymmetry.

2.5.1 Stock liquidity

Krinsky and Lee (1996) denotes that according to Glosten and Milgrom (1985) there are two types of traders: liquidity traders and informed traders. Informed traders trade because they have private information that is not reflected in the security prices, while liquidity traders trade for reasons other than having superior information. Consequently, there are traders who makes losses from trading with informed traders. The loss of this trade is recovered by the bid-ask

spread. This suggests that a greater level of information asymmetry among traders will lead to wider spreads. Kim and Verrecchia (1994) does not make a distinction between types of traders. Their intuition with respect to the bid-ask spread is that these spreads should be wider for periods leading up to the public announcement due to the greatest level of information asymmetry. After the announcement, the level of spread reduces due to a reduction in the level of information asymmetry. Hence, the semi-strong efficient market hypothesis holds. When information becomes publicly available, it will immediately be reflected in the stock prices. These results are in line with the empirical results from Krinsky and Lee (1996). They find that information asymmetry increases before the earnings releases. Further, their adverse selection proportion is higher for the event period than for the pre-disclosure period. Thus, according to Kim and Verrecchia (1994) and Krinsky and Lee (1996) the spread is higher during the event date than during the pre-disclosure period. (Kim & Verrecchia, 1994) (Krinsky & Lee, 1996)

Bischof and Daske (2013) finds evidence that stock market liquidity is an economic outcome that is sought by many regulators through the design of disclosure regulation. Also, many empirical studies support the idea of a positive relationship between a firm's disclosure level and the stock market liquidity (Welker, 1995), (Healy , Hutton, & Palepu, 1999), (Leuz & Verrecchia, 2000). Bischof and Daske (2013) use equity bid-ask spreads as a proxy for a firm's market liquidity. (Bischof & Daske, 2013)

Roulstone (2003) also use the bid-ask spread as a proxy for stock liquidity. However, Roulstone (2003) add share depth in their model. This spread is the difference between the specialist's bid price (the price that traders are willing to sell to the specialist) and the ask price (the price at which traders are willing to buy from the specialist). The share depth is the number of shares that is involved in the trade. Although Callahan et al. (1997) states that market liquidity studies only use bid-ask spread as a proxy for market liquidity, I add the bid-ask depth of the trade to control for the number of shares involved. Therefore I can make better comparisons among large and small companies. (Roulstone, 2003)

The first hypothesis is consistent with prior literature, which uses the bid-ask spread as a proxy for the level of information asymmetry and is constructed as follows:

H1: *Firms which use integrated reporting are negatively associated with the average spread during the event window.*

This hypothesis is stated in the alternative form. The corresponding null hypothesis is that integrated reporting is positively associated with the average spread during the event window. A rejection of the null hypothesis implies that integrated reporting reduces information symmetry.

2.5.2 Cumulative Abnormal Returns

Additionally, in order to answer my research question, I check whether integrated reporting enables investors to make better predictions on stock returns. Prior literature suggests that abnormal returns also proxies for information asymmetry. I use the work of Nichols and Wahlen (2004) to empirically check whether integrated reporting is a better predictor for stock performance. Nichols and Wahlen (2004) assess whether the sign of the change in annual earnings is associated with the sign of abnormal annual stock returns. Integrated reporting tells more about the non-financial part of the company; therefore, the earnings numbers contain more information. Subsequently, analysts are able to make better forecasts about future cash flows and earnings. The underlying concept is based on the efficient market hypothesis as explained in section 2.1.3. The efficient market adopts these expectations and are reflected in the stock price. Since the stock price at the moment contains more information, abnormal returns should be lower. (Nichols & Wahlen, 2004) This reasoning is essential for my choice to use abnormal returns in order to make predictions about the sign of the relation between integrated reporting and information asymmetry.

Nichols and Wahlen (2004) replicate the work of Ball and Brown (1968). I use the same calculation for the abnormal returns. However, I limit the window. I will elaborate this choice in the research design. In accordance with Nichols and Wahlen (2004) the cumulative abnormal returns (hereafter CAR3) are calculated as follows: the total return of a firm – the return on that day of the market index.

In summary, the CAR3 is a widely-used proxy to operationalize information asymmetry according to Nichols and Wahlen (2004) and Ball and Brown (1968). The second hypothesis is consistent with Nichols and Wahlen (2004) and is constructed as follows:

H2: *Firms which use integrated reporting are negatively associated with the cumulative abnormal returns during the event window.*

This hypothesis is stated in the alternative form. The corresponding null hypothesis is that the firms which use integrated reporting are positively associated with the cumulative abnormal returns during the event window. I assume that investors, who use integrated reports, are able to make expectations with greater accuracy about stock returns. Hence, the unexpected part of the returns is lower. A rejection of the corresponding null hypothesis implies that integrated reporting reduces information asymmetry.

Finally, these two hypotheses help making inferences about the association between integrated reporting and information asymmetry. If this predicted sign remains negative for both hypotheses than this implies that integrated reporting mitigates the information gap. This inference can be made based on theory discussed in section 2.1.

2.6 Summary

Integrated reporting gives a holistic view of the company by linking non-financial information with financial information. Subsequently, according to prior theory, this linkage of information should ensure investors to make better assessment of future cash flows which should be reflected in stock prices. Hence a reduction in information asymmetry should be reflected in the bid-ask spread and cumulative abnormal returns. Whether integrated reporting is negatively associated with information asymmetry will be tested in the following sections.

3. Research design:

The purpose of this study is to examine the association between integrated reporting and information asymmetry. The predictive validity framework (Libby boxes) presented in the Appendix of this study shows how the conceptual relation examined in this study will be operationalized in the research design. This operationalization is in line with prior literature discussed in Chapter 2.

3.1 Stock liquidity model:

Krinsky and Lee (1996) finds evidence that the adverse selection component increases significantly before and following the earnings announcements. Moreover, the inventory holding component is lower, suggesting that a market maker's risk of holding excessive inventory due to increased trading activity. Finally, they show that order processing costs also decline significantly during periods surrounding earnings releases. These results can be interpreted of increased information asymmetry. In accordance with Krinsky and Lee (1996) I assume that the bid-ask spread during the tested period reflects the level of information asymmetry, holding the inventory holding and the processing order cost constant. Keep in mind that this spread is subject to distortions due to an interaction between the three components. The operationalization of stock liquidity results in the following OLS regression model.

$$SPREAD3 = \beta o + \beta 1*IR + \beta 2*FIRM\_SIZE + \beta 3*VOLUME + \beta 4*GROWTH + \beta 5*INDUSTRY + \beta 6*ROA + \beta 7*REVENUE + \beta 8*LEVERAGE + \beta 9*PROFIT + \beta 10*RET\_VOL + \varepsilon i,t$$

SPREAD is calculated by taking the average of the quoted ask price less the quoted bid price the day before disclosure, the disclosure and the day after the disclosure. IR is a dummy variable which takes the value of (1) when companies use integrated reporting and (0) otherwise. Consistent with H1 I predict that SPREAD3 is significantly lower for the treatment group relative to the control group. Consequently, this suggests that integrated reporting is negatively associated with information asymmetry.

In accordance with Roulstone (2003), Bischof & Daske (2013), Healy et al. (1999), Aceituno et al. (2014) and Leuz (2003) I use FIRM_SIZE, VOLUME, GROWTH,

INDUSTRY, ROA, REVENUE, LEVERAGE, PROFIT and RET_VOL to control for endogeneity.

I calculate FIRM_SIZE as the log of the total assets. Firm size proxies for the amount of information available regarding a firm and is associated with the market's reaction to information announcement. Greater information lowers adverse selection thus I predict FIRM_SIZE is negatively correlated with SPREAD.

VOLUME is calculated by the log of the average daily trading volume for the year deflated by the number of shares outstanding. Firms with higher trading volume present market makers with more opportunities to manage their inventory and recoup losses to informed traders. Therefore, VOLUME should be negatively correlated with SPREAD.

GROWTH is calculated by taking the market-to-book ratio. According to Upadhay et al. (2010) firms with greater growth opportunities are associated with less transparency. Subsequently firms with higher market-to-book values are expected to disclose greater volumes of information. Companies use this in order to reduce information asymmetry. Therefore, GROWTH should be negatively correlated with SPREAD.

SIC is a 4-digt industry code. This variable controls for industry effects. The industry sector is a variable used to account for the volume of company information reported. (Frias-Aceituno, Rodriquez-Arize, & Garcia-Sanchez, 2013)

I use ROA to control for the profitability of firms. Frias-Aceituno, et al. (2013) suggest a positive impact of the profitability of firms on the degree of information disclosed. In addition, I add REVENUE to control for profitability. Revenue as line item in the income statement is used.

LEVERAGE is calculated by dividing total debt by total equity. Financial leverage commits companies in the form of paying interest and principal payments. A higher level of leverage is paired with a higher risk of financial failure. (Sierra, Zorio, & Garcia-Benau, 2013)

Following Frias-Aceituno, et al. (2013)

PROFIT is calculated by dividing net income before taxes by the book value of shareholders 'equity. Aceituno et al. (2014) observe that the most profitable companies tend to be those allocating most resources to the development of integrated reporting, in order to make their actions better known to the public.

Lastly, I calculate RET_VOL by using the standard deviation of the daily returns during the year. According to Roulstone (2003) the more volatile a firm's price, the more uncertain the market maker is of the short-term cost of holding the stock. In order to protect against price

swings, the market maker increases the spread. Stoll (1978) and Jegadeesh & Subrahmanyam (1993) state that there is a positive association between price variance and spread.

The ε denotes the error term. I do not make inferences regarding the error term.

3.2 Abnormal returns model:

According to literature as, discussed in chapter 2, abnormal returns is good proxy to capture information asymmetry. In order to test hypothesis 2 I, create the following OLS regression model:

$$CAR3 = \beta o + \beta 1*IR + \beta 2\ FIRM\_SIZE + \beta 3*VOLUME + \beta 4*GROWTH + \beta 5*INDUSTRY + \beta 6*ROA + \beta 7*REVENUE + \beta 8*LEVERAGE + \beta 9*RET\_VOL + \varepsilon i,t$$

The dependent variable is CAR3. This variable is calculated by taking the abnormal returns over a three-day period. This three-day period is the same as the period for the variable SPREAD in model 1, where day zero is the event of disclosure of the financial/integrated report. In order to calculate abnormal returns the stock return of the specific company is subtracted from the return of the market for that specific day. Consistent with Hypothesis 2 I expect that abnormal returns are lower for companies who use integrated reporting. Hence, integrated reporting provides more information to the public. According to the efficient market hypothesis investors are expected to make better predictions about the returns of the company.

The dummy variable IR is the same as in model 1. FIRM_SIZE, VOLUME, GROWTH, INDUSTRY, ROA, REVENUE, LEVERAGE and RET_VOL are calculated the same as well.

3.3 Testing

As a result, I can compare the spread and the abnormal returns among companies which use integrated reporting and companies which do not. I will test whether these values significantly differ in means from each other by using the independent T-test. After this I use multivariate analysis for both models to validate inferences regarding the univariate analysis. Additionally, I use robustness tests and a difference-in-difference test. Last-mentioned, from curiosity, is used to check whether the IIRC Framework has any impact spread or cumulative abnormal

returns. Lastly, I draw conclusion on the hypotheses and answer the research question: how integrated reporting is associated with information asymmetry?

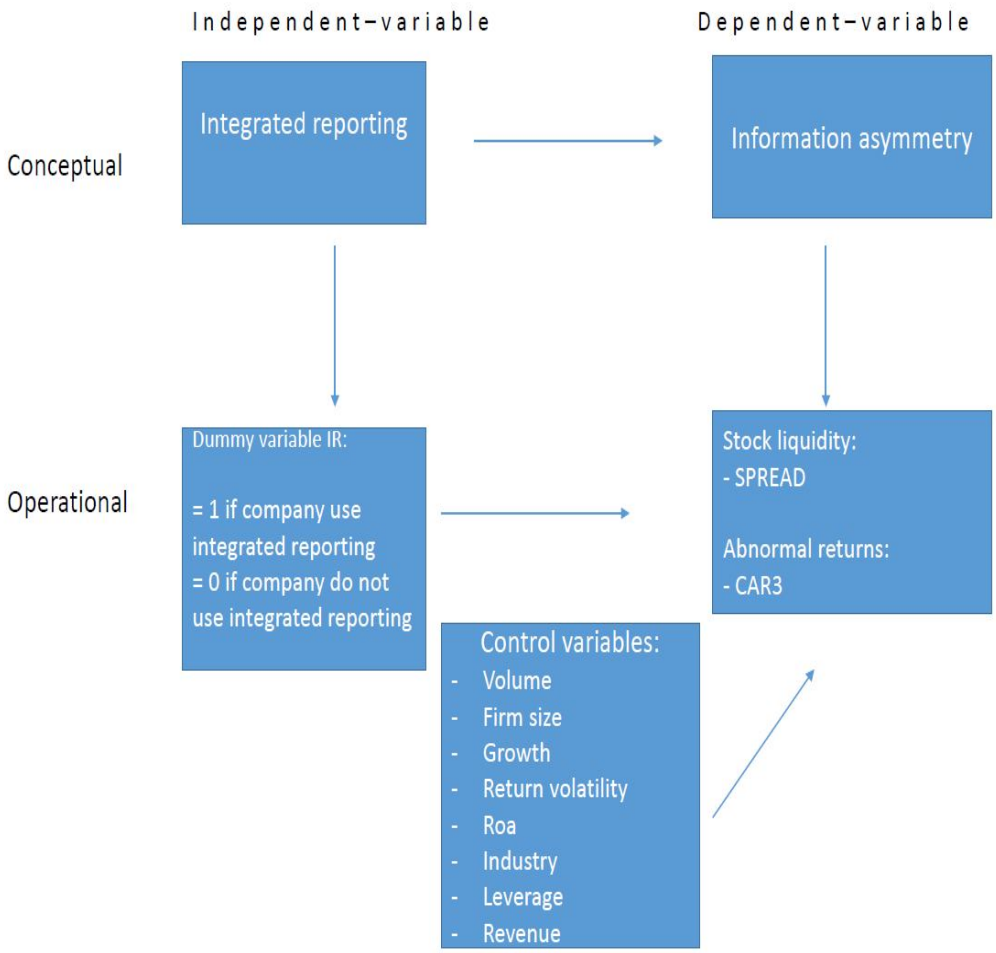
3.4 Construct validity

Construct validity is the extent to which a test measures what it claims to be measuring. The purpose of the linear regression model is measuring the 3-day cumulative abnormal returns and the 3-day spread when companies use integrated reporting.

Notice that the construct validity of integrated reporting is limited. Since I use a dummy variable to capture integrated reporting, which is straightforward. This a limitation of the conducted study.

The 3-day cumulative abnormal returns are measured by subtracting the return of the specific companies from the return of the S&P500 index on that day. The 3-day spread is calculated by taking the average spread of the event window. Figure 1 shows the Libby boxes in a structured way which is used to test the association between integrated reporting and information asymmetry. The upper boxes are the conceptual part of the variables. The lower boxes reflect the operationalisation of the variables. I hypothesize that integrated reporting is negatively associated with information asymmetry. Hence, integrated reporting has a negative predicted sign for the bid-ask spread and cumulative abnormal returns respectively. In addition, I structure the control variables in a separate box to control for omitted variable bias.

Figure 1 Predictive validity framework



3.5 Internal validity

This study uses cross sectional data from listed companies. Since values of x-variables are not randomly assigned I have two problems. First there are correlated omitted variables and secondly, reversed causality.

Since the values of X-variables are not randomly assigned instead endogenously determined, there are omitted variables which correlates with the X and Y variable. This results in biased coefficient estimates and t-statistics since the explanatory variables are correlated with the residuals. The second problem makes it hard to determine whether X causes Y or Y causes X.

I try to control for the first problem by using a set of control variables as proposed by prior literature. However, controlling for every variable possible is out of question. Especially,

since integrated reporting lacks body of existing knowledge due to its immaturity. The second problem can be solved by for instance, using lagged X-values or a difference-in-difference test. However, my research setting does not allow to solve for this problem. Looking at the aforementioned problems, I am limited to make inferences about the association between X and Y rather than supposing causality.

3.6 External validity

External validity measures the extent to which the results can be generalized to other populations. Since I use observational data this study for instance, can be generalizable to a European setting. According to the report from the GRI there are tenfold firms in Europe which use integrated reporting which makes it a possible to investigate. Conclusively, this study has a high external validity.

Note that in section 5.3 I test with a random effects model for generalization of the used sample.

4. Sample selection/data:

This section discusses the collected data that is used to answer the research question. The first paragraph describes the sampling process and used data sources. Subsequently the second paragraph describes the data collection and the third paragraph discusses the sample size per hypotheses.

4.1 Sample selection

This is an archival/observational study where the sample period starts in 2010. In 2010, integrated reporting was mandated for South-African companies. (IIRC, Integrated reporting, 2017). Also, criticism of Eccles & Krzus led to a rethinking of how integrated reporting should be operationalised. Subsequently, since 2010 integrated reporting gained attention, therefore I choose to start in 2010. In answer to harsh criticism the IIRC created a framework for integrated reporting in 2013. As firms needs time to adopt and adapt to the IIRC framework I decide to run the sample through the most recent year of data availability; which is 2015.

First of all, I limit myself to Northern-American listed companies. It is not possible to retrieve event dates of European companies (even with help from the Erasmus Datateam), therefore, I am forced to use Northern-American companies. Due to lack of time I cannot retrieve these event dates manually.

To answer the research question, I analyse a sample of 30 listed North-American companies that use integrated reporting according to a report retrieved from the GRI. According to this report there are 72 companies that use integrated reporting. This report describes the year in which companies starts using integrated reporting. Due to different starting years, I assume that all companies use integrated reporting starting in 2010, which is a small limitation. Due to missing data and non-listed companies I dropped 42 companies from my initial sample, remaining a sample of 29 listed companies. I use a compare means test, therefore I created a control group. This control group consists of 32 Northern-America listed companies. To retrieve a representative and comparable control group I use conditional statements in Compustat – Capital IQ. I set a minimum and maximum to total assets, revenue and liabilities. I retrieved these minimums and maximums from the integrated reporting sample. Finally, my sample consists of 61 companies in the period of 2010 to 2015. I use the same sample for both models tested.

Table 1 Final sample

	Firms
Initial sample of IR	72
Less:	
Missing observations	-38
No event date available	-5
Final IR sample	29
Control group	32
Final sample	61 (366 firm-year observations)

4.2 Data sources

I retrieved data regarding the dependent variables from the CRSP database within Wharton Research Data Service (WRDS). In order to calculate CAR3 I retrieved daily closing stock prices, paid dividends and returns on the S&P 500. Additionally, this data is also necessary to calculate the control variable 'standard deviation'. From CRSP I also retrieved closing bid- and ask prices in order to calculate the spread.

Event dates of the listed companies are retrieved from Audit Analytics. In this database, I extract dates of audit opinions. This date is necessary to calculate the CAR3 and the spread during the event window, which is the day before, the event date and the day after the event date. In accordance with prior literature to calculate control variables, I consult Compustat – Capital IQ. I consult the section Northern-America – fundamentals annual to retrieve the SIC code, Firm_Size, Profit, Volume, leverage and Growth.

5. Empirical results

This chapter provides insight into the results and analyses of the hypotheses tested. First, this chapter describes the descriptive statistics of the dataset tests for normality of the variables. Thereafter it shows the Pearson's correlation matrix for both models tested. Afterwards it tests the assumptions necessary for the uni- and multivariate analysis. Consequently, section 5.2 conducts a univariate analysis by doing an independent t-test. Accordingly, the multivariate analysis section describes the OLS regression and a random effect of the stock liquidity and cumulative abnormal returns model. Subsequently the robustness tests. Lastly, I conduct an additional analysis by doing a difference-in-difference to check if the release of the IIRC framework in 2013 has an association with the dependent variables.

5.1 Descriptive statistics

Table 2 provides the descriptive statistics of this research. The table provides a statistical overview of the dependent, independent and control variables used for the analysis. IR 0 is the group for firms that not use integrated reporting. IR 1 is the group form firms that use integrated reporting. The mean of the cumulative abnormal returns for the control group is -0.00103 and -0.0249 for the integrated reporting (IR) group, while the mean of the spread is 0.0241 for the and 0.0152 respectively. Both variables are widely dispersed according to the standard error.

The results are mixed. IR group has higher abnormal returns, which indicates that an integrated report does not help making better predictions about stock returns. The spread is on average lower for IR group which suggest that these firms are more liquid. The other variables which are not mentioned are the control variables.

Table 2. Sample Descriptive Statistics

	(1) IR 0	(2)	(3)	(4)	(5)	(6) IR 1	(7)	(8)	(9)	(10)
VARIABLES	N	mean	sd	min	max	N	mean	sd	min	max
CAR3	192	-0.00103	0.0259	-0.0809	0.221	174	-0.0249	0.304	-3.994	0.128
Spread3	192	0.0241	0.0438	0.00333	0.307	174	0.0152	0.0189	0.00667	0.237
Firm_Size	192	10.87	1.744	7.742	13.63	174	9.839	2.182	4.497	14.46
ROA	192	0.0495	0.103	-1.056	0.450	174	0.0495	0.105	-0.451	0.241
MTB	192	0.708	0.442	-0.310	2.504	174	0.595	0.408	-0.0144	2.540
Ret_Vol	192	-4.101	0.455	-5.103	-0.995	174	-4.009	0.648	-5.006	-0.591
Leverage	192	5.361	4.807	-8.546	19.14	174	3.457	8.387	-49.41	53.88
Industry	192	5,215	1,671	1,000	6,798	174	3,953	1,733	1,000	7,389
Revenue	192	9.113	1.845	4.725	12.98	174	8.853	2.147	-0.962	11.62
Volume	192	1.030	0.0492	0.888	1.176	174	0.897	0.0373	0.749	0.964

Normality tests are used to check whether the dataset is well modelled by a normal distribution. Because many tests require that the dependent variable is approximately normally distributed for each category of the independent variable. To test this, I look at the skewness and the kurtosis of the variables. In accordance with Trochim and Donnelly (2006) I use the range of -2 to 2 to assume normality. (Trochim & Donnelly, 2006) Table 3 shows the skewness and kurtosis of the variables used in the regression after winsorizing. Notice that Industry and IR are not included. Accordingly, Industry is a four-digit code and functions as a dummy variable and IR respectively. CAR3 is within the skewness range but has a high tailed distribution. Spread3 fails the test and has a high tailed distribution as well. The control variables fall mainly inside the range of the skewness but are high tailed likewise. Ultimately, the assumption of normality of the dataset holds approximately. It is useful to keep in mind that the results are mixed and therefore are subject to reliability errors. Nevertheless, I continue to assume that the variables used for the regression models follows a normal distribution by using the robust standard errors. Note: figure 7 in the appendix shows the descriptive statistics of the variables after winsorizing.

Table 3. Skewness and kurtosis values of the variables used in the regression

VARIABLES	(1) N	(3) skewness	(4) kurtosis
CAR3	366	-1.430	7.321
Spread3	366	2.216	6.958
Firm_Size	366	-0.406	2.921
ROA	366	-2.393	13.59
MTB	366	0.587	2.450
Leverage	366	1.296	3.430
Revenue	366	-1.197	4.743
Volume	366	-0.102	1.981
Ret_Vol	366	0.299	2.345

5.1.2 Correlation

In this paragraph, the correlation of the variables is presented and analysed. The correlation is the strength between one variable on the other. Table 4 and 5 presents the Pearson correlations between the variables in the regression models. The correlation values in the tables are significant at the 5% level. Table 4 shows a negative correlation between Spread3 and IR and is significant. This indicates that a when a firm use integrated reporting the spread becomes smaller with 0.1278. However, table 5 suggests that IR and CAR3 is negatively correlated (-0.0566) and is not significant. Meaning that when a company use integrated reporting, the cumulative abnormal returns declines by 0.0566. Although it is not significant, its outcome is desirable because it is in line with what I expected.

Table 4 provides a positive significant correlation between Spread3 and the control variables industry (0.1318) and leverage (0.1399). Table 5 shows that the control variables Firm_Size (0.1585) and the Ret_Vol (-0.3112) are significantly correlated with CAR3.

Although control variables are correlated with each other, there are few variables that have a strong correlation (higher then >0.6). Nevertheless, Firm_Size is strongly correlated with Revenue (0.8015). IR is strongly correlated with Volume (-0.8333) respectively. Merely two variables have violated the 0.6 rule of thumb so there is supporting evidence to ignore multicollinearity. The following paragraph tests for multicollinearity using the Variation Inflation Factor.

Table 4. Pearson correlation for the predictive validity framework 1.

		Spread3	(IR)	(Firm_Size)	(ROA)	(MTB)	(Ret_Vol)	(Leverage)	(Revenue)	(Volume)	(Industry)
Spread3	-1	1									
IR	-2	-0,1278*	1								
Firm_Size	-3	-0,0845	-0,2549*	1							
ROA	-4	-0,0518	-0,0003	0,1168	1						
MTB	-5	0,0325	-0,1315	0,2559*	-0,2339*	1					
Ret_Vol	-6	0,0596	0,0827	-0,3255*	-0,3523*	0,2389*	1				
Leverage	-7	0,1318*	-0,1399	0,3551*	-0,0905	0,1650*	-0,0222	1			
Revenue	-8	-0,1891	-0,0653	0,8015*	0,3148*	0,0270	-0,3630*	0,1140	1		
Volume	-9	-0,0580	-0,8333*	0,2314	-0,0392	0,157*	0,0161	0,0981	0,1159	1	
Industry	-10	0,1399*	-0,3483*	0,1750*	-0,1403	0,3393*	-0,0562	0,3205*	-0,0536	0,2641*	1

Table 4 Pearson correlations for the variables in the predictive validity framework used in model 1. Two-tailed tested significance at the 5% level is indicated by *.

Table 5. Pearson correlation for the predictive validity framework 2.

		(CAR3)	(IR)	(Firm_Size)	(ROA)	(MTB)	(Ret_Vol)	(Leverage)	(Revenue)	(Volume)	(Industry)
CAR3	-1	1									
IR	-2	-0,0566	1								
Firm_Size	-3	0,1585*	-0,2549*	1							
ROA	-4	0,0046	-0,0003	0,1168	1						
MTB	-5	0,0189	-0,1315	0,2559*	-0,2339*	1					
Ret_Vol	-6	-0,3112*	0,0827	-0,3255*	-0,3523*	0,2389*	1				
Leverage	-7	0,0339	-0,1399	0,3551*	-0,0905	0,1650*	-0,0222	1			
Revenue	-8	0,0989	-0,0653	0,8015*	0,3148*	0,0270	-0,3630*	0,1140	1		
Volume	-9	0,1344	-0,8333*	0,2314	-0,0392	0,1570*	0,0161	0,0981	0,1159	1	
Industry	-10	-0,0742	-0,3483*	0,1750*	-0,1403	0,3393*	-0,0562	0,3205*	-0,0536	0,2641*	1

Table 5 Pearson correlations for the variables in the predictive validity framework used in model 2. Two-tailed tested significance at the 5% level is indicated by *.

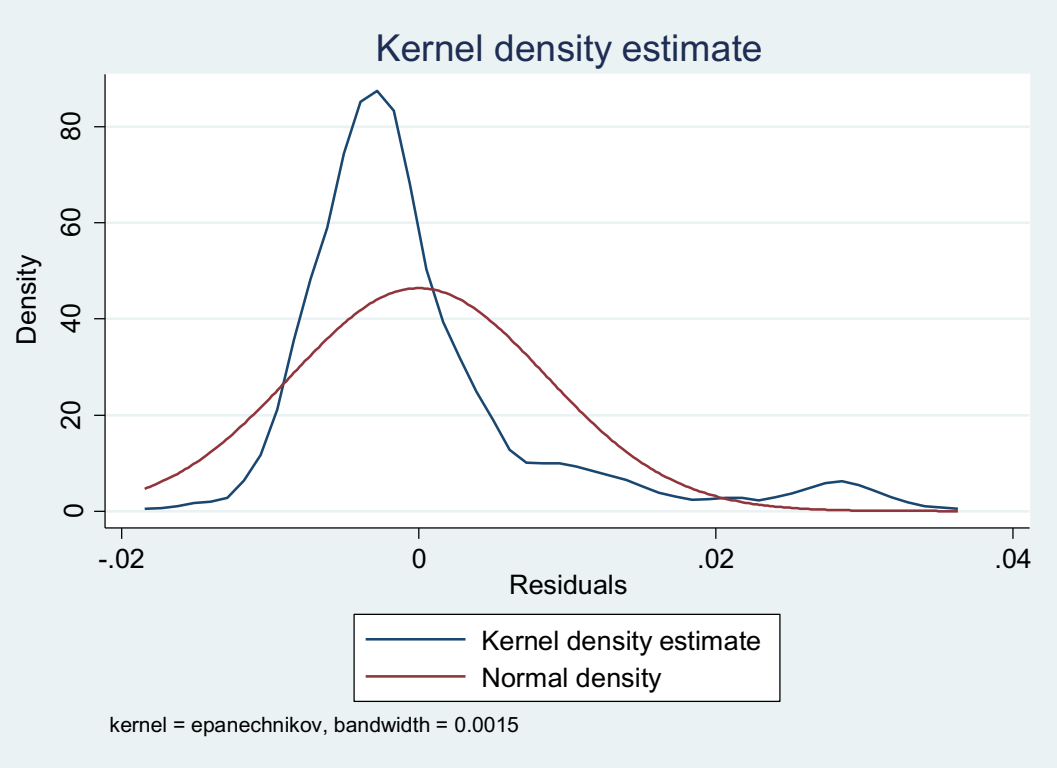
5.1.3 Testing the assumptions for the uni- and multivariate analysis

This paragraph describes the assumptions for the uni- and multivariate analysis. Although these tests differ in the assumptions used, some overlap. The important overlapping assumptions are normality, homogeneity of variances and no significant outliers. Indeed, the dependent variables used for the univariate analysis are continuous, the independent variable consists of two groups which are not randomly determined.

5.1.3.1 Normality

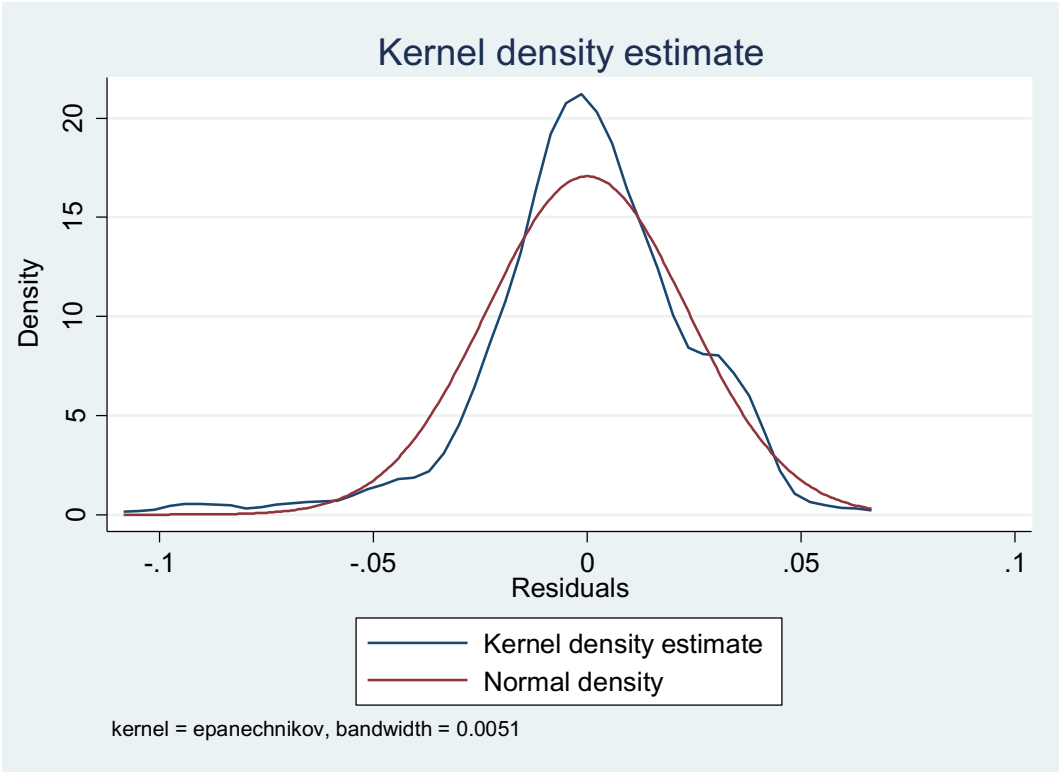
This assumption is based on whether the residuals of the model follows a normal distribution. Figure 2 tests this by plotting the residuals against the Kernel density line. Conclusively, the standard errors of the stock liquidity model do not follow a normal distribution and violates the assumption. Hence, I use the robust standard errors to correct for non-normality.

Figure 2 Residuals of the stock liquidity model



Yet, figure 3 suggests that the residuals of the cumulative abnormal return model follows a normal distribution.

Figure 3 Residuals of the cumulative abnormal returns model



5.1.3.2 Exogeniety

Exogeniety means that each X variable does not depend on the dependent variable Y. Rather the dependent variable depends on the X's and on the error term. Since Y depends on the error term, the X's are assumed to be independent of Y. This is a standard assumption in order to make a regression analysis. Hereby the focal point is whether the independent variable is correlated with the error term. If the independent variables are not independent of the error term and Y, then the estimated regression coefficients are not consistent and the regression will provide inaccurate estimates. In other words, this assumption is to minimize the possibility for omitted variable bias.

According to the findings in the correlation matrix in section 5.1.2 the assumption holds for model 1(IR significantly correlated) but violates for model 2(IR not significantly correlated). This makes model 2 more subject to omitted variable bias. However, I continue to

use model 2 because I believe that integrated reporting is an appropriate predictor for cumulative abnormal returns.

5.1.3.3 Homoscedasticity

The regression analysis use the assumption of homoscedasticity. Homoscedasticity describes a situation where the error term is the same across all values of the independent variables. Heteroscedasticity, the violation of this assumption, is present when the size of the error term differs across values of the independent variables. A more severe problem associated with heteroscedasticity is that the standard errors are biased. Because the standard error is central to conducting significance tests, biased standard errors can lead to incorrect inferences about the significance of the regression coefficients. I use the Breusch-Pagan-Godfrey test to check for heteroscedasticity. Both models have significant p-values, so the null-hypothesis of constant variances is rejected. Subsequently there is heteroscedasticity. To solve this problem, I use the robust standard errors to create more trustworthy results.

5.1.3.4 Serial correlation

When error terms from different time periods are correlated there is a serial correlation. This occurs in time-series studies, such as this study, when the errors associated with a given time period carry over into future time periods. With positive serial correlation, the OLS estimates of the standard errors will be smaller than the true standard errors. Accordingly, the parameter estimates are more precise than they really are.

There are two tests that are appropriate to check for serial correlation. I choose the Breusch-Godfrey test because: first, the Durban Watson test relies heavily on the assumption that the residuals are normally distributive. The Breusch-Godfrey test is less sensitive to that assumption. Due to heteroscedasticity in both models it is appropriate to use the Breusch-Godfrey test in this situation.

Second, it allows to test for serial correlation through a number of lags instead of 1 lag. The Durban-Watson test focuses on the correlation at the residual at time t and t-1. Whereas the Breusch-Godfrey test uses all of the correlation of the residuals between time t and t-k, where k is the number of lags specified.

The results of the tests for serial correlation can be checked in figure 4 and 5 in Appendix 1. Findings suggest that there is serial correlation for the stock liquidity model.

Accordingly, I use robust standard errors to correct for this problem. There is no significant serial correlation for the cumulative abnormal returns model. However, the abnormal returns model deals with Heteroscedasticity so robust standard errors are indispensable.

5.1.3.5 Multicollinearity

Multicollinearity exists when two or more predictors in a regression model are moderately or highly correlated. When two or more predictors are highly correlated then there is a redundant variable and needs to be excluded from the analysis. When this problem exists, it biases the standard errors of the fitted coefficients upwards. Therefore, it tends to bias the student t-test statistics downwards. This can be checked by looking at the Variation Inflation Factor (VIF). When the VIF of a variable exceeds 10, then this indicates multicollinearity. (O'Brien, 2007)

Figure 6 in the appendix shows that there are no VIF's that exceeds 10. Although Firm_Size has a VIF of 6.96 I do not exclude this variable from the regression models.

5.1.3.6 Wrap up

According to aforementioned sections, I do not see problems with the violation of the assumptions. Although, the dataset has problems with heteroscedasticity and normality there are possible solutions to overcome these problems. Subsequently, in the univariate analysis I test with unequal variances, in the multivariate analysis of the stock liquidity model I use the robust standard errors to correct for non-normality.

5.2 Univariate analysis

This paragraph empirically tests both hypotheses. Accordingly, it describes the findings that correspond to the student's t-test. I analyze whether the treatment group has higher stock liquidity relative to the control group and whether this difference is statistical significant, I test cumulative abnormal returns respectively. To test aforementioned I use the independent t-test. Since both models violate the homoscedasticity assumption, I test with unequal variances. Accordingly, this is strengthened by the Levene's test, which can be checked in figure 8 and 9 in Appendix 2. These values suggest that the variances differ significantly for both models.
Table 6 shows the findings of the independent t test with unequal variances for the stock liquidity model. According to table 6 the corresponding null hypothesis of the test; group

means do not differ significantly, is not rejected with a 95% confidence (0.0654). This implies that integrated reporting does not have a significant impact on the stock liquidity. However, the one-tailed probability of getting a difference is significant (0.0327). This finding is partly in accordance with hypothesis 1 that states: '*Firms which use integrated reporting are negatively associated with the average spread during the event window*'. Accordingly, I am 95% confident that treatment group has a smaller bid-ask spread relative to the control group and it is statistical significant. Thereby indicating that integrated reporting could be negatively associated with information asymmetry. Section 5.3 'multivariate analysis' digs deeper into this matter.

Table 6 Independent t-test with unequal variances for the stock liquidity

Group	Obs	Mean	Std. err.	Std.dev.	[95% confidence interval]	
0	192	0,015813	0,0008197	0,0113581	0,0141961	0,0174298
1	174	0,0139462	0,0005897	0,007779	0,0127822	0,0151102
Diff		0,0018667	0,0010098		-0,0001195	0,003853

diff = mean(0) - mean(1)		t = 1.8486
H0:diff=0	Satterthwaite's degrees of freedom = 339.479	
Ha: diff<0	Ha: diff! =0	Ha:diff>0
Pr(T < t) = 0.9673	Pr(|T| > |t|) = 0.0654	Pr(T > t) = 0.0327

I proceed testing hypothesis 2: '*Firms which use integrated reporting are negatively associated with the cumulative abnormal returns during the event window'*. Table 7 shows that the two-tailed and one-tailed tests are not significant. Meaning that these findings are not in accordance with hypothesis 2. Hence, I am 95% confident that the CAR3 is not lower for firms which use integrated reporting. Thereby indicating that integrated reporting is not negatively associated with information asymmetry. This indicates that the corresponding null hypothesis should be accepted. Again, section 5.3 'multivariate analysis' digs deeper into this matter.

Table 7 Independent t-test with unequal variances for the cumulative abnormal returns

Group	Obs	Mean	Std. err.	Std.dev.	[95% confidence interval]	
0	192	-0,0022308	0,0014392	0,0199421	-0,0050695	0,000608
1	174	-0,0038291	0,0021607	0,0285018	-0,0080938	0,0004357
Diff		0,0015983	0,0025962		-0,0035103	0,0067069

diff = mean(0) - mean(1)		t = 0.6156
H0:diff=0	Satterthwaite's degrees of freedom = 306.002	
Ha: diff<0	Ha: diff! =0	Ha:diff>0
Pr(T < t) = 0.7307	Pr(|T| > |t|) = 0.5386	Pr(T > t) = 0.2693

Conclusively, the results are mixed. I use two variables to operationalize information asymmetry. While one theory holds, the other fails. Hence, multivariate analysis reconnects with univariate analysis. Subsequently, this helps to substantiate the inferences about the hypotheses.

5.3 Multivariate analysis

This paragraph elaborates on the performed regressions to test the hypotheses. The two models formulated in preceding sections will be regressed. The random effects model will be tested as well. The dependent variable for the first regression is Spread3. Since not every assumption holds, I correct for heteroscedasticity by using the robust standard errors. Table 8 shows these results. Since I use panel date and have reason to believe that differences across entities have influence on the dependent variable, I add the results of the random effects model next to it. Subsequently, the random effect model allows to generalize the inferences beyond the sample used. It is desirable to investigate since I dropped the EU sample.

Table 8 shows that 23,9% of Spread3 is explained by the independent variables. The null-hypothesis of the Prob>F tests whether all of the model coefficients are 0. The p-value associated with the F-statistics is significant meaning that the coefficients are nonzero. Hence the independent variables reliably predict the dependent variable. The variable of interest is IR which tests hypothesis 1. IR has a negative predicted sign(-0.0129) and it is significant (0.00184). This finding is in accordance with the first developed hypothesis; the treated firm

group reportedly have a lower spread during the event period. The results of the regression model correspond with the findings in the univariate analysis. Notice that I use robust standard errors which weakens the inferences drawn from the model.

The stock liquidity model controls significantly for several variables. Firm_Size and Volume are negatively associated with spread. Industry and Leverage have a positive association with spread.

For a random effect, I am interested in whether that factor has a significant effect in explaining the response, but only in a general way. Random effects assume that the entity's error term is not correlated with the predictors which allows for time-invariant (here IR) to play a role in the explanatory variables. Results in table 8 suggest that IR is still negatively associated with the spread of the event window and is statistical significant. According to the random effects analysis, a generalization of the inferences about the factor IR is appropriate.

Table 8 OLS and RE Regression for the stock liquidity model with robust standard errors

VARIABLES	(1) OLS	(2) Random Effects
IR	**-0.0129*** **	**-0.0101*** **
	(0.00184)	(0.00364)
Firm_Size	**-0.00177*** **	-0.000979
	(0.000542)	(0.000765)
ROA	0.00816	0.00891
	(0.00523)	(0.00636)
MTB	0.00227	-0.00260
	(0.00166)	(0.00188)
Industry	**1.03e-06*** **	**1.39e-06** **
	(3.35e-07)	(5.69e-07)
Leverage	**0.000313** **	0.000203
	(0.000132)	(0.000212)
Revenue	0.000402	-2.24e-05
	(0.000483)	(0.000709)
Volume	**-0.0845*** **	**-0.0667*** **
	(0.0124)	(0.0222)
Ret_Vol	0.00164	0.00196
	(0.00154)	(0.00152)
Constant	**0.0314*** **	**0.0295*** **
	(0.00535)	(0.00772)
Observations	366	366
F(9,356)	9.14	30.46(Wald chi2)
Prob>F	0.0000	0.006(Prob>chi2)
R-squared	0.239	0.2143(Overall)
Number of companies		61
Company RE		YES

The regression model is Spread3= βo + β1*IR + β2*FIRM_SIZE + β3*ROA + β4*MTB + β5*INDUSTRY + β6*Leverage + β7*Revenue + β8*Volume + β9*Ret_Vol + εi,t.

All independent variables are winsorized at 1% and 95%. The stars behind the bolded numbers indicate the *10 percent level, ** 5 percent level, ***1 percent level of statistical significance of the respective variable.

Table 9 shows that 8% of CAR3 is explained by the independent variables. Despite this low value the F-statistic (model) is significant. Hence, the independent variables reliably predict the dependent variable. Since the assumptions hold for the cumulative abnormal return model, I do not use robust standard errors. Thus, the regression estimates the coefficients more reliable than the previous model. The findings of the cumulative abnormal returns model reject hypothesis 2. The OLS regression model predicts a positive sign (0.0137) and is significant at a 5% statistical significance (0.00193). The treated firm group is associated with higher cumulative abnormal returns during the event period relative to the control group. Hence, an

increase in the level of information asymmetry. This finding contradicts the stock liquidity model. Nevertheless, I assume the stock liquidity model is more reliable due to its higher R-square (23,4% against 8%) and significance level of the variable of interest respectively. Hence, I proceed with the first model specified, in order to answer the research question.

In the univariate analysis IR is not statistical significant, yet the regression model shows otherwise. I do not make inferences about this occurrence since I do not know the cause.

The cumulative abnormal returns model controls significantly for several variables. Firm_Size and Volume are positively associated with the cumulative abnormal returns during the event window while MTB and Revenue are negatively associated respectively.

The random effects model shows that IR is even more significant than the OLS regression. It is positively associated (0.0137) with the cumulative abnormal returns and statistical significant respectively. Hence, inferences beyond the sample used about the factor IR is applicable.

Table 9 OLS and RE Regression for the cumulative abnormal return model

VARIABLES	(1) OLS	(2) Random Effects
IR	**0.0137****	**0.0137*****
	(0.00576)	(0.00385)
Firm_Size	**0.00394****	**0.00394*****
	(0.00193)	(0.00133)
ROA	0.0140	0.0140
	(0.0307)	(0.0325)
MTB	**-0.0134****	**-0.0134****
	(0.00544)	(0.00564)
Industry	1.44e-06	1.44e-06
	(1.28e-06)	(1.07e-06)
Leverage	-0.000125	-0.000125
	(0.000362)	(0.000297)
Revenue	-0.00273	**-0.00273***
	(0.00189)	(0.00156)
Volume	**0.0824***	**0.0824*****
	(0.0421)	(0.0259)
Ret_Vol	-0.00557	-0.00557
	(0.00436)	(0.00391)
Constant	**-0.0439****	**-0.0439*****
	(0.0185)	(0.0145)
Observations	366	366
Prob>F	0.0005	
F(9, 356)	3.43	
R-squared	0.080	
Number of companies		61
Company RE		YES

The regression model is CAR3= βo + β1*IR + β2*FIRM_SIZE + β3*ROA + β4*MTB + β5*INDUSTRY + β6*Leverage + β7*Revenue + β8*Volume + β9*Ret_Vol + εi,t.

All independent variables are winsorized at 1% and 95%. The stars behind the bolded numbers indicate the *10 percent level, ** 5 percent level, ***1 percent level of statistical significance of the respective variable.

A short wrap up of the regression, results in the following table;

Table 10 Visualization of the stated hypotheses

Hypothesis 1: *Firms which use integrated reporting are negatively associated with the average spread during the event window.*	Accept
Hypothesis 2: *Firms which use integrated reporting are negatively associated with the cumulative abnormal returns during the event window.*	Reject

This table suggests that integrated reporting improves the stock liquidity of the firm by reducing the bid-ask spread. However, integrated reporting does not reduce cumulative abnormal returns. Accordingly, derived from the EMH, all expectations of the investors are reflected in the stock price. Therefore I do not find supporting evidence that integrated reporting reduces information asymmetry. Since. The following sections proceed with robustness and additional tests.

5.4 Robustness test

This paragraph describes the robustness tests done for the regression models. Because I use two methods a robustness test is necessary to compare the goodness of fit. The first robustness test removes the insignificant variables from the regression. Table 11 shows the results of the robustness test. In this case, the variables for the stock liquidity model are still statistical significant, yet the R-squared drops by 1%.

I conduct the same check for the cumulative abnormal returns model. IR becomes insignificant and Revenue as well. Hence, the R-squared drops approximately by 4% which is twice as less variation explained then before. Thus, making the model more negligible. Therefore, unreliable inferences about the cumulative abnormal returns model are inevitable.

Table 11 Robustness test of both models leaving the insignificant variables outside the analysis

VARIABLES	(1) Stock liquidity	(2) CAR
IR	-0.0118***	0.000480
	(0.00181)	(0.00274)
Firm_Size	-0.00138***	0.00336**
	(0.000248)	(0.00130)
Industry	1.03e-06***	
	(2.95e-07)	
Leverage	0.000278**	
	(0.000134)	
Volume	-0.0766***	
	(0.0110)	
MTB		-0.0121***
		(0.00386)
Revenue		-0.00138
		(0.00130)
Constant	0.0260***	-0.0180**
	(0.00296)	(0.00736)
Observations	366	366
R-squared	0.229	0.045

The regression model is Spread3= βo + β1*IR + β2*FIRM_SIZE + β3*Industry + β4*Leverage + β5*Volume + εi,t.(Robust standard errors)

The regression model is CAR3= βo + β1*IR + β2*FIRM_SIZE + β3*MTB + β4*Revenue + εi,t.

All independent variables are winsorized at 1% and 95%. The stars behind the bolded numbers indicate the *10 percent level, ** 5 percent level, ***1 percent level of statistical significance of the respective variable.

Additionally, I use the Akaike's information criterion (AIC) and the Bayesian information criterion (BIC) to compare the fitness of the regression models. In general, 'smaller is better': given two models, the one with the smaller AIC fits the data better than the one with the larger AIC. A smaller BIC indicates a better-fitting model respectively. (Akaike, 1973) Table 12 indicates that the stock liquidity model has a better fit. -2424.295 is smaller then -1691.774. Although the outcomes of the hypotheses contradict each other, I decide to place more emphasis on the stock liquidity model.

Table 12 The AIC and BIC values for the two models

Model:	Obs.	df	AIC	BIC
Stock liquidity	366	10	-2424.295	-2385.268

Model:	Obs.	df	AIC	BIC
Cumulative abnormal return	366	10	-1691.774	-1652.748

5.5 Additional testing

As an additional test, I am interested whether the release of the IIRC framework in 2013 has impact on stock liquidity and cumulative abnormal returns respectively. I use a difference-in-difference test. I choose 2014 as treatment year since firms need to adapt to the IIRC framework. Table 13 shows the results for the difference-in-difference test. It is noticeable that the release of the IIRC framework lowers the CAR by -0.0120 and is statistical significant at a 5% level for companies which use integrated reporting relative to the control group. This suggests that release of the IIRC framework has a positive impact on the integrated reporting group. Yet, did (the variable) is not statistical significant in the stock liquidity model. Accordingly, I do not find supporting evidence that the IIRC framework improves the stock liquidity for the treatment group.

a limitation of this tested model is the ignorance of early adopters. It is plausible that early adopters are fully compliant with the IIRC framework, in contrast to late adopters. However, these results could give insight for future research to investigate the effect of the release of the IIRC framework using a longer time-span.

Table 13 Diff-in-diff for both models tested

VARIABLES	(1) Stock liquidity	(2) CAR
time	0.000563	0.00329
	(0.00182)	(0.00295)
treated	-0.00235**	0.00240
	(0.00115)	(0.00297)
did	0.00145	**-0.0120****
	(0.00228)	**(0.00578)**
Constant	0.0156***	-0.00333*
	(0.000961)	(0.00182)
Observations	366	366
R-squared	0.014	0.017

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6. Conclusion:

This thesis attempts to answer the question; how integrated reporting associates with information asymmetry? In particular, stock liquidity and cumulative abnormal returns are used as proxies for information asymmetry during the event window. This thesis distinguishes two groups, namely one group of firms which use integrated reporting and one which does not.

In terms of stock liquidity, results show a significant difference between firms which use integrated reporting and which do not. Integrated reporting firms show a lower level of the spread. Hence, a lower spread indicates a higher level of stock liquidity which suggests a reduction in information asymmetry. While controlling for several variables, integrated reporting retained its significance and its negative predicted sign. Subsequently, I find supporting evidence for this research setting, that integrated reporting is negatively associated with information asymmetry. This finding is in line with research conducted by Lee and Yeo (2016).

The second model operationalises information asymmetry via cumulative abnormal returns during the event window. The results show that there is not a significant difference between integrated reporting firms and the control group. However, the regression analysis suggests that integrated reporting is a positive significant predictor for cumulative abnormal returns. Therefore, contradicting the results of the first model. Namely it suggests that

integrated reporting firms are associated with higher cumulative abnormal returns. Accordingly, an increase in information asymmetry.

This raises the question which model to rely on? Since I checked for the fitness of both models, I conclude that the stock liquidity model is more reliable. Indeed, the results of the uni- and multivariate analysis are in accordance with each other in contrast to the cumulative abnormal returns model. Adding the low R-squared of the cumulative abnormal return model strengthen the choice to rely more on the stock liquidity model.

Additionally, I tested whether the inferences about the dataset are generalizable to other samples using the random effects model. Favourably, the random effects model still shows significant values for the integrated reporting variable, thereby making this research more externally valid.

Although I decide not to make inferences about the results of the difference-in-difference tests, it is noticeable that the IIRC framework lowers cumulative abnormal returns for the treatment group relative to the control group. This finding potentially functions as useful insight for future research.

Conclusively, this research confirms the expectations developed in light of the stated research question and this thesis finds supporting evidence that integrated reporting is negatively associated with information asymmetry. Therefore, this research contributes to corporate sustainability and accounting literature as follows. This thesis confirms the allegations stated by the IIRC, namely creation of integrated reporting to harness information flow and transparency of business whereby integrated thinking is key (IIRC, 2017). Hence, integrated thinking is a plausible reason for diminishing information asymmetry since it reduces uncertainties about the operation of companies. Subsequently, the research conducted could function as a clear base to investigate the relation of integrated reporting with information symmetry more thoroughly. For instance, research about the effect of the quality of integrated reporting on information asymmetry is feasible.

In order to rely on the study conducted, future research needs to be aware of the following limitations. First, the small sample size which arises from the requirement of confirming the exact dates of financial report issuance (meaning both integrated and traditional financial reports). Therefore, the whole European setting, which I intended to use, is excluded from this study. Hence the reliability can be tackled.

Secondly, unlike previous literature on the association of the quality of IR with firm valuation, this study focusses on whether a company uses integrated reporting, it does not give

an indication on how the quality of integrated reporting affects information asymmetry. Since, the variable of interest is straightforward, it is difficult to assess the extent to which the association of the IR variable with the dependent variable is attributable to the IR variable. Therefore, this study is suggestive rather than objective.

Thirdly, Since the independent variable is not randomly assigned, this research is subject to omitted variables bias. For instance, the choice of adopting integrated reporting might be correlated with other (un)observable factors and thus endogenous determined. This limitation is unfortunately a result of the choice for conducting an archival/observational study.

fourthly, the stock liquidity model uses robust standard errors which make the inferences more unreliable. However, the univariate analysis slightly overcomes this problem by indicating that there is a significant difference in means.

fifthly, the regression models are contradictive, although I checked which model is more suitable, it remains a limitation.

Lastly, I rely on my dependent variables that are calculated over a short event window. It is interesting to test a wider event window to increase the reliability of this research. Especially, since integrated reporting is novel, investors do not fully understand this way of corporate reporting as explained by Stubbs and Higgins (2014). Although the results in this thesis refutes the aforementioned, it remains a possibility.

To partially overcome these limitations, I recommend investigating how a European setting is associated with stock liquidity and cumulative abnormal returns since sample sizes are enlarged, accordingly increasing the reliability of the study. Likewise, a larger sample might not violate all the assumptions necessary for the OLS regression.

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Appendix 1 Assumptions tested for uni- and multivariate analysis

Figure 4 Serial correlation of the stock liquidity model

Lags	Chi2	df	Prob>Chi2
6	136.371	6	0.0000
H0: no serial correlation			

Figure 5 Serial correlation of the cumulative abnormal returns model

Lags	Chi2	df	Prob>Chi2
6	6.198	6	0.4014
H0: no serial correlation			

Figure 6 Multicollinearity

Variable	VIF
Firm_Size	6.96
Revenue	5.57
IR	4.50
Volume	4.22
Leverage	2.08
Ret_Vol	1.76
Industry	1.76
ROA	1.63
MTB	1.57

Figure 7 Descriptive statistics after winsorizing

	(1) IR 0	(2)	(3)	(4)	(5)	(6) IR 1	(7)	(8)	(9)	(10)
VARIABLES	N	mean	sd	min	max	N	mean	sd	min	max
CAR3	192	-0.00223	0.0199	-0.0809	0.0347	174	-0.00383	0.0285	-0.112	0.0347
Spread3	192	0.0158	0.0114	0.00667	0.0467	174	0.0139	0.00778	0.00667	0.0467
Firm_Size	192	10.87	1.741	7.742	13.53	174	9.805	2.108	4.619	13.53
ROA	192	0.0484	0.0572	-0.391	0.164	174	0.0472	0.0999	-0.391	0.164
MTB	192	0.683	0.362	-0.00973	1.387	174	0.577	0.348	-0.00973	1.387
Industry	192	5,215	1,671	1,000	6,798	174	3,953	1,733	1,000	7,389
Leverage	192	5.375	4.634	0.243	15.68	174	3.309	4.302	0.243	15.68
Revenue	192	9.037	1.721	4.725	11.35	174	8.880	2.018	1.837	11.35
Volume	192	0.0260	0.0437	-0.119	0.0897	174	-0.108	0.0402	-0.209	-0.0363
Ret_Vol	192	-4.114	0.389	-4.907	-3.246	174	-4.066	0.459	-4.907	-3.246

Appendix 2 Levene's tests for univariate analysis

Figure 8 Levene's test for stock liquidity

W0 = 15.0039493 df(1, 364) Pr > F = 0.0001272
W50 = 3.1933261 df(1, 364) Pr > F = 0.07477142
W10 = 6.6798172 df(1, 364) Pr > F = 0.01013967

Figure 9 Levene's test for cumulative abnormal returns

W0 = 8.2490743 df(1, 364) Pr > F = 0.00431606
W50 = 7.8007548 df(1, 364) Pr > F = 0.00549837
W10 = 7.7795059 df(1, 364) Pr > F = 0.00556203