



The relation between growth opportunities and earnings quality:

A cross-sectional study about the quality of earnings for European firms with relatively high growth opportunities

Abstract: *Prior studies for US firms show that growth opportunities result in a lower quality of earnings. However, there is no recent study focused on European firms. Furthermore, there is no consensus about an appropriate proxy for growth options. Therefore, by using four different proxies for growth opportunities, this study tries to investigate the relation between growth options and earnings quality. The findings show that all models suggest a significant association between the two main variables. Except from the dividend to price ratio, the other proxies for growth options show a negative relation with the quality of earnings. Hence, this thesis supports the idea that growth options are still not fully included in the reported earnings under IFRS.*

Keywords: earnings quality, growth options, conservative accounting, Positive Accounting Theory, discretionary accruals

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1.Introduction

1.1 Introduction

Nowadays accounting standard setters like the IASB and FASB support the idea of neutral accounting instead of conservative accounting, despite the reasons for the existence of conservative accounting. Many researchers view conservative accounting as one of the main reasons for understatements in the accounting process for firms with a high level of growth opportunities (Watts R. L., 2003). Furthermore, growth opportunities firms are more attractive to investors because of the higher potential profits. Teoh and Wong support evidence that the earnings response coefficient is positively related to growth opportunities. This implies that investors are more sensitive for information about a growth opportunity firm (Teoh & Wong, 1993). Therefore it is necessary to provide a view on the current state of the earnings quality of firms with high growth opportunities.

1.2 Academic relevance and research question

Prior research has focused on the relation between growth opportunities firms and the earnings response coefficient. However, these researchers used samples of US firms, while this research uses European firms. The accounting within publicly traded European firms has to be in accordance with IFRS. In general these standards are more principle based than US GAAP. As a result, managers have more discretionary power to explain the current situation of the firm. Hence, IFRS might be more applicable to explain the complexity of growth opportunities within a firm. Furthermore, the ownership structure of European companies is generally more concentrated than the structure within US firms (Alonso et al., 2005). This could imply different results for European companies. Moreover, most of prior research took place before the accounting scandals at Enron, Worldcom and the implementation of the Sarbanes-Oxley Act. These events raised several questions about the audit profession. This research uses a sample period where the role of accountants is viewed from a different perspective (DeFond & Francis, 2005).

This thesis investigates the effect of growth opportunities on the earnings quality of firms. The research focuses on European companies, which are publicly traded. The purpose of this thesis is to give a better view on the current accounting quality of European firms which have

relatively more growth opportunities. The following research question helps to examine whether these firms have a different level of earnings quality:

RQ: Do European firms with relatively high growth opportunities have a relatively low level of earnings quality?

Besides Teoh and Wong, several researchers tried to explain the relation between growth opportunities and earnings quality using the earnings response coefficient (Ahmed, 1994) (Martikainen, 1997a). However, both researches use the earnings response coefficient as a measure for earnings quality. The earnings response coefficient measures the correlation between unexpected earnings and abnormal changes in stock prices. This coefficient gives an indication of the responsiveness of the investors to earnings news (Teoh & Wong, 1993). According to Dechow et al. properties of earnings could indicate a level of earnings quality. There are different categories to identify the level of earnings quality. Besides measuring the investor responsiveness like the earnings response coefficient does, properties of earnings and external indicators of earnings misstatements could be useful to measure earnings quality. This thesis uses properties of earnings as proxy for earnings quality. The level of discretionary accruals measures earnings management within companies. Furthermore, earnings management measures indirectly the quality of earnings (Dechow et al., 2010). Hence, the definition of earnings quality in this research is the value negatively related to the level of earnings management measured by discretionary accruals.

1.3 Sub-questions

Several researchers tried to capture the growth opportunities of firms in their research. However, according to AlNajjar and Riahi-Belkaoui it is hard to measure the growth opportunities with a single proxy. The investment opportunity set is not observable. Hence, there is no consensus on an appropriate proxy for growth opportunities. Therefore, the researchers used multiple proxies to check for robustness (AlNajjar & Riahi-Belkaoui, 2001a). Hence, there are a lot of measures which could indicate growth options for an entity. To provide sufficient robustness of the results, this research measures growth opportunities

with four different types of proxies. The following sub-questions help to answer the research question. Each of the sub-questions uses one of the proxies for growth opportunities.

Sub-question 1: Does the market value of assets to the book value of assets have an influence on the earnings quality of an entity?

In general, researchers use Tobin's Q as a proxy to control for growth opportunities. Billet et al. state that this ratio is the best proxy for measuring growth opportunities (Billet et al., 2007). Tobin's Q is a ratio of the market value of assets to the book value of assets (Ramalingegowda & Yu, 2012).

Sub-question 2: Does the sales rate of growth has an influence on the earnings quality of an entity?

The second proxy for growth opportunities in this research is the sales rate of growth. This proxy measures the actual growth of an entity. The sales of next year are divided by the sales of the current year to get a ratio of the sales growth (Alonso et al., 2005).

Sub-question 3: Does the level of dividend has an influence on the earnings quality of an entity?

According to Danbolt et al. dividend based proxies perform the best in predicting growth of sales, earnings and equity of an entity (Danbolt et al., 2011). Hence, this research investigates growth opportunities of companies with the dividend to price ratio.

Sub-question 4: Does the level of research and development has an influence on the earnings quality of the entity?

Another proxy for growth opportunities is the level of research and development. Ahmed has critique on market-based proxies. Therefore the researcher used research and development expenditures as a proxy for growth opportunities (Ahmed, 1994). Callen et al. used the research and development to sales ratio to measure growth options (Callen et al., 2013). The fourth sub-question uses this proxy to indicate growth options. The expectation is that some of

the proxies are highly correlated with each other. In chapter two of this thesis is an more extensive definition of all the proxies for growth opportunities.

1.4 Methodology of research

This research is a cross-sectional study, which investigates the relation between growth opportunities and earnings quality using ordinary least squared regression models. Each proxy used in the sub-questions above is regressed against the quality of earnings. These models help to identify any significant results for answering the hypotheses.

1.5 Set up of thesis

This section has given a broad overview of the research. The next part is the theoretical framework. This chapter discusses the underlying theory that could explain the relation between the growth opportunities and the quality of earnings of a company. This part also describes the variables in this investigation. Chapter three discusses prior research which is useful for making some expectations about the results. The next chapter uses this expectations to develop the hypotheses which support to answer the research question. The following section provides a description of the data and research design used. This helps to get the findings discussed in chapter six. This chapter also provides analyses to answer the hypotheses. After all, the last chapter gives a conclusion which answers the research question. This chapter also discusses some limitations of this research and provide suggestions for future research.

2. Theoretical Framework

This chapter provides relevant theories for the relation between growth opportunities and earnings quality. The next part of this chapter gives an extensive definition of the most important variables used in this research.

2.1 Agency theory

Jensen and Meckling developed the agency theory to describe the agency relation between ownership and control of a company. This theory explains problems related to information asymmetry like the adverse selection problem and the moral hazard problem. The theory uses an analysis of game theory in situations where one party acts as the agent to perform work for the other party. The other party is the principal, who wants the agent to work for the preferences of the principal. However, there are some issues with this relationship. The theory assumes that both parties want to maximize their own utility. Therefore, it is possible that not all the actions of the agent are in alignment with the preferences of the principal. The principal wants to make sure that the agent would not harm the wealth of the principal. The principal wants to control the actions of the agent by monitoring or appropriate incentives for the agent for example. These measures of the principal leads to additional costs. The name for these costs is agency costs (Jensen & Meckling, 1976). Important to mention is that ethicists have critique on the assumption that agents are selfish. They complain that the agency theory assumes that agents could not have altruistic motives. Therefore it is better to state that agents have their own preferences. Egoism is not the main driver behind the actions of agents. Agents work in alignment with their own preferences. Another problem with the agency theory is that it is hard to determine who the agent actually is. Both parties could make decisions which affect the welfare of the other party. So it is important to determine first whose welfare is ought to be served and who makes decisions on behalf of the other party. The agent serves the preferences of the principal and the welfare of the principal ought to be served. Another assumption of the agency theory is that individuals behave opportunistically. This means that individuals take advantage of specific circumstances and act without regard of what people say they are going to do (Heath, 2009).

Based on the agency theory, there is information asymmetry between the manager as an agent and the investors as the principals. Another name for this information asymmetry is the information gap. This means that the available information in a specific situation is different for each party. Because of the information gap, the agent could work at the expense of the principal because of his own preferences. The name for this problem is the moral hazard problem. Another issue is that the principal does not know whether the agent has the skills and the ideas which align with the preferences of the principal. Moreover, the agent will not admit that he is not applicable for the job. Hence, the main problem with this issue is that the principal knows the skills of the agent afterwards. In this situation the principal is most likely too late in acquiring sufficient information about the agent. The term for this issue is the adverse selection problem. So, the cause for the agency problem is the information asymmetry between the agent and the principal (Shapiro, 2005). Typically, the agent is in a situation to abuse the information asymmetry for his own preferences (Heath, 2009).

Besides the relation between managers and shareholder, the agency theory is also applicable to the relation between the managers and the debtholders. In this case, the manager is again the agent and the debtholder is the principal. One way to mitigate opportunistic behaviour of the manager is to use debt covenants. Debt covenants are positively related to growth opportunities (Billet et al., 2007). The main reason for this relation is the relative high information asymmetry. However, debt covenants could also be a reason to manage earnings. This leads to the expectation that growth opportunities are related to lower quality of earnings. Growth opportunities are a possible source of agency conflicts between debtholders and shareholders. The investment opportunities could result in decisions based on the interests of shareholders at the expense of the debtholders. Therefore, debtholders want to assess the level of growth opportunities of the entity. An change in growth opportunities might lead to a change in bargaining power of the entity, which results in renegotiations of the debt covenants (Mariano et al., 2015).

2.2 Conservative accounting

To close the gap of information asymmetry, investors try to monitor the managers. However, according to Ramalingegowda and Yu monitoring is less effective for firms with a lot of growth options. In this case, it is hard for investors to observe all the actions of managers and possible growth options. This results in a higher demand for conservatism in case of growth

opportunity firms (Ramalingegowda & Yu, 2012). Another solution for the agency problem is mitigating the opportunistic behaviour of the manager. According to Watts, conservatism has some advantages to constraint the actions of management. The definition of conservatism is the higher level of verifiability needed to recognize good news as a gain than bad news as a loss (Watts R. L., 2003). There are two forms of conservatism. First of all, the accounting policies could reflect conservatism independent from specific events. This kind of conservatism is named unconditional conservatism. Second of all, conservatism could depend on specific events or news. This is defined as conditional conservatism. Managers change estimates because of a specific event (Watts R. L., 2003).

There are several reasons for the existence of conservative accounting. First of all, conservatism is useful for contracting reasons. Conservatism reduces the probability that the manager overstates the assets and earnings. Debt covenants restrict the actions of managers. Otherwise, the company could pay dividends to the shareholders at the expense of the debtholders. Another reason for managers to overstate the earnings is because of compensation contracts. In this case, conservatism is also useful. Furthermore conservatism is also useful for corporate governance to identify projects with a negative net present value on time (Watts R. L., 2003).

Another reason for conservative accounting is litigation costs. The litigation costs are more likely to be high in case of an overstatement instead of an understatement of earnings and assets. So the expected litigation costs are lower when conservatism is applied in the accounting procedures (Watts R. L., 2003).

The third reason for conservative accounting could be taxable income. The accounting methods used for reporting to shareholders influences the taxable income. This results in a motivation for managers to lower taxes by understating earnings. Therefore, conservatism is useful for tax purposes (Watts R. L., 2003).

The last reason which Watts discussed in his article is regulation. Losses from overstated assets are easier to see than gains from understated assets. Losses from overstatements could raise the political costs. Hence, Managers try to avoid criticism for insufficient conservative behaviour (Watts R. L., 2003).

Besides the advantages of conservatism, there is also criticism on conservative behaviour. Ahmed stated that conservatism is the main reason for low disclosure quality of growth options (Ahmed, 1994). Hence, the expectation is that the quality of earnings is low for growth opportunity firms. Another criticism is that conservative accounting leads to accounting in future years which is not conservative. Decreasing earnings based on conservatism leads to higher earnings in the next years. However, Watts refuses this idea. He states that gains will be recognized only when they are realized (Watts R. L., 2003).

2.3 Positive Accounting Theory

Many researchers used the agency theory to explain why managers use accounting policies based on their own preferences. The positive accounting theory helps to explain the different motives for using different accounting policies. The theory discusses three different hypotheses (Watts & Zimmerman, 1986).

First of all, the bonus plan hypothesis could explain the current accounting policies of an entity. The bonus compensation received by the manager could be based on accounting variables. This results in an incentive for managers to use accounting policies, which steer the earnings upwards (Watts & Zimmerman, 1986).

The second hypothesis is the debt/equity hypothesis. As discussed in the agency theory, there could be an agency relation between management and debtholders. Debtholders use debt covenants to restrict the actions of the manager. These debt covenants are often based on accounting variables. This leads to an incentive for managers to choose accounting policies, which leads to accounting variables meeting the criteria of debt covenants. The hypothesis states that managers are more likely to choose accounting policies which improve accounting variables when the debt to equity ratio is of a higher level (Watts & Zimmerman, 1986).

The third hypothesis is the political cost hypothesis. This hypothesis assumes that firms with large growth opportunities have high political visibility and high political costs. The hypothesis predicts that managers choose to manage the earnings downward when the growth opportunities are high. Through this way, managers try to avoid extra regulation and increasing political costs (AlNajjar & Riahi-Belkaoui, 2001b). Linked to this hypothesis is the political risk hypothesis. This hypothesis describes the reason for managers to manage the earnings, because of special situations. These situations could limit the profitable activities of

the entity. The political risk hypothesis is intended for multinational firms with high growth opportunities in an unfriendly climate. To limit the risk of restrictions by the government, the manager reduces the earnings. The results of the financial reports will show lower growth opportunities than the actual growth opportunities (AlNajjar & Riahi-Belkaoui, 2001b).

2.4 US GAAP versus IFRS

As discussed in the introduction, most research about the relation between growth and earnings quality have used a sample of US firms. However, this research focuses on the relation for publicly traded European firms. Publicly traded European firms should report in accordance with the International Financial Reporting Standards instead of US GAAP. The question is whether the results in this research could be different because of differences in the accounting standards.

The level of research and development provides a signal about the potential growth for a company. Under US GAAP research and development costs are expensed as incurred. This makes the recognition of internally generated intangible assets rare. Furthermore, US GAAP provides some specific guidance for the development of software for sale to third parties (PwC, 2015).

Under IFRS research costs are always expensed, but development costs are only expensed when the following criteria are met (IFRS, 2012):

- Completing the intangible asset should be technical feasible. This means that the assets should be available for sale.
- The intention should be to complete the intangible asset for use or sale purposes.
- The presence of the ability to use or sell the intangible asset
- The entity should define how the intangible asset will generate probable future economic benefits. The entity should demonstrate the existence of a market. If the entity uses the asset for internal purposes, the usefulness of the intangible asset should be demonstrated.
- The entity should have sufficient adequate resources to complete the development and to use or sell it.
- The expenditures related to the intangible asset during its development could be measured reliably.

The main difference is that US GAAP prohibits the capitalization of development costs most of the time. IFRS state some criteria for the capitalization of development costs. Furthermore US GAAP gives specific guidelines for software development. IFRS make no difference between the capitalization of intangible assets for internal use and sale (PwC, 2015).

2.5 Definition of variables

The dependent variable in this research is the quality of earnings. This research makes use of the level of discretionary accruals to identify earnings management. Earnings management exists when the reported earnings are different from the actual earnings (Dutta & Gigler, 2002). According to Healy and Wahlen earnings management is a situation where the manager tries to mislead stakeholders about the economic performance or to influence contractual outcomes which depend on accounting variables by using professional judgement (Healy & Wahlen, 1999). Hence, the higher the level of earnings management, the lower the quality of earnings. This research measures discretionary accruals with the Modified Jones model. The research design section further explains this model. Dechow et al. have made a new model for detecting earnings management. This model incorporates accrual reversals and firm size. The researchers showed that prior accrual-based models could be improved significantly. However, this model is not applicable to this research (Dechow et al., 2012).

The independent variable in this research is growth opportunities. As discussed before this research uses several proxies for growth opportunities. The first proxy is Tobin's Q. This proxy measures the market value of assets to the book value of assets. The value of this ratio is above one if the assets are higher valued in the market than the cost to produce them (Faria & Mollick, 2010). Companies with higher market value than book value should have valuable opportunities. Several researcher have used the market to book ratio as a measure for growth opportunities. Billet et al. state that the market to book ratio is the best proxy for measuring growth opportunities (Billet et al., 2007). Martikainen states that the market to book ratio can be interpreted as a measure for expectations about growth opportunities (Martikainen, 1997b). This proxy has the highest correlation with actual investment opportunities, is least affected by confounding variables and reflects the information in other proxies (Billet et al., 2007). Hence, the higher the Tobin's Q for a specific firm, the more attractive for investors to invest in this company (Alonso et al., 2005).

The second proxy for growth opportunities is the growth of sales. The sales of next year are divided by the sales of the current year to get a ratio of growth. This measure tries to indicate growth opportunities with the actual growth reported that year. The higher the ratio, the higher the level of growth opportunities in the current year.

The third proxy for growth opportunities is the level of dividend to share price ratio. Low dividends leads to a high proportion of earnings available for investments. This leads to relatively higher growth opportunities. Hence, the lower the dividends the higher are growth opportunities. According to Danbolt et al. this proxy performs the best in predicting actual growth (Danbolt et al., 2011).

The last proxy to measure growth opportunities is the research and development to sales ratio. For this ratio the research and development expenditures are divided by the annual sales of an entity. Callen et al. used this proxy to measure expectations about growth options (Callen et al., 2013). Ahmed had critique on market-based proxies for growth options. He used the ratio of research and development expenditures to replacement costs of property, plant and equipment as an proxy for growth options. This proxy is less likely to be correlated with other factors (Ahmed, 1994). However, this proxy will result in biased results, because research and development costs are related to high uncertainty and complexity. Hence, the capitalization of research and development is associated with the higher analyst' forecast errors and forecast dispersion. (Dinh et al., 2015). Despite the uncertainty and complexity of research and development costs, because of the critique of Ahmed to use market-based proxies, this research will use the research and development to sales ratio as another proxy to check for the robustness of the results of the hypothesis.

2.6 Summary

This chapter discussed several theories that could influence the relation between growth opportunities and the quality of earnings for a firm. The first part is a discussion about the agency theory. This theory could explain whether growth opportunities have a significant effect on the quality of earnings. Another theory is the Positive Accounting Theory. Based on three different hypothesis, this theory could explain the sign of the effect of growth opportunities on earnings. Hence, this theory could also explain an effect on the quality of earnings. Because the Positive Accounting Theory is more extensive in describing the

different motives for managers to influence the earnings, this thesis uses this theory as the basic principle behind the research. The differences in accounting standards could lead to different results for European firm than for US firms. In combination with prior theories, the principle of conservatism could explain why growth opportunities are not fully reported. Furthermore, this chapter discussed the differences between IFRS and US GAAP for research and development. Research and development could indicate potential growth options for a firms. The last section of this chapter provides a clear definition of the most important variables used in this research.

3. Prior research

This chapter discusses literature that is mainly focused on accounting in growth opportunities firms. Further literature gives possible explanations about the relation between growth opportunities and earnings quality. To summarize, this chapter also includes a table with an overview of all the relevant literature.

3.1 Effect of investment opportunities on management decisions

Alonso et al. support evidence that the level of ownership concentration is positively related to the firm valuation. Moreover, the ownership structure for European companies seems to be more concentrated than for US firms (Alonso et al., 2005). Hence, this raises the expectation that the results for European firms will generally show a better earnings quality. Another finding of Alonso et al. is the positive relation between debt and dividend with the firm value in the absence of growth opportunities. Debt is related to firm value with the underinvestment hypothesis. This hypothesis states that too much debt can prevent managers from investing in projects with a positive net present value. The idea is that bondholders have priority in receiving cash flows. Managers will not be motivated to invest in projects when the company owners are less likely to benefit from the investment. According to the free cash flow hypothesis, free cash flows should be reduced when there is a lack of investment opportunities, otherwise the resources will not be used efficiently by the manager (Alonso et al., 2005). Billet et al. provide evidence that the level of leverage is negatively related to growth opportunities (Billet et al., 2007). Mariano and Tribo Gine investigated the relation between debt covenants and investment decisions. They found that especially covenant violation has an impact on the investment policy of the entity. Furthermore, they found an relation between the growth opportunities of a firm and the number of covenant renegotiations (Mariano & Tribo Gine, 2015). These findings suggest that growth opportunities has an effect on decisions made by managers related to financial activities. According to the Positive Accounting Theory, managers could have financial incentives to manage the accounting policies. This raises questions whether the financial decisions and purposes of managers affect the accounting quality.

Even more interesting is the situation discussed by Sen. The researcher suggests that incentives to report earnings of higher quality could be associated with an incentive to reduce

the investments. This suggests a reverse relation between earnings quality and growth opportunities. An firm value based incentive could motivate good firms to show some managerial optimism, which results in higher earnings quality. However, bad firms could reduce investments to mimic the disclosures of the good firms (Sen, 2005).

3.2 The negative effect of growth opportunities

Based on prior research, the expectation is that the level of earnings quality is lower for firms with growth opportunities. Core stated that the quality of mandated disclosure is lower for firms with growth opportunities. Managers could only decrease information asymmetry with investors by voluntary disclosures (Core, 2001). Ahmed states that conservatism is an important cause for a low disclosure quality of growth options. Accountants do not try to incorporate the value of growth options in the financial statements because of conservatism. There is a negative relation between the earnings response coefficient and growth options. He concludes that earnings are not so informative about growth opportunities (Ahmed, 1994). AlNajjar and Riahi-Belkaoui support evidence that the manager manage the earnings downward because of high growth opportunities. The researchers discussed that the political cost and political risk hypotheses are the main reasons for this (AlNajjar & Riahi-Belkaoui, 2001b). Monahan investigated the effect of conservative accounting for research and development on the relation between earnings and stock returns. This research supports evidence that conservative accounting for research and development affects the relation between earnings and stock returns for firms which experienced a high growth in research and development (Monahan, 2005).

Billet et al. conclude that the level of growth opportunities is positively related to debt covenants. So the number of covenants is increasing when a company has more investment opportunities (Billet et al., 2007). AlNajjar and Riahi-Belkaoui support evidence that the level of leverage is negatively related to the growth options for an entity (AlNajjar & Riahi-Belkaoui, 2001a). Watts discusses that covenants could be a reason to manage the earnings (Watts R. L., 2003). This is consistent with the debt/equity hypothesis. So the growth opportunities are positively related to the number of debt covenants and the number of debt covenants could be positively related to earnings management. This could imply that the level of investment opportunities raises the level of earnings management. This leads to a negative

relation between growth opportunities and the quality of earnings, because of the inverse relation between earnings management and earnings quality.

Lindenberg and Ross tried to link accounting data with financial data in their research. The researchers investigated the relation between Tobin's Q and monopoly power. They support evidence that firms with a high Tobin's Q have relatively more unique product and more unique factors of production. Hence, this study implies that Tobin's Q is positively related to monopoly power (Lindenberg & Ross, 1981). Cheng et al. expected that firms with relatively high market power want to protect their competition advantages by reporting lower disclosure quality. The researchers support evidence that market concentration is negatively related several attributes of earnings (Cheng et al., 2013). With the assumption that market concentration is positively related to growth options, these results imply that growth opportunities are negatively related to quality of earnings. However, Markarian and Santalo found mixed results about the effect of product market competition on earnings management. On average the results show a positive effect of product market competition on earnings management. The results suggest that especially firms with temporary competitive disadvantages have incentives to manipulate earnings. According to the results of Markarian and Santalo, firms with low growth options could have lower earnings quality (Markarian & Santalo, 2014). The next section discusses further evidence about a possible positive relation between growth opportunities and earnings quality.

3.3 The positive effect of growth opportunities

The literature discussed above states that earnings of growth opportunities firms is less likely to be informative. Conservatism is one of the reasons for this negative relation (Ahmed, 1994). However, Francis et al. support evidence that the firm stock performance is positively related to conservative accounting. This relation is even stronger when the information asymmetry is high or the corporate governance is weak (Francis et al. 2013). Assuming that high growth opportunities are related to a high level of information asymmetry, the results of Francis et al. imply that conservative accounting has a strong positive effect on stock performance of the company. However, the model developed by Li predicts that there is relatively less conservatism in industries with high growth opportunities like high-tech industries (Li, 2013). The reason for this relation could be the level of competition in the industry. Intense market competition is associated with a relatively low level of growth

opportunities (Onori, 2015). Besides this relation, competition is also related to conditional conservatism positively (Dhaliwal et al., 2014). These researches support the predictions of Li's model.

Furthermore, growth opportunities have a positive effect on the earnings response coefficient according to Teoh and Wong. This coefficient measures the correlation between unexpected earnings and abnormal changes in stock prices. Hence, investors value earnings of growth opportunities firms as relevant (Teoh & Wong, 1993). Martikainen has also found an effect of growth opportunities on the earnings response coefficient. The impact of losses on the earnings response coefficient is higher for firms with high growth opportunities (Martikainen, 1997a). The results of Gaio and Reposo are in alignment with these findings. Especially for firms with a lot of investment opportunities, there is a positive relation between firm valuation and earnings quality (Gaio & Raposo, 2011). These studies suggest that earnings of growth opportunities firms are informative for investors based on the positive relation between the earnings response coefficient and growth opportunities. However, this thesis does not focus on the responsiveness of investors as proxy for earnings quality.

Skinner and Soltes investigated the effect of dividend payout policies on the quality of earnings. As a proxy for earnings quality, the researchers measured the persistence of earnings. The results support evidence that the dividend payout policies provide information about the earnings quality. Earnings are more persistent for firms which pay dividends than for firms that do not. However, this research provides little evidence that the magnitude of dividend payments has influence on the earnings quality. These results could help to answer the third sub-question. According to this research there is little evidence that the level of dividend affects the quality of earnings (Skinner & Soltes, 2011). So, besides both a positive and a negative relation between growth options and earnings quality, there could also be no relation.

3.4 Summary

A lot of studies used the earnings response coefficient to measure the earnings quality with respect to growth options. Most of them found a positive relation between the earnings response coefficient and the level of growth opportunities. This means that investors react stronger to news of firms with a lot of investment opportunities. However, this thesis uses a

different proxy for measuring earnings quality. Conservatism could be a reason for lower quality of earnings for firms with growth options. Companies fail to include the potential growth in the current financial reports because of conservatism. However, the level of conservatism seems to be lower for industries with high growth options. The main reason for this idea is the level of competition in industries. Furthermore, debt covenants could be a reason for earnings management. In combination with the investigated relation between debt covenants and growth opportunities, debt covenants could be a reason for lower quality of earnings for growth opportunities firms. Besides debt covenants, the product market competition could affect the earnings quality. This could also indicate a relation between growth options and earnings quality. After all, growth opportunities have effect on the financial decisions made by the manager. So it is interesting to see whether the accounting decisions are affected by these financial decisions. The following table provides a brief summary of all the relevant literature used.

Table 1

Name and Year	Research	Methodology	Sample	Findings and Results
Ahmed, 1994	This study investigates the effect of competition, cost structure and growth opportunities on the earnings response coefficient.	Cross-sectional study, regression model	682 manufacturing companies from Compustat Quarterly Industrial file from 1980 to 1985	If unexpected earnings reflect information about future economic rents, product market competition and growth opportunities are negatively related to the ERC and the ratio fixed costs to total costs is positively related to the ERC.
AlNajjar & Riahi-Belkaoui, 2001a	Proposing a model to test for the relation between growth opportunities and corporate reputation, multinationality, size, profitability, leverage and systematic risk.	Cross-sectional study, regression model	323 firm years of US multinational firms from 1987 to 1993	According to the general model the investment opportunity set is positively related to corporate reputation, multinationality, size and profitability and negatively related to leverage and systematic risk.
AlNajjar & Riahi-Belkaoui, 2001b	This research investigates the relation between the investment opportunity set and accounting choices of management.	Cross-sectional study covariance regression model	339 firm years of US multinational firms from 1987 to 1990	Management of firms with a high level of the investment opportunity set makes accounting choices to reduce the reported earnings.
Alonso et al., 2005	This study examines the effect of financial leverage decisions, dividend payout policies and the ownership structure on the market value of companies in the absence or presence of growth opportunities.	Cross-sectional study, regression model	101 non-financial Spanish firms from 1991 to 1995, which are publicly traded	There is a negative relation between firm value and both leverage and dividend payments for firms with growth opportunities. This relation is positive for firms without profitable investment projects.
Billet et al., 2007	This study focuses on the influence of growth opportunities on the choice of leverage, debt maturity and covenants.	Cross-sectional study, cluster analysis	15.504 debt issues from 1960 to 2003 from the FISD	Covenant protection is positively related to growth opportunities, debt maturity and leverage. The negative relation between leverage and growth opportunities is significantly decreasing by covenant protection.
Cheng et al., 2013	This research investigates the effect of product market competition on earnings quality.	Cross-sectional study, regression model	US firms from the manufacturing sector from 1996 to 2005	There is a positive relation between product market competition and attributes of earnings quality.

Continued

Name and Year	Research	Methodology	Sample	Findings and Results
Core, 2001	This article tries to give an review of empirical disclosure literature.	Literature Review	Voluntary disclosure literature covered by Review	There are multiple ways to make a contribution to the voluntary disclosure literature. Further research could focus on how information asymmetry affects the cost of capital, whether information asymmetry affects expected returns and the simultaneous choice of disclosure quality, management incentives and corporate governance mad by the firm.
Dechow et al., 2010	This study reviews several measures to indicate the quality of earnings.	Literature Review	More than 300 studies about characteristics and attributes of earnings	Fundamental performance and performance measurement have an influence on all the proxies for earnings quality. This influence is not the same for every proxy. Proxies do not measure the same underlying construct.
Dhaliwal et al., 2014	This research examines the influence of product market competition on conditional accounting conservatism.	Cross-sectional study, regression model, (pooled cross-sectional analysis)	Firms with NYSE-, AMEX- or NASDAQ-listed securities with share codes 10 or 11 from 1975 to 2005	There is a positive effect of product market competition on conditional accounting conservatism.
Francis et al., 2013	This study tests whether conservative accounting affects shareholder value.	Natural quasi-experiment	6.326 public companies from Januari 2007 to December 2009	There is a positive relation between conservative accounting and stock performance. This relation is stronger for firms with relatively weaker corporate governance or higher information asymmetry.
Gaio & Reposo, 2011	This research investigates the relation between firm valuation and earnings quality.	Cross-sectional study, regression model	More than 7000 firms from 38 different countries from 1990 to 2003	There is a positive relation between firm valuation and an aggregate earnings quality measure. This relation is especially strong for firms with more investment opportunities, more need for external finance and for firms in low investor protection countries.

Continued

Name and Year	Research	Methodology	Sample	Findings and Results
Li, 2013	The researcher examined the role of conservative accounting in debt contracting efficiency.	Exploratory study	-	the model developed by Li predicts that there is relatively less conservatism in industries with high growth opportunities like high-tech industries.
Lindenberg & Ross, 1981	The researchers investigate the extent, history and distribution of monopoly and quasi-rents in the industrial sector.	Cross-sectional study, regression model	246 firms with SEC 10-K information from 1976 and 1977	Sectors with relatively high value of Tobin's are more likely to have unique products and factors of production. At the low end of Tobin's Q are relatively competitive, tightly regulated or dying industries.
Mariano & Tribo Gine, 2015	This study investigates the results of debt covenant violation.	Cross-sectional study	Bank loans to non-financial US firms from 1996 to 2008	The effect of covenant violation on the investment policy depends on the growth opportunities. The effect is positive when the growth opportunities are relatively high. Otherwise the effect is negative. In presence of high growth options, firm performance increases after a covenant violation.
Markarian & Santalo, 2014	This study focuses on the effect of product market competition on incentives to manipulate earnings.	Cross-sectional study, regression model	16.112 firms from 1989 to 2011	An average positive relation between product market competition and earnings management. This effect is not the same for all competitors in the industry. The effect is positive for firms in the most transparent markets.
Martikainen, 1997a	This paper focuses on how accounting losses affect the Earnings Response Coefficient for different leverage and growth categories.	Cross-sectional study, pooled regression analysis	All NYSE companies from the Compustat Research Annual tapes from 1975 to 1990	The effect of accounting losses on the Earnings Response Coefficient is highest for the firms with high growth opportunities and for firms with low financial leverage. The impact is hardly present for firms with low growth options and firms with high financial leverage.

Continued

Name and Year	Research	Methodology	Sample	Findings and Results
Martikainen, 1997b	The researcher examines the relation between the market to book equity ratio and the earnings to book equity ratio.	Cross-sectional study	All NYSE companies from the Compustat Research Annual tapes from 1975 to 1990	The results support evidence that the effect of the market to book value of equity on the earnings to book value of equity is different for companies with accounting losses than for companies with accounting profits.
Monahan, 2005	This study evaluates the effects of conservative accounting on the relation between aggregate earnings and contemporaneous stock returns and the association between equity market value and estimates of value derived from the residual income valuation (RIV) model.	Cross-sectional study, regression model	Firm data from Merged Quarterly Compustat Files from 1993 to 1995	The results show that conservative accounting of R&D only affects the relation between earnings and stock returns for firms with high growth of R&D. The effect of conservative accounting for R&D on the relation between estimates from the RIV model and equity market values is increasing for past growth in R&D.
Onori, 2015	This paper investigates the relation between competition and growth.	Exploratory study	-	The relation between competition and growth is an inverted U-shape, if external learning is stronger than in-house learning.
Sen, 2005	This study focuses on the quality of reported earnings under conservative accounting.	Exploratory study	-	The developed model suggests that incentives to improve earnings quality may lead to incentives to reduce investments.
Skinner & Soltes, 2011	This research looks whether dividend payout policies provide information about the reported earnings quality.	Cross-sectional study, regression models	Non-utility and non-financial domestic firms that trade on the NYSE, AMEX and NASDAQ from 1974 to 2005	Dividend policies do provide information about earnings quality. However, there is little evidence that the magnitude of dividends influence this relation.
Teoh & Wong, 1993	The researchers tested whether the Earnings Response Coefficient is different for Big eight audited firms relatively to non-Big eight audited firms.	Cross-sectional study, regression models	Firms listed on NYSE, AMEX and NASDAQ from 1973 to 1988	The ERC of Big eight audited firms is relatively higher than the ERC of non-Big eight audited firms. Furthermore, the relation of the ERC with growth and persistence is positive. The relation between ERC and firm risk is negative and weak.
Watts, 2003	Watts tries to give explanations for conservatism and results for standard-setters.	Literature Review	-	The FASB should recognize the problems that conservatism tries to address.

4. Hypotheses development

The first part of this chapter discusses the hypotheses, which are useful to answer with respect to the research question of this thesis. The next part includes Libby boxes to give an overview of the research methodology used. The last part of this chapter tells whether the research meets criteria of different types of validities.

4.1 Hypotheses

Based on prior research the expectation is that growth opportunities are negatively related to earnings quality. According to AlNajjar and Riahi-Belkaoui the political cost hypothesis is the main reason for managing earnings downward, when an entity has many growth options (AlNajjar & Riahi-Belkaoui, 2001b). Cheng et al. support this idea with evidence that market concentration is negatively related to several attributes of earnings (Cheng et al., 2013). Billet et al. stated that the number of debt covenants is higher for firms with a lot of growth options (Billet et al., 2007). In addition, Watts states that covenants could be a reason to manage earnings downward (Watts R. L., 2003). So covenants could also be a reason for lower earnings quality because of growth opportunities. Core states that only voluntary disclosure could improve earnings quality for growth opportunities firms (Core, 2001). Therefore, the alternative form of the hypotheses is based on the expectation that there is a negative relation between growth opportunities and earnings quality.

To identify companies with growth options this research uses the market value of assets to the book value of assets. The name for this ratio is the Tobin's Q (Ramalingegowda & Yu, 2012). This ratio explains whether a firm is valued correctly and gives a signal to investors whether it is useful to invest in the company. A high level of Tobin's Q indicates relatively more growth opportunities (Faria & Mollick, 2010). Besides Ramalingegowda and Yu other researchers used Tobin's Q to control for growth options (Callen et al, 2013). The expectation is that Tobin's Q is negatively related to earnings quality. Hence, the expectation is that the level of discretionary accruals is positively related to Tobin's Q. This leads to the first hypothesis:

H1: The level of the market value of assets to the book value of assets has a negative effect on the earnings quality of a company.

Another indication of the growth opportunities within a firm is the realized growth. To measure the growth of a company the sales growth is used. Alonso et al. used the sales rate of growth to measure the growth opportunities. The researchers divided the companies in three groups. They used one group with the presence of sales growth and one group with absence of sales growth (Alonso et al., 2005). The expectation is that a high level of sales growth is related to a low quality of earnings. Hence, the expectation is that firms with a high level of increasing sales has relatively more discretionary accruals. Therefore this thesis expects that there is a negative relation between the sales rate of growth and the quality of earnings. This results in the second hypothesis:

H2: The sales rate of growth has a negative effect on the earnings quality of a company.

For the third hypothesis this thesis makes use of the dividend to price ratio. Instead of the first two proxies for growth opportunities, the higher the value of this proxy, the lower the value of growth opportunities. The idea is that income, which is not paid out as dividend, remains in the company. This income is available for future investments. Danbolt et al. state that this proxy performs the best in measuring actual growth (Danbolt et al., 2011). Based on the expectation of a negative relation between growth opportunities and earnings quality, the expectation for this hypothesis is a positive relation between the level of dividend and earnings quality. This results in the third hypothesis. However, the research of Skinner and Soltes raises the expectation that there is no significant relation between the dividend to price ratio and earnings quality. The payout ratio only provides information about the quality of earnings (Skinner & Soltes, 2011).

H3: The dividend to price ratio has a positive effect on the earnings quality of a company.

Ahmed had critique on market-based proxies for growth options. He used the ratio of research and development expenditures to replacement cost of property, plant and equipment as an proxy for growth options. This proxy is less likely to be correlated with other factors (Ahmed, 1994). Callen et al. used also other proxies. The researchers used for example the research and development to sales ratio (Callen et al., 2013). However, this proxy results in biased results, because research and development costs are related to high uncertainty and complexity. Hence, the capitalization of research and development is associated with the higher forecast errors and forecast dispersion by analysts (Dinh et al., 2015). Despite the uncertainty and complexity of research and development costs, because of the critique of Ahmed to use market-based proxies, this research uses the research and development to sales ratio as

another proxy. The expectation is that the research and development costs are negatively related to the earnings quality of an entity. This leads to the last hypothesis:

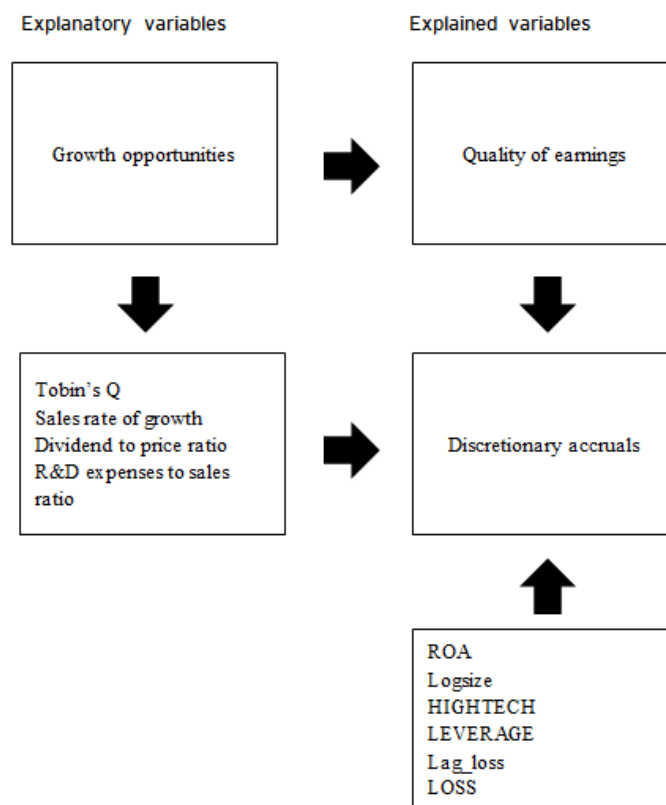
H4: The research and development expenditures to sales ratio has a negative effect on the earnings quality of a company.

The hypotheses are stated in the alternative form. The null hypotheses propose no relation between the variables.

4.2 Libby boxes

This part includes a figure which contains Libby boxes. The Libby boxes should help to summarize the research of this thesis. The two boxes at the top of the figure include the dependent and independent variables in this research. The two boxes below explain how these variables are operationalized. Each of the four measures in the left box stands for a hypothesis. Finally, the last box at the bottom of the figure provides the control variables used in this thesis.

Figure 1: Libby boxes



4.3 Construct validity

It seems to be very hard to measure growth opportunities for an entity. The results of Danbolt et al. support evidence that the more complex models do not perform better than the proxies used in this paper for predicting growth (Danbolt et al., 2011). To limit the problem of a low construct validity, this thesis uses four different proxies to measure growth options. This helps to check for the robustness of the research. To measure earnings quality, this thesis makes use of the level of discretionary accruals. Measuring discretionary accruals helps to estimate possible earnings management. However, because earnings management is not directly observable, it is very hard to measure. Dechow et al. tested several models for measuring earnings management. Because of the difficulties in measuring earnings management, the results indicate that the powers of the tests are low (Dechow et al., 1995). This leads to a low construct validity for the dependent variable in this research. As a reaction to the weaknesses of prior models, Dechow et al. developed a new model for detecting earnings management. This model assumes that accrual distortions must reverse in a later period. Dechow et al. provide evidence that including accrual reversals significantly improves accrual-based tests for earnings management (Dechow et al., 2012).

4.4 Internal validity

As indicated in the introduction, this research is a cross-sectional study. This study uses data of real companies from prior years. Hence, it is impossible to control for every factor that could influence the relation between growth opportunities and earnings quality. Possible omitted variables are a risk for investigating a causal effect. These variables could influence the effect between the dependent and independent variable. This research is not able to identify possible other causes for differences in the level of earnings quality. Hence, the risk on confounding variables results in a low internal validity of this research. Furthermore, this thesis does not control for possible reversal causalities. Hence, this thesis only presumes whether there is a relation between growth options and earnings quality.

4.5 External validity

The extent to which results of a study are generalizable to other circumstances is defined as the external validity. The whole population in this thesis includes all publicly traded European firms. This study uses a large sample of publicly traded companies in European countries. Therefore, this thesis assumes that the sample is representative for all publicly traded European companies. Hence, the external validity in this research is high.

4.6 Summary

The first part in this chapter explained why the expectation is a negative relation between growth opportunities and earnings quality based on prior research. The next part provided the hypotheses, which support the research question. Then Libby boxes summarized the research. The last part of this chapter described the construct, internal and external validity for this research. The conclusion is that the construct and internal validity are low and the external validity is high.

5. Research Design

The first part of this chapter explains how the proxies are measured. The next part introduces the control variables in this research. After the description of the control variables, it is possible to provide the regression models. The last part of this chapter explains the additional tests performed to check for the assumptions of ordinary least squared regression models. The program STATA is used for making the regression models and additional tests.

5.1 Earnings quality proxy

Chapter 2 gives a clear explanation of the independent variable and related proxies. It is possible to literally extract the required data for computing these proxies. However, measuring the dependent variable is harder to accomplish. AlNajjar and Riahi-Belkaoui used the Jones Model to detect earnings management (AlNajjar & Riahi-Belkaoui, 2001b). This thesis measures earnings quality with the Modified Jones Model. This model is an extended version of the Jones Model. Especially in the mostly developed countries, the Modified Jones Model is effective in detecting earnings management (Islam et al., 2011). The following formulas explain the Modified Jones Model:

$$TA\tau = a_1 \left(\frac{1}{A_{\tau-1}} \right) + a_2(\Delta REV\tau) + a_3(PPE\tau) + \varepsilon_\tau \quad (1)$$

$$NDA\tau = a_1 \left(\frac{1}{A_{\tau-1}} \right) + a_2(\Delta REV\tau - \Delta REC\tau) + a_3(PPE\tau) \quad (2)$$

$$AAC = TA - NDA \quad (3)$$

This model makes a regression of economic events that drives accruals. As stated in the third formula, the purpose is to measure the discretionary accruals (AAC) by subtracting the non-discretionary accruals (NDA) from the total accruals (TA). $\Delta REV\tau$ measures the change in revenues between year τ and $\tau - 1$. This measures the activities in the company and captures the working capital items. $PPE\tau$ stands for the property, plant and equipment in year τ . The purpose of this variable is to capture the long term accruals. $A\tau - 1$ is the total assets in the year $\tau - 1$. $\Delta REC\tau$ measures the change in receivables from year $\tau - 1$ to year τ . The model assumes that all changes in credit sales in the event period result from earnings management.

Hence, receivables are subtracted from the revenues (Dechow et al., 1995). After all, the level of AAC will be the proxy to measure the earnings management. This proxy measures the quality of earnings indirectly.

5.2 Independent variables

The first measure for growth opportunities is Tobin's Q. To compute Tobin's Q the market value of assets is divided by the book value of assets. This ratio indicates whether a firm is over- or undervalued. For measuring the market value of assets, the market value of common stock is added to the book value of assets. Then the book value of common stock and the book value of deferred taxes are subtracted from this value (Ramalingegowda & Yu, 2012). To calculate the market value of common stock, this research uses the product of the closing share price and the number of common shares outstanding.

The growth of sales is the second proxy for measuring growth opportunities. The sales of next year are divided by the sales from the current year to compute this ratio. So the first step is to generate a lead variable for sales. This helps to compute the ratio of salesgrowth.

The third hypothesis uses the dividend to price ratio. To compute this ratio, the total amount of dividend is divided by the market value of common shares outstanding. The market value of shares outstanding is computed with the number of shares outstanding times the closing price of a single share.

The research and development expenses to sales ratio is the last proxy for growth opportunities. This variable is computed by dividing the research and development expenses with the total sales.

5.3 Control variables

Besides the proxies for the main variables in this research, there has to be controlled for some other variables, which could affect the relation between the quality of earnings and growth options. The regression models include these variables.

To control for the complexity of the company, the size of the firm is included. Besides the effect of size on earnings quality, size could also have an effect on the growth opportunities of

a company. AlNajjar and Riahi-Belkaoui investigated the relation between size and growth opportunities. They found a positive relation between the size of a company and the growth opportunities. The researchers discussed that large firms are more able to increase the value of investment options (AlNajjar & Riahi-Belkaoui, 2001a). Bentzen et al. tested for Gibrat's Law. This law states that the growth of a firm depends on the initial size of the firm. The results support evidence that the law is applicable to some industries. However, most research found evidence that growth is negatively associated with the firm size (Bentzen et al., 2006). According to Hulsink et al. small and medium enterprises do not have enough resources for innovations. Hence, these firms seek collaboration with bigger firms. The study concludes that networking has influence on the level of innovation and growth opportunities (Hulsink et al., 2008). The size of a company could influence both the dependent and independent variable in this research. Hence, in this research should be controlled for the size of a firm. This research measures the logarithm of total assets to control for the size of companies. The high diversity of firms within the sample results in high differences in the level of total assets. Therefore, the logarithm of assets is used to scale the data for this variable. This results in a better distribution for this variable.

The level of debt could also influence both the growth opportunities and the quality of earnings. According to Ghosh and Moon debt financing could have a positive and negative effect on the quality of earnings. For low levels of debt is the relation positive, while the relation is negative for high levels of debt (Ghosh & Moon, 2010). Leverage has a negative effect on the growth opportunities of an entity (AlNajjar & Riahi-Belkaoui, 2001a). Therefore this thesis uses the leverage ratio as a control variable. This ratio stands for debt divided by equity.

Furthermore, Li stated that the level of conservatism is lower in the high-tech industry (Li, 2013). Watts stated that unconditional conservatism influence the accounting policies of a firm (Watts R. L., 2003). Hence, this research controls for specific characteristics of high-tech industries by using a HIGHTECH dummy variable. To identify firms from high-tech industries, this research focuses on SIC codes. Kile and Phillips have made a list of SIC codes. This list includes the SIC codes for high-tech industries. These SIC codes are used for making the HIGHTECH dummy variable (Kile & Phillips, 2009).

Other control variables used by Chen et al., in the Modified Jones Model are the return on assets (ROA) to control for profitability and a dummy variable to control for losses (Chen et

al., 2010). However, losses in prior years could create incentives for managers to steer the earnings in the current year. Therefore, this thesis also uses a lag loss dummy variable.

5.4 The regression models

Based on both the main variables and the control variables, the following formulas help to answer the hypotheses:

$$AAC = \beta_0 + \beta_1TobinQ + \beta_2ROA + \beta_3LOGSIZE + \beta_4HIGHTECH + \beta_5Leverage + \beta_6LagLOSS + \beta_7LOSS + \varepsilon \quad (4)$$

$$AAC = \beta_0 + \beta_1SalesGrowth_{t+1} + \beta_2ROA + \beta_3LOGSIZE + \beta_4HIGHTECH + \beta_5Leverage + \beta_6LagLOSS + \beta_7LOSS + \varepsilon \quad (5)$$

$$AAC = \beta_0 + \beta_1DivtoPrice + \beta_2ROA + \beta_3LOGSIZE + \beta_4HIGHTECH + \beta_5Leverage + \beta_6LagLOSS + \beta_7LOSS + \varepsilon \quad (6)$$

$$AAC = \beta_0 + \beta_1R\&DtoSales + \beta_2ROA + \beta_3LOGSIZE + \beta_4HIGHTECH + \beta_5Leverage + \beta_6LagLOSS + \beta_7LOSS + \varepsilon \quad (7)$$

To get better insights in the meaning of these variables, the appendix includes a table with the definition for each variable (see appendix, table 2).

5.5 Additional tests

This research does some additional tests to check whether there might be problems with the models discussed in last section. A problem could be the effect of outliers on the results. Therefore, this thesis uses histograms to detect outliers. To address the detected outliers, this research winsorizes the data before performing the regressions. Instead of winsorizing, another option is to remove outliers. However, the advantage of winsorizing is that the number of observations does not decrease. Therefore, winsorizing is more common in academic research.

Furthermore, this thesis should check for the assumptions of ordinary least squared regression models. First of all, this paper uses scatter plots of the residuals against the lagged residuals to check for the independence of the error terms. Furthermore, this thesis uses the correlation between the residuals and the lagged residuals to be certain whether autocorrelation is an issue for the regression models. The second assumption of ordinary least squared regression models is homoscedasticity. This research uses the White-test and plots of the residuals against the fitted values to check for this assumption. The next assumption is that there is no perfect correlation between the variables. The name for this phenomena is multicollinearity. The results section provides a correlation table. Together with VIF values this table helps to make conclusions about multicollinearity. Another assumption is the normal distribution of residuals. The Shapiro-Wilk test and Q-Q plots check for this assumption. Finally, the last assumption states that there is no model misspecification in the regression model. This research uses the linktest in STATA to see whether specification errors exist in the regressions.

5.6 Data

The data for this research are from 2012 to 2015. The year 2012 is included for making lagged variables. Therefore, this research focuses on the effect of growth opportunities on earnings quality from 2013 to 2015. The sample includes data of companies from 33 different European countries, which are publicly traded. The 33 countries are all the available European countries from the Compustat database (see appendix, table 24). The daily closing share price (prccd) is extracted from the Compustat Global – Security Daily database. All the other variables are extracted from the Compustat Global – Fundamentals Annual database. The total sample is 16,131. However, after calculating the discretionary accruals and the independent variables, removing the gaps in the data and winsorizing the control variables, the total number of observations is 4,196. This is the total sample before winsorizing the main independent variables. However, not every observation includes data for each proxy of growth opportunities. To winsorize the data, the data are divided into four different datasets, because winsorizing Tobin's Q could remove useful data for another growth opportunity measure. With these four datasets it is possible to generate the four different regression models used for the hypotheses. The sample size for each dataset is different. The sample for the first model includes 3,992 observations. The sample for the second model includes 2,157

observations. The third model uses a sample of 1,112 observations. The last model uses 1,847 observations.

5.7 Summary

This chapter explains the measures for the different variables in this research. To get a simple overview of all the variables used in this research, the appendix includes a table which summarizes the variables (see appendix, table 2). The data used in this thesis are from Compustat Global – Security Daily and from Compustat Global – Fundamentals Annual database. Winsorizing helps to adjust the outliers in the dataset. After cleaning the data, it is possible to run the four different regression models.

6. Findings

This chapter provides the final results of this research. The first part explains the descriptive statistics. The next part provides the regression models for testing the hypotheses. Further, the additional tests are explained. In the last section it is possible to answer the sub-questions based on the results.

6.1 Descriptive statistics

Based on the histograms of the variables (see appendix, figures 2-15) this research winsorizes the data for ROA, LEVERAGE and every growth measure for the highest and lowest percent values. This results in four different data sets. Below is the table with the descriptive statistics of all the variables in this research. The table is divided in four panels. Each panel stands for the data used in a single regression model.

Table 3

Panel A					
Variable	Obs	Mean	Std. Dev.	Min	Max
AAC	3,992	-0.001	0.106	-0.575	0.514
TobinQ	3,992	1.923	2.717	0.322	21.287
ROA	3,992	-0.040	0.251	-1.607	0.278
Logsize	3,992	5.187	2.293	-3.863	15.352
HIGHTECH	3,992	0.244	0.429	0	1
LEVERAGE	3,992	0.382	0.819	-1.881	4.941
Lag_loss	3,992	0.364	0.481	0	1
LOSS	3,992	0.362	0.481	0	1
Panel B					
Variable	Obs	Mean	Std. Dev.	Min	Max
AAC	2,157	0.004	0.097	-0.537	0.462
salesgrowth	2,157	1.051	0.342	0.015	2.870
ROA	2,157	-0.008	0.189	-1.607	0.278
Logsize	2,157	5.493	2.176	-2.577	15.352
HIGHTECH	2,157	0.226	0.418	0	1
LEVERAGE	2,157	0.402	0.802	-1.881	4.941
Lag_loss	2,157	0.329	0.470	0	1
LOSS	2,157	0.320	0.467	0	1

Continued

Panel C					
Variable	Obs	Mean	Std. Dev.	Min	Max
AAC	1,112	0.007	0.066	-0.340	0.368
DIVtoPrice	1,112	0.034	0.029	0.000	0.200
ROA	1,112	0.059	0.061	-0.510	0.278
Logsize	1,112	6.133	1.924	0.980	11.877
HIGHTECH	1,112	0.256	0.437	0	1
LEVERAGE	1,112	0.387	0.565	-1.881	4.941
Lag_loss	1,112	0.081	0.273	0	1
LOSS	1,112	0.073	0.260	0	1

Panel D					
Variable	Obs	Mean	Std. Dev.	Min	Max
AAC	1,847	-0.005	0.094	-0.537	0.462
RDtoSales	1,847	0.303	1.553	0.000	13.735
ROA	1,847	-0.019	0.220	-1.607	0.278
Logsize	1,847	5.479	2.218	-1.698	15.184
HIGHTECH	1,847	0.395	0.489	0	1
LEVERAGE	1,847	0.349	0.710	-1.881	4.941
Lag_loss	1,847	0.297	0.457	0	1
LOSS	1,847	0.300	0.459	0	1

The next table provides the correlation between the variables for each individual dataset. As indicated by the study of Bentzen et al., the correlation between the proxies for growth opportunities and logsize is negative (Bentzen et al., 2006). The correlation between the growth proxies and leverage is not negative for all proxies. However, AlNajjar and Riahi-Belkaoui raises this expectation (AlNajjar & Riahi-Belkaoui, 2001a). The results show that there is no remarkable correlation between the variables. Moreover, the appendix includes VIF values (see appendix, table 11). As a rule of thumb, VIF values higher than ten are an indicator for multicollinearity. However, the VIF values seems to be rather low. Therefore, this thesis assumes that there is no multicollinearity in the regression models.

Table 4

Panel A								
	AAC	TobinQ	ROA	Logsize	HIGHTECH	LEVERAGE	Lag_loss	LOSS
AAC	1.000							
TobinQ	-0.046	1.000						
ROA	0.385	-0.303	1.000					
Logsize	0.055	-0.184	0.429	1.000				
HIGHTECH	-0.016	0.126	-0.053	-0.196	1.000			
LEVERAGE	-0.020	-0.095	0.066	0.199	-0.112	1.000		
Lag_loss	-0.110	0.023	-0.423	-0.349	-0.007	0.024	1.000	
LOSS	-0.252	0.027	-0.540	-0.325	0.007	0.038	0.594	1.000
Panel B								
	AAC	Salesgrowth	ROA	Logsize	HIGHTECH	LEVERAGE	Lag_loss	LOSS
AAC	1.000							
Salesgrowth	0.056	1.000						
ROA	0.325	-0.057	1.000					
Logsize	0.031	-0.082	0.340	1.000				
HIGHTECH	-0.001	0.040	-0.071	-0.200	1.000			
LEVERAGE	-0.045	-0.007	0.000	0.182	-0.125	1.000		
Lag_loss	-0.121	-0.038	-0.411	-0.293	-0.006	0.065	1.000	
LOSS	-0.276	-0.022	-0.546	-0.255	-0.008	0.0890	0.551	1.000
Panel C								
	AAC	DIVtoPrice	ROA	Logsize	HIGHTECH	LEVERAGE	Lag_loss	LOSS
AAC	1.000							
DIVtoPrice	0.070	1.000						
ROA	0.256	0.057	1.000					
Logsize	-0.046	-0.041	-0.156	1.000				
HIGHTECH	0.025	-0.034	0.221	-0.187	1.000			
LEVERAGE	-0.019	0.029	-0.199	0.234	-0.126	1.000		
Lag_loss	-0.026	0.067	-0.219	0.064	-0.084	0.070	1.000	
LOSS	-0.191	0.078	-0.482	0.069	-0.085	0.049	0.221	1.000
Panel D								
	AAC	RDtoSales	ROA	Logsize	HIGHTECH	LEVERAGE	Lag_loss	LOSS
AAC	1.000							
RDtoSales	-0.035	1.000						
ROA	0.333	-0.478	1.000					
Logsize	0.084	-0.225	0.414	1.000				
HIGHTECH	-0.049	0.168	-0.141	-0.371	1.000			
LEVERAGE	-0.033	-0.049	0.043	0.198	-0.187	1.000		
Lag_loss	-0.161	0.239	-0.502	-0.352	0.093	0.040	1.000	
LOSS	-0.270	0.249	-0.600	-0.351	0.099	0.075	0.631	1.000

6.2 Results of regression models

The next page includes table 5 with the four different regression models. The Tobin's Q as measure of growth opportunities has a significant positive relation with the level of discretionary accruals (AAC). The coefficient is even significant at a one percent level. This means that the higher the market value of assets relative to the book value of assets, the higher the level of discretionary accruals within a firm.

The growth of sales as proxy for growth opportunities is significantly related to the level of discretionary accruals at a one percent level. This means that the actual growth in sales is related to the level of discretionary accruals. This is a positive association. This is consistent with the expectation that actual growth is negatively related to quality of earnings.

The third measure of growth is the dividend to price ratio. The coefficient is significant at a five percent level. Furthermore the coefficient is positive. This means that the level of dividend relative to the share price is positively related to the level of discretionary accruals. An possible reason for this finding could be a reversal effect of earnings on dividend payments. According to Daniel et al. Management try to meet dividend thresholds by earnings management (Daniel et al., 2008).

The last proxy for growth opportunities is the level of research and development expenses relative to the level of sales. The coefficient of this ratio is significant at a one percent level. This means that the higher the level of R&D expenses relative to sales, the higher the level of discretionary accruals for entities.

Table 5

Regression models with discretionary accruals (AAC) as dependent variable				
	Coefficient			
AAC	Tobin's Q as growth measure	Sales growth as growth measure	Dividend to price ratio as growth measure	R&D expenses to sales ratio as growth measure
TobinQ	0.003*** (4.270)	-	-	-
Salesgrowth	-	0.018*** (3.190)	-	-
DIVtoPrice	-	-	0.137** (2.070)	-
RDtoSales	-	-	-	0.009*** (6.320)
ROA	0.186*** (22.990)	0.150*** (11.680)	0.239*** (6.360)	0.162*** (12.310)
Logsize	-0.006*** (-7.360)	-0.004*** (-3.650)	-0.001 (-0.530)	-0.003*** (-3.030)
HIGHTECH	-0.006* (-1.770)	-0.001 (-0.150)	-0.004 (-0.880)	-0.009** (-2.030)
LEVERAGE	-0.003 (-1.300)	-0.002 (-0.940)	0.003 (0.870)	-0.004 (-1.200)
Lag_loss	0.022*** (5.320)	0.016*** (3.090)	0.009 (1.250)	0.012** (2.000)
LOSS	-0.025*** (-5.830)	-0.037*** (-6.660)	-0.025*** (-2.970)	-0.028*** (-4.440)
Intercept	0.035*** (6.560)	0.014 (1.520)	-0.007 (-0.950)	0.023*** (3.060)
Adjusted R-squared	0.176	0.134	0.073	0.142
Number of observations	3,992	2,157	1,112	1,847

Ordinary least squared regressions are performed using discretionary accruals (AAC) as dependent variable. *, **, *** indicate significant coefficients at a 10%, 5% and 1% confidence level respectively. The values between the brackets are the t-values for each coefficient. Each model uses a different proxy for growth options as main independent variable. The adjusted R-squared indicates the proportion of variance of AAC which is explained by each of the models.

6.3 Additional tests

To check for the assumptions of ordinary least squared regressions models (OLS), this research performs some additional tests. The regression models should meet the criteria of no multicollinearity, normal distribution of the residuals, homoscedacity, no model misspecification and independence of error terms.

The Q-Q plots show clear deviation from a linear trend for each model. Furthermore, every Shapiro-Wilk test shows a p-value lower than 0.01. Therefore, according to the Q-Q plots and the Shapiro-Wilk W tests (see appendix, figures 16-19 and tables 7-9) all regression models suffer from having no normal distribution of the residuals.

As discussed before, the VIF values (see appendix, table 11) and the correlation table support evidence that the regression models meet the criteria of no multicollinearity. As a rule of thumb VIF values should be lower than ten. In this case, all VIF values are close to two or even lower. Hence, the models do not suffer multicollinearity issues.

Furthermore, the regression models do not meet the criteria of homoscedacity. The plots of the residuals against the fitted values show that the values are narrower scattered at the right side of the plots. Moreover, all white tests provide p-values which could be rejected at a one percent level. Hence, based on the plots of the residuals against the fitted values and the white tests (see appendix, figures 20-23 and tables 12-15) this research should reject the null hypothesis of homoscedacity.

The appendix provides the results of the linktests for model misspecifications. The value of $\hat{\rho}$ should be significant. Otherwise, the model includes variables which should be removed from the model. The value of $\hat{\rho}^2$ should not be rejected. If $\hat{\rho}^2$ is significant, this research should reject the hypothesis of no model misspecification. This means that a model does not include relevant variables for predicting the outcome of the dependent variable. The first model with Tobin's Q as independent variable for growth has no model misspecification, based on the p-values of $\hat{\rho}$ and $\hat{\rho}^2$ (see appendix, table 16). However the second model with salesgrowth as growth measure has a specification error (see appendix, table 17). According to the linktest there are relevant variables missing in the regression model because the value of $\hat{\rho}^2$ is significant. For the third model exists the same problem. Apparently, there are relevant variables missing in this model according to the linktest (see appendix, table

18). The fourth model with RDtoSales as independent variable has no misspecification error (see appendix, table 19).

Based on the measurements for the correlation between the residuals and the lagged residuals, there is no significant high correlation (see appendix, figures 24-27 and tables 20-23). The highest correlation between the residuals and the lag value of residuals exists for the model with DIVtoPrice as proxy for growth options. Even this correlation seems to be rather low with a value of 0.185. Therefore this research assumes that autocorrelation is not a problem for the regressions.

In the presence of heteroscedasticity the standard errors could be wrong. This leads to misleading results. Hence, heteroscedasticity could be a problem for the regression models. Another problem is that there is no normal distribution of the residuals. This situation is more likely to happen in regressions with dummy variables. However, the regressions include dummy variables, because they could improve the models (Brooks, 2008).

Because of the issues with the residuals, table 6 provides the results of the four regression models with robust standard errors. In comparison with the results of table 5, these results suggest almost the same outcomes. The results are so close to each other that the conclusions are the same for both tables with respect to the hypotheses.

Table 6

Regression models with discretionary accruals (AAC) as dependent variable and robust standard errors				
Coefficient				
AAC	Tobin's Q as growth measure	Sales growth as growth measure	Dividend to price ratio as growth measure	R&D expenses to sales ratio as growth measure
TobinQ	0.003*** (2.680)	-	-	-
Salesgrowth	-	0.018** (2.150)	-	-
DIVtoPrice	-	-	0.137** (2.130)	-
RDtoSales	-	-	-	0.009*** (4.020)
ROA	0.186*** (11.450)	0.150*** (5.130)	0.239*** (3.900)	0.162*** (6.150)
Logsize	-0.006*** (-7.000)	-0.004*** (-3.690)	-0.001 (-0.530)	-0.003*** (-3.200)
HIGHTECH	-0.006 (-1.540)	-0.001 (-0.130)	-0.004 (-0.840)	-0.009* (-1.940)
LEVERAGE	-0.003 (-1.390)	-0.002 (-0.970)	0.003 (0.810)	-0.004 (-1.060)
Lag_loss	0.022*** (4.880)	0.016*** (2.830)	0.009 (1.450)	0.012* (1.640)
LOSS	-0.025*** (-5.490)	-0.037*** (-5.800)	-0.025*** (-3.090)	-0.028*** (-3.880)
Intercept	0.035*** (6.230)	0.014 (1.190)	-0.007 (-0.830)	0.023*** (2.890)
R-squared	0.177	0.136	0.079	0.146
Number of observations	3,992	2,157	1,112	1,847

Ordinary leased squared regressions are performed using discretionary accruals (AAC) as dependent variable. *,**,*** indicate significant coefficients at a 10%, 5% and 1% confidence level respectively. The values between the brackets are the t-values for each coefficient. Each model uses a different proxy for growth options as main independent variable. The adjusted R-squared indicates the proportion of variance of AAC which is explained by each of the models.

6.4 Analysis and answering sub-questions

The expectation in this research is a negative relation between growth options and earnings quality. This expectation is based on conservatism, the political cost hypothesis and debt covenants. Conservatism affects the level of research and development and therefore influences the quality of earnings. According to the political cost hypothesis, firms want to manage earnings downward when they have high growth opportunities. Finally, growth opportunities are positively related to debt covenants (Billet et al., 2007). In addition, debt covenants are an incentive to manage earnings. Debt covenants are often linked to accounting variables. Therefore managers want to manage earnings to meet the criteria of covenants (Watts R. L., 2003). A combination of these two relations leads to the expectation that growth options are associated with the quality of earnings by the mediating effect of debt covenants.

With the help of the first hypothesis this research could answer the first sub-question. This hypothesis uses Tobin's Q as measure for growth opportunities. The results provide evidence that Tobin's Q is positively related to the level of discretionary accruals. The coefficient in table 5 and 6 is 0.003. This coefficient is significant at a one percent level in both tables. Therefore this thesis rejects the null hypothesis of no relation between Tobin's Q and the quality of earnings. The first sub-question is:

Sub-question 1: Does the market value of assets to the book value of assets has an influence on the earnings quality of an entity?

Based on the rejection of the first hypothesis it is possible to answer this question. The market value of assets to the book value of assets has an positive influence on the level of discretionary accruals. Therefore the conclusion is that this ratio has a negative impact on the earnings quality of an entity. This is exactly conform the expectations. Firms with a Tobin's Q different from one are over- or undervalued. Therefore, changes in this ratio could indicate a difference in earnings quality.

The second hypothesis focuses on the growth of sales as proxy for growth opportunities. This research finds a positive relation between the growth of sales and discretionary accruals. The coefficient for the sales rate of growth is 0.018. This coefficient is significant at a one percent level in table 5. The coefficient is significant at a five percent level with the robust standard errors in table 6. Hence, the results suggest that there is a significant relation between the

sales rate of growth and discretionary accruals. Therefore, this thesis rejects the null hypothesis. The second sub-question is:

Sub-question 2: Does the sales rate of growth has an influence on the earnings quality of an entity?

There is a rejection of the null hypothesis. Hence, this thesis presumes that the sales rate of growth is related to the level of discretionary accruals. Based on the results the answer to the second sub-question is that there is a negative relation between the growth of sales and the earnings quality as expected.

The third hypothesis uses the dividend to price ratio as proxy for growth opportunities. According to the results there is a significant positive relation between the dividend to price ratio and the level of discretionary accruals. The coefficient for DIVtoPrice in model 3 is 0.137. In both table 5 and 6 this coefficient is significant at a five percent level. This leads to a negative relation between this ratio and the quality of earnings. However, this is inconsistent with the expectation that dividends are positively related to the quality of earnings. Because of the lack of internal validity, the reason for this relation could be a reversal effect. This thesis tries to confirm expectations about the effect of growth options on earnings quality. However earnings could also affect the dividend payments. According to Daniel et al. firms manage earnings to meet dividend thresholds. So dividend threshold could affect earnings quality and earnings have an effect on the actual dividend payments (Daniel et al., 2008). This means that the results presume a positive effect of earnings quality on the level of dividend payments. The third sub-question is:

Sub-question 3: Does the level of dividend has an influence on the earnings quality of an entity?

The results confirm that dividends scaled by the price of shares have influence on the quality of earnings. Based on the article of Skinner and Soltes, this is in alignment with the expectations (Skinner & Soltes, 2011). However, in contrast to the expectations, this relation is negative. So according to the results, higher dividend payments, which are linked to low growth, results in higher quality of earnings. Besides growth options, dividend could provide other signals. Higher dividend could also indicate higher incentives for managers to keep the shareholders satisfied with an increase in earnings according to the positive accounting theory. This means that the quality of earnings could affect the dividend payments without

regard of growth opportunities. Daniel et al. support this. According to this article, firms manage earnings to meet dividend thresholds. Dividend payments are influenced by earnings management (Daniel et al, 2008). Furthermore, Skinner and Soltes support evidence that firms which pay dividends have more persistent earnings than firms without dividend payments. The researchers were not able to support significant evidence about the magnitude effect of dividend payments on the quality of earnings (Skinner & Soltes, 2011). These possible explanations mitigate the surprise of the positive relation between dividend payments and discretionary accruals.

The last regression model is useful to answer the fourth sub-question. This model uses the level of research and development expenses as measure for growth opportunities. The last sub-question is:

Sub-question 4: Does the level of research and development has an influence on the earnings quality of the entity?

According to the results of this regression model the research and development expenses scaled by sales are significantly related to the level of discretionary accruals. The coefficient of RDtoSales in model 4 is 0.009. This coefficient is significant at a one percent level in table 5 and 6. So this thesis rejects the null hypothesis of no relation. The sign of this relation is positive. Therefore this research suggests a negative relation between the research and development expenses scaled by sales and the quality of earnings. This is in alignment with the expectations raised in prior chapters.

6.5 Summary

The first part of this chapter provides the descriptive statistics. After making histograms it seems to be necessary to winsorize some variables. This leads to different sample sizes for each regression model. The additional tests provide sufficient reasons to have a questionable mind about the assumptions of ordinary least squared regression models. Especially the assumptions related to the error term do not meet the criteria. Therefore, the same regression models are performed with robust standard errors. The results with the robust standard errors generate the same conclusions as the results without the robust standard errors. All proxies for growth options have a significant effect on the quality of earnings. Three of them have a coefficient with the expected sign. Possible reasons could be conservatism, the political cost

hypothesis and covenants. However, the dividend to price ratio has an opposite association with quality of earnings. A possible reason could be that dividend payments also provide other signals except from growth opportunities. Moreover, dividend payments are related to earnings persistence, which is another proxy for earnings quality. Because of the lack of internal validity, there could also be a reversal causality between earnings and dividend payments.

7. Conclusion

7.1 Answering the research question

The findings show mixed results about the relation between growth opportunities and the quality of earnings. First of all, there is a positive association between Tobin's Q and discretionary accruals. This suggests a negative relation between growth opportunities and the quality of earnings. Second of all, the sales rate of growth is significantly related to discretionary accruals. The findings show a negative relation between the sales rate of growth and earnings quality. Furthermore, the ratio of dividend to price is positively related to the level of discretionary accruals. This raises the idea of a positive association between growth options and earnings quality. The last measure for growth options is the level of research and development expenses scaled by sales. The results suggest a negative association between growth opportunities and earnings quality. Based on these results this chapter answers the research question:

RQ: Do European firms with relatively high growth opportunities have a relatively low level of earnings quality?

The results show that all models suggest an association between growth opportunities and the quality of earnings. Three of these models show the expected sign of the association. Therefore, it is most likely that the level of growth opportunities has a negative effect on the quality of earnings. However, the third model cannot be ignored. The unexpected association between the dividend to price ratio and discretionary accruals is in contrast with the other models. This association could also be explained by other reasons. According to Daniel et al. it is most likely that earnings affect dividend payments instead of the other way around (Daniel et al., 2008). Hence, the conclusion is that European firms with relatively high growth opportunities have a relatively low level of earnings quality.

This study helps to understand that the quality of earnings for growth opportunities firms is still an issue in Europe. Besides US GAAP, IFRS also fails to report growth opportunities in the financial reports.

7.2 Limitations

Despite the academic relevance of this thesis, this research suffers from some limitations. This thesis measures earnings quality indirectly by indicating possible earnings management. To measure earnings management, this research uses discretionary accruals as proxy. However, earnings management is not always seen as something bad. Managers could steer earnings to meet earnings forecasts. Higher levels of discretionary accruals could help to increase the predictability of the performance of a company. Hence, stakeholders could be more satisfied with earnings management (Mintz & Morris, 2016). Therefore, discretionary accruals are not the perfect proxy for measuring earnings quality.

Another limitation is the possible existence of causality issues because of low internal validity. Sen discussed a possible effect of the incentive to report higher quality of earnings on the incentive to reduce the investments. This suggests that the quality of earnings could affect the growth opportunities of a firm (Sen, 2005). To make conclusions about a possible causal effect the use of lead and lagged variables of the growth options is necessary. This helps to check whether the relation between growth options and earnings quality does not suffer from reversal causality.

7.3 Recommendations

Further research could help to understand what the main reason is for the negative association between growth opportunities and earnings quality presumed by this thesis. The expectations raised in this thesis are based on conservatism, the positive accounting theory and covenants. Proxies for conservatism could be included in the model for example. This helps to confirm whether conservatism is the reason for the negative relation found in this paper. Another suggestion for further research is the use of other proxies for earnings quality. As discussed in last section, discretionary accruals are not the perfect proxy for measuring earnings quality. Finally, this thesis found a positive association between dividend payments and earnings quality. Because of causality issues, further research could also check whether there is an effect of the quality of earnings on dividend payments instead of the other way around.

8. Bibliography

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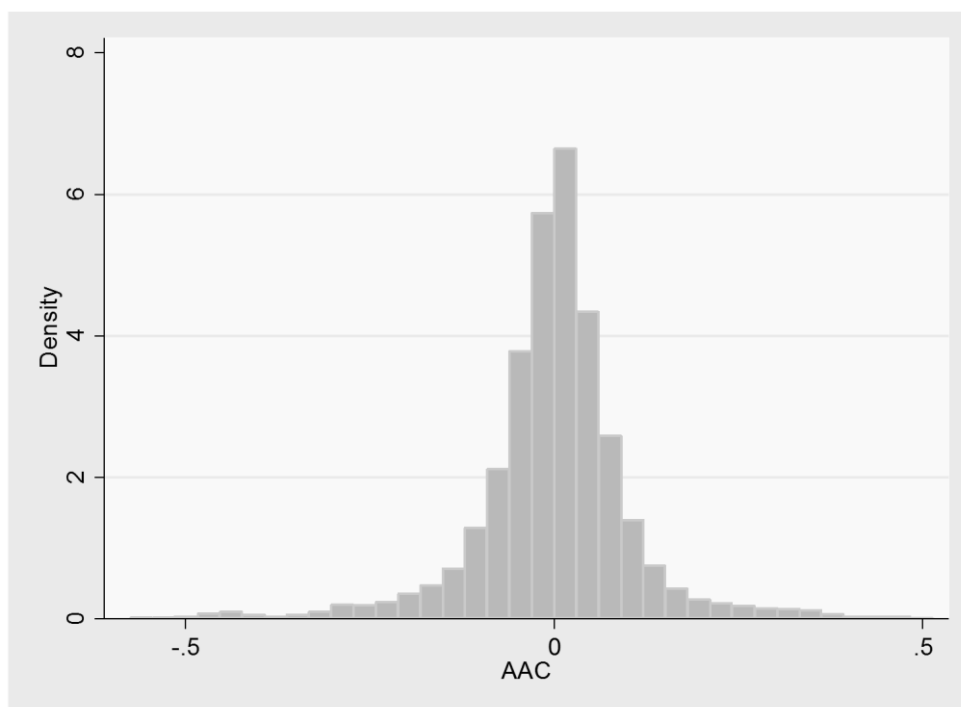
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9. Appendix

Table 2 Variable description

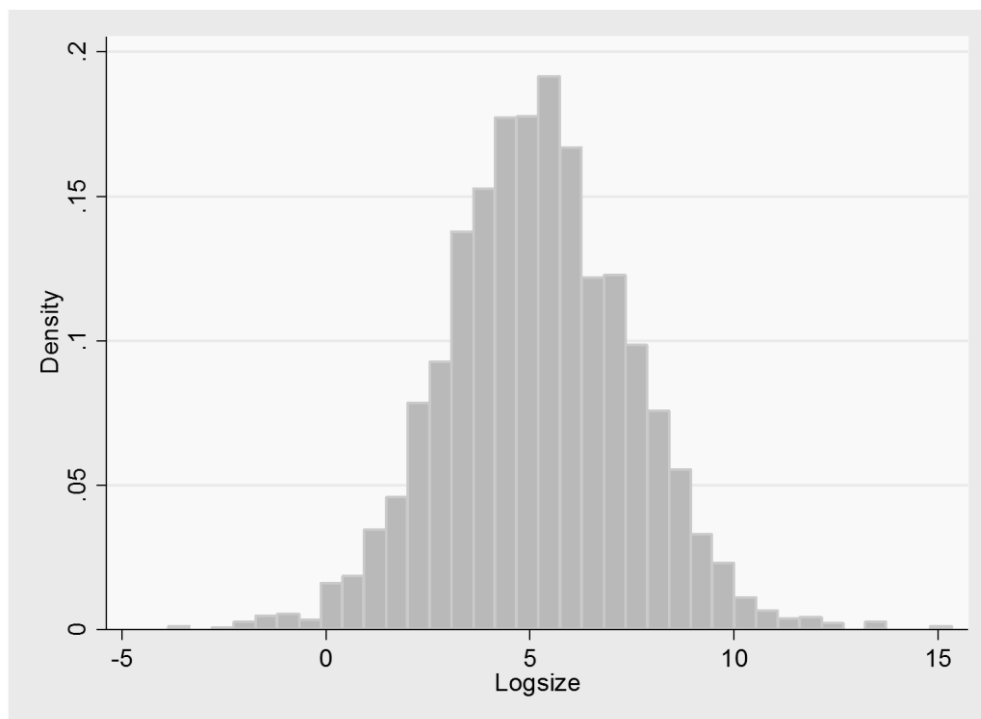
Variable	Description
AAC	The level of discretionary accruals
TobinQ	Tobin's Q: the market value of assets divided by the book value of assets
Salesgrowth	The growth of sales measured as a ratio of the sales of the next period divided by the sales of the current period.
DIVtoPrice	Ratio of dividend paid to the market price per share.
RDtoSales	Ratio of the research and development expenses divided by the sales in the same period.
ROA	The return of assets calculated by the level of net income divided by the total of assets in the current period.
Logsize	The log of the level of total assets for a company in the current period.
HIGHTECH	Dummy variable for high-tech industries. This variable is 1 for companies in high-tech industries. Otherwise the value is 0. High-tech firms include firms with the following SIC codes: 283, 357, 366, 367, 382, 384, 481, 482, 489, 737, 873.
LEVERAGE	Ratio of debt divided by equity in the current period.
Lag_loss	Lag dummy variable for losses. The value is 1 when the income in the prior year is negative. Otherwise this value is 0.
LOSS	Dummy variable for losses. The value is 1 when the income in the current year is negative. Otherwise this value is 0.

Figure 2 Histogram of AAC without winsorizing



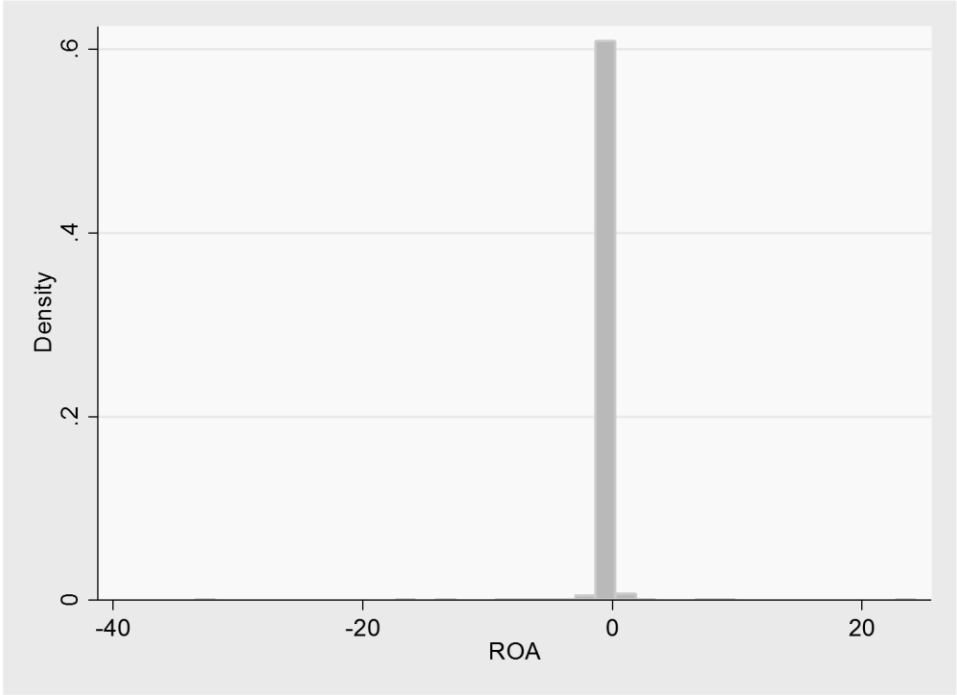
Based on the distribution of AAC, this thesis does not winsorize this variable.

Figure 3 Histogram of Logsize without winsorizing



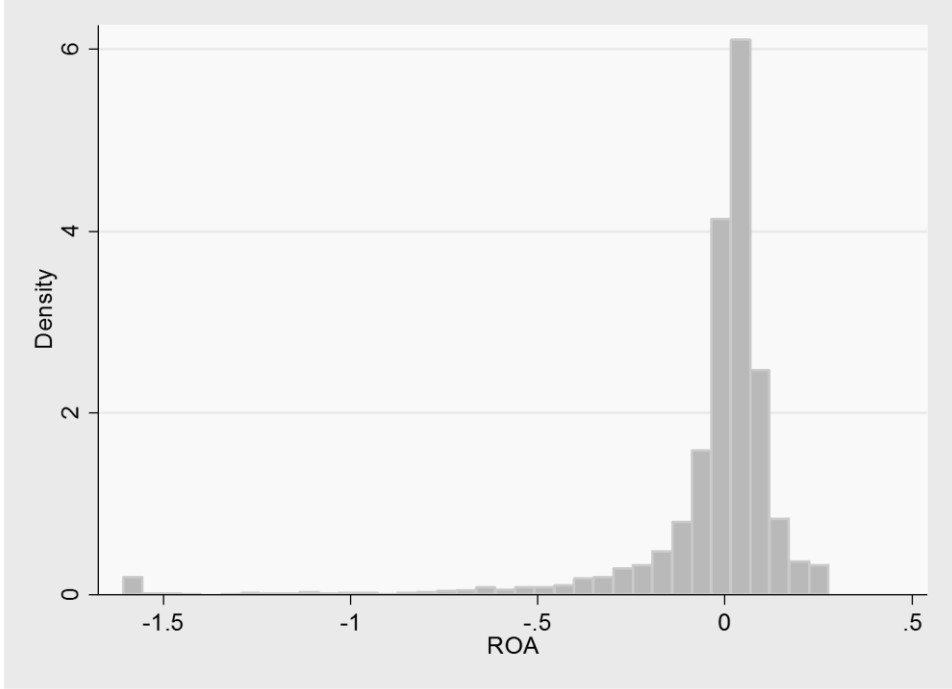
Based on the distribution of Logsize, this thesis does not winsorize this variable.

Figure 4 Histogram of ROA before winsorizing



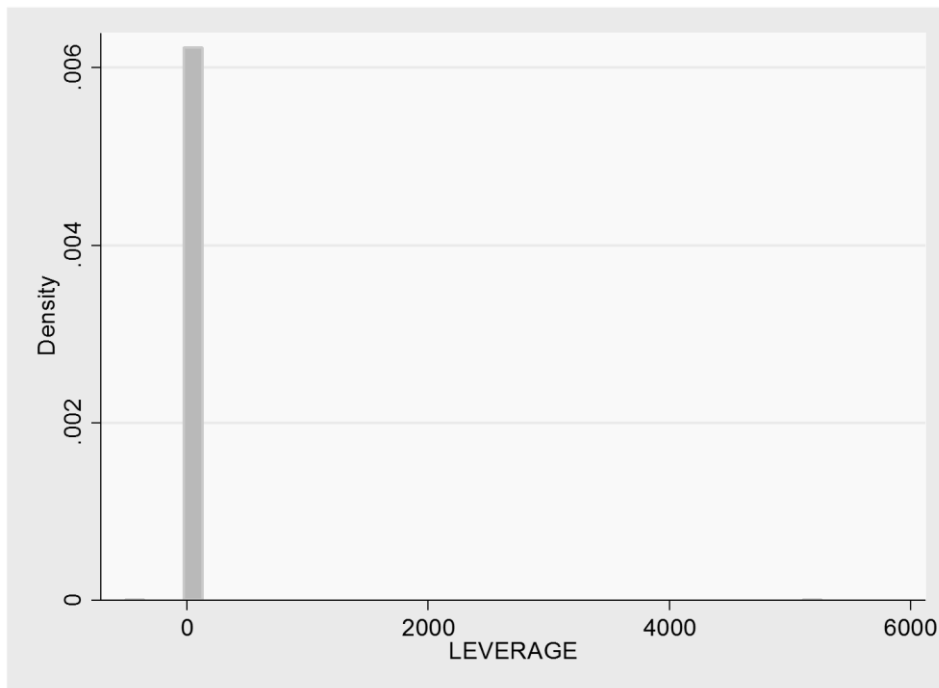
Based on this distribution, the conclusion is to winsorize ROA.

Figure 5 Histogram of ROA after winsorizing



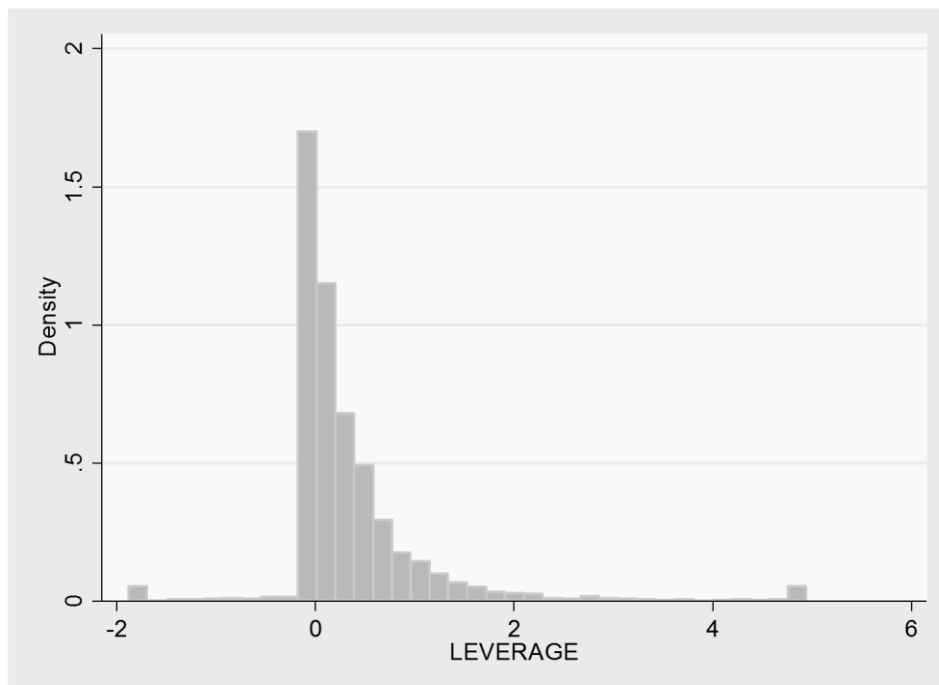
After winsorizing, the distribution of ROA seems to be much better.

Figure 6 Histogram of LEVERAGE before winsorizing



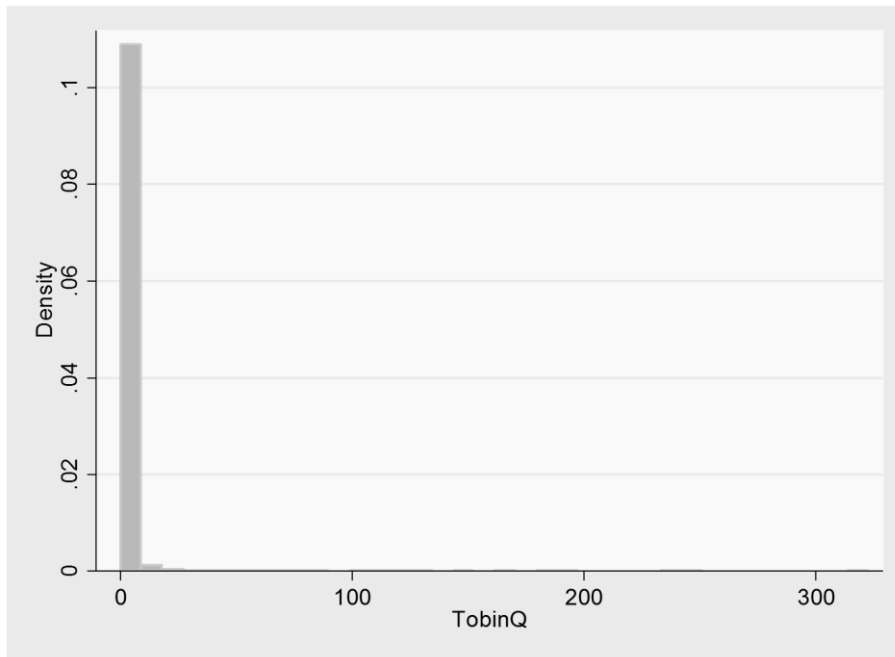
Based on this distribution, the conclusion is to winsorize LEVERAGE.

Figure 7 Histogram of LEVERAGE after winsorizing



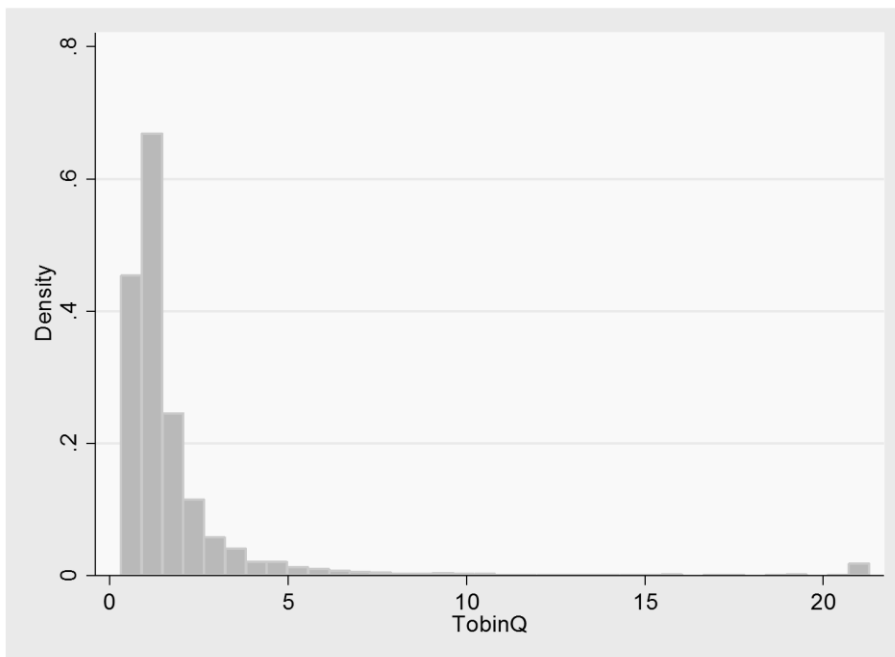
After winsorizing, the distribution of LEVERAGE seems to be much better.

Figure 8 Histogram of TobinQ before winsorizing



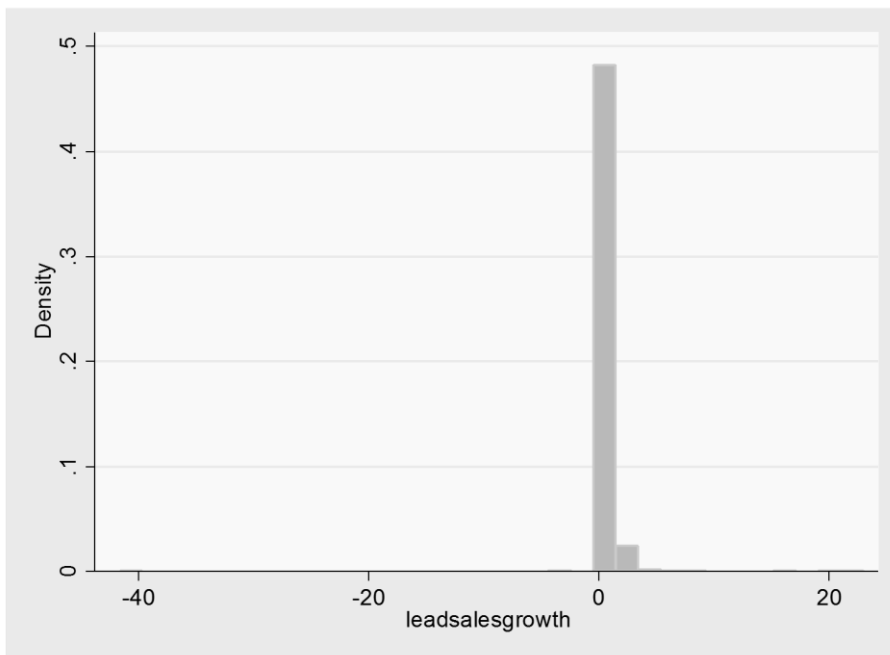
Based on this distribution, the conclusion is to winsorize TobinQ.

Figure 9 Histogram of TobinQ after winsorizing



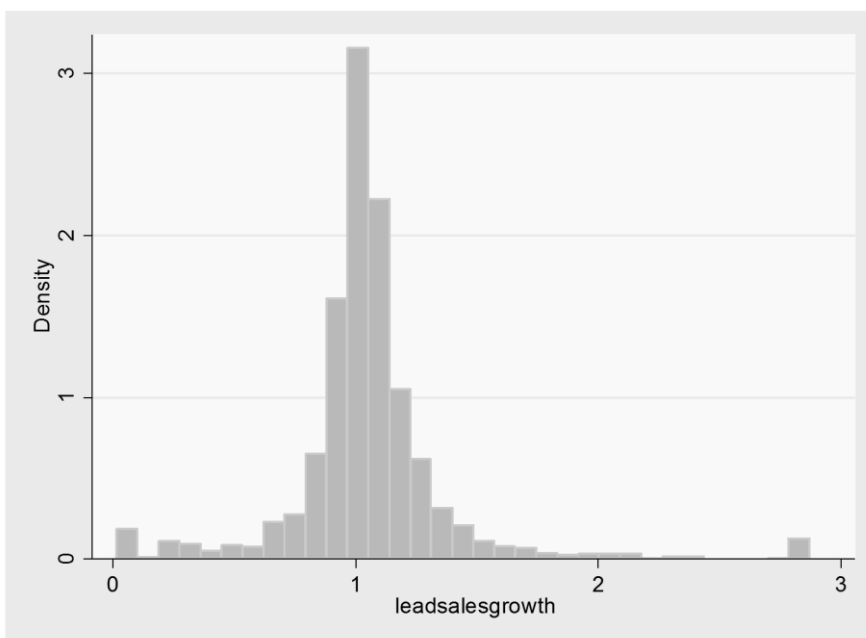
After winsorizing, the distribution of TobinQ seems to be much better.

Figure 10 Histogram of Salesgrowth before winsorizing



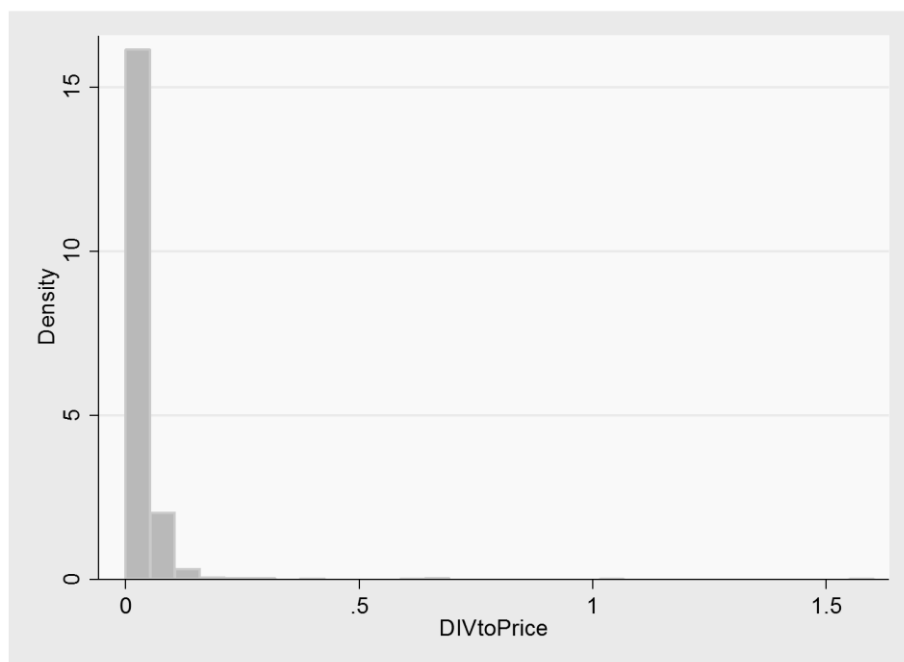
Based on this distribution, the conclusion is to winsorize Salesgrowth.

Figure 11 Histogram of Salesgrowth after winsorizing



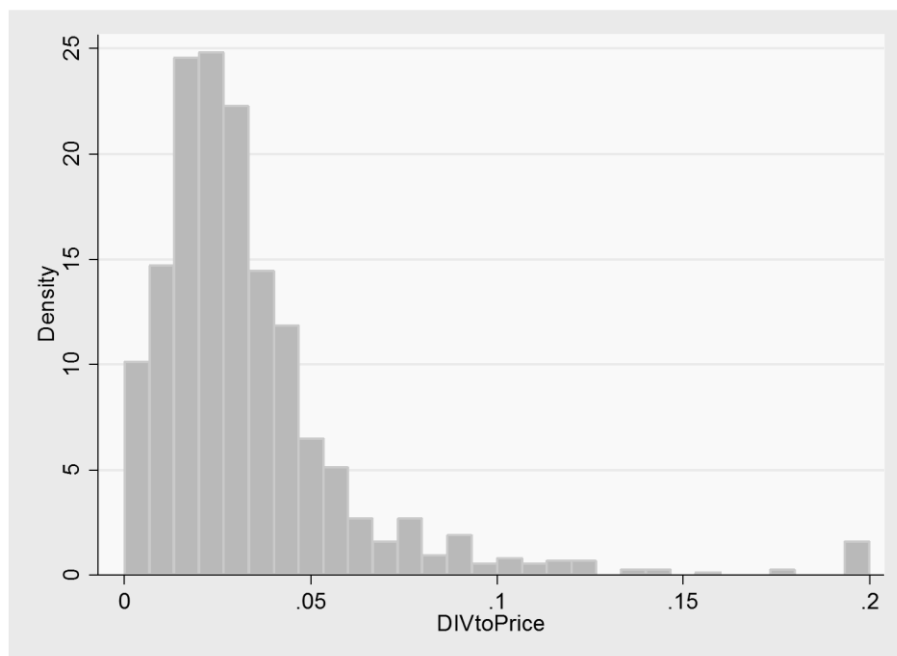
After winsorizing, the distribution of Salesgrowth seems to be much better.

Figure 12 Histogram of DIVtoPrice before winsorizing



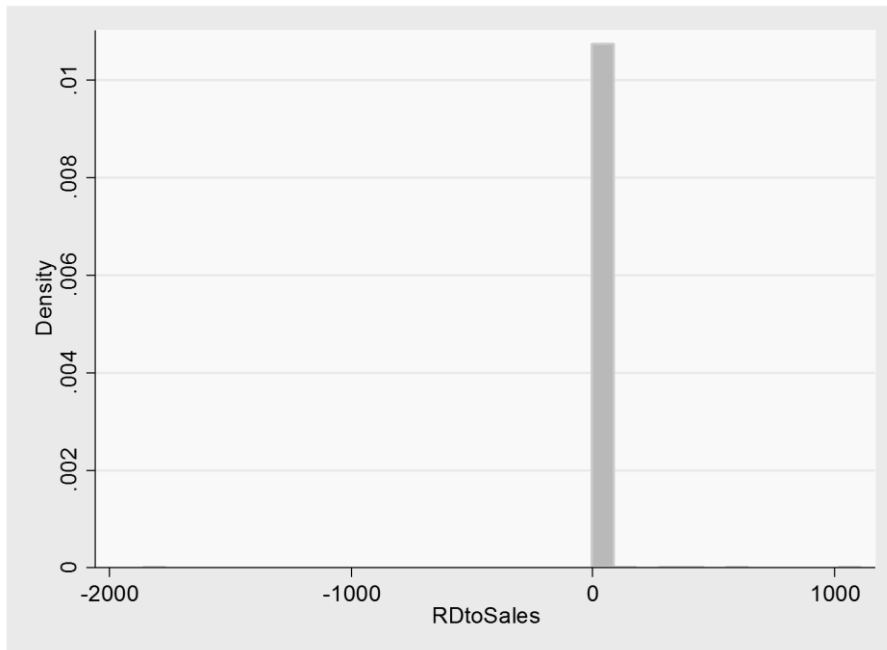
Based on this distribution, the conclusion is to winsorize Salesgrowth.

Figure 13 Histogram of DIVtoPrice after winsorizing



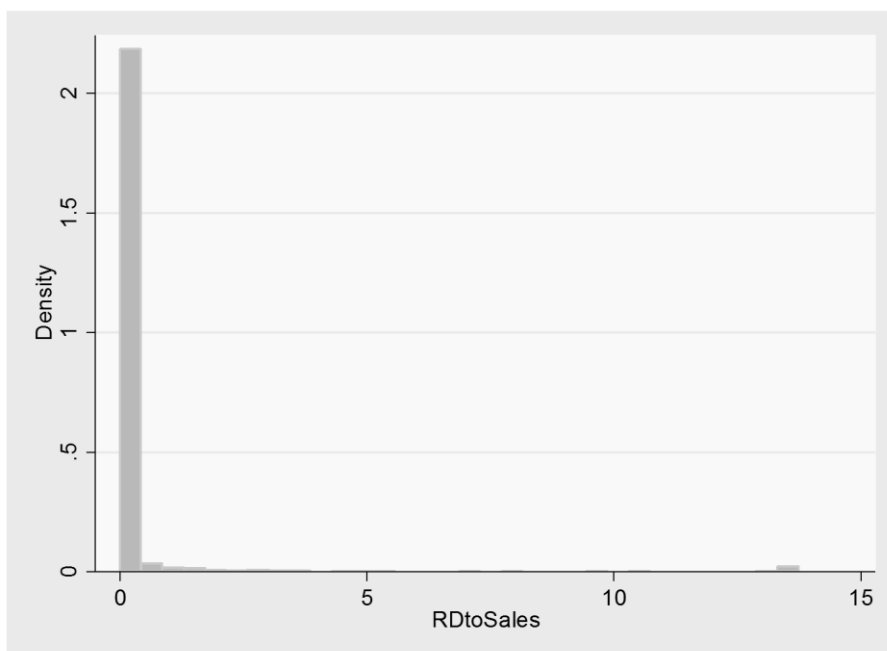
After winsorizing, the distribution of Salesgrowth seems to be much better.

Figure 14 Histogram of RDtoSales before winsorizing



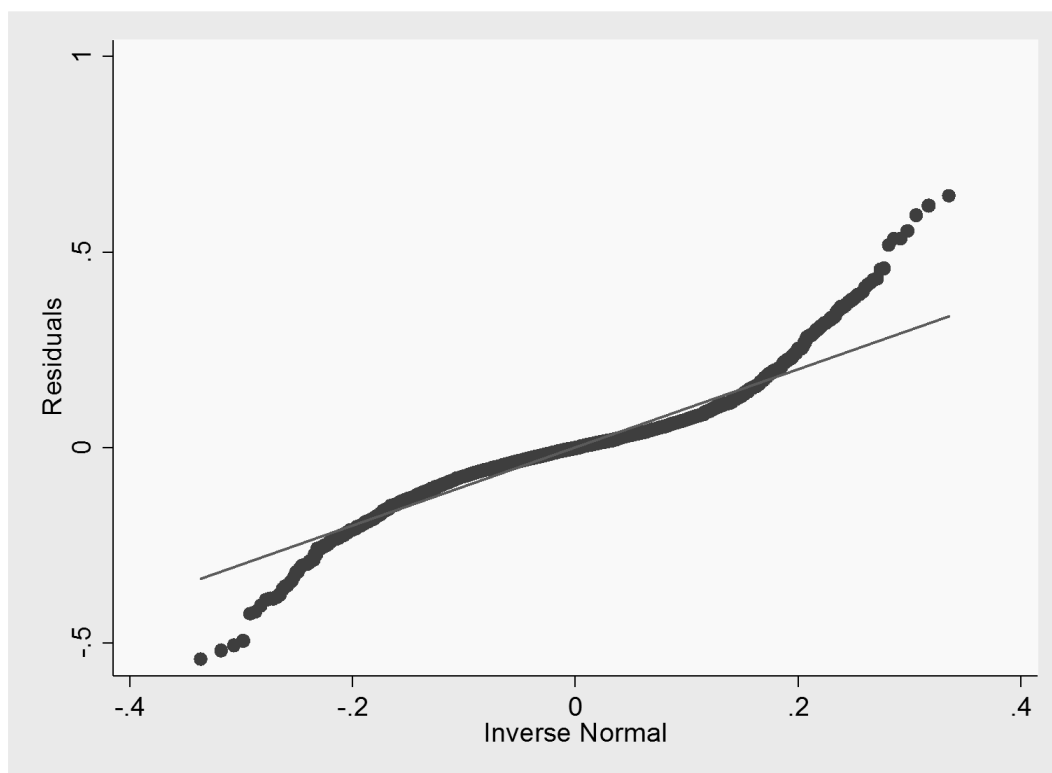
Based on this distribution, the conclusion is to winsorize Salesgrowth.

Figure 15 Histogram of RDtoSales after winsorizing



After winsorizing, the distribution of Salesgrowth seems to be slightly better.

Figure 16 Q-Q Plot Regression with Tobin’s as growth measure



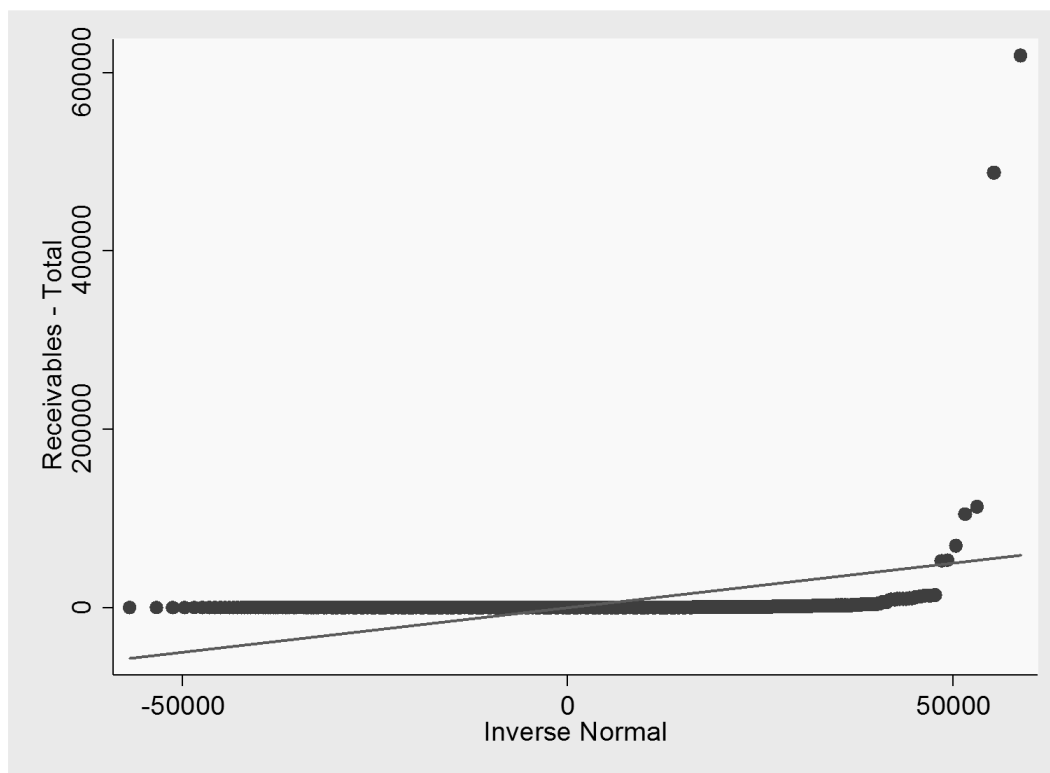
This Q-Q plot shows significant deviation from normality of the residuals for model 1.

Table 7 Shapiro-Wilk W test of regression with Tobin’s Q as growth measure

Shapiro-Wilk W test					
Variable	Obs	W	V	z	Prob>z
r	3,992	0.924	169.168	13.367	0.000

The Shapiro Wilk test of model 1 rejects the null hypothesis of normal distributed residuals.

Figure 17 Q-Q Plot Regression with Salesgrowth as growth measure



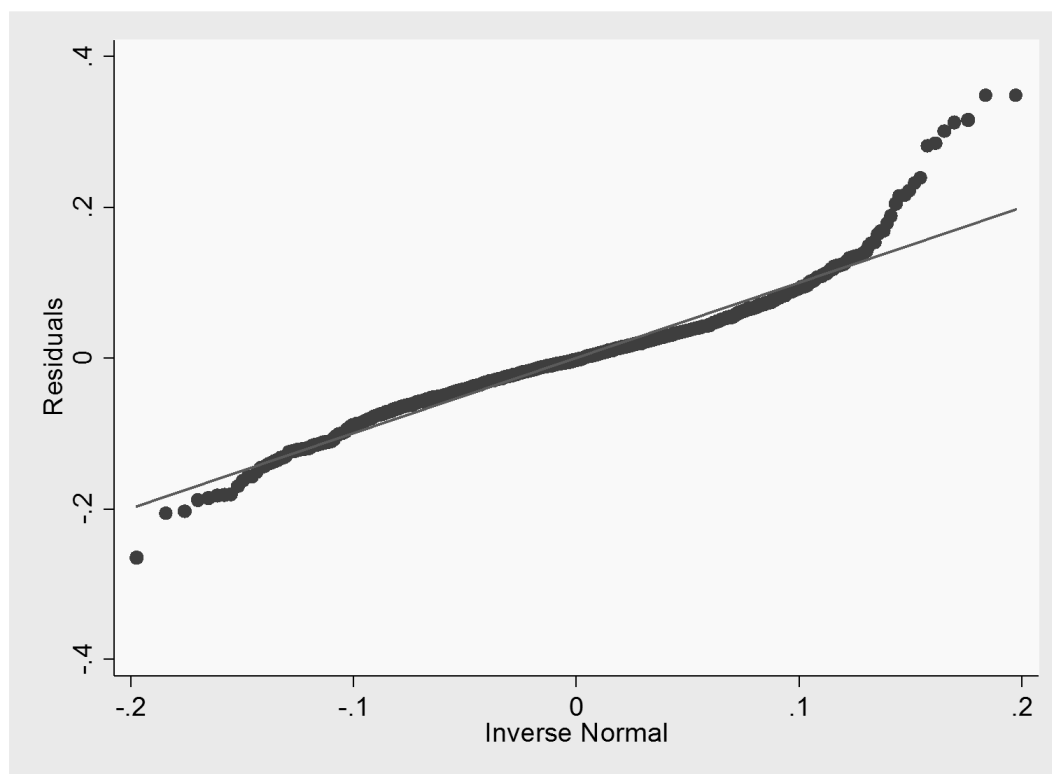
This Q-Q plot shows significant deviation from normality of the residuals for model 2.

Table 8 Shapiro-Wilk W test of regression with Salesgrowth as growth measure

Shapiro-Wilk W test					
Variable	Obs	W	V	z	Prob>z
r	2,157	0.026	1237.173	18.163	0.000

The Shapiro Wilk test of model 2 rejects the null hypothesis of normal distributed residuals.

Figure 18 Q-Q Plot Regression with DIVtoPrice as growth measure



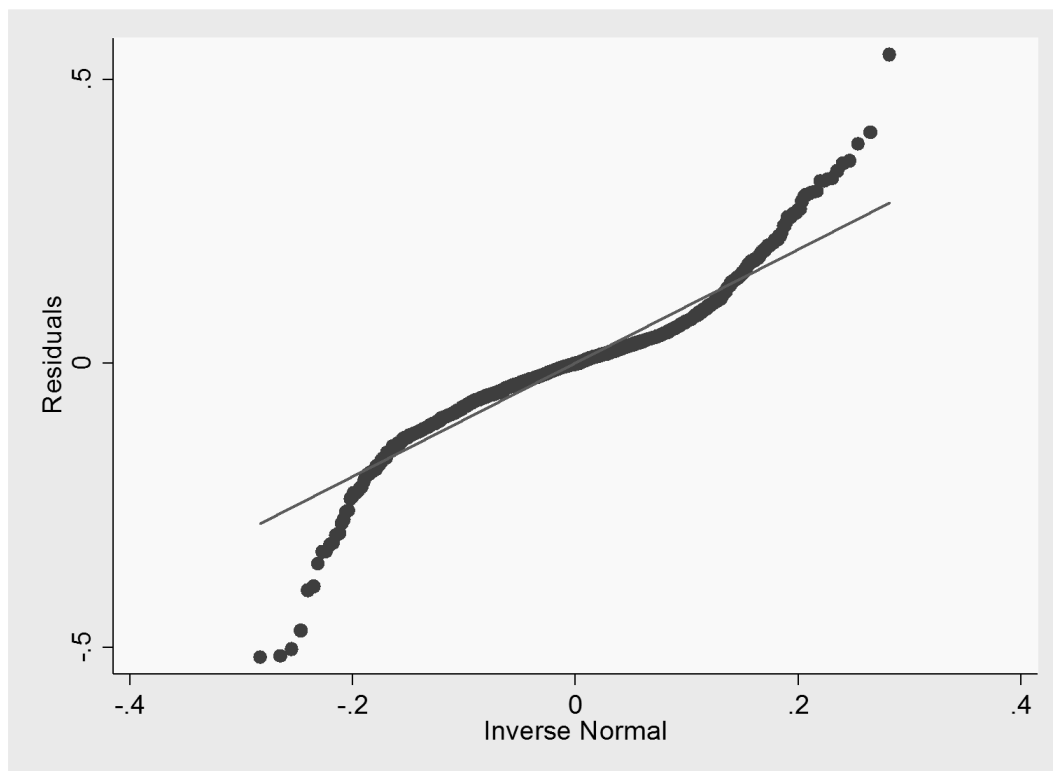
This Q-Q plot shows significant deviation from normality of the residuals for model 3.

Table 9 Shapiro-Wilk W test of regression with DIVtoPrice as growth measure

Shapiro-Wilk W test					
Variable	Obs	W	V	z	Prob>z
R	1,112	0.942	40.410	9.200	0.000

The Shapiro Wilk test of model 3 rejects the null hypothesis of normal distributed residuals.

Figure 19 Q-Q Plot Regression with RDtoSales as growth measure



This Q-Q plot shows significant deviation from normality of the residuals for model 4.

Table 10 Shapiro-Wilk W test of regression with RDtoSales as growth measure

Shapiro-Wilk W test					
Variable	Obs	W	V	z	Prob>z
r	1,847	0.919	89.457	11.398	0.000

The Shapiro Wilk test of model 4 rejects the null hypothesis of normal distributed residuals.

Table 11 VIF values

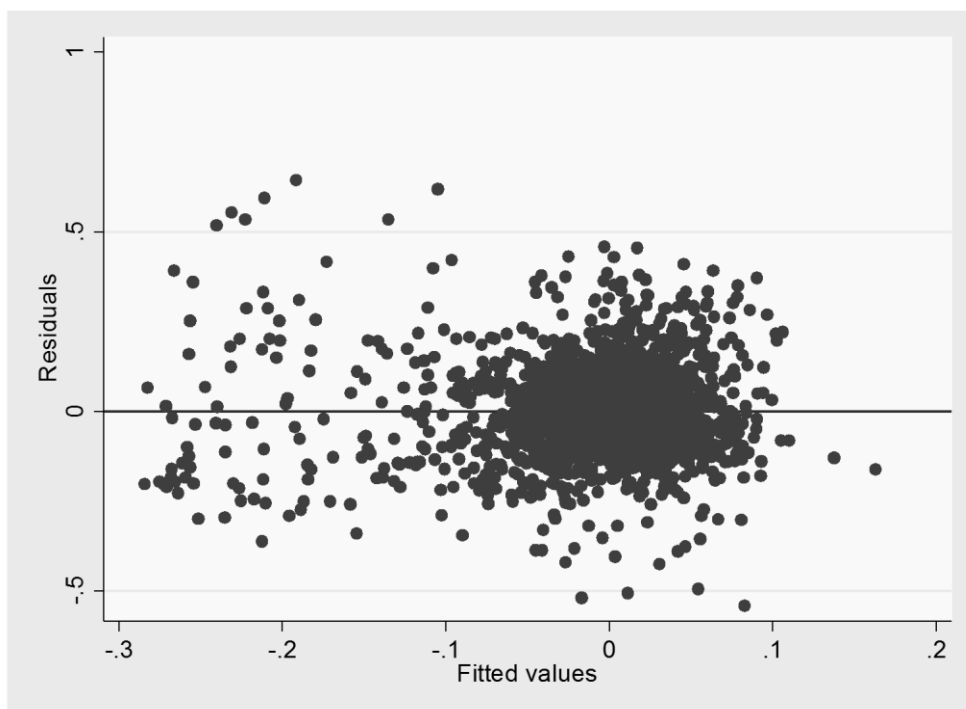
Panel A		
Variable	VIF	1/VIF
LOSS	1.880	0.533
ROA	1.760	0.570
Lag_loss	1.640	0.610
Logsize	1.390	0.718
TobinQ	1.160	0.862
LEVERAGE	1.070	0.939
HIGHTECH	1.060	0.942
Mean VIF	1.420	

Panel B		
Variable	VIF	1/VIF
LOSS	1.760	0.567
ROA	1.550	0.645
Lag_loss	1.520	0.656
Logsize	1.270	0.787
LEVERAGE	1.070	0.937
HIGHTECH	1.060	0.946
Salesgrowth	1.020	0.984
Mean VIF	1.320	

Panel C		
Variable	VIF	1/VIF
ROA	1.450	0.688
LOSS	1.350	0.741
LEVERAGE	1.100	0.910
Logsize	1.100	0.911
HIGHTECH	1.090	0.921
Lag_loss	1.080	0.928
DIVtoPrice	1.030	0.971
Mean VIF	1.170	

Panel D		
Variable	VIF	1/VIF
LOSS	2.070	0.484
ROA	2.060	0.486
Lag_loss	1.770	0.567
Logsize	1.470	0.680
RDtoSales	1.320	0.759
HIGHTECH	1.190	0.838
LEVERAGE	1.090	0.920
Mean VIF	1.570	

Figure 20 Residuals against the fitted values plotted for regression model with Tobin’s Q as growth measure



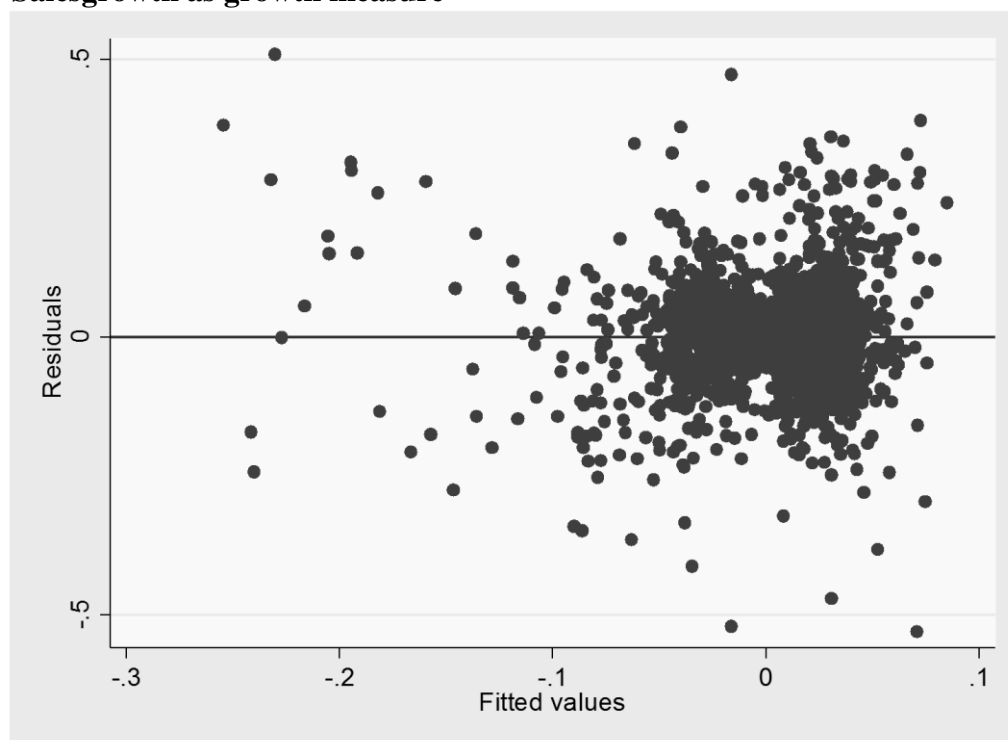
This plot presumes heteroskedasticity for model 1.

Table 12 White test for regression model with Tobin’s Q as growth measure

White test			
Source	chi2	df	p
Heteroskedasticity	807.740	32	0.000
Skewness	160.720	7	0.000
Kurtosis	38.720	1	0.000
Total	1007.180	40	0.000

The null hypothesis of homoskedasticity is rejected for model 1.

Figure 21 Residuals against the fitted values plotted for regression model with Salesgrowth as growth measure



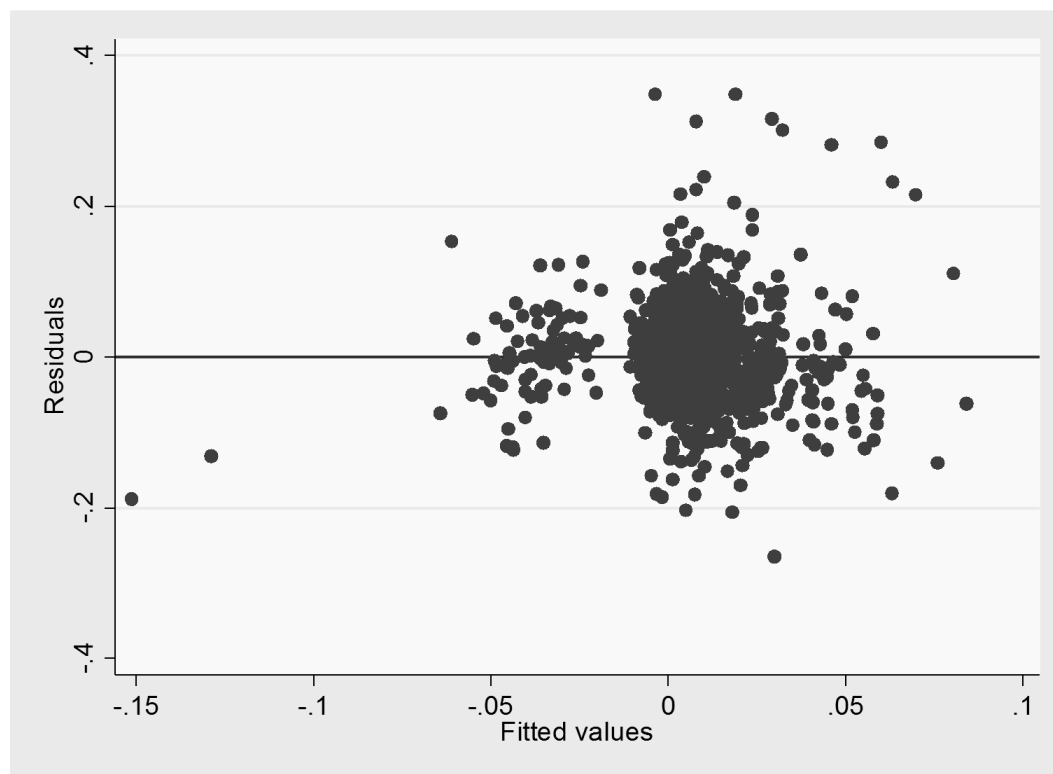
This plot presumes heteroskedasticity for model 2.

Table 13 White test for regression model with Salesgrowth as growth measure

White test			
Source	chi2	df	p
Heteroskedasticity	350.510	32	0.000
Skewness	33.980	7	0.000
Kurtosis	25.270	1	0.000
Total	409.760	40	0.000

The null hypothesis of homoskedasticity is rejected for model 2.

Figure 22 Residuals against the fitted values plotted for regression model with DIVtoPrice as growth measure



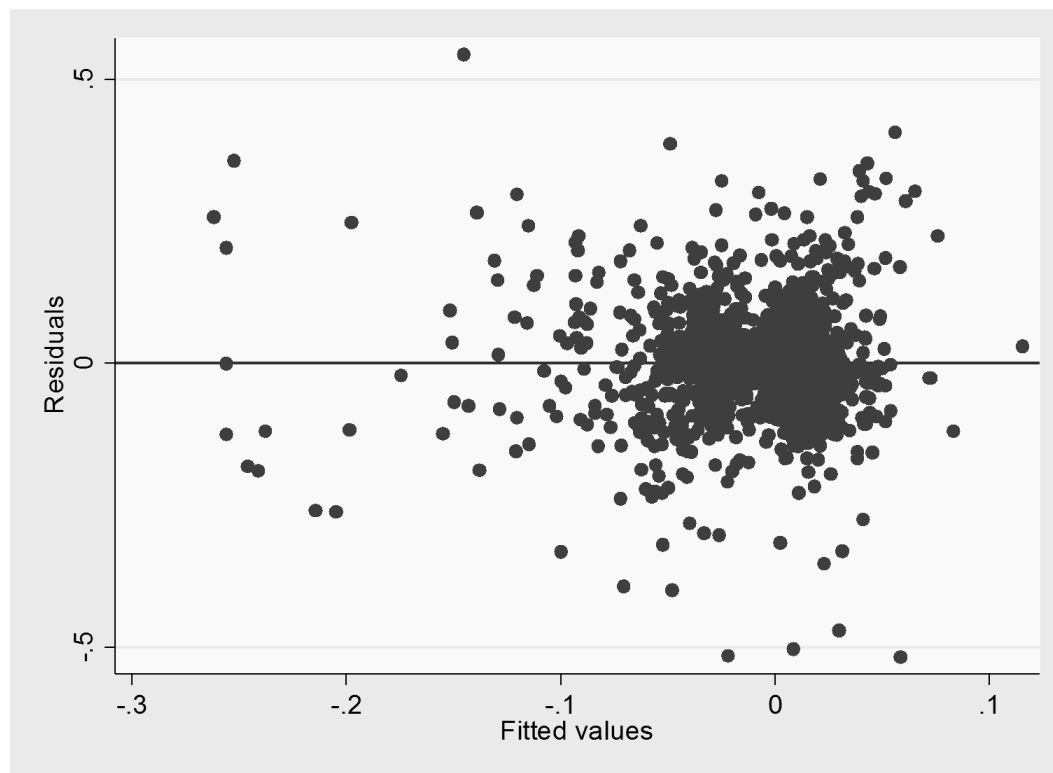
This plot presumes heteroskedacity for model 3.

Table 14 White test for regression model with DIVtoPrice as growth measure

White test			
Source	chi2	df	p
Heteroskedasticity	86.620	32	0.000
Skewness	21.770	7	0.003
Kurtosis	12.370	1	0.000
Total	120.770	40	0.000

The null hypothesis of homoskedacity is rejected for model 3.

Figure 23 Residuals against the fitted values plotted for regression model with RDtoSales as growth measure



This plot presumes heteroskedacity for model 4.

Table 15 White test for regression model with RDtoSales as growth measure

White test			
Source	chi2	df	p
Heteroskedasticity	306.230	32	0.000
Skewness	13.700	7	0.057
Kurtosis	18.540	1	0.000
Total	338.470	40	0.000

The null hypothesis of homoskedacity is rejected for model 4.

Table 16 Linktest for regression model with Tobin's Q as growth measure

aac	Coefficient	t	P>t
_hat	0.961	19.480	0.000
_hatsq	-0.322	-1.080	0.279
Intercept	0.001	0.370	0.712
Adjusted R-squared	0.177		
Number of observations	3,992		

The linktest for model 1 shows no model misspecification errors.

Table 17 Linktest for regression model with Salesgrowth as growth measure

aac	Coefficient	t	P>t
_hat	1.198	17.620	0.000
_hatsq	2.784	4.780	0.000
Intercept	-.004	-2.080	0.038
Adjusted R-squared	0.145		
Number of observations	2,157		

The linktest for model 2 shows a model misspecification error. Based on this test, the model misses relevant variables.

Table 18 Linktest for regression model with DIVtoPrice as growth measure

aac	Coefficient	t	P>t
_hat	0.960	9.340	0.000
_hatsq	-6.182	-3.570	0.000
Intercept	0.003	1.250	0.211
Adjusted R-squared	0.088		
Number of observations	1,112		

The linktest for model 3 shows a model misspecification error. Based on this test, the model misses relevant variables.

Table 19 Linktest for regression model with RDtoSales as growth measure

aac	Coefficient	t	P>t
_hat	1.088	13.260	0.000
_hatsq	0.848	1.470	0.141
Intercept	-0.001	-0.320	0.750
Adjusted R-squared	0.146		
Number of observations	1,847		

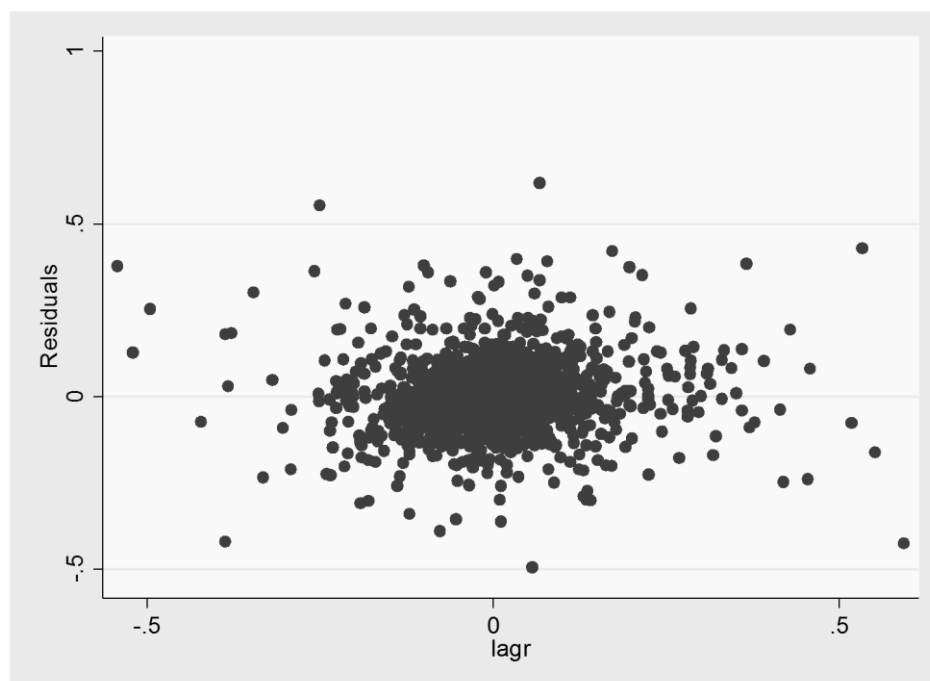
The linktest for model 1 shows no model misspecification errors.

Table 20 Correlation between residuals and lagged residuals for regression model with Tobin's Q as growth measure

Correlation table		
	r	lagr
r	1.000	
lagr	0.091	1.000

The correlation between the residuals of the current period and prior period is rather low.

Figure 24 Scatterplot for residuals against lagged residuals for regression model with Tobin's Q as growth measure



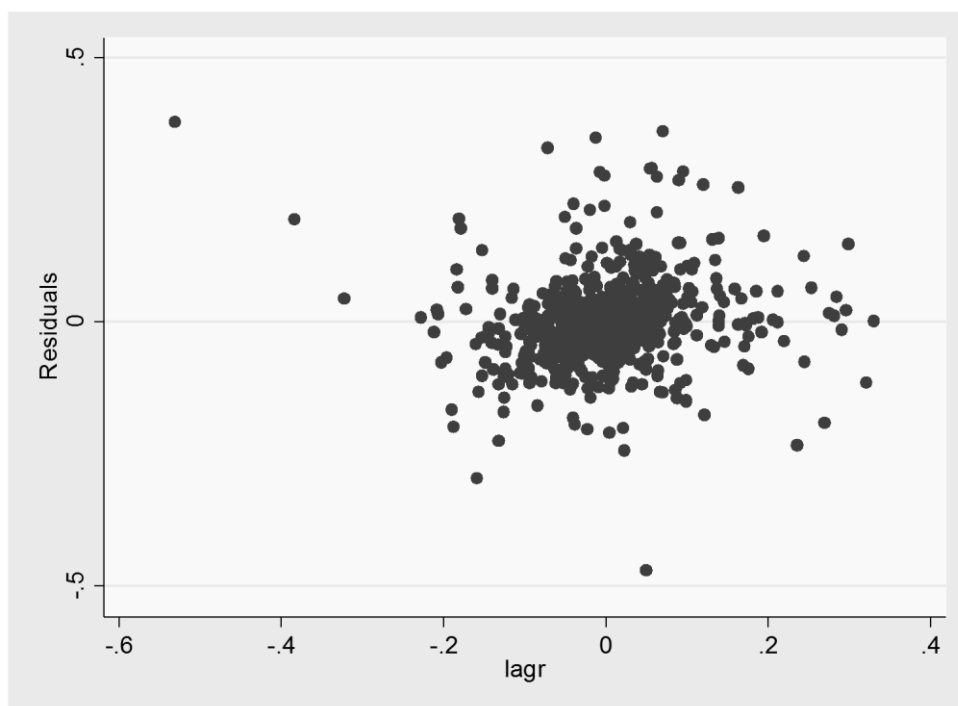
The scatterplot does not show a direct relation between residuals of the current period and residuals of prior period.

Table 21 Correlation between residuals and lagged residuals for regression model with Salesgrowth as growth measure

Correlation table		
	r	lagr
R	1.000	
Lagr	0.108	1.000

The correlation between the residuals of the current period and prior period is rather low.

Figure 25 Scatterplot for residuals against lagged residuals for regression model with Salesgrowth as growth measure



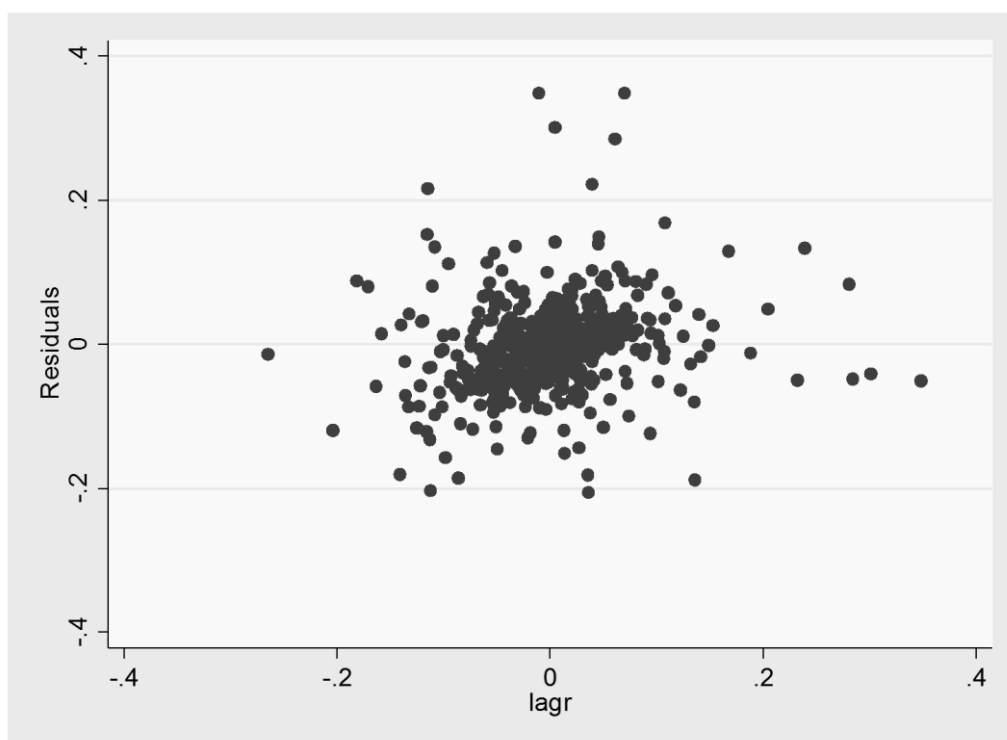
The correlation between the residuals of the current period and prior period is rather low.

Table 22 Correlation between residuals and lagged residuals for regression model with DIVtoPrice as growth measure

Correlation table		
	r	lagr
r	1.000	
lagr	0.185	1.000

The correlation between the residuals of the current period and prior period is rather low.

Figure 26 Scatterplot for residuals against lagged residuals for regression model with DIVtoPrice as growth measure



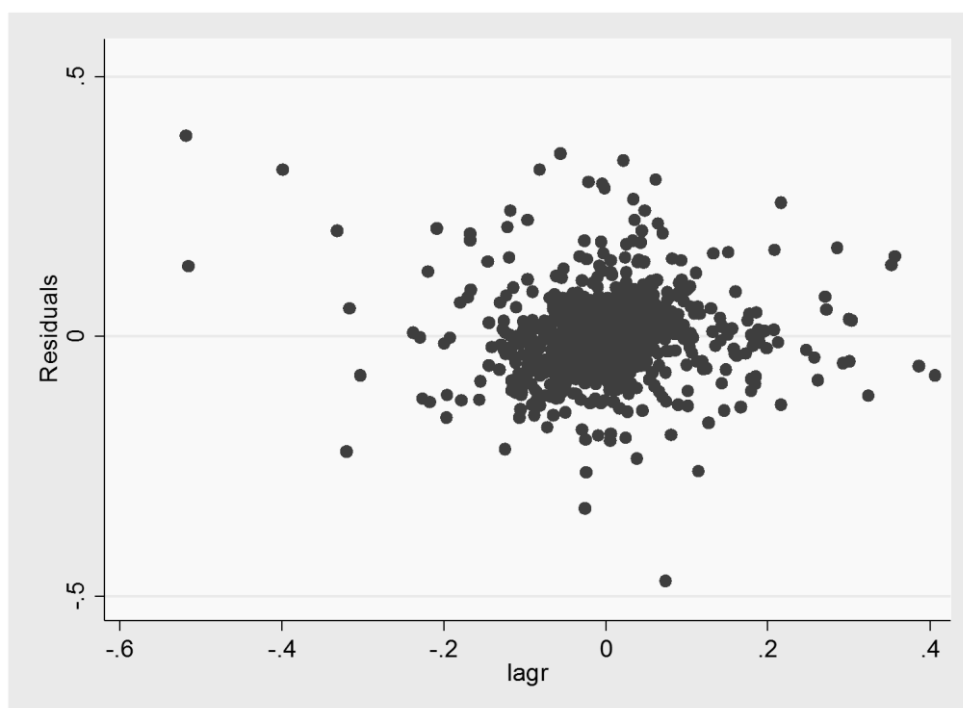
The correlation between the residuals of the current period and prior period is rather low.

Table 23 Correlation between residuals and lagged residuals for regression model with RDtoSales as growth measure

Correlation table		
	r	lagr
r	1.000	
lagr	0.023	1.000

The correlation between the residuals of the current period and prior period is rather low.

Figure 27 Scatterplot for residuals against lagged residuals for regression model with RDtoSales as growth measure



The correlation between the residuals of the current period and prior period is rather low.

Table 24 List of European countries used in this research

Countries (Country code)
Austria (AUT)
Belgium (BEL)
Switzerland (CHE)
Cyprus (CYP)
Czech Republic (CZE)
Germany (DEU)
Denmark (DNK)
Spain (ESP)
Estonia (EST)
Finland (FIN)
France (FRA)
Great Britain (GBR)
Gibraltar (GIB)
Greece (GRC)
Croatia (HRV)
Hungary (HUN)
Ireland (IRL)
Iceland (ISL)
Italy (ITA)
Liechtenstein (LIE)
Lithuania (LTU)
Luxembourg (LUX)
Latvia (LVA)
Monaco (MCO)
Malta (MLT)
Netherlands (NLD)
Norway (NOR)
Poland (POL)
Portugal (PRT)
Slovakia (SVK)
Slovenia (SVN)
Sweden (SWE)
Turkey (TUR)
