
Influencing the number: the relation between accrual-based earnings management and stock repurchases

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ABSTRACT

This study examines the relation between accrual-based earnings management and stock repurchases as tools to influence an entity's earnings per share (EPS). The sample consists of 3255 stock repurchasing events of firms listed in EU15 countries in the period 1999-2010. Using a two-stage regression model, the relation between the level of abnormal accruals and the probability of accretive stock repurchases is studied. Findings reveal an unpredictable relation between accrual-based earnings management and stock repurchases in an European context over the period 1999-2006, and an indication of a complementary relation over the period 2007-2010. This study provides better insight into managerial strategies to deal with the entity's EPS under both favorable economic conditions as well as during times of financial crisis.

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“Numbers in the abstract are just that -- numbers. But relying on the numbers in a financial report are livelihoods, interests and ultimately, stories: a single mother who works two jobs so she can save enough to give her kids a good education; a father who labored at the same company for his entire adult life and now just wants to enjoy time with his grandchildren; a young couple who dreams of starting their own business.”

(Levitt 1998)

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Chapter 1 Introduction

1.1 Positive Accounting Theory and earnings management

Consistent with Smith and Watts' (1983) definition of a corporation, in agency theory a firm is considered to be a nexus of contracts among various stakeholders who basically act in their self-interest and have a claim to a common output. Within the *ex post* opportunistic perspective of Positive Accounting Theory, it is suggested that the accounting practices adopted by management do not per se best reflect the underlying economic performance of the corporation. Instead, it argues that management adopts manipulative strategies to influence wealth transfers among stakeholders. Based upon the fundamental hypotheses underlying Positive Accounting Theory by Watts and Zimmerman (1990), three types of wealth transfers can be distinguished. These are transfers between firms and managers (management compensation hypothesis), between firms and fund providers (debt hypothesis) and between firms and society (political cost hypothesis).

The semi-strong form of the efficient market hypothesis (EMH) assumes that all publicly available information is incorporated in the share price. Deviating from the semi-strong form of the EMH creates possibilities for management to influence market participants' perception of the company's financial position by manipulating accounting numbers. These manipulating practices are called earnings management (EM). In this study, EM is defined using a widely accepted definition by Healy and Wahlen (1999): *"Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers"*. Since EM practices might result in an incontrovertible impact on wealth transfers among stakeholders, financial information flows, related financial decision making and capital markets in general, EM is of great importance for regulators, standard setting bodies and practitioners.

1.2 Meeting or beating earnings expectations

Some firms avoid negative earnings surprises by meeting or beating earnings expectations through upward earnings management (Matsumoto 2002; Lee 2007). Managers can have many incentives to meet or beat earnings expectations. For instance, Barth et al. (1999) demonstrate that firms showing a continuous increase in earnings over the years have higher price-to-earnings multiples than other firms. These results suggest that beating market expectations based on prior performance is positively received by the market. Consistent with these results, it is also reported that the market assigns a higher value to firms which consistently meet earnings expectations (Kasznik and McNichols 2002). The market assigns a higher value to firms even when earnings targets are achieved through

earnings management (Bartov et al. 2002). Additionally, Jiang (2005) documents that firms beating earnings benchmarks have better one-year ahead credit ratings and a smaller initial bond yield spread. This implies that companies meeting or beating earnings targets are also able to reduce the cost of debt. However, despite these benefits Levitt (1998) warns for the use of EM practices in order to meet or beat market expectations: *“The motivation to meet Wall Street earnings expectations may be overriding common sense business practices. [...] In the zeal to satisfy consensus earnings estimates [...] wishful thinking may be winning the day over faithful representation.”*

Being part of the literature about meeting or beating financial analysts’ and stakeholders’ earnings forecasts, this study focuses on the relation between accrual-based earnings management and stock repurchases as tools to influence the earnings per share (EPS). Management can decide to exercise a stock repurchase as a real earnings manipulation activity (Hribar et al. 2006). Yu (2009) defines accrual-based earnings management as actions taken by management to manipulate earnings through exploiting accounting discretion within GAAP choices. Exploiting discretionary components of reported income (Dechow 1995) has no direct cash flow consequences (Roychowdhury 2006). In contrast, real activities manipulation affects cash flows and in some cases also accruals. Combining the definitions by Roychowdhury (2006) and Zang (2007) leads to the following definition of real activities manipulation: *“purposeful management action that deviates from normal business practices, undertaken with the primary objective of meeting certain earnings thresholds, which is achieved by changing the timing or structuring of operation, investment or financing transaction and which has sub-optimal business consequences.”* Examples of real manipulating activities are underprovisioning for bad debt expenses, delaying asset write-offs, postponing maintenance- and advertising expenditures, overproduction to lower the cost of goods sold and (temporary) reductions in R&D expenditures. Concluding, management that applies real activities earnings management decides to destroy economic value for the purpose of meeting short-term earnings benchmarks, while the application of accrual-based earnings management is based on exploiting accounting discretion and not directly linked to waste of economic value.

In an U.S. setting, Graham et al. (2006) document that most EM is achieved via real actions as opposed to accounting manipulations. They report that managers admit that they would take real economic actions and would even give up positive NPV projects, to meet short-term earnings thresholds. These results illustrate that managers attach significant importance to at least meet market expectations. Myers et al. (2007) indicate that managers strategically time stock repurchases to increase the EPS if otherwise the trend of consecutive quarterly EPS increases would be interrupted. Additionally, Chan et al. (2010) find evidence that at least some open-market buyback

programs may be intended to manipulate investors’ opinion. As will appear from the literature review in chapter 4, the reacquisition of shares is a useful tool for managers to get (at least) closer to their earnings targets.

1.3 Influencing the earnings per share

Various studies show economic events (e.g. initial public offerings, seasoned equity offerings) around which companies manage to use income-increasing earnings management. This in order to increase their earnings per share to meet market participants’ forecasts and to present an attractive figure that shows the financial position of the firm. Companies exercising stock repurchases get a higher price for shares to be issued in the future. The EPS is calculated by dividing the entity’s earnings (net income minus dividends on preferred stock) by the weighted average number of shares outstanding during the reporting period:

$$\text{Earnings per share} = \frac{\text{Earnings}}{\text{Weighted average number of shares outstanding}} \quad \begin{matrix} \uparrow \\ \downarrow \end{matrix}$$

When the other factor remains constant, it is possible (to a certain extent) to increase the EPS by either increasing the nominator, or decreasing the denominator. As discussed in the previous section, earnings can be influenced by exploiting managers’ accounting discretion or by the application of real manipulating activities, while decreasing the number of shares outstanding is attainable by exercising stock repurchases. This study only focuses on the application of accrual-based earnings management to influence the earnings, and only on stock repurchases as a real manipulating activity to influence the weighted average number of shares outstanding during the reporting period.

If management decides to either influence the nominator or the denominator, accrual-based earnings management and stock repurchases are used as substitutes in influencing the EPS. In contrast, if management decides to influence both the nominator and the denominator of the EPS equation by applying accrual-based earnings management and exercising stock repurchases, both tools are used as complements in influencing the EPS. This leads to the following research question:

Are accrual-based earnings management and stock repurchases used as complements or substitutes in influencing an entity’s earnings per share in an European context?

This study fills an important gap in the current empirical meeting or beating literature by examining the relation between accrual-based earnings management and stock repurchases in influencing the EPS in an European context. It contributes to the current literature in that it is one of the few studies

on the use and the relation of multiple EM tools, and within this small group of researches this study is unique in the use of a sample that consists of European listed companies. Additionally, this research extends prior literature in this area of research by taking into account the foregone return on cash used for repurchases. Finally, the results of this study are also useful in practice because they provide insight into managerial decision making when dealing with periodic earnings benchmarks generated by market participants' expectations. Consequently, market participants will be able to see through managerial strategies to at least influence the EPS of the entity more thoroughly. This will help them to anticipate on future firm performance and to better ground their investment decisions.

The first five chapters provide the theoretical background where this research is based on. The next session provides an overview of the empirical literature on EM incentives and discusses which models are used by researchers to detect EM. Chapter three gives an insight in the current mechanisms to repurchase stock. Besides the extensive literature review provided on EM and stock repurchases in chapter four, factors affecting the EPS will be discussed in more detail in chapter five. After the discussion of the theoretical background, the theory is applied in the research design and makes it possible to analyze the results of this study. Chapter six consists of a detailed description of the methodology used to investigate the relation between accrual-based earnings management and stock repurchases. Besides that, the general European as well as the country specific institutional settings regarding to stock repurchases are discussed. In chapter seven the empirical results are presented, after which these are analyzed and compared to the results of other empirical literature in chapter eight. Finally, chapter eight also sheds light on the limitations of this study and provides some fruitful avenues for future research.

Chapter 2 Earnings management

2.1 Introduction

This chapter covers two important aspects related to earnings management. First, three main incentives for EM will be discussed, including: (1) capital market expectations and valuation, (2) contracts written in terms of accounting numbers; and (3) antitrust or other government regulation (Healy and Wahlen 1999). After that, various models to detect EM will be discussed shortly.

2.2 Earnings management and capital markets

2.2.1 Meeting and beating analysts' earnings forecasts

Capital market expectations and valuations appear to be important incentives for managers to manipulate accounting numbers, since capital market participants rely on accounting information prepared by management. Habib and Hansen (2008) document that investors pay a premium for companies beating the earnings forecasts, and note that the evidence is mixed on the question whether this reaction is rational. This questionable rationality is underlined by the studies by Richardson et al. (2004) and Kross et al. (2011). Richardson et al. (2004) find that dampening of capital market expectations is used to create possibilities for management to meet or beat the earnings target. Additionally, Kross et al. (2011) find evidence suggesting that companies consistently meeting or beating expectations, are more likely to guide market expectations downward to avoid breaking the consistency. Consistent results regarding earnings manipulation to meet capital market expectations are found by Ball and Shivakumar (2008).

2.2.2 Earnings management surrounding economic events

Various capital market-based researches indicate that the existence of earnings management surrounding economic events affect companies' stock performance. For instance, such economic events are initial public offerings (IPOs), seasoned equity offerings (SEOs) and stock repurchases. Research by Xiong et al. (2008) suggests that earnings management in the pre-IPO period plays an important role although investors may not be sophisticated enough to measure the level of earnings management. A related study by Teoh et al. (1998a) provides evidence on the existence of a poor stock return performance in the following three year period after the abnormal high accrual usage in the pre-IPO period. DuCharme et al. (2004) find consistent results. In a subsequent research, Teoh et al. (1998b) also find the relation between discretionary current accruals and future returns to be stronger and more persistent for seasoned equity issuers than for non-issuers. This is in line with investors naively extrapolating pre-issue earnings without fully adjusting for the potential manipulation of reported earnings. In contrast with these results, Shivakumar (2000) shows that investors infer earnings management and rationally undo its effects at equity offering

announcements. Therefore, Shivakumar (2000) concludes that earnings management might not be designed to mislead investors, but that it merely reflects the issuers' rational response to anticipated market behavior at offering announcements. In contrast, Ball and Shivakumar (2008) argue that IPO firms face a greater threat of shareholder litigation and regulatory action if they do not meet higher reporting standards and conjecture that prior evidence on opportunistic reporting behavior by IPO firms to inflate the price is biased. Consistent with studies reporting earnings management surrounding equity issuance, Liu et al. (2010) find income-increasing earnings management prior to bond offerings. They find that firms using earnings management issue debt at a lower cost, and indicate that bond holders fail to see through the inflated earnings numbers in pricing new debt.

2.3 Earnings management and contractual agreements

The second incentive for managers to manipulate the entity's accounting numbers mentioned by Healy and Wahlen (1999) is to influence contractual agreements written in terms of accounting numbers. Since a lot of contractual agreements are based on a companies' creditworthiness, Demirtas et al. (2006) did research on earnings management surrounding initial credit ratings, which are via the cost of capital also very important for contractual agreements. The results of this research indicate that accruals are unusually positive and high around initial credit ratings. Another study that provides us with empirical evidence of earnings management related to contractual agreements is done by DeFond and Jiambalvo (1994). They show that abnormal total and working capital accruals are significantly positive in the year preceding, and in the year of debt covenant violation, and suggest out of these findings that this is due to earnings management. Sweeney (1994) also detects earnings management surrounding debt covenant violations, but especially in the period after contract violation. Management compensation contracts and CEO changes as incentives for management to manipulate earnings are also included in this category. Extensive research is done in this separate area of earnings management. For example, Bergstresser and Phillipon (2006) show that the use of discretionary accruals is more pronounced at firms where the CEO's potential total compensation is more closely tied to the value of stock and option holdings. Pourciau (1993) and Wells (2002) find evidence on earnings management surrounding non-routine CEO changes. This in order to influence the future compensation of the new CEO, which is based on a contractual agreement between the company and the CEO.

2.4 Earnings management and antitrust- and government regulation

Antitrust or government regulation is the last incentive for management to manipulate earnings that will shortly be discussed here. Empirical research is done on the effects of changed and new regulations by government on the application of EM. For example, Yin and Cheng (2004) provide

evidence on the existence of income-decreasing EM prior to tax rate reductions, especially for companies that generate profits. The study by Chan et al. (2008) provides mild evidence on an increase in opportunistic financial reporting for firms reporting material internal control weaknesses under Sarbanes-Oxley Section 404. Another example is related to companies operating in financial industries such as banks and insurance companies, which are required to meet certain capital requirements imposed by governmental institutions. Shen and Chih (2005) find evidence for earnings management in the banking industry. They also document that the increased demand for investor protection and transparency might be an incentive for managers to reduce their earnings management practices.

2.5 Detecting earnings management

2.5.1 Discretionary versus non-discretionary accruals

Considerable empirical research in the field of EM focuses on estimating the use of discretionary accruals as a proxy for opportunistic financial reporting behavior by management. The total amount of accruals equals the difference between earnings and cash flows. Total accruals can be split into non-discretionary accruals and discretionary accruals. Non-discretionary accruals are the result of usual business, while the detection of discretionary accruals is an indication of EM.

Extensive research has been done on which accounts and real activities are used by managers to manipulate earnings figures. For instance, Thomas et al. (2004) find empirical evidence for EM through structuring transactions between parent companies and affiliates to meet income related objectives, Hribar et al. (2006) document EM using stock repurchases, and Frank and Rego (2006) find evidence on the use of the deferred tax asset valuation allowance account to manage earnings. Besides that, Zang (2007) reports evidence on the use of R&D and selling, general and administrative expenses, overproducing inventory and timing of asset sales. Additionally, Tung et al. (2010) indicate the existence of EM through selling long-lived assets and investments, and Barua et al. (2010) detected that firms shift operating expenses to income-decreasing discontinued operations to increase core earnings.

2.5.2 The Jones model

Over the last decades, various models to detect EM have been developed and reviewed. The remaining part of this chapter discusses various models to detect earnings management in a chronological manner, following Ronen and Yaari (2008). It is possible to detect EM in time-series studies, which try to capture EM for the same firm over time, or cross-sectional, in which accounts manipulation of companies operating in the same industry are compared. In most cases, the amount

of discretionary accruals is calculated by deducting the non-discretionary accruals from total accruals. Healy (1985) contributed to the literature by defining normal accruals as the deflated long-run accruals. In this situation, normal accruals can be calculated by correcting total accruals (TA_i) for the lagged assets (A_{i-1}). On average, these accruals are measured over a five-year period ($n=5$). In formula: $NDA_{t+1} = \frac{1}{n} \sum_{i=t-n}^t \frac{TA_i}{A_{i-1}}$. An important assumption underlying this methodology is the existence of an event year in which EM is applied. Jones (1991) also performed an event study. According to the Jones model, no discretionary accruals are present in the estimation period prior to the period of the event (that is, non-discretionary accruals equal total accruals). In the estimation period, normal accruals of firm i are calculated by $NDA_{it}/A_{it-1} = \alpha_i(1/A_{it-1}) + \beta_{1i}(\Delta Rev_{it}/A_{it-1}) + \beta_{2i}(PPE_{it}/A_{it-1}) + \varepsilon_{it}$, where A is assets, REV is revenues, PPE is gross property, plant and equipment, ε is an error term, i is the index of the firms, t is the time period and Δ indicates the change in a variable. The change in sales (ΔRev_{it}) is included as a proxy for the change in working capital (therefore the sign of β_{1i} is expected to be positive), and PPE_{it} is included as a proxy for depreciation (therefore the sign of β_{2i} should be negative). All variables are deflated by lagged assets to correct for heteroskedasticity. In other words, to lower the variables' dispersion of variances.

2.5.3 The modified Jones model

Ronen and Yaari (2008) report that various studies (Bernard and Skinner 1996; Healy 1996; Dechow et al. 2003; Wasley 2005) find evidence on type I errors (incorrectly rejecting the null hypothesis stating that no earnings management is in place) in studies in which the Jones model has been applied. Different other models to detect earnings management have been developed after the Jones model. Dechow et al. (1995) adjusted the Jones model to eliminate the measurement error when discretion is exercised over revenues. The modified Jones model estimates non-discretionary accruals in the event period using the Jones model plus a correction to the change in sales for the change in receivables ($\Delta Rev_{it} - \Delta Rec_{it}$). The term ΔRec_{it} reflects the net receivables in year t minus net receivables in year $t-1$ scaled by total assets at $t-1$ (A_{t-1}). The rationale behind this modification is that it is easier to manage earnings by exercising discretion over the recognition of revenue on credit sales than it is to manage earnings by exercising discretion over the recognition of revenue on cash sales. Growth in credit sales is no longer seen as EM by the model. As a result from this, EM via revenues is more accurately detected by the modified Jones model. Until 1996, it appears from the study of Guay et al. (1996) that only the Jones and modified Jones model have the potential to provide reliable estimates of discretionary accruals. After this time, these models became fundamental to various new models to detect EM.

2.5.4 The forward-looking model

Dechow et al. (2003) documented the forward-looking model to detect EM. This model is different from prior models in that it separates non-discretionary accruals from discretionary accruals in credit sales, and that it controls for both growth and lagged accruals. The equation of this cross-sectional forward-looking model that estimates non-discretionary accruals is $TACC_{it} = \alpha + \beta_1((1+k) \Delta Sales - \Delta AR) + \beta_2 PPE + \beta_3 TACC_{it-1} + \beta_4 GR_sales_{it+1}$, where $TACC_{it}$ represents firm i 's total accruals in the current year (scaled by year $t-1$ total assets), k reflects the sensitivity of the change in non-discretionary accounts receivable to sales ($k=1$ means 100% of change in AR is non-discretionary), $\Delta Sales$ and ΔAR respectively represent the change in sales and accounts receivables (scaled by year $t-1$ total assets), PPE is gross property, plant and equipment, $TACC_{it-1}$ represents firm i 's total accruals from prior year (scaled by $t-2$ total assets), and GR_sales_{it+1} is the change in firm i 's sales from year t to $t+1$ (scaled by year t sales).

2.5.5 Performance-adjusted models

In addition to the forward-looking model by Dechow et al. (2003), three performance-adjusted models have also been developed. These models are based on the rationale that performance affects the estimation of EM because non-discretionary accruals may be incorrectly classified as discretionary accruals when a firm's performance is abnormal and the relationship between accruals and performance is non-linear (Ronen and Yaari 2008). The three performance-adjusted models are the components model (Kang and Sivaramakrishnan 1995), the cash-flows model (Dechow and Dichev 2002) and the linear performance-matching Jones model (Kothari et al. 2005).

An example of such a modification of the Jones and modified Jones model by Kothari (2005) is the inclusion of an intercept and a control for the performance. The intercept enhances the power of type I errors, and the inclusion of the lagged return on assets (ROA_{t-1}) takes into account the non-linear relationship between normal accruals and performance.

2.5.6 The synthesis model

A lot of components from prior models are combined and put into one model by Ye (2006). This synthesis model is called the 'business model', since it also takes into account some business fundamentals like the historical depreciation for current assets. It includes an intercept, the Jones (1991) model, the performance control of Kothari et al. (2005), factors to incorporate abnormal lagged accruals, working capital intensity (Dechow et al. 2003), depreciation rates and historical depreciation for current assets (from Kang and Sivaramakrishnan 1995). According to Ye (2006) the

synthesis model demonstrates substantially better ability to capture the dynamics in accruals than commonly-used models such as the Jones model and the performance-adjusted Jones model. The unexpected accruals generated by the proposed model are shown to have lower bias and greater power when testing EM in several different scenarios.

2.6 Conclusion

This chapter covers the main managerial incentives to manipulate accounts. These are meeting or beating capital market expectations, meeting contractual agreements and dealing with antitrust and government regulation. When looking at recent studies, it appears that earnings management is still a hot research topic. Various models to detect earnings management have been developed in the past decades. The Jones (1991) and modified Jones model (Dechow et al. 1995) appear to be fundamental to the models developed later.

Chapter 3 Stock repurchase mechanisms

3.1 Introduction

A firm can buy back its own shares by distributing cash to its shareholders. Companies can choose from six mechanisms to realize this: fixed-price tender offers, Dutch-auction tender offers, open-market share (OMR) repurchases (Comment and Jarrell 1991), transferable put-rights distributions (TPRs) (Kale et al. 1989; Dumont et al. 2004), targeted stock repurchases (Hsieh and Wang 2009) and since 2004 also via accelerated share repurchases (ASRs) (Bargeron et al. 2011).

3.2 Fixed-price tender offers

When a firm wants to repurchase its own shares via a fixed-price tender offer, it should publicly disclose the tender offer including the single purchase price, the number of shares it wants to repurchase, conditions related to the offer, and the expiration date. The company usually offers a premium to the market price to generate an incentive for its shareholders to tender shares. Every single shareholder individually decides whether or not to participate and the number of shares to tender to the firm at the predetermined price by the company. If the number of shares tendered by the shareholders exceeds the demand of the company, shares are bought on a pro rata basis. The expiration date of the tender offer can be extended if the shareholders have not tendered enough shares yet, or management can either choose to purchase the shares tendered or terminate the offer. The latter results in a situation in which a company has announced a share repurchase, after which it actually does not repurchase shares at all.

3.3 Dutch-auction tender offers

The process of Dutch-auction tender offers is basically equal to the process of fixed-price tender offers, except for the realization of a price agreement between the firm and its shareholders. In case of a Dutch-auction tender offer, the company only specifies a price range for the tender offers rather than one fixed-price as in the mechanism discussed before. This results in a variety of tender offers from the shareholders. The company ranks all offers by the submitted prices and sets the final price at the minimum price at which the firm can buy all of its shares. All shares tendered at or below the final price will be repurchased by the firm. The company does not buy any shares tendered at a price higher than the final tender offer price. Lie and McConnell (1998) find some evidence that earnings improve following both types of self-tender offers, and does not find any significant differences in earnings improvement between the two types of offers.

3.4 Open-market share repurchases

Open-market share repurchases are widely used by companies to buy back their own shares. Grullon and Ikenberry (2000) find that open-market repurchases cover 91% of the total value of share repurchase announcements in the United States in the period from 1980 to 1999. Using an open-market share repurchase strategy, a company publicly announces that it will repurchase a certain dollar amount of its own shares from the open-market within a certain span of time. This might take a couple of years. Firms announcing share reacquisitions are not obliged to actually repurchase shares. Stephens and Weisbach (1998) find that firms on average acquire 74 to 82 percent of the shares announced as repurchase targets within three years of the repurchase announcement. Since open-market share repurchases may take a few years to complete, fixed-price tender offers and Dutch-auction tender offers are likely to be better managerial decisions if share reacquisitions are desirable in the near future.

3.5 Transferable put-rights distributions

The fourth possibility to repurchase shares is via transferable put-rights distributions. If a firm chooses this mechanism, it decides how many shares it wants to buy back and distributes put options among its shareholders in portion to the number of shares owned. Such put options give shareholders the right to sell shares at a predetermined price, again within a certain period of time. Kale et al. (1989) argue that TPRs have two major advantages over fixed-price tender offers: shareholders who do not wish to sell back their shares can trade the TPRs in the open-market, and TPRs will lead to a higher tax efficiency among shareholders. The first argument possibly leads to gains from trade, and also to ownership of the firm among shareholders with high reservation prices. For a firm, this might also function as a part of their anti-takeover strategy.

3.6 Targeted stock repurchases

The fifth possible strategy to repurchase shares is via a targeted stock repurchase. Using this mechanism, a firm negotiates with an individual shareholder or a group of shareholders about the buyback of a large amount of shares against the market price plus a premium per share. This strategy is usually used by management of firms that fight against an unwanted takeover threat.

3.7 Accelerated share repurchases

It is also possible to buy back shares via accelerated share repurchases. When a company uses this methodology to buy back shares, it hires an investment bank. This bank in turn borrows shares from existing shareholders and is in a short position. This position will be covered in the future period by buying shares from the open-market and returning them to the initial investors. The firm pays the bank for the shares and a premium per share for its services. Usually, the firm will cover the biggest

part of the potential losses from the investment bank due to price changes. According to Michel et al. (2010), the accelerated share repurchase strategy is an hybrid form of open-market and tender offer stock repurchases. They also report that accelerated share repurchases are more credible than open-market share repurchases because they commit the firm to repurchase. Additionally, Marquardt et al. (2009) find that ASRs are chosen over OMRs when the repurchase is accretive to EPS, when annual bonus compensation is tied to EPS performance, and when CEO horizons are short. Besides that, Chemmanur et al. (2010) argue that ASR firms have lower pre-announcement market valuations, greater positive announcement effects and better post-announcement stock returns than OMR firms.

3.8 Conclusion

There are six different mechanisms managers can choose if a share reacquisition is desired. The open-market stock repurchase mechanism is mostly used in the United States. Since 2004, it is also possible to repurchase your own stock via accelerated share repurchases. This mechanism differs from other mechanisms in the incorporation of an investment bank as an intermediate between the company and the capital market.

Chapter 4 Review of the empirical literature on EM and stock repurchases

4.1 Introduction

Although stock repurchases do not create shareholder value at time zero in a perfect market (Fairchild 2006; Oded and Michel 2008), various studies report significant abnormal stock performance at the buyback announcement (Comment and Jarrell 1991; Lie 2005; Lee et al. 2010) and in the long-run (Yook 2010). But, different researches on the long-run stock performance generate inconsistent results. For example, Jianxin and Gupta (2009) find that overvaluation-induced income-increasing earnings management is negatively related to future abnormal stock returns and operating performance, while the study by Bradford (2008) reports no evidence on the existence of abnormal stock performance in the long-run. According to Chang et al. (2010) stock market responses to share repurchase announcements are also dependent on the record of actual buyback after an announcement following their previous repurchase plan announcements. The results of studies by Lie (2005) and Bonaimé (2010) are consistent with Chang et al. (2010). This might be a reasonable explanation for the inconsistent results of the researches on the long-run stock performance after share reacquisition announcements.

Companies can have many incentives to repurchase their own shares. Firms repurchase stock to take advantage of potential undervaluation, to distribute excess capital, to alter their leverage ratio, fend off takeovers and counter the dilution effects of stock options (Dittmar 2000). Besides that, Kim (2005a) also finds that companies can reduce their daily return volatility by actively buying back shares when the share price falls. Consistent with Kim (2005a), Hong et al. (2008) document that firms with more ability to repurchase shares when prices drop far below fundamental value (i.e. less financially constrained firms) have lower short-horizon return variances than other firms. Other incentives for share reacquisitions can be signaling, reducing the agency costs of free cash flow (cash flow hypothesis), to influence the capital structure in general, to increase the value of employee stock options and for regulatory and tax considerations. As will appear from the following sections, various incentives are closely related to each other. An overview of the empirical literature discussed in section 4.1 till 4.5 can be found in appendix II table 1 till table 5 respectively.

4.2 Stock repurchases and signaling undervaluation

Many studies focus on stock repurchases as a tool to signal undervaluation of shares to the market. For instance, the results of Lee et al. (2010) indicate support for the undervaluation hypothesis. The undervaluation hypothesis states that information asymmetry between management and shareholders may cause a firm's stock price to be undervalued. Companies try to show this, and their trust in their own future performance by buying back shares from the market (Lee et al. 2010). Many

studies acknowledge that these practices influence firm value and the industry of the repurchasing company. For instance, Akhigbe and Madura (1999) show that bank stock repurchases result in a positive and significant valuation effect for the repurchasing banks. In addition, they also document that share repurchases lead to positive significant intra-industry effects. These intra-industry effects appear to be more favorable when the valuation effect for the repurchasing bank is more favorable. In line with these findings, Miller and Shankar (2005) report that insurance firms also experience a significant increase in value at the time of a repurchase announcement, while at the same time there is a significant decrease of value of rival insurance firms. Besides the implications of signaling undervaluation to the market, it might also be interesting for market participants to know which repurchase mechanisms managers use to get this done. Louis and White (2006) suggest that managers intentionally use fixed-price repurchase tender offers to signal undervaluation. In the same study, they did not find evidence on managers using Dutch-auction tender offers with the purpose to signal undervaluation. Another research by Louis et al. (2010) shows results consistent with the notion that fixed-price repurchase tender offers are more likely than Dutch-auction repurchase tender offers to signal undervaluation. Recently, Michel et al. (2010) state, based on 127 stock repurchase announcements of firms listed on either NASDAQ, NYSE or AMEX over the period from 2004 through 2007, that accelerated share repurchases do not signal undervaluation.

4.3 Empirical evidence on the free cash flow hypothesis

Guffey and Schneider (2004) argue that the most important argument for firms repurchasing shares comes from variables associated with the free cash flow hypothesis. This hypothesis states that managers of firms that have substantial uncommitted cash flows may choose share repurchase rather than investments, especially if the expected return on investment alternatives is poor. Grullon and Michaely (2004) find results consistent with the free cash flow hypothesis. Besides that, Kim (2005b) argues that a change in liquidity associated with open market share repurchases is larger in firms with a higher degree of pre-announcement information asymmetry. In addition, the study of Nayar et al. (2008) suggests that improvement in liquidity is transitory and limited to the tender period when the firm's offer to repurchase shares is outstanding. Recently, Young and Yang (2011) find that EPS targets explain firm-level repurchase policy. Also, in contrast to Bens et al. (2002) they argue that repurchases undertaken to influence the EPS yield net benefits to the company's shareholders and that this link is more pronounced for firms with EPS targets in the presence of surplus cash flow.

4.4 Stock repurchases as anti-takeover deterrence

The incentives related to the free cash flow hypothesis and liquidity for capital distribution among shareholders is also closely related to another incentive, which is the anti-takeover deterrence. If the company faces the threat of an unwanted takeover, management could opt for a share repurchase announcement instead of distributing cash dividends to its shareholders. This is all focused on influencing the earnings per share, which in turn could also be a separate incentive for a stock repurchase announcement. Influencing the EPS will be discussed in chapter five. Although the results of different studies are mixed regarding the functionality of the following incentive, Dittmar (2000) states that stock repurchases can be used against takeovers because of the presence of an upward sloping supply curve for shares. This makes it possible for a potential target to increase the cost of an acquisition by repurchasing stock, because investors with the highest reservation values remain shareholders of the company. In other words, only those investors who only want to sell their shares against a high share price will remain shareholders of the company. Barger (2011) recently reports that accelerated share repurchases are likely as defense against unwanted takeover attempts, which is in line with the findings of Dittmar (2000) and Lee et al. (2010). In contrast, Guffey and Schneider (2004) argue that anti-takeover protection is not an incentive for managers to announce a stock repurchase. Recent studies by Akyol et al. (2010) find results consistent with Guffey and Schneider (2004) against the anti-takeover argument and also specifies that choosing accelerated stock repurchases over open market stock repurchases does little to decrease a firm's attractiveness as a potential takeover target.

4.5 The effect of stock repurchases on capital structure

Regulatory, tax and capital structure considerations might also be fundamental to a repurchase decision. Equity reduces, and thus the leverage ratio increases as a consequence of share reacquisitions. The leverage or tax hypothesis argues that share repurchase is a means to adjust the firm's financial leverage, thereby allowing the firm to benefit from the tax advantages of debt financing. Mintz (1995) argues that when a firm increases its leverage, the cost of capital decreases and that tax savings cause cash to be preserved. The stock market will recognize that the tax savings will flow to the shareholders. Additionally, Mintz states that because of this reasoning, a stock repurchase announcement should boost market value by a factor consistent with the prevailing price-to-earnings ratio. Hovakimian (2004) finds in a sample of 3712 U.S. firm years in the period 1980 through 1998 that firms which repurchase equity generally have low debt ratios, but also that firms do not initiate equity transactions to offset the accumulated deviation from the target leverage ratio. Evans et al. (2004) report that the adoption of a repurchase strategy leads to smaller net working capital flow components and net operating flow, while net investment flow increases.

Grullon and Michaely (2004) find a reduction in systematic risk and cost of capital relative to non-repurchasing firms.

Finally, the last incentive for a share repurchase discussed here is to influence the value of employee stock options. Lee et al. (1992) find that managers of repurchasing firms do increase frequency of buying and decrease their frequency of selling shares prior to repurchase announcements. They act according to the existence of favorable information in the announcements of repurchases about the future. Other studies which are closely related to this incentive are performed by Kahle (2002) and Bens et al. (2003). They both document an increase in the level of stock repurchases when the dilutive effect of outstanding employee stock options on diluted EPS increases. In contrast with Lee et al. (1992) and Bens et al. (2003), but in line with Huang et al. (2010), Young and Yang (2011) identify stock repurchases as a potentially important benefit of EPS-based targets in executive compensation contracts to reduce agency problems. From this one might conclude that employee stock options possibly play a certain role surrounding stock repurchases decisions.

4.6 Effect of EM and stock repurchases on the earnings per share

Since 'the number' is an important indicator of companies' financial performance for market participants, one of the main incentives for EM and stock repurchases is influencing the EPS (Badrinath and Varaiya 2001; Brav et al. 2005). In support of this statement, McNally (1999) shows that firms which repurchase more frequently have higher earnings. Furthermore, Hribar et al. (2006) find a disproportionately high number of stock repurchases among firms that would have missed analysts' forecasts. They find the repurchase-induced component of earnings surprises to be discounted by the market. Additionally, their results indicate that this discount is larger when the repurchase seems motivated by EPS management. According to the findings of Hribar et al. (2006), using a stock repurchase to avoid missing analysts' forecasts appears to mitigate some of the negative stock price responses. The study of Hribar et al. (2006) is based on the research by Bens et al. (2003). The results of both studies are consistent with each other. Bens et al. (2003) find an increase in the level of firms' stock repurchases when earnings are below the level required to achieve the desired level of EPS growth. These findings suggest that stock repurchases indeed have a positive impact on the EPS. But, companies do not only use stock repurchases to increase the number. Recently, Kurt (2010) reports that firms using accelerated stock repurchases tend to manage their earnings upward during the quarter of the announcement.

Various studies also show empirical evidence on different forms of earnings management surrounding stock repurchases. For example, Brockman et al. (2008) find that managers increase the frequency and magnitude of bad news announcements during the 1-month prior to share

reacquisitions. Although to a lesser extent, they additionally find managers increasing the frequency and magnitude of good news announcements during the 1-month period following their repurchases. Empirical studies on the combined use of other forms of EM surrounding stock repurchases are for instance done by Core et al. (2006) and Gong et al. (2008). Core et al. suggest that managers' repurchase and insider trading behavior varies consistently with the information underlying the operating accruals strategy. This supports the combined use of EM tools by managers. Based on a sample of 1720 U.S. open-market repurchases over the period 1984-2002, Gong et al. suggest that one reason firms experience post-repurchase abnormal returns is that post-repurchase realized earnings growth exceeds expectations formed on the basis of pre-repurchase deflated earnings numbers. This might indicate that firms use both stock repurchases and other forms of earnings management closely after each other, or even at the same time, to realize a desired change in the company's earnings per share. In contrast, Zang (2007) find real earnings manipulation and accrual based manipulation to be used as substitutes in managing earnings. Complementary to the study by Zang (2007), Yu (2009) specifically focuses on earnings management and share repurchases. Yu (2009) investigates the relation between accrual-based earnings management and EPS management through stock repurchases and also finds a substitutive relation in an U.S. environment.

4.7 Conclusion

This literature review on earnings management and stock repurchases shows various incentives to decide for a buyback of the firm's own shares. These incentives are signaling undervaluation, to distribute excess capital, to alter their leverage ratio, fend off takeovers, counter the dilution effects of employee stock options, reducing daily return volatility, reducing the agency costs of free cash flow and to deal with regulatory and tax issues.

Chapter 5 Effect of stock repurchases on EPS: the mechanism in detail

5.1 Introduction

This chapter provides insight in the mechanisms underlying the earnings per share. Possible effects of stock repurchases on the earnings per share will be discussed. First, the timing effect of a buyback will be discussed. After that, the impact of a share reacquisition on the EPS nominator will be explained using the studies of Bens et al. (2003) and Hribar et al. (2006).

5.2 Timing implications of stock repurchases

One has to keep in mind that not every share reacquisition per definition leads to an increase in EPS through the decline in the average number of outstanding shares. One explanation is the influence of accounting rules, especially Statement of Financial Accounting Standards No. 128 *Earnings Per Share*. This accounting rule is the reason why, for example, shares purchased at year-end do not reduce the number of shares outstanding that should be used in the calculation of prior year's EPS. According to the rules, the number of shares used for reporting purposes should be a time weighted average for the year. Therefore, a buyback at year-end is not expected to change the EPS calculation for reporting purposes. In contrast, a share reacquisition in the beginning of the period is effective in the way that the number of shares bought will be deducted from shares outstanding for the full period. This implies that the timing of share repurchases is an important aspect in managing the number. Concluding, dependent on the timing and the number of shares involved in the event (*ceteris paribus*), stock repurchases lead to either a decreased (high impact) or an unchanged EPS denominator (low impact).

5.3 Earnings effect of stock repurchases

In addition to the timing of the economic event, a stock repurchase also has an effect on the EPS nominator, the earnings. The EPS nominator effect will be discussed following the studies of Bens et al. (2003) and Hribar et al. (2006), which are key studies for this literature review. They argue that the stock repurchasing effect on the EPS nominator (net income minus dividends on preferred stock) arises because of the cash payout required in a buyback event. The distribution of cash decreases earnings by the amount of any foregone return on cash used, or even the interest expense on cash borrowed for the purpose of share repurchases. This implies, that the foregone return or interest expense incurred on the cash distribution must be lower than the firm's earnings-to-price ratio at the time of the buyback. In short, the effect on EPS depends mechanically on the relation between the firm's P/E ratio and the opportunity cost of the cash used to undertake repurchases (Bens et al. 2003).

The following example from Hribar et al. (2006) visualizes the relation between the P/E ratio and the opportunity cost of cash. The pre-buyback (EPS_0) and post-buyback (EPS'_0) EPS for the current period can be expressed as:

$$EPS_0 = E_0/S_0 \text{ and } EPS'_0 = (E_0 - C_0)/(S_0 - w\Delta S) \quad (1)$$

Where:

E_0 = periodic earnings in the absence of repurchases

C_0 = foregone return on cash used for repurchases

S_0 = common shares outstanding before repurchases

ΔS = number of shares repurchased

w = transaction timing to calculate weighted-average shares outstanding for the period, which value varies between 1 in the beginning of the period, and 0 at the end of the period.

Now suppose that shares are repurchased at price P per share using cash that was previously earning an after-tax return r per period. The foregone return on cash used for repurchases is C_0 , which is equal to the price (P) times the number of shares repurchased (ΔS), times the after-tax return (r), corrected for the transaction timing (times w). In symbols: $C_0 = w(\Delta SPr)$. The mathematical steps that should be undertaken to identify the relation between the after-tax return and the P/E ratio are shown in textbox 1 on the next page. As follows from this calculation, the requirement a firm should meet to let a repurchase be accretive to EPS is $(EPS_0/P) > r$. This implies that EPS will only increase as a consequence of a buyback when the inverse price-to-earnings ratio at the time is higher than the common after-tax return per period. For example, if a firm usually earns 5% after taxes on cash, stock repurchases are only effective as a tool to increase EPS when the P/E ratio at the time of the buyback is less than 20. That is, when the inverse P/E ratio is more than 1/20 or 5 percent. Note that in case of a higher price-to-earnings ratio, the cost of the repurchase will outweigh the reduction in shares outstanding. This implies that the EPS actually declines.

5.4 Conclusion

Management should be aware of the factors that influence the effect on the EPS when considering a share reacquisition. A share reacquisition can only be accretive if the inverse price-to-earnings ratio is higher than the common after-tax return of the period. Besides that, one should take into account the implications of timing and the proportion of shares involved before deciding to exercise a stock repurchase. Otherwise an (opposite) undesired effect might be the result of stock repurchases.

$$(1) \text{EPS}'_0 > \text{EPS}_0 \text{ or } \frac{(E_0 - C_0)}{(S_0 - w\Delta S)} > \text{EPS}_0 \left(\frac{(S_0 - w\Delta S)}{(S_0 - w\Delta S)} \right)$$

From $\text{EPS}_0 = \frac{E_0}{S_0}$ follows that $E_0 = \text{EPS}_0 \times S_0$. Substituting this into formula (1) yields:

$$(2) \frac{(\text{EPS}_0 S_0 - C_0)}{(S_0 - w\Delta S)} > \text{EPS}_0 \left(\frac{(S_0 - w\Delta S)}{(S_0 - w\Delta S)} \right)$$

And $\text{EPS}_0(S_0 - w\Delta S) = (\text{EPS}_0 S_0) - (\text{EPS}_0 w\Delta S)$, so

$$(3) (\text{EPS}_0 S_0) \frac{-C_0}{(S_0 - w\Delta S)} > (\text{EPS}_0 S_0) - \frac{(\text{EPS}_0 w\Delta S)}{(S_0 - w\Delta S)}$$

Dividing (3) by $(\text{EPS}_0 S_0)$ and multiplying by -1 yields:

$$(4) \text{EPS}_0 \frac{w\Delta S}{(S_0 - w\Delta S)} > \frac{C_0}{(S_0 - w\Delta S)}$$

Where $C_0 = w(\Delta SPr)$. Substituting this into formula (4) yields:

$$(5) \text{EPS}_0 \frac{w\Delta S}{(S_0 - w\Delta S)} > \frac{w(\Delta SPr)}{(S_0 - w\Delta S)}$$

Dividing (5) by P yields:

$$(6) \frac{\text{EPS}_0}{P} \frac{w\Delta S}{(S_0 - w\Delta S)} > \frac{w\Delta S}{(S_0 - w\Delta S)} r$$

Dividing (6) by $\frac{w\Delta S}{(S_0 - w\Delta S)}$ yields:

$$(7) \frac{\text{EPS}_0}{P} > r$$

Textbox 1: calculation of the relation between the price-to-earnings ratio and the after-tax return

Chapter 6 Research design

6.1 Introduction

This chapter provides a detailed research design to examine the relation between accrual-based earnings management and stock repurchases as tools to influence the EPS. Two hypotheses will be introduced first, after which the sample, the institutional settings regarding stock repurchases in EU15 countries, and the methodology will be described.

6.2 Hypothesis development

Gong et al. (2008) and Brockman et al. (2008) report empirical evidence on accrual-based earnings management in the pre-repurchase period. Based on these studies, one might expect to find that earnings management and stock repurchases are used complementary in influencing the earnings per share. Zang (2007) investigates the relation between real manipulation and accrual-based manipulation in managing the earnings and the related EPS in a sample of U.S. firms. She finds that manipulation using real activities and accrual-based manipulation are used as substitutes in managing the EPS. Stock repurchases are real activities that affect the EPS. The study by Yu (2009) suggests a substitutive relation between accruals management and both EPS management through repurchases and earnings management using real activities in the U.S. environment. Based on the studies by Zang (2007) and Yu (2009), one might also in an European context expect to find that earnings management and stock repurchases are used as substitutes in influencing the EPS. Apparently, the predictions regarding the outcome of this study are inconsistent. Based on the hypotheses stated by Yu (2009), the proposed hypotheses to test whether accrual-based earnings management and stock repurchases are used complementary or substitutive in influencing the EPS in an European environment are:

H1: Companies exercising share repurchases are likely not to apply earnings management via abnormal accrual usage.

H2: Companies exercising share repurchases are likely to apply earnings management via abnormal accrual usage.

The first hypothesis is formulated to test whether accrual-based earnings management and stock repurchases are used as substitutes, while the second hypothesis is stated to test whether the tools to influence the EPS are used complementary.

6.3 Sample

The sample consists of firms listed in EU15 countries which repurchase stock in the period 1999-2010. Companies listed in countries that joined the European Union during the sample period are excluded. Year 1999 is the starting year of the sample period, since this is the first year for which comprehensive data regarding European listed firms is available. The period ends in 2010, which is the most recent year for which data is available. Note that the period 2007-2010, in which the financial crisis took place, is also included in the sample. The crisis might have created unusual incentives to adopt both accounting and real strategies to cope with the unusual external economic environment in the period. In order to investigate the influence of the financial crisis, the research is also conducted for the period before- and in which the crisis took place separately. These periods are 1999-2006 and 2007-2010 respectively.

Like Von Eije and Megginson (2008), stock repurchase data is retrieved from the Worldscope database. Fama and French (2001) and Skinner (2008) measure stock repurchases as net repurchases, while Von Eije and Megginson (2008) use gross repurchase data. The difference between gross- and net repurchases is the exclusion of shares issued for employee stock option programs, share issued to fund acquisitions and shares issued for other corporate purposes (Skinner 2008). In this study, only large buybacks where more than 20% of the outstanding shares are bought back will be excluded. According to Yu (2009), this effectively removes Dutch auctions, fixed-price tender offers (see chapter 3) and other repurchase programs from the sample which are, according to their size, expected to be used for other purposes than real earnings management. This causes the sample of stock repurchase data used in this study to consist of neither pure gross repurchase nor pure net repurchase data. Instead, it approximates net repurchase data as a result of the 20% criterion. The use of European net repurchase data from Worldscope would bias the results of this study since European listed entities are allowed to report stock repurchase data in either market or book values. This problem is eliminated by using cash flow data recorded in Worldscope (item number 04751) representing 'funds used to decrease the outstanding shares of common and/or preferred stock'.

Except for the market capitalization data, which is retrieved from Datastream, all remaining financials are obtained from the Worldscope database. As in Von Eije and Megginson (2008), the Worldscope database is searched for both active and suspended companies to avoid survivor bias. Financial institutions and utility firms are excluded because these companies might be restricted in freely exercising share repurchases (Bens et al. 2003; Hribar et al. 2006; Von Eije and Megginson 2008; Yu 2009). The industries included in the sample are basic materials, industrials, consumer goods,

health care, consumer services, telecommunications, and technology. Table 7 shows the related ICB codes.

Industry	ICB industry code
Basic materials	1000
Industrials	2000
Consumer goods	3000
Healthcare	4000
Consumer services	5000
Telecommunications	6000
Technology	9000

Table 7: industry related codes

Stock repurchasing companies for which any data is missing are excluded from the sample. Taking all corrections into account yields a sample of 3255 stock repurchase events over the period 1999-2010. Most companies report stock repurchases in the sample period in Euros. Amounts of companies reporting share repurchases after 1998 in other currencies are translated into Euros using fixed end-of-year exchange rates from Worldscope. Appendix III table 8 shows the average value of shares repurchased, which varies between 42 million Euro in 2009 and 142 million Euro in 2002, and table 9 shows the amount of stock repurchases per country per year.

6.4 Institutional settings in EU15 countries

According to Von Eije and Megginson (2008), the European Union as a whole and also individual countries have changed their institutional settings regarding stock repurchases in the previous decades. Most countries relaxed their restrictions on stock repurchases and reduced negative tax effects imposed on the buyback of firms' own stock. Since companies listed in the United Kingdom (27%), France (18%), Switzerland (12%), Germany (9%) and the Netherlands (6%) jointly account for more than 71% of the total sample of stock repurchasing events in this study, the discussion regarding the institutional settings is mainly focused on these countries and EU-wide policies. Appendix I table A and B show the institutional differences between the countries mentioned before.

Table A categorizes the differences by respectively the way stock repurchases should be approved, for which time period the approval holds, price and volume restrictions, disclosure requirements, whether insider trading is allowed, the reporting authority and other issues. U.S. data is also included for analyzing purposes in chapter 8.2. From this table it appears that within the group of European countries some differences exist in the implemented price-and volume restrictions. More detailed, companies in the United Kingdom are restricted by a maximum repurchase price of no higher than +5% of 5 day price, in France not higher than daily high (which is the highest price on a specific date), and in Italy not even higher than the most recent price. In contrast, in Germany and the Netherlands firms are only restricted by the minimum and maximum price determined in the shareholder meeting. The column that lists the volume restrictions shows that firms in the United Kingdom are allowed to repurchase a higher percentage of their total amount of outstanding shares than firms listed in the other European countries.

A part of a table by Lasfer (2002) is included in appendix I table B, which shows the most important changes in laws in EU15 countries regarding stock repurchases. This table shows a great shift in the restrictions on share repurchases in EU15 countries took place in the period before 1998. In this period a lot of countries implemented rules which made it possible or far more attractive to repurchase shares. This is consistent with the worldwide trend to relax stock repurchase regulation in the nineties (Sabri 2003).

Many differences exist in the institutional settings regarding share repurchases between EU15 countries in the nineties (Lasfer 2002; Kim et al. 2004). Lasfer (2002) documented that stock repurchases in the European member states are regulated by the Second Law Directive 77-91/EEC (12/76), which is modified by 92-101 (11/92) and serves the goal of maintaining capital integrity and

shareholders' rights as equal. An important aspect included in this law, is that companies are allowed to only repurchase their fully paid up shares out of distributable reserves. The shares bought back can either be kept as treasury stock (which is limited to 10% of capital subscribed) or used to reduce the firm's share capital. EU-wide policies do not cover the tax treatment of share repurchases. Consequently, countries implemented their own tax related policies on stock repurchases.

In the United Kingdom, stock repurchases are legalized by the introduction of the Company Act in 1981 (Lasfer 2002). In both France and the United Kingdom, stock repurchases were only allowed in order to reduce the amount of capital until 1998. This means that stock repurchases may not be motivated by losses and the shares bought back have to be cancelled instead of being kept as treasury stock. After 1998, it became also possible to keep the repurchased stocks as treasury stock. As mentioned before, 27% of the stock repurchase events included in the sample are exercised by companies listed in the United Kingdom. Since both cash dividends and stock repurchases can be part of companies' payout policy, this relatively high percentage might be caused by the fact that Great Britain reduced the attractiveness of cash dividends to institutional investors in 1997 (Bell and Jenkinson 2002).

In Switzerland, stock repurchases are allowed since the change in the Swiss Corporation Law in 1992. No additional disclosure in the annual report is required, nor shareholder approval for open market share repurchases. However, Kim et al. (2004) report that open market share repurchases are not popular in Switzerland because of the imposed tax disadvantage by government. Consequently, most stock repurchases are exercised via a so-called second trading line, which is a special segment on the Swiss Stock Exchange.

In 1998, the laws regarding stock repurchases were changed in Germany too. According to Seifert and Stehle (2003), since 1998 German companies are only allowed to repurchase a maximum volume of 10% of their stock, when the annual stockholder assembly authorizes the firm's management to exercise the buyback within a certain share price range, when the buyback is not exercised for trading, and only if the company treats all shareholders equally regarding the share price offered. These restrictions are documented in §71 Aktiengesetz (1998). These institutional changes are not expected to cause a bias in the results since they took place in the years before the beginning of the sample period. As appears from the analysis by Kim et al. (2004) summarized in appendix I table A, Dutch corporations need approval at the shareholder meeting before exercising open market stock

repurchases. Since 2001, stock repurchases are more attractive in the Dutch economic environment because of changes in the Dutch tax regulations.

Although listed companies are obliged to comply with the rules implemented in their country, Ginglinger and Hamona (2007) report that only few French listed firms fully comply with the regulations for all their buybacks. These results were found in a sample of 36848 stock repurchasing events in the period 2000-2002. When looking at the differences in stock repurchase restrictions between the United States and Europe, it appears that U.S. listed firms are not restricted at all by governmental regulation while European firms are. These restrictions make it less likely that European firms are able to use superior information to repurchase shares when their shares are undervalued. Not surprisingly, Rau and Vermaelen (2002) document that firms which are listed in the United Kingdom and announce stock repurchase events earn smaller excess returns both in the short run and long run than U.S. listed firms. Differences in the market reaction to repurchase announcements also exist within Europe. For instance, in the period 1997-2006 Andriosopoulos and Lasfer (2011) found mainly positive returns in the United Kingdom and Germany, while these results do not hold for French listed firms.

6.5 Methodology

6.5.1 Description of the research

Three steps can be distinguished in investigating whether accrual-based earnings management and stock repurchases are used complementary or substitutive in influencing the EPS. First, the sample including stock repurchases by companies listed in EU15 countries must be separated in two groups: accretive and non-accretive share repurchasing companies. As explained in chapter 6.5.2, this separation is based on the model by Hribar et al. (2006). Unlike Yu (2009), the foregone return on cash used for the repurchase is estimated in order to make it possible to use the more sophisticated form of the model by Hribar et al. (2006). Second, accrual-based earnings management is estimated for the whole sample using the modified Jones model by Dechow et al. (1995) as discussed in chapter 2.5.3 and more detailed in chapter 6.5.3.

The third and final step consists of the actual investigation of the relation between the two tools to influence the EPS, by using a two stage regression model. The models used in each stage are based on, but not similar to Yu (2009). In chapter 6.5.4 the first stage regression model is discussed. The error term of the first stage regression model reflects the probability of an accretive share repurchase. This probability is included as an explanatory variable of the level of abnormal accruals in the second stage regression model. This model is discussed in chapter 6.5.5. The results of the second stage regression model indicate the association between accrual-based earnings management and stock repurchases. These results will be used as a basis for the conclusion of the research.

6.5.2 Identifying accretive share repurchases

Following Yu (2009), the total sample including stock repurchases of companies listed in EU15 countries is divided into accretive and non-accretive share repurchases. This separation is based on the model of Hribar et al. (2006). The authors classify stock repurchases as accretive stock repurchases if the current quarter EPS (including the buyback) exceeds the EPS prior to the buyback by at least one cent. Consistent with the method used in Yu (2009), in this study firms are classified as being accretive stock repurchasing firms for the entire year if they exercise accretive stock repurchases in any given quarter of that year.

The model by Hribar et al. (2006) is based on an 'as-if' measure. This measure estimates what the EPS would have been without the execution of the stock repurchases. The 'as-if' estimate is subtracted from the EPS including the buyback. If the outcome is positive, the stock repurchase is classified as an accretive stock repurchase, otherwise as a non-accretive share repurchase.

Hribar et al. (2006) provide two possible 'as-if' estimates:

$$\text{ASIF_EPS1} = \text{NI}_t / (\text{Shares outstanding}_{t-1} + 0.5 * \text{Shares issued}_t) \quad (2)$$

$$\text{ASIF_EPS2} = (\text{NI}_t + C_t) / (\text{Shares outstanding}_{t-1} + 0.5 * \text{Shares issued}_t) \quad (3)$$

Where:

NI_t = reported earnings available to common shareholders for the period;

C_t = foregone return on cash used for repurchases;

$\text{Shares outstanding}_{t-1}$ = the number of shares outstanding in the previous year;

Shares issued_t = the number of shares issued in year t .

Hribar et al. (2006) use the earnings available to common shareholders for the fiscal quarter. Since only annual data is used in this study, NI_t reflects the reported earnings for the year. The difference between formula (2) and (3) is the inclusion of the estimate of the foregone return on cash used for repurchases (C_0). Hribar et al. (2006) use the time weighted product of the repurchase dollar amount and the average treasury-bill rate for the quarter to estimate C_0 . As appears from their study, whether or not including C_0 in the model affects the sample size of accretive share repurchases. In the sample of Hribar et al. (2006), 26480 U.S. firm quarters with stock repurchases are included over the period 1988-2001. Excluding the foregone return on cash used for repurchases from the model yields 4667 classifications of accretive stock repurchases, while including C_0 leads to 2473 classifications as accretive stock repurchases. This is respectively 17.6% and 9.34% of the sample. Yu (2009) uses model (2) to distinguish accretive stock repurchases from non-accretive stock repurchases. This study uses model (3) as a classification benchmark for the firms included in the sample. This in order to limit the bias of not taking into account C_0 in the model. Since average treasury-bill rates are not available for the sample used in this study, the equations (1) from chapter five are used to calculate the foregone return on cash used for repurchases. The calculation is included in textbox 2 and yields the following relation:

$$C_0 = S_0(\text{EPS}_0 - \text{EPS}'_0) + \text{EPS}'_0 * w \Delta S \quad (4)$$

Where:

C_0 = foregone return on cash used for repurchases;

S_0 = common shares outstanding before repurchases;

EPS_0 = pre-buyback EPS;

EPS'_0 = post-buyback EPS;

ΔS = number of shares repurchased;

w = transaction timing to calculate weighted-average shares outstanding for the period.

The following relations are shown in chapter five:

$$(1) \text{EPS}_0 = \frac{E_0}{S_0} \text{ and } \text{EPS}'_0 = \frac{(E_0 - C_0)}{(S_0 - w\Delta S)}$$

From $\text{EPS}_0 = \frac{E_0}{S_0}$ follows that $E_0 = \text{EPS}_0 * S_0$.

Substituting $E_0 = \text{EPS}_0 * S_0$ into $\text{EPS}'_0 = \frac{(E_0 - C_0)}{(S_0 - w\Delta S)}$ yields:

$$(2) \text{EPS}'_0 = \frac{(\text{EPS}_0 S_0 - C_0)}{(S_0 - w\Delta S)}, \text{ which equals:}$$

$$(3) \text{EPS}'_0(S_0 - w\Delta S) = (\text{EPS}_0 * S_0) - C_0, \text{ which equals:}$$

$$(4) -C_0 = \text{EPS}'_0 * S_0 - \text{EPS}'_0 * w\Delta S - (\text{EPS}_0 * S_0)$$

Multiplying (4) by -1 yields:

$$(5) C_0 = -\text{EPS}'_0 * S_0 + \text{EPS}'_0 * w\Delta S + \text{EPS}_0 * S_0, \text{ which equals}$$

$$(6) C_0 = S_0(\text{EPS}_0 - \text{EPS}'_0) + \text{EPS}'_0 * w\Delta S$$

Textbox 2: calculation of the foregone return on cash used for stock repurchases

Due to the unavailability of quarterly data, only annual data is used in this study. This is in line with the data used by Yu (2009). Because of the use of annual data, the assumption is made that the average transaction timing factor equals 0.5. This assumption makes the final model used to estimate C_0 equal to:

$$C_0 = S_0(\text{EPS}_0 - \text{EPS}'_0) + (0.5 * \Delta S * \text{EPS}'_0) \quad (5)$$

As we can see from the relation $C_0 = w(\Delta SPr)$ from chapter five, the transaction timing factor has great impact on C_0 . Exclusion of the transaction timing factor is expected to result in an overestimated cost component. This in turn will lead to an amount of classifications of accretive share repurchases which is too low. On the other hand, neglecting C_0 will result in an overestimated amount of repurchases classified as accretive share repurchases. For these reasons, the assumption $w=0.5$ is made regarding the value of C_0 . Finally, ASIF_EPS2 is subtracted from EPS'_0 . If this result is positive, the firm is classified as an accretive stock repurchasing firm.

6.5.3 Detecting earnings management

Because of the availability of European data and for reasons of comparability with the study of Yu (2009), the modified Jones model developed by Dechow et al. (1995) will be used to detect earnings management. As shortly discussed in chapter 2.5.2 and 2.5.3, this model estimates total non-discretionary accruals by using the following formula:

$$NDA_t = \alpha_1 \left(\frac{1}{TA_{t-1}} \right) + \alpha_2 (\Delta REV_t - \Delta REC_t) + \alpha_3 (PPE_t) \quad (6)$$

Where:

NDA_t = non-discretionary accruals ;

TA_{t-1} = total assets at $t-1$;

ΔREV_t = revenues in year t less revenues in year $t-1$;

ΔREC_t = net receivables in year t less receivables in year $t-1$;

PPE_t = gross property, plant and equipment in year t ;

$\alpha_1, \alpha_2, \alpha_3$ = firm specific parameters.

According to Dechow et al. (2003), all variables in model (6) should be scaled by total assets at time $t-1$. Jones (1991) states that the firm specific parameters (α_1 , α_2 , and α_3) are generated using the following model in the estimation period (ΔREC_t is originally not included, but this factor is added because the modified Jones model will be used here):

$$TA_t = a_1 \left(\frac{1}{TA_{t-1}} \right) + a_2 (\Delta REV_t - \Delta REC_t) + a_3 (PPE_t) + u_1 \quad (7)$$

Where:

a_1, a_2, a_3 = ordinary least squares (OLS) estimates of α_1 , α_2 , α_3 .

The parameters are estimated per year (t) and industry (i). Therefore, similar to Roychowdhury (2006), Zang (2007) and Yu (2009), a minimum of 15 observations for each industry-year group will be used to estimate the firm specific parameters. Discretionary accruals can be calculated by subtracting non-discretionary accruals from total accruals. Following Hribar and Collins (2002), Bergstresser and Phillipon (2006) and Yu (2009), total accruals at the end of the year ($TACC_t$) is defined as income before extraordinary items in period t ($EBXI_t$) minus net operating cash flows in period t (OCF_t). Following Yu (2009), when taking these aspects into account the modified Jones model can also be stated as:

$$\frac{TACC_{i,t}}{TA_{i,t-1}} = \alpha_0 \frac{1}{TA_{i,t-1}} + \alpha_1 \left(\frac{\Delta SALES_{i,t} - \Delta REC_{i,t}}{TA_{i,t-1}} \right) + \alpha_2 \left(\frac{PPE_{i,t}}{TA_{i,t-1}} \right) + \varepsilon_{i,t} \quad (8)$$

Where:

$\epsilon_{i,t}$ = error term.

The residual ($\epsilon_{i,t}$) in model (8) reflects the use of discretionary accruals. The level of discretionary accruals is the proxy for the degree of earnings management applied by sample firms.

6.5.4 Estimating the probability of accretive share repurchases

As explained in chapter 6.5.1, during the first stage regression the probability of accretive share repurchases $\hat{A_REP}_t$ is estimated. This is done using the model of Yu (2009) plus some extensions. Yu (2009) uses a logistic model to estimate the probability of accretive share repurchases. The model by Yu (2009) is stated as follows:

$$A_REP_{i,t} = \alpha_0 + \alpha_1 REP_TA_{i,t-1} + \alpha_2 FCF_{i,t-1} + \alpha_3 LEV_{i,t-1} + \alpha_4 LOGSIZE_{i,t-1} + \gamma_k Industry_{i,k} + \delta_j Year_{i,j} + \epsilon_{i,t} \quad (9)$$

In this model, $A_REP_{i,t}$ is a dummy variable that equals 1 if the stock repurchase is classified as accretive and that equals 0 if the stock repurchase is classified as non-accretive. The error term $\epsilon_{i,t}$ reflects the estimation of the probability of accretive share repurchases, which is denoted as $\hat{A_REP}_t$ in the second stage regression model which in turn is discussed in the next section. $REP_TA_{i,t-1}$ represents the value of share repurchases (REP) during a year deflated by total assets at the beginning of the year ($TA_{i,t-1}$). $FCF_{i,t-1}$ reflects the free cash flows deflated by $TA_{i,t-1}$. $LEV_{i,t-1}$ is defined as long-term debt deflated by $TA_{i,t-1}$. $LOGSIZE$ corrects for firm size and is defined by the logarithm of firms' total assets at the beginning of the year. Andriosopoulos and Lasfer (2011) report that larger firms are more likely to make subsequent share repurchase announcements. The model also controls for firms' industry and year.

In addition to the control variables adopted by Yu (2009), this study also incorporates three other variables to control for endogeneity problems, which means that variables not included in the model have explanatory power for both earnings management via accruals and stock repurchases. Based on Skinner (2008), return on assets (ROA) is included as a proxy for profitability, and the raw stock return over the prior three year period ($t=-3$, $t=-2$, and $t=-1$) is included as a proxy for past stock return. The latter is based on share prices, while the ROA is calculated by deflating the operating income before depreciation by $TA_{i,t-1}$.

The third additional variable is the book-to-market (B/M) ratio, which is derived from Ikenberry (1995). The B/M potentially reflects undervalued firms (see textbox 3) and is calculated by dividing the market value of equity times the number of shares outstanding by the book value of equity. According to Skinner (2008), a correction for employee stock options would also have added value

but is not feasible due to the availability of data. Taking these extensions into account, the first stage logistic regression model used in this research is as follows:

$$\begin{aligned}
 A_REP_{i,t} = & \alpha_0 + \alpha_1 REP_TA_{i,t-1} + \alpha_2 FCF_{i,t-1} + \alpha_3 LEV_{i,t-1} + \alpha_4 LOGSIZE_{i,t-1} + \alpha_5 ROA \\
 & \quad (+) \quad \quad (+) \quad \quad (-) \quad \quad (+) \quad \quad (+) \\
 & + \alpha_6 PAST_RETURN + \alpha_7 BM + \alpha_8 Country + \gamma_k Industry_{i,k} + \delta_j Year_{i,j} + \epsilon_{i,t} \quad (10) \\
 & \quad (-) \quad \quad (+)
 \end{aligned}$$

Based on Yu (2009), the value of share repurchases ($REP_TA_{i,t-1}$), free cash flows ($FCF_{i,t-1}$), and firm size ($LOGSIZE_{i,t-1}$) are expected to be positively related to accretive stock repurchases, while the leverage ratio ($LEV_{i,t-1}$) is expected to be negatively related to accretive stock repurchases. It appears from Skinner (2008) that profitability (ROA) can be expected to be positively related to accretive stock repurchases and entities' past return (PAST_RETURN) can be expected to be negatively related to accretive stock repurchases. In textbox 3 it is described why the book-to-market ratio is expected to be positively related to accretive stock repurchases.

Since the B/M ratio is equal to the earnings-to-price ratio divided by the return on equity ((E/P)/(ROE)), the B/M ratio is high for a firm that either experienced bad performance (low ROE) in the past or if the firm's future earnings forecast is unattractive to the market (high E/P ratio). The effect of a low future expected growth in earnings is a decrease of the E/P ratio ($E/P = (r-g)/\delta$ where r is return, g is earnings growth forecast and δ is the (constant) dividend distribution factor). As appears from the E/P formula, the growth factor is negatively related with the E/P ratio. High growth potential results in a higher price and thus a higher market value of the firm and a lower related B/M ratio. Besides the B/M ratio, M could also be a valuable indicator for value stocks since small firms might be affected by economic downturns which do not influence their bigger counterparts.

As appears from the previous discussion, the relation between the B/M ratio and the E/P ratio is as follows. Firms with high B/M ratios usually have low growth expectations, which leads to a higher E/P ratio and thus a lower inverse E/P ratio, which is the P/E ratio. Taken into account the opportunity cost of capital, these firms are expected to meet the requirement $\frac{EPS_0}{P} > r$ relatively more often than firms with a high P/E ratio, and thus a low E/P ratio. Therefore, stock repurchases are likely to be used more by high B/M firms than low B/M firms.

Textbox 3: The relation between the book-to-market ratio and stock repurchases

6.5.5 Complements or substitutes?

The second stage regression model includes the probability of accretive share repurchases $\hat{A_REP}_t$ and other variables to correct for endogeneity issues in explaining the amount of abnormal accruals. $AB_ACC_{i,t}$ represents the level of abnormal accruals that is found using the modified Jones model. An adjusted model from Yu (2009) is used for this regression. In addition to the factor reflecting the probability of accretive share repurchases, the model again also includes corrections for leverage ($LEV_{i,t}$), firm size ($LOGSIZE_{i,t-1}$) and ROA. Richardson et al. (2002) report that low B/M firms are also more likely to apply accrual-based earnings management. Therefore, BM is added to the second stage OLS regression model. The signs below the variables in the second stage regression model (11) indicate the predicted direction of the relation between the independent explanatory variables and AB_ACC :

$$\begin{aligned}
 AB_ACC_{i,t} = & \alpha_0 + \alpha_1 LOGSIZE_{i,t-1} + \alpha_2 LEV_{i,t-1} + \alpha_3 ROA_t + \alpha_4 \hat{A_REP}_t + \alpha_5 BM_t \\
 & \quad (+) \quad \quad (-) \quad \quad (-) \quad \quad (?) \quad \quad (-) \\
 & + \alpha_6 GDP_{t-1} + \alpha_7 INDUSTRY + \alpha_8 COUNTRY + \varepsilon_{i,t} \quad (11) \\
 & \quad \quad \quad (-)
 \end{aligned}$$

Based on Yu (2009), firm size is expected to be positively related to the level of abnormal accruals and leverage is expected to be negatively related to the level of abnormal accruals. Ikenberry et al. (1995) provide evidence on a positive relation between the book-to-market ratio and the level of abnormal accruals. The same relation is expected to be present in our sample. Relatively bad performing firms are expected to apply more accrual-based earnings management than well performing firms. Therefore, the predicted relation between the proxy for profitability and the level of accrual-based earnings management is negative. Additionally, firms' performance is expected to be positively influenced by their economic environment. Consequently, less accrual-based earnings management is expected to be present in good financial times and therefore the business cycle as captured in the proxy GDP_{t-1} , is expected to be inversely related to the level of accrual-based earnings management. The sign of the relation between the probability of accretive share repurchases and the level of abnormal accruals is object of this study and therefore ambiguous.

If $\hat{A_REP}_t$ appears to be a significant explanatory variable of the level of abnormal accruals, the sign of the relation between $\hat{A_REP}_t$ and $AB_ACC_{i,t}$ indicates whether stock repurchases and accrual-based earnings management are used complementary or substitutive in managing the earnings per share. A negative association between the independent and the explanatory variable indicates substitution, where a positive relation suggests complementary use.

6.6 Conclusion

Two hypothesis are stated in this chapter. The first suggest substitutive use of accrual-based EM and stock repurchases in influencing the EPS, while the second one suggest a complementary relation. The sample consists of 3255 stock repurchasing events of firms listed in EU15 countries during the period 1999-2010. There appear to be some differences in the institutional settings across EU15 countries, and the regulation in the United Kingdom seems to be somewhat different than in rest of the sample in continental Europe. A three step methodology is discussed to investigate the relation between accrual-based EM and stock repurchases to influence the EPS. The last step consist of the second stage regression in which the relation between the level of abnormal accruals and the probability of accretive stock repurchases is examined.

Chapter 7 Empirical results

7.1 Introduction

This chapter covers the results of the empirical research, which will be discussed following the same stepwise method as used in the methodology section. That is, the results of separating accretive- from non-accretive repurchases are discussed first, where after the findings regarding the detection of accrual-based earnings management are presented. Finally, the outcomes of the two-stage regression model are discussed.

7.2 Results of separating accretive- from non-accretive repurchases

Appendix III table 9 shows the amount of (non-)accretive stock repurchases per country for each year. 32,14% of the stock repurchases from the sample is classified as a repurchase which increases the company's earnings per share with at least 0,01 eurocent. Figure 1 visualizes the information regarding the total amounts of (non-)accretive stock repurchases per year from table 9.

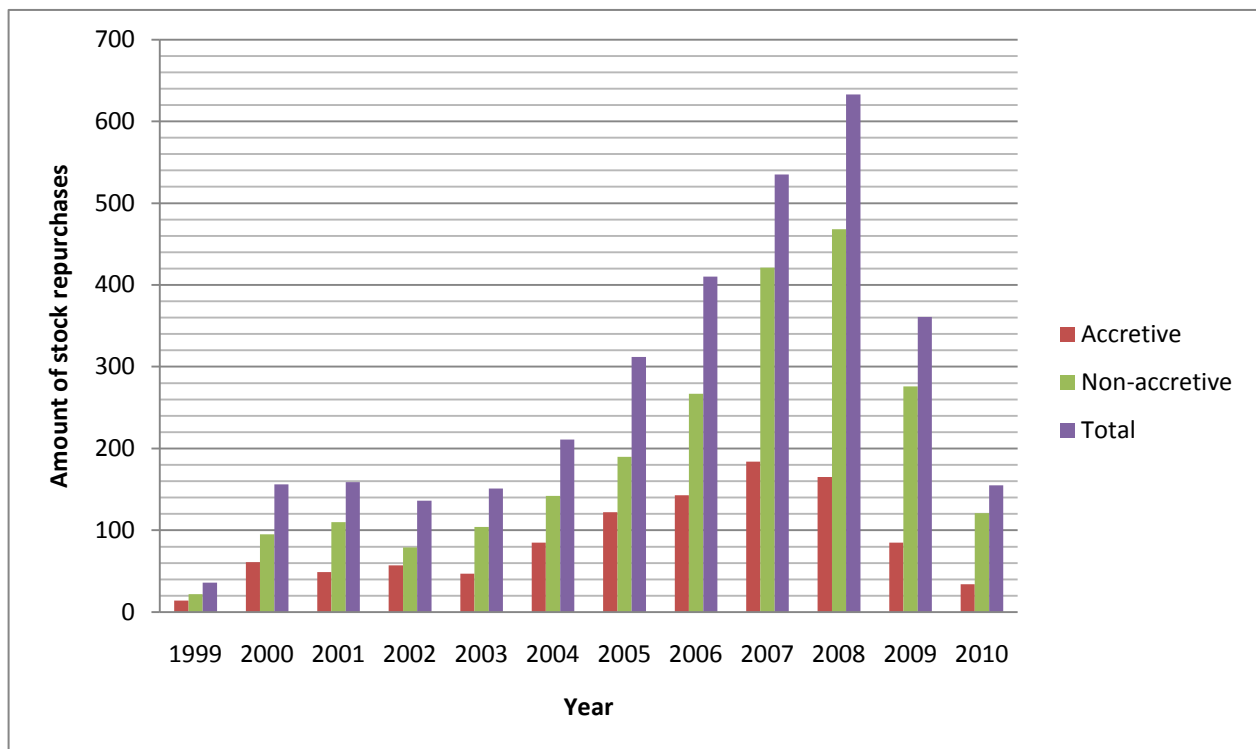


Figure 1: amount of (non-)accretive stock repurchases per year

From figure 1 an upward trend in the total amount of stock repurchases can be identified during the period 2002-2008. After this period, a strong decline in the amount of stock repurchases is visible. When looking at the possible incentives to repurchase stock, this could have several reasons. In chapter 4 the main incentives for stock repurchases are explained. Applicable explanations to this situation are signaling undervaluation, changing the capital structure, investing free cash flows, influencing employee stock options and influencing the earnings per share. Anti-takeover deterrence

is not applicable to this situation since this incentive is eliminated from the data by deleting stock repurchases in which more than 20% of companies' outstanding shares is involved. Possible explanations are discussed in the following sections.

An explanation related to the incentive to signal undervaluation could be that management adjusted its performance forecasts downwards and does not longer estimate that the firm is undervalued due to the new economic circumstances. Another explanation can be related to the incentive to change companies' capital structure. As stated in chapter 4.5, the leverage ratio increases as a consequence of stock repurchases. Increasing the leverage ratio might be too risky for firms in times of financial crisis. But, this explanation contrasts the results of the study by Grullon and Michaely (2004). They found a reduction in systematic risk and the cost of capital for repurchasing firms relative to non-repurchasing firms in a sample of firms listed in the United States over the period 1980-1997. From these results one could expect an increase in the amount of stock repurchases in times of financial crisis.

Since it is likely that companies have excess cash during economic downturns, the free cash flow hypothesis could also explain the drop in stock repurchases after 2008. Another possible explanatory incentive could be that companies want to manage employee stock options. When firms issue stock options as part of their remuneration plan, the company should repurchase enough of their own stock to make it possible for their employee to directly exercise the stock options. In times of financial crisis, it seems likely that less stock options are granted to employees as bonuses. One could also argue that companies do not take care of the value of employee stock options during bad financial times, which could also be an explanation for the decreasing trend after 2008.

The final explanation related to the incentive to influence the EPS could be that companies' management might have realized that possible underperformance in comparison to their targets was a consequence of the beginning of the longer lasting financial crisis instead of a short-term downturn in their results. Consequently, management might have decided to stop trying to influence their EPS to meet or beat expectations.

7.3 Results of the detection of accrual-based earnings management

As indicated in chapter 6.5.3, a minimum of 15 observations for each industry-year group is used to estimate the firm specific parameters. Table 10 lists the amount of stock repurchases per industry per year and table 11 gives an overview of the industry-year combinations used to estimate the parameters used in the modified Jones model. Data for the first years of the sample period and for the telecommunications industry (ICB code 6000) is combined for the greater part. Appendix IV table

12 presents the estimated parameters used in the modified Jones model to detect accrual-based earnings management.

	1000	2000	3000	4000	5000	6000	9000
1999	3	15	10	1	2	2	3
2000	17	63	36	12	15	4	9
2001	17	61	30	15	17	3	16
2002	15	54	22	13	21	2	9
2003	11	53	34	15	24	4	10
2004	18	67	51	15	36	6	18
2005	31	97	67	23	59	11	24
2006	29	138	84	25	89	9	36
2007	40	195	92	38	109	9	52
2008	39	245	114	45	116	14	60
2009	20	134	55	27	70	11	44
2010	4	51	23	19	32	6	20
Total	244	1173	618	248	590	81	301
Percentage	7,50	36,04	18,99	7,62	18,13	2,49	9,25

Table 10: amount of stock repurchases per industry per year

Industry	ICB industry code	Data combined for the years
Basic materials	1000	<ul style="list-style-type: none"> • 1999 and 2000; • 2002 and 2003; • 2009 and 2010
Industrials	2000	-
Consumer goods	3000	<ul style="list-style-type: none"> • 1999 and 2000
Healthcare	4000	<ul style="list-style-type: none"> • 1999 and 2000; • 2001 and 2002
Consumer services	5000	<ul style="list-style-type: none"> • 1999 and 2000
Telecommunications	6000	<ul style="list-style-type: none"> • 1999, 2000, 2001, 2002 and 2003; • 2004 and 2005; • 2006 and 2007; • 2008, 2009 and 2010
Technology	9000	<ul style="list-style-type: none"> • 1999, 2000 and 2001; • 2002 and 2003

Table 11: composition of the industry-year groups

Figure 2 shows the average amount of discretionary accruals lagged by total assets for both non-accretive and accretive repurchasing companies. Additionally, the difference between the average Euro amounts of lagged discretionary accruals of accretive and non-accretive repurchasing companies is plotted in this figure. As described in chapter 6.5.3, the amount of discretionary accruals is used as a proxy for accrual-based earnings management. The average amounts of discretionary accruals for both non-accretive and accretive repurchasing companies differ from each other over the period 1999-2007, while they are approximately equal over the period 2007-2010.

The graph representing the differences between the average euro amounts of lagged discretionary accruals of accretive and non-accretive repurchasing companies approximates zero over the period 2007-2010. This graph indicates that there is no steady relation between the application of accrual-based earnings management and non-accretive nor accretive repurchasing companies over the period 1999-2007. However, it appears from the graph that both non-accretive and accretive repurchasing companies seem to act equally regarding the application of accrual-based earnings management in times of financial crisis. This could either indicate that there is no relation between accrual-based earnings management and stock repurchases or that there is a complementary relation. The results of the two-stage regression model, which goes further into the relation between accrual-based earnings management and stock repurchases, are presented in the following section.

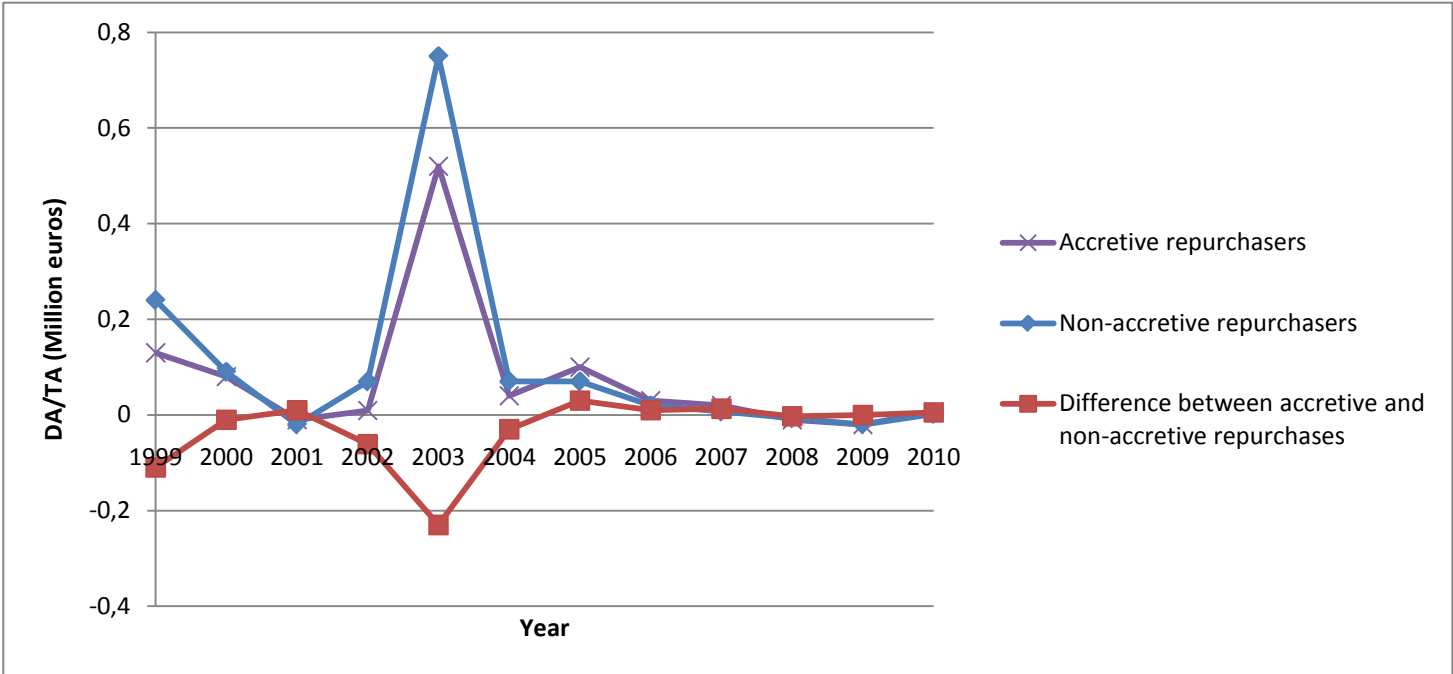


Figure 2: amount of discretionary accruals lagged by total assets

7.4.1 Regression stage 1: generating the predicted probability of accretive repurchases

In stage one of the two-stage regression model the predicted probability of accretive share repurchases is estimated using logistic regression model (10). Those predicted probabilities are incorporated as explanatory variables in the OLS regression model of stage two. Figure 3 presents the average probability of accretive share repurchases for all industries per year. The graph shows an average predicted probability within the range of 30 to 40 percent over the period 1999-2007. After this period, a strong decline in the predicted probability is visible. The lowest estimated predicted probability equals 21,94% for the year 2010. In other words, the chance that a stock repurchasing company increases its earnings per share with at least 0,01 eurocent, is equal to 21,94%.

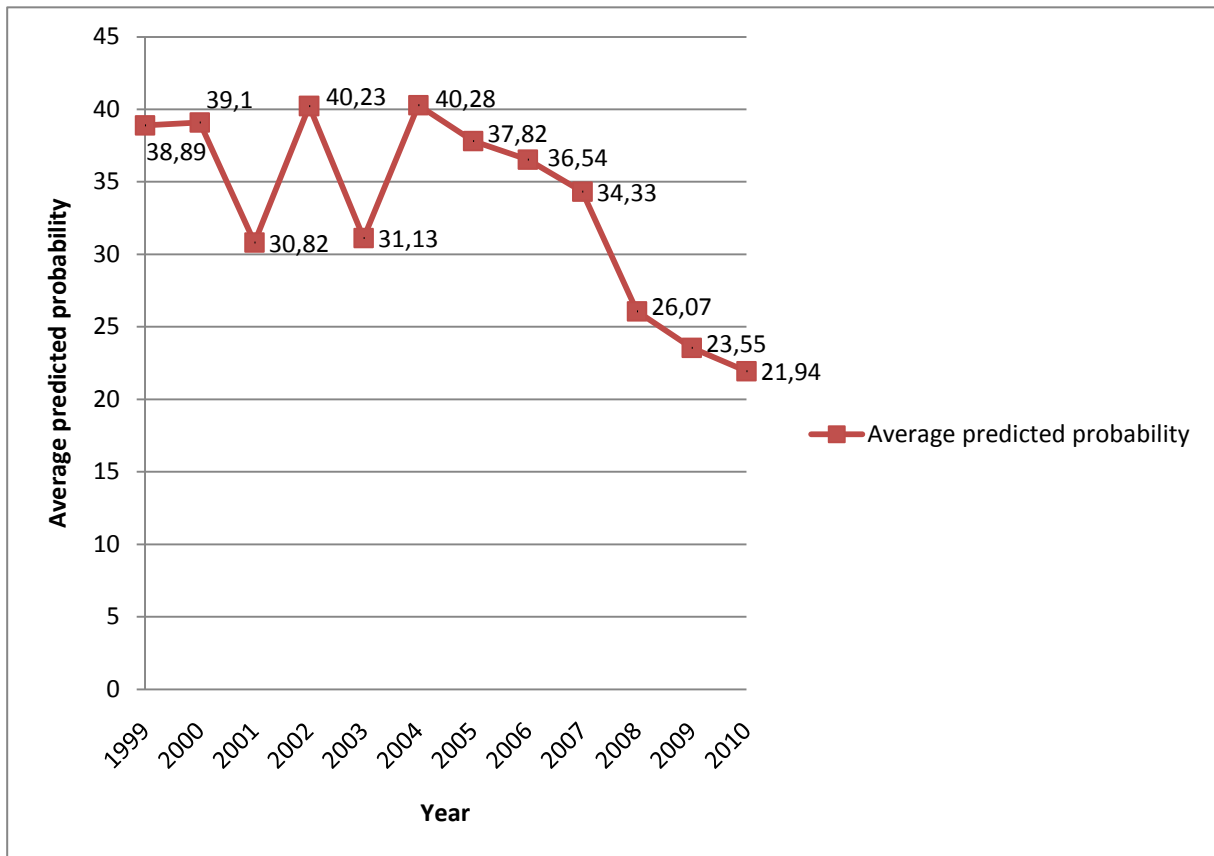


Figure 3: average predicted probability of accretive share repurchases per year

Formula (3) in chapter 6.5.2 expresses the Hribar et al. (2006) model to identify accretive share repurchases. From chapter 5 and formula (3), it appears that several underlying factors can be identified which could cause a share reacquisition to be non-accretive. These are, the foregone return on cash used for the repurchase, the timing factor, the proportion of shares involved, the relation between the inverse price-to-earnings ratio and the common after-tax return of the period, and the periodical earnings itself.

The foregone return on cash used for repurchases can be expected to be lower during economic downturns since it is likely that there are less profitable projects to invest in, and projects might also be less profitable in such periods. Therefore, this factor is not expected to significantly lower the chance that a buyback is classified as an accretive repurchase. The timing factor has no impact on the probability of accretive repurchases because this variable is assumed to be equal to 0,5. The proportion of shares involved in the buyback could have an impact on the chance that a stock repurchase is accretive. Figure 4 shows the average value of share repurchases per year and figure 5 expresses the average percentage of shares repurchased per year. The graph representing the average value of share repurchases as well as the graph expressing the average percentage of share repurchases show a decline in the period 2007-2009, and a recovery in the direction of the range for the years 1999-2007 in 2010. The movement in the period 2007-2009 corresponds with the

development of the probability of accretive repurchases over the same period. In contrast with figure 4 and 5, the predicted probability of accretive repurchases shows a decrease in 2010. Therefore, the development of the predicted probability over the years 2007-2010 might only partly be due to the changes in the average value of stock involved in the repurchases and the changes in the average percentage of stock repurchases.

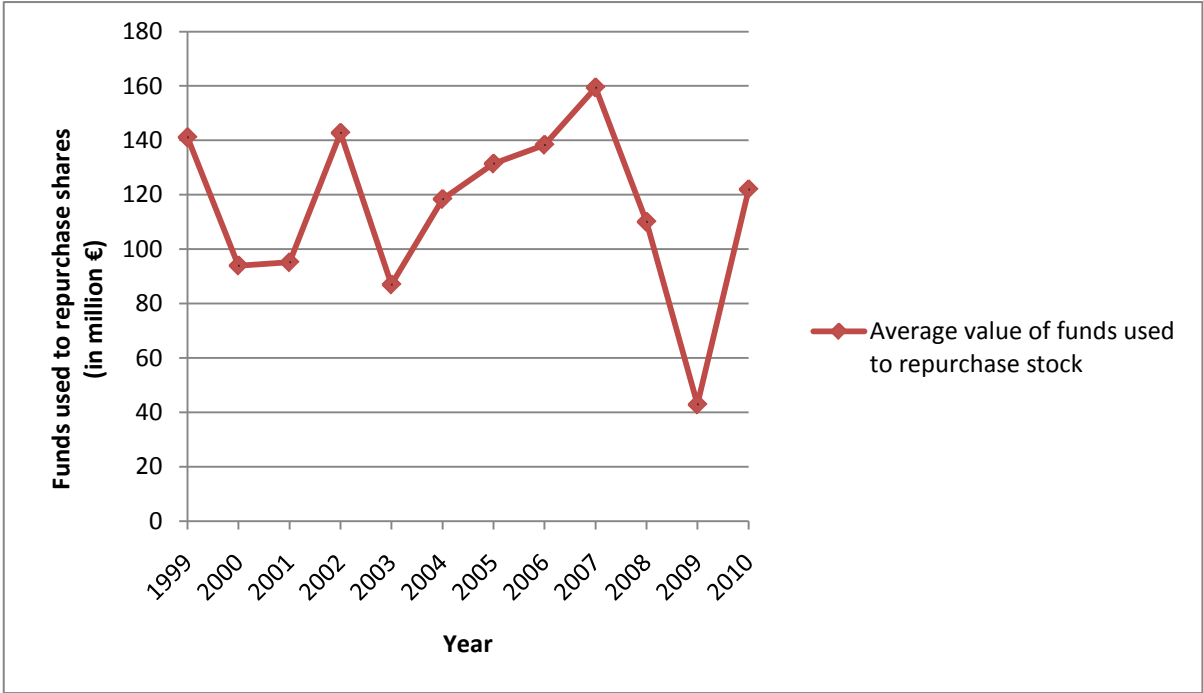


Figure 4: average value of share repurchases per year

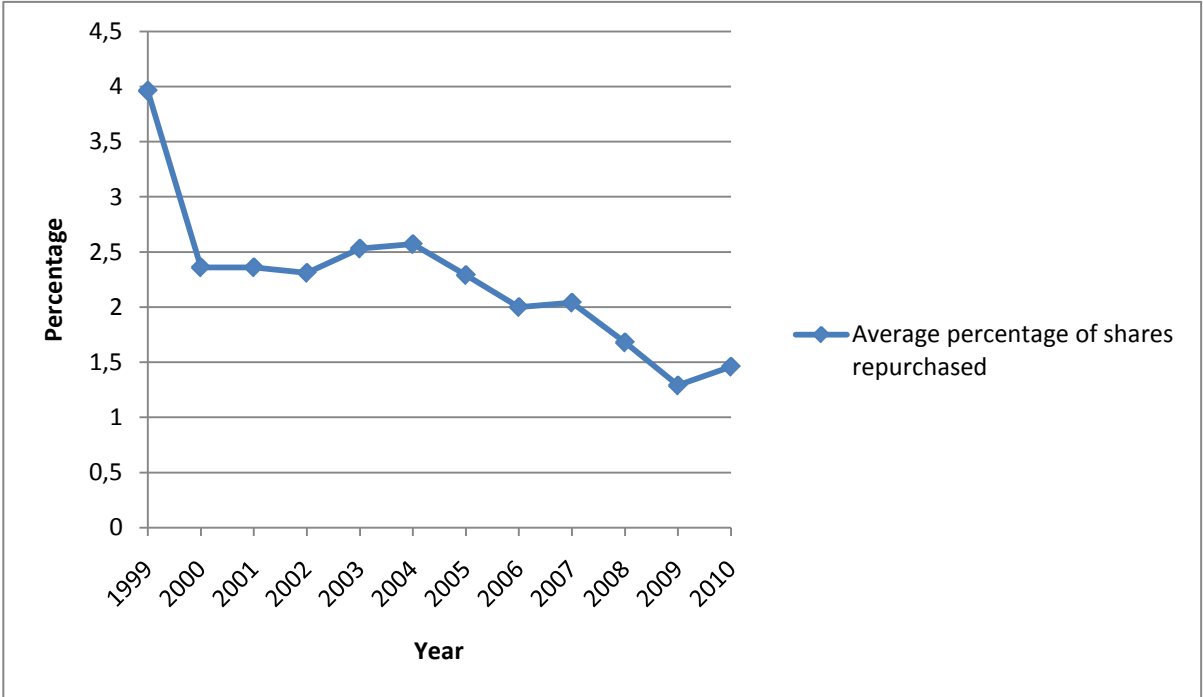


Figure 5: average percentage of shares repurchased

Another factor which could be fundamental to the change in predicted probability is the level of the earnings generated in the period. The earnings number can influence the predicted probability via both the ASIF_EPS2, as appears from formula (3), and via the relation between the inverse price-to-earnings ratio and the common after tax return. The latter is described in chapter 5. In formula (3), the earnings number is the main part of the nominator in calculating the ASIF_EPS2. That means, when the earnings component drops due to the bad economic circumstances in the crisis, the nominator decreases which in turn results in a decline in the ASIF_EPS2. The inverse price-to-earnings ratio is defined as the EPS divided by the price per share. A decline in the earnings results in a decline of the inverse price-to-earnings ratio. Since the requirement to let a firm's repurchase be accretive is that $(EPS_0/P) > r$, less repurchases will be accretive to EPS. This could explain the decrease in the average amount of accretive share repurchases presented in figure 1. Note also from figure 1 that the total amount of stock repurchases still increases in the years 2007 and 2008. This might imply that companies' management tried to outweigh the negative effects of the economic environment on their EPS by repurchasing stock. After 2008, companies might have realized that the possible poor performance was longer lasting when the real impact and proportion of the financial crisis came to light. Management might have translated these observations into an adjustment in their stock repurchasing behavior. However, this is a possible indirect effect from which management could have prevented itself by checking the requirement $((EPS_0/P) > r)$ before deciding to exercise a buyback. Therefore, I suggest that the direct effect of a decline in the earnings number on the nominator in the ASIF_EPS2 calculation is stronger than the indirect effect via the inverse price-to-earnings ratio. Additionally, I suggest that a drop in earnings is fundamental to the change in the probability of accretive repurchases in the period 2007-2010.

7.4.2 Regression stage 2: the relation between accrual-based earnings management and stock repurchases

Model (11) in chapter 6.5.5 presents the second stage regression model, from which the relation between accrual-based earnings management and the probability of accretive stock repurchases can be derived. The prediction of the relation was ambiguous because this study is the first European study on the relation between accrual-based earnings management and stock repurchases and besides that, the outcomes of prior related studies pointed in different directions. Table 13 shows the correlations between the independent variables and the related p -values in parenthesis. Many independent variables are significantly correlated to each other, which is not surprising since companies have a lot of characteristics and relations between these characteristics in common. However, from table 14 can be concluded that the extent to which the independent variables are correlated to each other does not significantly impact the results of the second-stage regression

model (tolerance>0.2, VIF<10) (Field 2005). In other words, no multicollinearity problems arise in this context.

	AB_ACC	LOGSIZE	LEV	ROA	\hat{A}_{REP}	BM	GDP	INDUSTRY (dummy)	COUNTRY (dummy)
AB_ACC _t	-	-	-	-	-	-	-	-	-
LOGSIZE _{t-1}	,091	-	-	-	-	-	-	-	-
	(,000)****								
LEV _{t-1}	,074	,235	-	-	-	-	-	-	-
	(,000)****	(,000)****							
ROA _t	,050	-,034	-,046	-	-	-	-	-	-
	(,002)****	(,026)***	(,004)***						
\hat{A}_{REP}_t	,046	,303	,017	,342	-	-	-	-	-
	(,005)***	(,000)****	(,166)	(,000)****					
BM _t	,007	-,003	,026	,167	,057	-	-	-	-
	(,355)	(,424)	(,070)*	(,000)****	(,001)***				
GDP _{t-1}	-,105	,027	-,065	,140	,134	,010	-	-	-
	(,000)****	(,063)*	(,000)****	(,000)****	(,000)****	(,280)			
INDUSTRY (dummy)	,018	-,124	-,086	,044	-,101	,020	-,036	-	-
	(,152)	(,000)****	(,000)****	(,006)***	(,000)****	(,124)	(,021)**		
COUNTRY (dummy)	,043	,038	,114	,069	-,201	,004	,133	-,059	-
	(,007)***	(,014)**	(,000)****	(,000)****	(,000)****	(,409)	(,000)****	(,000)****	

****, ***, **, and * indicate significance at 0,1%, 1%, 5% and 10% respectively.

Table 13: correlations between abnormal accruals and independent variables

Independent variable	Period 1999-2010		Period 1999-2006		Period 2007-2010	
	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF
LOGSIZE _{t-1}	,825	1,212	,917	1,090	,692	1,446
LEV _{t-1}	,921	1,086	,938	1,066	,886	1,129
ROA _t	,807	1,240	,796	1,256	,778	1,286
\hat{A}_{REP}_t	,707	1,414	,752	1,329	,603	1,658
BM _t	,971	1,030	,936	1,068	,979	1,022
GDP _{t-1}	,942	1,062	,922	1,085	,916	1,092
INDUSTRY (dummy)	,965	1,036	,958	1,044	,959	1,043
COUNTRY (dummy)	,883	1,132	,883	1,132	,861	1,161

Table 14: variance inflation factors per (sub)period

Appendix IV table 15 shows the results of the second stage OLS regression model for the periods 1999-2010, 1999-2006 and 2007-2010. The predicted probability of accretive share repurchases (\hat{A}_{REP}) does not significantly predict the proxy for accrual-based earnings management (AB_ACC) for the periods 1999-2010 and 1999-2006. Surprisingly, the results are different for the period in which the financial crisis took place. For the period 2007-2010, \hat{A}_{REP} significantly ($p=0,05$) predicts AB_ACC. Since this is a positive relation as indicated by its sign, these results are an indication of complementary use of accrual-based earnings management and stock repurchases in influencing the earnings per share in an European context.

When looking at the results shown in table 15, it appears that the explanatory variable BM does not significantly predict the level of abnormal accruals in any period. This is inconsistent with the predictions based on the literature by Richardson et al. (2002), which suggests that low book-to-market firms are under relatively greater pressure to meet market expectations and thus are likely to adopt more aggressive accounting policies. Apparently, in practice there is no difference between the application of accrual-based earnings management between high BM and low BM firms. In addition, the explanatory variable LOGSIZE is not significant in explaining the level of abnormal accruals over the period 2007-2010, while the relation is highly significant in explaining the level of abnormal accruals when taking into account the period 1999-2010 or the sub-period 1999-2006. This might be explicable by the possibility that in bad economic times companies of any size look for comparable possible strategies to manage their earnings and deal with the economic circumstances.

The signs of the relations between LEV and AB_ACC and ROA and AB_ACC turn out to be different than their predicted signs for both the period 1999-2010 and the sub-periods. The predictions are based on the outcomes of the study by Yu (2009). The positive sign of the relation between LEV and AB_ACC might be explained by the possibility that high leveraged firms find an incentive to apply accrual-based earnings management in meeting their debt covenants to prevent themselves from fines or capital restrictions in the future. The positive relation between ROA and AB_ACC possibly is the consequence of the desire of high ROA firms' management to consequently meet or beat market participants' expectations regarding the return on assets.

7.5 Conclusion

The sample is divided into accretive and non-accretive stock repurchases using the model by Hribar et al. (2006). The results of this separation of the sample shows that 32% of the stock repurchase events is classified as an accretive stock repurchase while 68% is classified as a non-accretive share reacquisition. After that, the cross-sectional modified Jones model has been used to detect accrual-based earnings management. It appears that the differences in the application of accrual-based

earnings management between accretive and non-accretive share repurchasing companies converges after 2007. In line with these findings, it appears from the two-stage regression model that the probability of accretive share repurchases is not related to the level of abnormal accruals in the periods 1999-2010 and 1999-2006, while there is a positive relation in the period 2007-2010. These results indicate complementary use of accrual-based earnings management and stock repurchases in influencing companies' earnings per share in an European context during the financial crisis in the period 2007-2010.

Chapter 8 Discussion

8.1 Conclusion

Being part of the meeting or beating literature, this study investigates the relation between accrual-based earnings management and stock repurchases in influencing companies' earnings per share in an European context over the period 1999-2010. Although the results suggest that there is no relation between these two types of earnings management in the period 1999-2010 nor in the sub-period 1999-2006, an indication of complementary use of accrual-based earnings management and stock repurchases in influencing companies' earnings per share is detected in an European context during the financial crisis in the period 2007-2010.

8.2 Analysis

As described in chapter 4, empirical evidence regarding the use of other EM tools surrounding stock repurchase events is mixed. The outcomes of the studies of Core et al. (2006), Gong et al. (2008), and Brockman et al. (2008) suggest that various types of EM practices are used in the pre- or post-repurchase period. In contrast, Zang (2007) reports evidence regarding the existence of a substitutive relationship between accrual-based earnings management and real earnings manipulating activities. Subsequent research by Yu (2009) indicates that the substitutive relation found by Zang (2007) also holds for accrual-based earnings management and stock repurchases as real earnings management activity to influence the company's earnings per share. Recently, Young and Yang (2011) reported that repurchasing companies with EPS conditions are associated with lower abnormal working capital accrual activity in a sample of 1047 repurchase observations of United Kingdom resident firms in the period 1998-2006. In line with Zang (2007) and Yu (2009), these results suggest a substitutive relation between the different tools to influence the EPS.

In this study an indication of a complementary relation between the two EM tools is detected in the period 2007-2010. These findings are not corresponding with the findings of Yu (2009) and Young and Yang (2011). Although a more recent sample period is used in this research, for the period 2007-2010 the results of this study are in line with the findings of Core et al. (2006), Gong et al. (2008), and Brockman et al. (2008) regarding the complementary use of different EM tools in order to meet or beat analysts' expectations or companies' targets.

There are four possible explanations which are likely to be fundamental to the difference in the results between this study and the research by Yu (2009). These explanations are related to the sample, related to the model used to separate accretive from non-accretive stock repurchases, related to the differences between the models used to estimate the probability of accretive stock repurchases, and related to the differences between the second-stage regression models.

The first explanation of the difference in outcomes might be that the sample used by Yu (2009) only consists of firms listed in the United States, where the sample used in this study only consists of European listed firms. This difference might be crucial in several aspects. Firms listed in the United States have to comply with U.S. General Accepted Accounting Principles (US GAAP), where European listed firms have to report in accordance with International Financial Reporting Standards (IFRS). This is an important difference since the guidelines allow different types of financial reporting and therefore provide companies with other possibilities to exercise their financial strategies in order to meet their targets. Besides that, Kim et al. (2004) report that European listed companies have to deal with many more restrictions on stock repurchases than firms listed in the United States. This is also visible in appendix I table A, in which the main differences in the restrictions on stock repurchases across European listed firms and also the differences between European and U.S. listed firms are shown per category. As discussed in chapter 6.4, some regulatory differences exist across European countries, but the differences in restrictions between European and U.S. listed firms are even more pronounced. In contrast to European listed firms, companies listed in the United States are not limited at all in their possibilities to exercise stock repurchases. This is expected to explain a major part of the differences in the results of this study and the outcomes of the research by Yu (2009), because the restrictions on stock repurchases could cause that European listed firms' management need more tools to realize the desired EPS related objectives than their American colleagues. However, note that the actual difference in the volume restriction between firms listed in the United Kingdom and U.S. firms is limited to 5% (20% minus 15%), and limited to 10% (20% minus 10%) with respect to the other European countries listed in appendix I table A. This is due to the fact that stock repurchase events which involve more than 20% of the companies' total amount of shares are excluded from the sample.

When comparing the samples used in this study and in the research by Yu (2009) in more detail, a few differences come to light. In a sample of 8540 stock repurchasing events, Yu (2009) found 2909 (34%) repurchases to be accretive to EPS. In this study, 32% of the 3255 repurchases are classified as accretive repurchases. Yu (2009) includes 9 different industry categories in the sample and the sample exists for 57% of firms operating in the manufacturing industry, while this study includes only 7 industry categories in the sample in which the largest percentage (36%) of stock repurchases is attributable to industry 2000, industrials. The proportion accretive/non-accretive repurchases is comparable, but the results of this study are relatively less influenced by the impact of certain individual industry category. One could argue that the results of this research are in turn relatively more influenced by the entities listed in the United Kingdom, since those entities cover 27% of the

total sample. The cumulative impact of these facts on the differences in the results are not directly traceable.

Additionally, European and American people are not the same. They both have their own set of morals and values, which could cause some economic events to be perceived differently at the exchange where the company is listed. For instance, Othman and Zeghal (2006) document that the socio-economic differences between Anglo-American and European continental firms lead to major differences between the prominent incentives for earnings management. From this one can derive that European and U.S. listed firms might choose to adopt other strategies when they aim at influencing their EPS.

Secondly, a possible explanation of the differences in the results in comparison to the study of Yu (2009) could be that a different model is used to separate accretive from non-accretive stock repurchasing companies. As discussed in chapter 6.5.2, the measure ASIF_EPS2 is subtracted from EPS'_0 to assess whether a stock repurchase event should be classified as accretive or non-accretive. In the study of Yu (2009), the simplified version of the model by Hribar et al. (2006) is used in which ASIF_EPS1 is subtracted from EPS'_0 . This model neglects the foregone return on cash used for repurchases and therefore yields a higher percentage of accretive repurchasing companies in the sample.

Third, based on prior literature also four explanatory variables were added to the first stage-regression model by Yu (2009) in order to estimate the probability of accretive share repurchases (see chapter 6.5.4). A robustness test is executed to verify whether the results of this study presented in appendix IV table 15 remain the same if the original model by Yu (2009) (formula (9)) instead of the model as shown by formula (10) is used to separate accretive from non-accretive share repurchases. It appears from appendix V table 16 that the results of this study are not robust against omitting the added explanatory variables ROA, PAST_RETURN, BM and Σ COUNTRY. Except for LOGSIZE and ROA, all other explanatory variables turn out to be less significant in explaining AB_ACC. In particular, the probability of accretive stock repurchases estimated using formula (9) does not significantly predict the level of abnormal accruals. Concluding, the extensions of the first-stage regression model are not only theoretically likely to have added value, but also in practice.

The fourth possibility to explain the variety in the outcomes is that an extended version of the second-stage regression model by Yu (2009) is used to investigate the relation between accrual-based earnings management and the probability of accretive share repurchases. The modifications are already discussed in chapter 6.5.5.

As mentioned before, the results of this study also deviate from Young and Yang (2011). This might be explicable by the fact that another model is used to detect both earnings management and stock repurchases, but the composition of the samples is maybe even more important. Where the sample of this study covers 15 European countries including the United Kingdom, Young and Yang (2011) focus only on the United Kingdom. This could have major impact on the results because the same socio-economic differences appear because of the Anglo-American accounting environment in the United Kingdom and the Euro-Continental environment in the remaining European countries.

8.3 Limitations

The main limitations of this study are related to the models used and the availability of European data. First, the way the model by Hribar et al. (2006) is used in this study has implications for the accurateness of the separation between accretive and non-accretive share repurchasing firms. The use of annual data and the assumption regarding the timing factor ($w=0.5$) affects the accuracy of the outcome of the model. Recall from chapter 5.2 that timing is an important issue when managing the earnings per share using stock repurchases. Besides that, the estimate of the foregone return on cash used for repurchases (C_0) differs from the original estimate (the time weighted product of the repurchase dollar amount and the average treasury-bill rate for the quarter) in the model of Hribar et al. (2006). This is due to the availability of data for our sample and might also cause some noise in the accuracy of the separation between accretive and non-accretive repurchasing firms.

A limitation is also present regarding the detection of earnings management. Earnings management is only detected using the modified Jones model by Dechow et al. (1995). A robustness test could be exercised to strengthen the results generated by the modified Jones model. This could for example be done like Yu (2009), using the model by Dechow et al. (2003). Additionally, as described in chapter 6.5.3 the parameters are estimated per industry-year combination with a minimum of 15 observations for each industry-year group. Therefore, data of years including less than 15 observations is combined with data of the prior or following year in estimating the parameters for the industry within a certain year. This yields some bias in the estimation of the parameters.

When looking at the first stage regression model, it appears that the measure of \hat{A}_{REP} might be somewhat biased due to endogeneity issues in addition to those corrected for in the model. For example, employee stock options could create an incentive for both applying accrual-based earnings management and exercising stock repurchases (Yu 2009). Also, the raw stock return is included as a proxy for past stock return. It might be better to include a proxy that more accurately reflects past stock return. The most important limitation of the second stage regression model is that no explanatory variables are included which correct for the existence of earnings management via real

activities in explaining the level of abnormal accruals. For instance, real earnings management activities can be sales manipulation, reduction of R&D expenses and overproduction to lower the cost of goods sold (Roychowdhury 2006; Zang 2007).

8.4 Future research opportunities

This study only reports an indication of a complementary relation between accrual-based earnings management and stock repurchases in influencing the earnings per share for European listed companies in general during the period 2007-2010. It might be interesting for market participants to know whether this relation is only present during economic downturns, and for which specific countries within Europe the relation holds. Therefore, it is interesting to repeat an extended version of this study after a couple of years. Additionally, it appears from this study that only few researches are focused on the relation between different types of earnings management. The results of those studies are also mixed and mainly focused on the Anglo-American accounting environments. Therefore, this remains a fruitful avenue for future research.

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Appendix I Institutional differences between EU15 countries

Table A Restrictions on stock repurchases across European and U.S. listed firms

	Approval	Timing restriction	Price restriction	Volume restriction	Separate disclosure	Insider trading	Major reporting authority
United States	Board	None	None	None	None	-	SEC
United Kingdom	Shareholder meeting	18 months	No higher than +5% of 5 day price	15% of total shares	Daily	Yes	FSA (Financial Supervisory Authority)
France	Shareholder meeting	18 months	No higher than daily high	10% of total shares, 25% of daily volume	Monthly	Yes	COB (Comm. On Securities Trading)
Germany	Shareholder meeting	18 months	Prescribed by shareholder meeting: max and min	10% of total shares	Some ad hoc, 5%-10% hurdles	-	BaFin (Financial Supervisory Authority)
Italy	Shareholder meeting	18 months	No higher than most recent price	10% of total shares, 25% of monthly volume	Yes (treated as public offers)	-	CONSOB (Comm. on Financial Markets)
Netherlands	Shareholder meeting	18 months	Prescribed by shareholder meeting: max and min	10% of total shares	Daily	Yes	Authority FM (FM: Financial Market)

Kim et al. (2004)

Table B Changes in laws that made stock repurchases legally permissible in EU15 countries

Countries	Legally permissible
Austria	Only for stock options
Belgium	Yes but complicated process
Denmark	Yes- 10%, distributable reserves, 18 months. If +10% sold in 3 years
Finland	As of 1 Sep 1997.
France	Pre-July 98 Reduction in capital Post 3 July 1998 Simplified buy-back
Germany	1 May 1998
Greece	Yes – Limitations
Ireland	Irish CA 1990
Italy	Civil Code & Law 58/98
Luxembourg	Law August 1915
Netherlands	No legal framework, Some case law
Portugal	CSC & Privatization law 11/90
Spain	Yes
Switzerland	Code of Obligation 1992 Swiss Federal Reform 1/98
UK	Companies Act 1981, 1985

Lasfer (2003)

Appendix II Summary literature on stock repurchases discussed in chapter 4
Table 1 literature 4.1 Introduction

Introduction Author(s)	Object of study	Sample	Methodology	Result(s)
Fairchild, R.J. 2006.	Demonstrating the fallacy of the view that repurchasing shares can increase the share price	-	Numerical example in a perfect market	He argues that the misconception may result in value-reduction if it means that firms become obsessed with using cash flow to repurchase shares rather than investing in positive NPV projects.
Oded, J. and A. Michel. 2008.	Showing that stock repurchases do not create value for investors and demonstrating the magnitude of distortion that arises from using EPS to make stock repurchase decisions	Examination of ExxonMobil's stock repurchases	Numerical analysis	No effect of changes in EPS is associated with changes in the wealth of shareholders at time zero.
Comment, R., and G.A. Jarrell. 1991.	Three forms of common stock repurchases are compared. Dutch-auction self-tender offers, open-market share repurchase programs and fixed-price self-tender offers	U.S. data, 165 dutch-auction and fixed-price self-tender offers during 1984-1989 and 1,197 common stock repurchase authorizations during 1985-1988	Measuring average excess stock returns, comparing key characteristics	Each stock buyback is associated with significant positive excess stock returns on their announcement. Buyback announcement returns are increasing in the fraction of shares sought, which is consistent with both signalling and an upward-sloping supply curve for stock.
Lie, E. 2005.	Operating performance following open market share repurchase announcements	U.S. data, 4729 share repurchase announcements, period 1981-2000.	Operating performance measured by operating income scaled by average of cash-adjusted assets	Both the operating performance improvement and the positive earnings announcement returns are limited to those firms that actually repurchase shares during the same fiscal quarter.
Yook, K.C. 2010.	Long-run stock performance following stock repurchases	Firms listed on the NYSE, AMEX or NASDAQ, 4208 repurchases, 1994-2007.	BHAR method	Evidence that firms that announce repurchase programs infrequently and repurchase shares actually experience significant long term abnormal returns.

Jianxin, D.C., and M. Gupta. 2009.	Overvaluation and earnings management	U.S. data, 91,742 firm year observations, period 1963-2002.	Modified Jones model	Overvaluation-induced income-increasing earnings management is negatively related to future abnormal stock returns.
Bradford, B.M. 2008.	Reexamines the evidence supporting long-term performance after announcements of open-market repurchase plans	U.S. data, 400 firms; 723 announcements of open-market stock repurchases, period 1993-1999	Buy and hold abnormal returns and cumulative abnormal returns	No evidence on the existence of long-term abnormal performance after repurchase plan announcements.
Chang, S.C., S.S. Chen, and L.Y. Chen. 2010.	Whether prior experience of share repurchases matters in the market reactions to the subsequent repurchase announcements	1741 U.S. firms; 5717 open-market stock repurchase announcements period 1986-2005	Regression analysis including abnormal stock return and record on actual buyback	Upon the announcement of share repurchases, stock markets not only respond more positively to those made by firms that have better record on actual buyback following their previous repurchase plan announcements, but also experience a stronger reaction for announcing firms with better stock performance after prior repurchase announcements.
Bonaimé, A.A. 2010.	Whether a firm's reputation is a determinant of repurchase completion rates and whether the stock market discounts announcements made by less reputable firms	U.S. data, 133 observations, period 2004-2007	Logit regression	Prior completion rates are positively correlated with current completion rates and announcement returns, suggesting consistency in repurchases and implying a reputational effect.
Dittmar, A.K. 2000.	Relation between stock repurchases and distribution, investment, capital structure, corporate control, and compensation policies	Firms listed on Compustat and CRSP, excluding financial institutions, public utilities, and transportation companies, period 1977-1996	Tobit model using cross-sectional data	Firms repurchase stock to take advantage of potential under-valuation and, in many periods, to distribute excess capital. Firms also repurchase stock during certain periods to alter their leverage ratio, fend off takeovers, and counter the dilution effects of stock options.

Kim, J. 2005a.	Examines changes in daily return volatility associated with open market share repurchases	905 firms with 549 listed on NYSE/Amex and 356 NASDAQ listed firms, period 1990-1992	Univariate analyses, control sample analyses, and multiple regression analyses are employed to explore relations between daily return volatility and a number of variables	Evidence that an open market share repurchase firm, by actively buying back its shares when the share price falls, reduces daily return volatility.
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Table 2 literature 4.2 Stock repurchases and signaling undervaluation

Introduction Author(s)	Object of study	Sample	Methodology	Result(s)
Akhigbe, A., and J. Madura. 1999.	Intraindustry effects of bank stock repurchases	Banks listed on Amex, NYSE, or OTC, 77 bank stock repurchase announcements and 2066 rival banks, period 1978-1995	Event study methodology is used to measure the average daily abnormal returns to bank stock repurchase announcements	Bank stock repurchases result in a positive and significant valuation effect for the repurchasing banks. Positive significant intraindustry effects of bank stock repurchases. Intraindustry effects are more favorable when the valuation effect for the repurchasing bank is more favorable.
Miller, J.M., and S.G. Shankar. 2005.	Effect stock repurchases announcements on the value of the announcing insurance firms and on the value of rival insurance firms	U.S. data, 96 insurance company repurchases, period 1980-2000	Event study methodology Brown and Warner (1985)	Insurance firms experience a significant increase in value at the time of the announcement, while there is a significant decrease of value of rival insurance firms.
Louis, H., and H.White. 2006.	Examining whether managers intentionally use repurchases as signaling devices	U.S. data, 177 repurchase tender offers, period 1981-2001	Regression analysis	Evidence suggesting that managers intentionally use fixed-price repurchase tender offers to signal undervaluation. In contrast, no evidence that managers use Dutch-auction tender offers to signal undervaluation.
Louis, H., A.X. Sun, and H. White. 2010.	Examining why abnormally high net insider selling is observed after RTO announcements although, on average, firms experience positive abnormal returns in the years after the repurchases	U.S. firms, 274 RTOs, period 1984-2003	Multivariate regression analysis	Results consistent with the notion that fixed price RTOs are more likely than Dutch-auction RTOs to signal undervaluation.

Michel, A., J. Oded, and I. Shaked. 2010.	Characteristics and market performance of ASR stock	127 announcements of firms listed on NASDAQ, AMEX and NYSE, period 2004-2007	Multivariate regression analysis	ASRs do not signal undervaluation.
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Table 3 literature 4.3 Empirical evidence on the free cash flow hypothesis

Introduction Author(s)	Object of study	Sample	Methodology	Result(s)
Bens, D.A., V. Nagar, and F. Wong, 2002.	Real cost of awarding employee stock options	U.S. data, 1048 firm-year observations, period 1996-1999	Regression analysis	Firms experiencing significant employee stock option (ESO) exercises shift resources away from real investments towards the repurchase of their own stocks.
Guffey, D.M., and D.K. Schneider. 2004.	Explaining share repurchasing behavior	U.S. data, 721 firms, period 1994-1996	Principal component analysis and regression	Most important explanation comes from variables associated with the free cash flow hypothesis. The second most important explanation is variables associated with size and scale of operations. No evidence for anti-takeover. Tax or leverage hypothesis remains an important explanatory variable.
Grullon, G., and R. Michaely. 2004.	Better understand the economic motivations behind the decision to repurchase shares	U.S. data, 4443 open-market stock repurchases, period 1980-1997	Regression analysis	Announcements of open-market share repurchase programs are not followed by an increase in operating performance. Repurchasing firms experience a reduction in systematic risk and cost of capital relative to non-repurchasing firms. Evidence on free cash-flow hypothesis. Investors under-react to repurchase announcements.
Nayar, N., A.K. Singh, and A.A. Zebedee. 2008.	Liquidity effects of repurchase programs	U.S. firms, 165 observations, period 1993-2004	Investigation both temporary and permanent liquidity effects using univariate analysis	Improvement in liquidity is transitory and limited to the tender period when the firm's offer to repurchase shares is outstanding.

Young, S., and J. Yang. 2011.	The link between firms' stock repurchase activity and the presence of EPS performance conditions in executive compensation contracts.	U.K. resident-firms listed on LSE, 1047 firm year observations, period 1998-2006.	Logistic regression and tobit regression	Positive association between repurchases and EPS-contingent compensation arrangements. And repurchasers with EPS conditions are associated with lower abnormal accruals.
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Table 4 literature 4.4 Stock repurchases as anti-takeover deterrence

Introduction Author(s)	Object of study	Sample	Methodology	Result(s)
Dittmar, A.K. 2000.	Relation between stock repurchases and distribution, investment, capital structure, corporate control, and compensation policies	Firms listed on Compustat and CRSP, excluding financial institutions, public utilities, and transportation companies, period 1977-1996	Tobit model using cross-sectional data	Firms repurchase stock to take advantage of potential under-valuation and, in many periods, to distribute excess capital. Firms also repurchase stock during certain periods to alter their leverage ratio, fend off takeovers, and counter the dilution effects of stock options.
Bargeron, L., M. Kulchania, and S. Thomas. 2011.	Whether firms' decisions to include ASRs in their repurchase programs are associated with factors expected to influence the costs of lost flexibility and the benefits of enhanced credibility and immediacy.	U.S. firms, 256 ASR, period 1996-2008	Univariate, logit regression	ASR is significantly negatively (positively) associated with the variability of the firm's share price and the stock market <i>illiquidity</i> of the firm's shares. ASR is likely as defense against unwanted takeover attempts and as distribution of the proceeds of asset sales.
Guffey, D.M., and D.K. Schneider. 2004.	Explaining share repurchasing behavior	U.S. data, 721 firms, period 1994-1996	principal component analysis and regression	Most important explanation comes from variables associated with the free cash flow hypothesis. The second most important explanation is variables associated with size and scale of operations. No evidence for anti-takeover. Tax or leverage hypothesis remains an important explanatory variable.
Akyol, A.C., J.S. Kim, and C. Shekhar. 2010.	Examines the choice between accelerated share repurchase (ASR) and open market repurchase (OMR) as repurchase mechanisms	U.S. data, 135 ASRs, period 2004-2007	Regression analysis	Results suggest that choosing ASR over OMR and the resulting positive market reactions does little to decrease a firm's attractiveness as a potential takeover target.

Table 5 literature 4.5 *The effect of stock repurchases on capital structure*

Introduction Author(s)	Object of study	Sample	Methodology	Result(s)
Mintz, S.L. 1995.	Shareholder value and buybacks	-	Numerical	When a firm increases its leverage, either by adding new debt or by depleting its cash, the tax savings conserves cash and lowers the cost of capital. The stock market will recognize that the tax savings will flow to the shareholders.
Hovakimian, A. 2004.	Whether security issues and repurchases adjust the capital structure toward the target	U.S. data, 3712 firm-years with security issues and 12,533 firm-years with security repurchases, period 1980–1998	Regression analysis	Firms that issue or repurchase equity generally have low debt ratios. Firms do not initiate equity transactions to offset the accumulated deviation from the target leverage ratio.
Huang, R., C. Marquardt, and B. Zhang. 2010.	Contracting and behavioral explanations for why managers prefer to avoid earnings dilution.	U.S. data, 5980 firm-year observations, period 1993-2005.	Regression analysis	Managers only avoid earnings dilution when their bonus compensation explicitly depends upon earnings per share (EPS) performance; this effect is increasing in the magnitude of EPS-contingent bonus compensation.
Evans, J.P., R.T. Evans, and J.A. Gentry. 2003.	Summary of changes in the cash flow position of companies embarking on a share repurchase strategy	-	Classification schemes	Adoption of a repurchase strategy leads to smaller net working capital flow components and net operating flow while net investment flow increases. Existence of a clear cash flow effect leading up to the announcement period as well as reliance on external funds.

Grullon, G., and R. Michaely. 2004.	Better understand the economic motivations behind the decision to repurchase shares	U.S. data, 4443 open-market stock repurchases, period 1980-1997	Regression analysis	Announcements of open-market share repurchase programs are not followed by an increase in operating performance. Repurchasing firms experience a reduction in systematic risk and cost of capital relative to non-repurchasing firms. Evidence on free cash-flow hypothesis. Investors under-react to repurchase announcements.
Kahle, K. 2002.	How stock options affect the decision to repurchase shares.	U.S. data, 712 repurchases and 205 dividend increases, period 1991-1996.	Regression analysis	Firms announce repurchases when executives have large numbers of options outstanding and when employees have large numbers of options currently exercisable.
Lee, D.S., W.H. Mikkelsen, and M.M. Partch. 1992.	Personal open market trades by managers around stock repurchases by tender offer	U.S. SEC data; 146 repurchasing firms, 1168 size-matched comparison firms; January 1977 through June 1988	Comparing the number of purchases and the number of sales by managers per firm in each of the eight six-month periods. They also measure the dollar amount purchased and sold by managers per firm. Another measure of trading used is based on classifying managers of a particular firm as buying or selling	Managers of repurchasing firms increase frequency of buying and decrease their frequency of selling shares prior to repurchase announcements. The unusual trading we report is associated with fixed price repurchase offers. They act according to the existence of favourable information in the announcements of repurchases about the future.
Bens, D.A., Nagar, V., D.J. Skinner, M.H.F. Wong. 2003.	Whether corporate executives' stock repurchase decisions are affected by their incentives to manage diluted EPS	357 firms from Compustat classified as S&P 500 Industrial firms for period 1996-1999	Regression analysis	CEOs increase the level of their firms' stock repurchases when: the dilutive effect of outstanding employee stock options (ESOs) on diluted EPS increases, and when earnings are below the level required to achieve the desired rate of EPS growth.

Table 6 literature 4.6 Effect of EM and stock repurchases on the earnings per share

Introduction Author(s)	Object of study	Sample	Methodology	Result(s)
Badrinath, S.G., and N.P. Varaiya. 2001.	Stock repurchases and the EPS	-	Review article	Main incentives for EM and stock repurchases is influencing the EPS.
Brav, A., J. Graham, C. Harvey, and R. Michaely. 2005.	Payout policy in 21 st century	384 CEOs and Treasurers from U.S. firms	Interviews and survey	Managers like to repurchase shares when stock is undervalued and to influence their EPS.
McNally, W.J. 1999.	Open market stock repurchase signaling	U.S. data, 702 repurchases, period 1984-1988	Empirical signaling model	Firms that repurchase more have higher earnings; riskier firms have higher earnings (Given the repurchase proportion); and firms where insiders have a greater ownership stake have higher earnings.
Hribar, P., N.T. Jenkins, and W.B. Johnson. 2006.	Whether firms use stock repurchases to meet or beat analysts' earnings per share (EPS) forecasts	U.S. firms listed on the NYSE, AMEX, or NASDAQ, sample of 133,149 firm-quarters, and a sample of 26,480 firm-quarters with stock repurchases, period 1988-2001	Probit model	Disproportionately large number of accretive stock repurchases among firms that would have missed analysts' forecasts. The repurchase-induced component of earnings surprises appears to be discounted by the market.
Bens, D.A., Nagar, V., D.J. Skinner, M.H.F.Wong. 2003.	Whether corporate executives' stock repurchase decisions are affected by their incentives to manage diluted EPS	357 firms from Compustat classified as S&P 500 Industrial firms for period 1996–1999	Regression	CEOs increase the level of their firms' stock repurchases when: the dilutive effect of outstanding employee stock options (ESOs) on diluted EPS increases, and when earnings are below the level required to achieve the desired rate of EPS growth.
Kurt, A.C. 2010.	Earnings management motivation of accelerated share repurchases (ASR)	U.S. data, 216 ASR transactions, period 2004 through 2007	Modified Jones model	ASR firms tend to manage their earnings upward during the quarter of the announcement.

Brockman, P., I.K. Khurana, and X. Martin. 2008.	Voluntary disclosures around share repurchases	U.S. data, 628 firms, period 1994-2005	Regression analysis	Managers increase frequency and magnitude of bad news announcements during the 1-month period prior to buyback. They also increase the frequency and magnitude of good news announcements during the 1-month period following their repurchases.
Core, J.E., W.R. Guay, S.A. Richardson, R.S. Verdi. 2006.	Whether managers' trading decisions (both at a firm and personal level) are correlated with trading strategies suggested by the operating accruals and the post-earnings announcement drift (SUE) anomalies	Sample of firms listed on NYSE and AMEX, 51 437 firms quarters, period 1989-2000	OLS prediction model to estimate abnormal net share repurchases, and regression analysis	Evidence for the accruals anomaly, i.e., managers' repurchase and insider trading behavior varies consistently with the information underlying the operating accruals trading strategy. No evidence for the SUE anomaly.
Gong, G., H. Louis, and A.X. Sun. 2008.	Earnings management and firm performance following open-market repurchases	U.S. data, 1720 open-market repurchases, period 1984-2002	Calendar-time portfolio approach and Jones model	The study suggests that one reason firms experience post-repurchase abnormal returns is that post-repurchase realized earnings growth exceeds expectations formed on the basis of pre-repurchase deflated earnings numbers.

Appendix III Descriptive statistics

Table 8 Average value of shares repurchased (in million Euros)

	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Luxembourg	Netherlands	Portugal	Spain	Switzerland	United Kingdom	Average per year in total sample
1999	0	0	0	60,68	823,20	7,14	64,28	8,41	4,86	0	44,21	9,66	15,37	0	0	141,07
2000	1,85	4,49	28,68	53,14	140,39	184,05	194,88	0	7,77	0	63,33	9,89	0	89,51	97,76	93,94
2001	19,83	0	10,95	33,25	176,96	93,70	35,95	15,01	5,38	0	30,31	13,66	0	127,77	160,72	95,14
2002	4,24	8,06	25,56	7,21	185,60	60,36	0	14,61	1,94	0	12,35	8,8	0	403,81	260,75	142,70
2003	3,52	9,19	34,94	344,15	90,53	82,48	1,83	11,6	11,57	7,01	20,50	34,64	0,9	47,77	155,07	86,97
2004	21,44	35,25	66,19	492,27	141,72	109,11	0,8	19,20	0	43,22	106,24	66,23	0	127,46	108,71	118,38
2005	34,33	91,89	65,69	451,82	60,39	135,83	6,87	20,29	48,93	280,74	423,02	51,73	141,64	98,58	179,05	131,40
2006	83,48	29,62	65,72	401,21	49,66	145,61	1,81	26,23	8,06	175,47	383,56	22,64	196,74	130,40	197,67	138,31
2007	84,84	56,64	67,70	290,84	78,69	215,73	18,10	77,66	37,16	880,89	260,35	141,75	107,70	160,96	213,84	159,39
2008	31,87	74,06	56,40	142,55	43,70	253,66	11,40	93,91	22,89	671,34	147,32	101,45	94,62	162,20	121,29	110,03
2009	4,91	9,24	172,85	1,94	28,52	10,65	2,94	11,12	2,39	42,00	89,72	1,77	76,14	145,83	29,05	42,87
2010	1,06	74,00	206,01	9,46	64,53	54,85	2,94	0,06	2,65	742,04	12,39	0	57,50	660,23	18,01	121,94
Average per country over the period	24,28	32,70	66,72	190,71	156,99	112,76	28,48	24,84	12,8	236,89	132,78	38,52	57,55	179,54	128,49	

Table 9 Amount of (non-)accretive stock repurchases per country per year

		Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Luxembourg	Netherlands	Portugal	Spain	Switzerland	United Kingdom	TOTAL
1999	Accretive	0	0	0	2	4	0	0	1	1	0	4	2	0	0	0	14
	Non-acc.	0	0	0	2	1	3	1	2	1	0	8	4	1	0	0	23
	Total	0	0	0	4	5	3	1	3	2	0	12	6	1	0	0	37
2000	Accretive	1	0	6	3	8	12	1	0	1	0	7	2	0	9	11	61
	Non-acc.	0	1	10	7	4	12	0	0	4	0	6	3	0	15	33	95
	Total	1	1	16	10	12	24	1	0	5	0	13	5	0	24	44	156
2001	Accretive	3	0	4	2	4	8	1	0	1	0	2	2	0	13	9	49
	Non-acc.	2	0	8	13	9	16	2	2	2	0	10	5	0	14	27	110
	Total	5	0	12	15	13	24	3	2	3	0	12	7	0	27	36	159
2002	Accretive	1	0	7	4	7	6	0	2	0	0	5	1	0	9	15	57
	Non-acc.	4	1	8	5	4	12	0	1	2	0	11	6	0	10	15	79
	Total	5	1	15	9	11	18	0	3	2	0	16	7	0	19	30	136
2003	Accretive	1	2	8	0	11	6	0	1	2	0	2	1	0	5	8	47
	Non-acc.	4	0	8	4	12	11	3	0	1	1	8	6	1	12	33	104
	Total	5	2	16	4	23	17	3	1	3	1	10	7	1	17	41	151
2004	Accretive	2	7	13	5	18	7	1	1	0	0	3	1	0	16	11	85
	Non-acc.	1	3	5	1	13	13	2	1	0	1	11	7	0	15	53	126
	Total	3	10	18	6	31	20	3	2	0	1	14	8	0	31	64	211
2005	Accretive	3	6	11	3	23	8	4	1	3	1	5	4	8	19	23	122
	Non-acc.	4	9	7	7	38	14	4	2	11	1	9	5	13	19	47	190
	Total	7	15	18	10	61	22	8	3	14	2	14	9	21	38	70	312

2006	Accretive	1	10	9	3	26	18	0	0	3	3	8	1	10	19	32	143
	Non-acc.	4	11	11	6	67	14	6	4	7	0	12	5	9	23	88	267
	Total	5	21	20	9	93	32	6	4	10	3	20	6	19	42	120	410
2007	Accretive	4	8	12	3	34	12	4	5	6	1	16	2	10	28	39	184
	Non-acc.	4	17	11	12	81	22	5	2	17	2	19	6	16	42	95	351
	Total	8	25	23	15	115	34	9	7	23	3	35	8	26	70	134	535
2008	Accretive	5	9	8	4	33	21	1	1	5	4	10	3	9	26	26	165
	Non-acc.	5	16	11	19	108	30	15	9	27	1	14	10	30	47	126	468
	Total	10	25	19	23	141	51	16	10	32	5	24	13	39	73	152	633
2009	Accretive	5	5	2	1	19	14	2	0	3	0	2	1	6	15	10	85
	Non-acc.	3	9	4	12	47	16	10	3	18	1	10	7	16	27	93	276
	Total	8	14	6	13	66	30	12	3	21	1	12	8	22	42	103	361
2010	Accretive	1	1	8	1	7	2	1	0	0	0	1	0	0	4	8	34
	Non-acc.	0	0	5	2	15	6	1	1	3	2	2	0	2	13	69	121
	Total	1	1	13	3	22	8	2	1	3	2	3	0	2	17	77	155
TOTAL		58	115	176	121	593	283	64	39	117	18	185	84	131	400	871	3255

Appendix IV Empirical results

Table 12 Estimated parameters used in the modified Jones model

	1000			2000			3000			4000		
	a ₁	a ₂	a ₃	a ₁	a ₂	a ₃	a ₁	a ₂	a ₃	a ₁	a ₂	a ₃
1999	19,482	-2,302E-6	,013	,552	-2,435E-6	-,029	4,450	1,547E-6	-,045	2,933	3,828E-6	,003
2000	19,482	-2,302E-6	,013	,997	-6,960E-6	,017	4,450	1,547E-6	-,045	2,933	3,828E-6	,003
2001	64,342	2,974E-6	-,049	3,252	-4,972E-6	-,001	-,726	2,750E-6	-,050	40,418	2,777E-5	-,179
2002	2,557	-7,891E-6	-,031	-1,717	6,665E-6	,009	-2,458	-1,779E-6	-,029	40,418	2,777E-5	-,179
2003	2,557	-7,891E-6	-,031	-10,572	,000	,567	5,319	3,915E-6	,017	-10,702	-2,075E-5	-,024
2004	-,643	-2,240E-6	,001	-1,612	-3,641E-5	,034	,319	1,086E-6	-,030	-5,642	-3,544E-5	-,006
2005	-,406	-1,928E-5	,069	-,009	-9,646E-6	-,021	9,783	-5,944E-6	-,033	5,356	1,011E-5	-,076
2006	-6,552	-7,730E-6	,015	,508	-2,477E-6	-,019	4,658	-2,984E-5	,027	-5,093	2,165E-5	-,009
2007	1,707	-3,979E-6	-,001	,420	-9,832E-7	-,003	3,417	3,999E-7	,025	-1,234	-6,729E-6	-,046
2008	2,272	1,313E-6	-,015	-,056	-1,259E-7	-,007	2,446	-2,448E-6	,039	,067	1,841E-6	-,039
2009	-6,371	4,240E-6	,001	,079	9,074E-6	-,036	-4,935	9,618E-6	,020	-1,335	-8,816E-6	-,039
2010	-6,371	4,240E-6	,001	,365	1,525E-5	-,077	-1,353	1,726E-5	-,070	2,484	-5,345E-6	-,061

Table 12 Estimated parameters used in the modified Jones model (continued)

	5000			6000			9000		
	a ₁	a ₂	a ₃	a ₁	a ₂	a ₃	a ₁	a ₂	a ₃
1999	-9,370	,000	,303	112,485	8,011E-5	-,004	13,678	-5,634E-6	-,074
2000	-9,370	,000	,303	112,485	8,011E-5	-,004	13,678	-5,634E-6	-,074
2001	7,138	6,393E-5	,131	112,485	8,011E-5	-,004	13,678	-5,634E-6	-,074
2002	,787	-3,413E-5	,055	112,485	8,011E-5	-,004	46,281	,000	-,386
2003	1,944	1,188E-5	-,017	112,485	8,011E-5	-,004	46,281	,000	-,386
2004	,863	-4,277E-5	,044	6,760	8,028E-5	-,016	1,304	,000	-,011
2005	3,138	,000	,065	6,760	8,028E-5	-,016	1,294	2,359E-6	-,124
2006	1,030	-3,948E-6	,041	6,068	5,386E-5	-,059	,487	2,194E-6	-,085
2007	-,427	-4,038E-6	,009	6,068	5,386E-5	-,059	,533	-1,132E-6	-,080
2008	-1,125	-8,947E-7	,028	-,566	2,067E-5	,032	-,668	-6,081E-5	-,102
2009	-,943	9,656E-6	-,031	-,566	2,067E-5	,032	,234	-,001	-,119
2010	1,612	2,148E-7	-,062	-,566	2,067E-5	,032	-1,178	,001	-,131

Table 15 Results second-stage OLS regression model

		Dependent variable: AB_ACC								
		Period 1999-2010			Period 1999-2006			Period 2007-2010		
Independent variable	Predicted sign	sign	t-value	p	sign	t-value	p	sign	t-value	p
(Constant)			,033	,974		-,153	,878		-,023	,981
LOGSIZE	+	+	4,057	,000***	+	5,734	,000****	-	-,219	,827
LEV	-	+	2,542	,011**	+	2,177	,030**	+	2,052	,040**
ROA	-	+	2,921	,004***	+	1,562	,118	+	2,502	,012**
Â_REP	?	+	1,624	,104	+	,244	,807	+	1,990	,047**
BM	-	-	-,302	,763	-	-,407	,684	-	-,196	,845
GDP	-	-	-6,911	,000****	-	-5,111	,000****	-	-3,627	,000****
INDUSTRY (dummy)			1,788	,074*		,099	,921		2,206	,028**
COUNTRY (dummy)			3,062	,002***		2,058	,040**		2,342	,019**
N		3253			1571			1682		
Adj-R ²		0,028			0,043			0,023		
F-Value		12,833			9,780			4,948		

****, ***, **, and * indicate significance of explanatory variables at 0,1%, 1%, 5% and 10% respectively

Appendix V Results robustness tests

Table 16 Results robustness test second-stage regression model

Independent variable	Dependent variable: AB_ACC										
	Predicted sign	Period 1999-2010			Period 1999-2006			Period 2007-2010			
		sign	t-value	p	sign	t-value	p	sign	t-value	p	
(Constant)			-0,76	,940		-,148	,882		-,361	,718	
LOGSIZE	+	+	3,749	,000****	+	5,075	,000****	+	,528	,598	
LEV	-	+	2,554	,011**	+	2,190	,029**	+	1,929	,054*	
ROA	-	+	2,637	,008***	+	1,424	,155	+	2,759	,006**	
\hat{A}_{REP}^1	?	+	0,957	,338	+	,143	,886	+	,317	,752	
BM	-	-	-,342	,733	-	-,424	,672	-	-,158	,875	
GDP	-	-	-6,776	,000****	-	-5,131	,000****	-	-3,330	,001****	
INDUSTRY (dummy)			1,766	,077*		,082	,935		2,169	,030**	
COUNTRY (dummy)			2,864	,004***		1,959	,050**		1,736	,083*	
N			3253			1571			1682		
Adj-R ²			0,028			0,048			0,021		
F-Value			12,611			9,774			4,456		

****, ***, **, and * indicate significance of explanatory variables at 0,1%, 1%, 5% and 10% respectively

1) \hat{A}_{REP} is estimated based on the first stage regression model by Yu (2009) shown in formula (9)