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Predicting The Future Cash Flows of European Firms

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Abstract

Prior research suggests that the cash flow statement approach is a better method than the balance sheet approach to predict future cash flow in the United States. They also find that within the cash flow statement approach current cash flow is a better measurer than earnings to predict future cash flow and when the balance sheet approach is applied earnings is a better predictor for future cash flow. Firms in the US use US GAAP as accounting standard. European firms on the other hand mainly use IFRS as accounting standard. This thesis researches if the same findings hold for European firms. To analyse this both approaches are applied to determine which approach is a better approach to predict future cash flows for European firms. The results show that for European firms the cash flow statement approach is a better approach than the balance sheet approach to predict future cash flow as well. Additionally the results show that within both approach current cash flow is a better measurer than earnings to predict future cash flow. Therefore the conclusion is that for European firms just like for US firms the cash flow statement approach is the best approach and current cash flow is the best measurer to predict future cash flow, but when the balance sheet approach is used current cash flow is also the best predictor for future cash flow for European firms.

Keywords:

Future cash flow, current cash flow, earnings, cash flow statement approach, balance sheet approach

Contents

1. Introduction

"Cash is king" is a well-known proverb originally used when the prices in the securities market are too high. It is better to wait until the prices drop and keep cash (McGraw Hill, 2002). It is not only important to keep cash in this case but also to do investments and for paying dividends. Without cash a company cannot grow and maintain itself. Many stakeholders benefit from having cash. For shareholders it is important, because with cash the company has the ability to pay dividends. For potential investors it is important to know if a company has enough cash to make profitable investments. In that case an investor wants to know if an investment in a company would generate enough cash to make a profit out of the investment. Therefore several stakeholders benefit from predicting future cash flow. This thesis will try to determine what financial statement item is the best proxy to predict the future cash flow.

Prior research shows two main financial statement items that are used to predict future cash flow: current cash flow and earnings. Bowen et al. (1986), Finger (1994), Barth et al. (2001), Subramanyam and Venkatachalam (2007), Lorek and Willinger (2009) and Chen et al. (2020) conclude that current cash flow is a better measurer than earnings to predict future cash flow. Greenberg et al. (1986), Lorek and Willinger (1996), Dechow et al. (1998), Kim and Kross (2005), and Nam et al. (2012) conclude that earnings is a better measurer than current cash flow to predict future cash flow. Nallaredy et al. (2020) combine the information of prior research and find some interesting similarities between papers with the same conclusion. Most papers that conclude that current cash flow is a better measurer use the cash flow statement approach to determine cash flow. Most papers that conclude that earnings is the best measurer use the balance sheet approach to determine cash flow. Nallaredy et al. (2020) test both approaches to conclude which approach is a better fit for firms in the United States. They conclude that the cash flow statement approach is better, because the models using this approach have a higher adjusted R-squared. So current cash flow explains more of the variance in future cash flow for firms in the United Stated and therefor have a higher explanatory power (Nallaredy et al., 2020). They also construct an international sample to investigate if this outcome also hold for other countries. But in the models they use they don't control for the countries or regions in the sample. In there sample there are 21 different countries, nine of them are European, nine are Asian and three are from other regions. The outcome of this research tells something about the whole world and not about specific regions.

The focus of this thesis is on predicting the future cash flow for firms in the European Union and especially where the Euro is the used currency. These countries must comply to certain economic rules for stability and steady economic growth (EU, 2016). An other reason why this research is interesting is the fact that the US and certain European countries use different accounting standards. In the US, companies are mandated to us U.S. General Accepted Accounting Principles (GAAP) and in the European Union firms are mandated to use International Financial Reporting Standards (IFRS). This research shows if there are differences in applying a different accounting standard. The research question is the following:

In Europe, is cash flow according to the cash flow statement approach the best approach to forecast future cash flows?

Not only does this research look at earnings and cash flows but also to the accruals of the companies. Barth, et al. (2001) investigate if accruals have a role in prediction future cash flows. They find that different accrual components reflect different information related to future cash flows. So accruals also have a role in predicting future cash flows. According to IAS 7 (IFRS, 2021) the indirect method of constructing the cash flow statement is based on earnings and the accruals. So after rearranging we can conclude that the cash flow and accruals can predict earnings. Therefore this research also investigate if the combination of cash flows and accruals have an significant explanatory power in predicting the future cash flows.

As stated before this research is helpful to several stakeholders. First the management of a company. The answer provides the best way to predict future cash flows based on the current numbers. Also this research provides information about the use of accruals and if earning management can positively or negatively affect the future cash flows. The second stakeholders are the shareholders. They can use this information to check their company and to see if management is influencing the cash flows in a way they prefer or in a way they don't prefer. The last group who can be interested in this research are investors. With the information provided by this research they can investigate if the company in which they have invested will be liquid enough to generate a acceptable profit.

Another reason why this thesis is relevant is because it distinguishes the results of European firms from US firms. This study examines if earnings or current cash flow is a better predictor for future cash flow. A reason why the results of Nallaredy et al. (2020) are not generalizable is because the different accounting standards used in the US and Europe. As mentioned before US firms use US GAAP and European firms IFRS as accounting standard. A difference in the results can be due to different ways of revenue recognition and the use of accruals. According to PwC (2014) revenues can be recognized earlier under IFRS than under US GAAP. This can lead to the fact that it can take longer to receive the cash for the transaction under IFRS than under US GAAP which create a bigger gap between cash flow and earnings. Therefore it can be that under IFRS it is more difficult to predict future cash flow by earnings than by current cash flow. This can result in difference between predicting future cash flow for US companies and European companies.

To answer the research question several hypotheses will be tested. First for both approaches will be tested to analyse if earnings or current cash flow is a better measurer to predict future cash flow. Thereafter both approaches will be compared to conclude which approach is better helping predicting the future cash flow. For all the tests the adjusted R-squared of the different models will be compared to draw conclusions. Finally accruals will be added to the models to test if they have a significant impact in predicting the future cash flow. This will be done for all accruals combined and the single types of accruals that are covered in the data. The tests of these hypotheses will help to answer the research question. The data will be collected from Compustat Global which provide accounting data for listed companies worldwide. Of this data only the firms with their headquarter in Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, The Netherlands, Portugal and Spain will be used. These countries implemented the Euro as currency from the beginning of the Euro in 1999. First it was only used for accounting purposes and from 2002 it was the only payment method in those countries.

The findings of the tests for the separate approaches shows the following results. For the cash flow statement approach the results show that current cash flow has a higher explanatory power than earnings to predict the future cash flow. For the balance sheet approach the results are the same. Current cash flow is a better measurer to predict future cash flow than earnings. When the two approaches are compared the conclusion is that the cash flow statement approach is a better approach to determine the cash flow and that current cash flow within this approach is the best measurer to predict the future cash flow. This is also the main answer to the research question. In addition accruals are added to the models to see if they have a contribution in predicting the future cash flow. The results do not show a significant increase in the adjusted R-squared, so the conclusion is that accruals do not add significant power in predicting the future cash flow. When the single accrual items are added to the model, the results show that depreciation is the accrual contributing the most to predict the future cash flow out of all the accruals. The other distinguished accruals are amortization, accounts receivable, inventories, accounts payable and others. Others is the difference between total accruals and the accruals mentioned. The answer of the research question is that the cash flow statement approach is a better approach than the balance sheet to determine cash flow and that within the cash flow statement approach the current cash flow is a better predictor than earnings for future cash flow. Also, accruals do not add significant contribution in predicting future cash flow for firms located in the European Union.

The main result is similar to the paper of Nallaredy et al. (2020). They also concluded that the cash flow statement approach is a better approach than the balance sheet approach to determine cash flow. Also within the cash flow statement approach current cash flow is a better measurer than earnings for future cash flow. As mentioned before this paper concerns firms in the US, using US GAAP as accounting standard. This thesis is about firms in the EU, who use IFRS as accounting standard. So the main conclusion is the same for firms in both regions. The difference between the study of Nallaredy et al. (2020) and this thesis is in the balance sheet approach. The results of this thesis show that also using this method current cash flow is a better predictor than earnings for future cash flow, while Nallaredy et al. (2020) concluded that using this approach earnings is a better predictor than current cash flow. The results show differences between firms in the US and EU using this method. A reason for the difference could be that firms in the US and Europe use different accounting standards, US GAAP and IFRS respectively. This research cannot conclude if that is the case. Future research can use this thesis to do research on that.

The structure of the thesis is as follows. In the next section elaborates prior research to show the difference between the approaches. Also some research about European settings is addressed. The information gathered in this section leads to the formulation of the hypotheses. Section 3 explains the establishment of the data as well as the explanation of the dependent and independent variables. Section 4 covers the method of executing the tests of the hypotheses. Finally this thesis concludes with the results of the tests and the conclusions of the thesis.

2. Literature review

This section discuss the relevant literature related to this research. It presents the different views on the predictability of cash flows. From earlier research two approaches can be distinguished. The first one is the cash flow statement approach and the other is the balance sheet approach. These two approaches are elaborated in this section. Also the relevant background information and the setting of this research are discussed as well. Finally the hypotheses for this research are formulated and explained.

2.1 Two approaches

In this section the two different approaches to construct the variable cash flow from operations are discussed. The first approach is the cash flow statement approach and the second is the balance sheet approach. Finally the results of earlier research are combined to state some expectations for this research.

2.1.1 Cash flow statement approach

Nallaredy et al. (2020) explains in their research that there are different approaches to determine the best proxy for predicting the future cash flow. The first one is the cash flow statement approach. Barth et al. (2001) used this method to define the variables used in their research to predict future cash flows. Barth et al. (2001) tried to predict the future cash flow of American firms using 10,164 firm-year observations between 1987 and 1996. The predictors they used were earnings and cash flow. Earnings is defined as the income before extraordinary items and discontinued operations. Cash flow is defined as net cash flow from operating activities less the accrual portion of extraordinary items and discontinued operations reported on the statement of cash flows. Because the researchers used items from the cash flow statement, this method is called the cash flow statement approach. One of the result of the paper is that cash flow has a higher explanatory power than earnings to predict the future cash flow. The adjusted R-squared indicates the proportion of the variance of the dependent variable (in this case the future cash flow) explained by the independent variable (in this research earnings or cash flow) adjusted for the number of variables. In this research the adjusted R-squared is higher when cash flow is the independent variable and therefore the explanatory power of current cash flow to predict future cash flow is higher than the explanatory power of earnings. When they add more lags to the model the explanatory power increases indicating that adding more lags increases the predictability of the future cash flow.

An other example is the research of Subramanyam and Venkatachalam (2007). They did their research on American companies between 1988 and 2000 which gave them 45,395 firm-year observations. They used the same variables as Barth et al. (2001) with the same definitions. So earnings is the income before extraordinary items and discontinued operations and cash flow is the net cash flow from operating activities adjusted for extraordinary items and discontinued operations. This information is obtained from the cash flow statement. Not only did Subramanyam and Venkatachalam (2007) research the predictability of future cash flow, but also the market value of equity and the predictability of future earnings. For predicting the future cash flow current cash flow has higher explanatory power than earnings to predict the future cash flow, but for the other two analysis the conclusion is different. According to their

research earnings has higher predicting power than cash flow in predicting the market value of equity and future earnings.

Lorek and Willinger (2009) also researched the topic of predicting future cash flow, but interestingly that they already did so in 1996. The difference is that in the first research they used the balance sheet approach and in this research they used the cash flow statement approach. So in their second research they used cash flow statement items to define the variables used to analyse the hypotheses. They conclude that the model using past cash flow as independent variable provides a significantly more accurate one-year ahead prediction of future cash flow than the model using past earnings as independent variable. The difference between this research and for example the research of Barth et al. (2001) is the use of lags. Barth et al. (2001) added lags which increased the explanatory power (adjusted R-squared) of the model. According to Lorek and Willinger this is limitation of their research.

Another limitation of the paper of Lorek and Willinger (2009) is that they only use annually reported data. All the papers addressed in this section used annual reported data to do their analysis. Lorek and Willinger state that using quarterly reported data could give different conclusions, because of quarter-to-quarter and quarter-by-quarter autocorrelation in the data. By quarter-to-quarter they mean adjacent biases and by quarter-by-quarter they mean seasonal biases.

The research done by Nam et al. (2012) used quarterly reported data to do the analysis using the cash flow statement approach. As the researches addressed before this research covers firm-year observations for American firms between 1987 and 2004. Therefore the conclusions of this research can be compared with the other papers. The results of this paper are different than the other papers. According to the research of Nam et al. (2012) earnings has a higher explanatory power (adjusted R-squared) in predicting future cash flow than current cash flow. This is a totally different result.

A more recent paper is the research done by Chen et al. (2020). Their dataset captures firm-year observations between 1988 and 2016, covering most years of all researches addressed. They also use American firms and annually reported data. The variables used are obtained according to the cash flow statement approach as explained by Bath et al. (2001). The results show again that current cash flow has a higher predictability power for future cash flow than earnings.

The papers addressed in this section lead to several conclusions and expectations. According to the results of the papers it can be expected that by using the cash flow statement approach current cash flow is a better predicter for predicting the future cash flow than current earnings using annually reported data. Nam et al. (2012) used quarterly reported data and they conclude that current earnings is a better predictor for predicting future cash flow than current cash flow. The results of these papers will be used in section 2.1.3 to make some expectations of this research were the European setting will be tested.

2.1.2 Balance sheet approach

The second approach is the balance sheet approach used by several researches to predict the future cash flow of firms. One of the first researches using this approach is the paper written by Greenberg et al. (1986). This paper test the predictability of future cash flows in the United

States between 1964 and 1982. The measure of earnings was defined as the income before extraordinary items and discontinued operations. Cash flows are defined as the cash from operations. They used the following method to calculate the cash from operations. First they took the working capital from operations in period *t*. They added the difference between the change in current liabilities of period *t* and the change of debt in current liabilities of period *t* (also known as the current portion of long term debt). Finally they subtract the difference between the change in current assets of period t and the change in cash in hand of period *t*. Because they use balance sheet items to calculate the cash from operations it is called the balance sheet approach. This research concludes that the current earnings is a better predictor for future cash flow than the current cash flow. They did this by analysing different settings with one to five year lag periods and multilegged periods of two to three years. For every analysis they created two regressions one with earnings as independent variable and one with cash flow as independent variable. For al settings current earnings had a larger coefficient and after doing the sign test they concluded that for every setting current earnings is a better predictor for future cash flows.

Bowen et al. (1986) also did research on this topic in 1986. Their definition of cash flow from operations (CFO) is a little bit different than the definition of Greenberg et al. (1986). First they calculate the working capital fund operations (WCFO) by adding adjustments for 'other' elements of net income before extraordinary items and discontinued operations to the income including depreciation and amortization. To calculate the CFO they made the following adjustments. They subtracted the following items from the WCFO at time *t*: change in accounts receivable of period *t*, the change in inventory of period *t* and the change in other current assets of period *t*. They add the following items: change in accounts payable of period *t*, the change in taxes payable of period *t* and the change of current liabilities of period *t*. These are all balance sheet items, so therefore this is also the balance sheet approach. The sample of this research consists of 324 US firms and covers the years 1971 to 1981. The sample size is this small, because they eliminated firms that did not use the working capital format every year. Bowen et al. (1986) used a one and two year prediction model and conclude that earnings is not a better method to predict future cash flow than current cash flow. This is a different finding that the finding of Greenberg et al. (1986). Two limitation for this research could be that the sample period is smaller and the number of firms used is smaller than the research of Greenberg et al..

The same result is found by Finger (1994). He concluded that cash flow is a better predictor to forecast future cash flow in the short run. His motivation to research this topic was the long term vision of predicting cash flow. He states that earlier research including the researches discussed before focus too much on the short term. He included forecast of future cash flow from one to eight years. Finger used 50 sample firms with firm years between 1935 and 1987 to create his sample. The conclusion is different in the long run. According to Finger both earnings and current cash flow are equivalent in predicting future cash flow. So when looking to the short run, Finger (1994) and Bowen (1986) have the same conclusion and differ from Greenberg et al. (1986).

Later research did support the conclusion of Greenberg et al. (1986). For example the paper of Lorek and Willinger (1996). In section 2.1 an other paper of Lorek and Willinger is discussed.

That was a response to this paper. In their first paper (1996) they used the balance sheet approach and in their second paper (2009) they used the cash flow statement approach. The first paper will be discussed now, because this section is about the balance sheet approach. They used both annual and quarterly data to analyse the research question and they also used accounts from the income statement and balance sheet to calculate the cash flow from operations. Lorek and Willinger found evidence that earnings is a better predictor for future cash flow in this research. In later research they used the other method and conclude that current cash flow is a better proxy to predict future cash flow. In that research they used the cash flow statement approach. Dechow et al. (1998) finds similar results as Greenberg et al. (1986). They use the same years from the sample of Greenberg et al., but extended that to 1992. So they used annual reporting data of 1.337 which covers 22.776 firm-year observations between 1963 and 1992. Their conclusion is that earnings is a better predictor for future cash flow. Therefore this conclusion can explain why earnings rather than current operating cash flows tend to be used in valuation and in performance measures.

The last research that will be discussed is written by Kim and Kross (2005). It is also one of the most recent papers using the balance sheet approach. Their sample covers the years 1973 – 2.000. This results in 100.266 firm-year observations. In this paper they only focus on a one-year forecast of cash flow which is a limitation of this paper. They conclude that earnings is a better predictor than current cash flow to predict on year future cash flow.

When combining the information of this section the following can be concluded. On the short term earnings is a better proxy to predict future cash flow than current cash flow. In the long run the explanatory power of current cash flow to predict future cash flow increases more than the explanatory power of earnings. So in in the long run the explanatory power of both variables become closer. An explanations for this can be accruals, which will be discussed in section 2.2.

2.1.3 Balance sheet vs cash flow statement approach

In different researches different approaches are used to calculate the cash flow to predict the explanatory power of future cash flow. Nallaredy et al. (2020) combined the information of the researches discussed before and tried to find conclusive evidence on which approach and which variable has a higher explanatory power for predicting future cash flow. They find evidence that using the current cash flow to predict future cash flow using the cash flow statement approach results in the highest adjusted R-squared and the highest explanatory power. When using earnings to predict the future cash flow, the cash flow statement approach is also a better method to calculate future cash flow, because the explanatory power for the model is higher when using the cash flow statement approach. The research of Nallaredy et al. (2020) is based on US firms, which are mandated to use US GAAP as accounting system. European firms are mandated to use IFRS. The rules of the different systems can lead to different earnings. This can result in a different outcome when the data consists of European firms. For now the prediction for this study will be the same as the results found by Nallaredy et al. (2020). So the cash flow statement approach is a better approach than the balance sheet approach to determine cash flow and current cash flow has a higher explanatory power than earnings in predicting the future cash flow.

Another result of Nallaredy et al. (2020) is that when adding accruals to the model the explanatory power of the model increases. In the next session accruals will be discussed in more detail.

2.2 Accruals

Accruals are used all the time in accounting. One of the most common known accrual used is depreciation of assets. Barth et al. (2001) did one of the most cited researches accruals and its predictability of future cash flow. The basic equation to calculate earnings using accruals is cash flow plus accruals. For example the only accrual is depreciation, then cash flow plus depreciation (depreciation is negative) results in the earnings. According to Bart et al. and Brochet et al. (2008) the most common used accruals are the change in accounts receivable, the change in inventory, the change in accounts payable and depreciation and amortization. Barth et al. (2001), Brochet et al. (2008) and Nallaredy et al. (2020) all find evidence that adding the accruals to the model will increase the explanatory power of the model to forecast future cash flow. But in all cases it is not a major contribution to the models explanatory power so the economical impact is not that big. Nallaredy et al. (2020) concluded that accruals based on the balance sheet have more predictive ability than accruals based on the cash flow statement. This doesn't mean that the balance sheet is the better method when using accruals. The increase of the explanatory power is higher when using the balance sheet approach instead of the cash flow statement approach.

Dechow (1994) gives a good and clear definition of accruals. He states that there are two important accounting principles in the production of earnings. The first is the revenue recognition principle and the second the matching principle. The first principle requires revenues to be recognized when a firm has performed all services to collect cash and cash receipt is reasonably certain. The matching principle requires cash outlays associated directly with revenues to be expensed in the period in which the firm recognizes the revenue. To account the revenues according to this principles accruals are required to mitigate timing and matching problems. What we can conclude from this that accruals are temporary, because it is a method to manage the earnings. So in the long run accruals are close to 0. Because of this in the long run cash flow and earnings tends towards each other. Therefore the conclusion of Finger (1994) that in the long run the explanatory power of earnings and current cash flow to predict future cash flow tends towards each other can be explained by this.

2.3 The European setting

This research focuses on European firms. All research discussed in the prior sections were about US firms. The main difference between European firms and US firms is the accounting standard the different companies are allowed to use. US firms are mandated to use US GAAP and European firms are mandated to use IFRS. One of the first studies comparing IFRS to GAAP is done by Palea and Scagnelli (2017). This research only covers banks in France, Germany, Italy and Spain. They compared IFRS to the domestic GAAP and not necessarily US GAAP. They concluded that the predictive ability of net income to predict future cash flow is higher under IFRS than under GAAP. So they only focused on earnings and not on current cash flow.

Atwood et al. (2011) tried to find evidence that the association between current earnings and future cash flow and future earnings differ between firms using IFRS as accounting standard and firms using US GAAP as accounting standard. They constructed a sample of 58832 firm year observations between 2002 and 2008. The 33 countries are represented in the sample, 11 of these countries are countries in the European Union. They find some interesting results suggesting small differences between countries using IFRS and US GAAP. First they find some results for earnings, positive earnings are not more or less persistent under one of the systems. In contrast, losses reported under IFRS are less persistent than losses reported under US GAAP. An interesting result for this research is that earnings are more associated with future cash flow under US GAAP than under IFRS. This can give some expectations for this research, namely that the explanatory power of earnings predicting future cash flow is lower than the explanatory power of current cash flow predicting future cash flow. The paper of Atwood et al. (2011) does not try to find evidence about the difference in association of current cash flow and future cash flow under the different systems. Therefore it can be the case that the association between current cash flow and future cash flow under IFRS is even lower and that the final outcome still can be that current earnings has a higher explanatory power to predict future cash flow than current cash flow.

2.4 Hypotheses

This section gives some expectation and hypotheses attached to this expectation. First this paper focuses on both the cash flow statement approach and balance sheet approach separately. From prior research it can be expected that under the cash flow statement approach current cash flow has a higher explanatory power than current earnings to predict the future cash flow. Therefore hypothesis 1a is the following:

H1a. Under the cash flow statement approach the explanatory power of current cash flow is higher than the explanatory power of current earnings to predict future cash flow.

From prior research the conclusion is that under the balance sheet approach that current earnings is a better proxy than current cash flow to predict future cash flow, but in the long run they become closer. Still the explanatory power of earnings to predict future cash flow is higher in the long run. Therefore hypothesis 1b is the following:

H1b. Under the balance sheet approach the explanatory power of current earnings is higher than the explanatory power of current cash flow to predict the future cash flow.

When the evidence for both hypotheses 1a an 1b is found the evidence for which approach is the better approach to predict future cash flow is also found. Of all the models the explanatory will be found so they need to be compared. Nallaredy et al. (2020) find evidence that the cash flow statement approach is a better method than the balance sheet approach to predict future cash flow for both the association of current earnings and current cash flow with future cash flow. The expectation for this research therefore is that the cash flow statement approach is a better method to predict future cash flow. Therefore hypothesis 2 is the following:

H2. The cash flow statement approach has a higher explanatory power to predict the future cash flow than the balance sheet approach.

Finally this paper looks at the significant contribution of accruals in predicting the future cash flow. As stated before there is no evidence found that accruals add economically value to predict the future cash flow (Barth et al., 2001, Brochet, 2008, Nallaredy et al., 2020). For this research the expectation is therefore that accruals add no economical value to the explanatory power. Hypothesis 3 is the following:

H3. Accruals add no significant economic value to the explanatory power to the prediction of future cash flow

Adding accruals can only be done in the models using current cash flow as the independent variable, because of the theory that earnings is equal to the sum of cash flow and accruals. If accruals are added to earnings they are counted double. The results of the test testing the hypotheses are shown in section 5.

3. Data

This research is about predicting the future cash flow of European companies. First the process of obtaining the data is described. Thereafter the construction of the dependent and independent variables are described and this section ends with the descriptive statistics of the obtained data.

3.1 Data Collection

The financial data is obtained from the Compustat Global dataset. Compustat Global provides the required financial data that is needed for this research. The data covers the years 2000 to 2019. The euro was introduced in 1999 after the fundaments of the euro by the treaty of Maastricht in 1992 (European Union, 1992). First the Euro was only used for accounting purposes. On the first of January 2002 the euro became the official currency of the countries that signed the treaty (European Central Bank, 2020). The Compustat Global dataset provides data for 32.078 companies all over the world with 426.309 firm-year observations. After removing all non-European countries and countries that do not use the Euro as currency there are 2.437 companies left representing 33.134 firm-year observations. Many countries left in the data joined the European union or insert the euro between 2000 and 2019. Therefore companies in this countries are also removed from the dataset. Companies with their headquarter in the following countries are left in the dataset: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, The Netherlands, Portugal and Spain. These countries adopted the euro in 1999. After removing the countries that adopted the euro after 1999 the dataset contains 29.180 firm-year observations of 2.124 companies. Thereafter firms excluded from the sample are financial firms, because financial firms often have high leverage. So findings including these firms can cause problems, because there balance sheet is totally different than the balance sheet of non-financial firms (Fama & French, 1992). This can be done by looking at the standard industrial classification (SIC) codes. Compustat also provides these codes for European firms. Financial firms have a code between 6000 and 6799. After removing these firms 29.038 firm-year observations are left covering 2.119 firms. Finally, firm-years with sales less than 10 million euros and firm-years with no information about total assets are removed. The dataset now contains 1.822 firms covering 24.795 firm years.

3.2 Dependent Variables

This study tries to find evidence which approach and which independent variable has the most explanatory power in predicting the future cash flow. So the dependent variable for all tests will be cash flow. This research follows earlier research described in the literature review. The cash flow is determined as the cash from operating activities minus cash flow from extraordinary items and discontinued operations (e.g. Barth et al., 2001, Nallareddy et al., 2020). If there is no information on cash flow from extraordinary items and discontinued operations it is set to zero and cash flow will be the cash from operating activities. This is the cash flow according to the cash flow statement approach. To determine cash flow according to the balance sheet approach first the accruals according to balance sheet items need to be determined. This also follows earlier research (e.g. Greenberg et al., 1986, Lorek & Willinger, 1996, Nallareddy et al., 2020). Accruals are the changes in noncash current assets less changes in non-debt current liabilities less depreciation expenses. After accruals are determined, the cash flow according to the balance sheet approach is earnings, defined as the income before extraordinary items and discontinued operations, minus the determined accruals according to balance sheet items. The cash flow determined by the two approaches will be used as the dependent variables in this research.

3.3 Independent Variables

This research tests three hypotheses, all having different independent variables to compare with each other to reject or not to reject the hypotheses. The first hypothesis is about the balance sheet approach. The different independent variables are the current cash flow and the earnings, because the goal is to find the best statement item to predict the future cash flow. For the balance sheet approach the earnings are income before extraordinary items and discontinued operations and the cash flow is the same as described for the dependent variable cash flow under the balance sheet approach. So it is earnings minus accruals according to balance sheet items. These definitions follow other research described in section 2 (e.g. Greenberg et al., 1986).

The second hypothesis is about the cash flow statement approach. For this approach earnings and current cash flow are also the two independent variables that will be compared, but this time according to the cash flow statement. Earnings follows the same definition as the balance sheet approach, but cash flow is determined as the net cash flow from operating activities minus cash flow from extraordinary items and discontinued operations. If there is no information on cash flow from extraordinary items and discontinued operations this will be set to zero. These definitions also follow other research (e.g. Dechow et al., 1998, Nallareddy et al., 2020).

For the last hypothesis accruals are added to the models as independent variables. Both approaches have a different way to determine the accruals. For the balance sheet approach the method is described in the dependent variable subsection for calculating the cash flow according to the balance sheet approach. So it is the changes in non-cash current assets minus the changes in non-debt liabilities minus depreciation expenses. The determination of accruals according to the cash flow statement approach is the difference between earnings and cash flow determined according to the cash flow statement approach. To test if different types of accruals add power in predicting the future cash flow an other model is created were different types of accruals will be added to the existing models. The different types of accruals will be the change

in accounts receivable, the change in inventory, the change in accounts payable, depreciations, amortization and other items. These statement items affect the earnings but do not affect the cash flow. Other items is determined as the difference between the variable accruals that also exists and all the other accrual items named before.

All these variables are important in testing the different hypotheses and in finally answering the research question of this paper.

3.4 Descriptive Statistics

The descriptive statistics of the sample used for this research are shown in table 1 and the definitions of all variables are described in table A1 of the appendix. Both earnings and cash flow have a positive mean. Accruals has a negative mean, because it is the difference between cash flow and earnings. The mean of cash flow is higher than earnings so therefore the mean of accruals is negative. The mean of cash flow according to the cash flow statement and balance sheet approach differ meaning that the approaches end in different results. The standard deviation of cash flow according to the balance sheet approach is higher than cash flow computed by the cash flow statement. Therefore, the spread of cash flow according to the balance sheet is higher. The descriptive statistics of the different types of accruals show that on average depreciation and amortization are higher than other accruals. These are also the most common types and most known types of accruals. Therefore it can be expected that these two types contribute most to the explanatory power of predicting future cash flow.

Table 1

Descriptive statistics

	n	mean	min	max	sd
Earnings	22,647	0.06	-9.66	6.39	0.27
Cash flow	22,647	0.19	-3.60	4.02	0.28
Cash Flow Balance sheet approach	22,647	0.18	-5.71	5.54	0.33
Accruals	22,647	-0.13	-9.85	8.14	0.30
Accruals Balance sheet approach	22,647	-0.12	-10.91	4.24	0.26
Change in Accounts Receivable	22,647	0.01	-5.26	4.97	0.13
Change in Inventory	22,647	0.01	-3.24	7.68	0.12
Change Accounts Payable	22,647	0.01	-1.67	5.72	0.09
Depreciation	19,099	0.08	0.00	2.87	0.11
Amortization	19,099	0.03	0.00	2.28	0.07
Other	22,647	-0.02	-7.68	8.40	0.30

Table 1 shows the descriptive statistics of the variables in this research. It show the number of observations the mean, minimum and maximum. The data covers firms in European countries where the Euro is the currency since 2000. The firm-year observation are from 2000 to 2019. Firms with less than 10 million euros of sales are removed. All continuous variables are winsorized at 1% and 99%. Also all variables are deflated by the average value of total assets.

4. Methodology

The method for this research is similar to other research that is already done, but this time the data covers companies in the European Union using IFRS as accounting standard and in addition more lags are added tot the model to see if this contributes to predicting the future cash flow. First, the method to test the first hypothesis is described. Hypothesis 1a covers the cash flow statement approach and hypothesis 1b covers the balance sheet approach. The different variables used in the models are described in subsections 3.2 and 3.3 concerning the variables. The results for hypothesis 1 can also be used for hypothesis 2. Thereafter new models need to be created to test hypothesis 3 about the accruals.

4.1 Hypothesis 1 Cash flow vs. Earnings

This research tries to find evidence on which statement item has the most explanatory power in predicting the future cash flow of a firm. From prior research it is found that earnings and current cash flow are the best predictors, but which is better depends on the type approach the research uses. Nallareddy et al. (2020) used both approaches to predict the future cash flow for companies in the US. They found that the cash flow statement approach is a better approach and that current cash flow is the best predictor. They concluded this, because the model in which current cash flow according to the cash flow statement approach was the independent variable had the highest adjusted R-squared. For this research the same method will be used.

Section 4.1.1 is about the models and method testing hypothesis 1a. This hypothesis is about the cash flow statement approach. Section 4.1.2 is about the models and method to test hypothesis 1b, which is about the balance sheet approach.

4.1.1 Cash Flow Statement Approach

Prior research shows that there are various ways to determine the cash flow. The cash flow statement approach and the balance sheet approach. Section 2.1.1 explained what the cash flow statement approach is. Cash flow is determined as the net cash from operations minus the accrual portion of extraordinary items and discontinued operations and earnings as the income before extraordinary items and discontinued operations. This research uses a time-series model to predict the future cash flow by the different independent variables. The following models are used to test hypothesis 1a:

$$CF^{CF}{}_{i,t} = \beta_0 + \beta_1^{EARN} EARN_{i,t-1} + \epsilon_{i,t} \quad (1)$$

$$CF^{CF}{}_{i,t} = \beta_0 + \beta_1^{CF} CF_{i,t-1} + \epsilon_{i,t} \quad (2)$$

Equation 1 predicts the cash flow using the earnings as independent variable and equation 2 uses the cash flow according to the cash flow statement approach as independent variable. Both models use a one year lag to predict future cash flow. As an additional test an other model is used:

$$CF_{i,t} = \beta_0 + \sum_{s=1}^{T} \beta_s EARN_{i,t-s} + \epsilon_t \quad (3)$$

$$CF_{i,t} = \beta_0 + \sum_{s=1}^{T} \beta_s CF_{i,t-s} + \epsilon_t \quad (4)$$

These models are distributed-lag models (Pesando, 1976) and show if the independent variable, in equation 3 earnings and in equation 4 cash flow, has a significant effect on cash flow in the long run. All lags are taken into account in these models. The letter *i* represents a company in the dataset.

If equation 1 has a higher adjusted R-squared than equation 2 earnings is a better predictor than current cash flow for future cash flow according to the cash flow statement approach. If the adjusted R-squared of equation 2 is higher than the adjusted R-squared of equation 1 it is the other way around. The same holds for equation 3 and 4. If the adjusted R-squared of equation 3 is higher than the adjusted R-squared of equation 4 earnings is a better predictor than cash flow according to the cash flow statement approach in the long run. If the adjusted R-squared of equation 4 is higher than the of equation 3 it is the other way around.

As an additional test all the single years are also tested. This is done by equation 1 and 2. This table shows if the explanatory power of the independent variables change over time and if this change is positive or negative.

4.1.2 Balance Sheet Approach

The other approach to calculate the cash flow is the balance sheet approach. This means that the cash flow is determined by the use of balance sheet items. Table A1 of the appendix shows that the cash flow is computed as the working capital from operations plus the difference between the change in current liabilities and the change of debt in current liabilities minus the difference between the change in current assets and the change in cash in hand. To test hypothesis 1b this approach is required to calculate the cash flow. The following models test the hypothesis:

$$CF^{BS}{}_{i,t} = \beta_0 + \beta_1^{EARN} EARN_{i,t-1} + \epsilon_{i,t} \quad (5)$$

$$CF^{BS}{}_{i,t} = \beta_0 + \beta_1^{BS} CF_{i,t-1} + \epsilon_{i,t} \quad (6)$$

Equation 5 tests the relation between earnings and the future cash flow according to the balance sheet approach. Equation 6 tests the relation between current and future cash flow according to the balance sheet approach. If the adjusted R-squared of equation 5 is higher than equation 6 earnings is a better estimator to predict future cash flow according to the balance sheet approach. If the adjusted R-squared of equation 6 is higher it is the other way around.

Equations 3 and 4 are also used to test which predictor is a better predictor for the future cash flow in the long run according to the balance sheet approach. Equation 5 and 6 are also used to determine the future cash flow per year and add the results to the table presenting every single year. This is explained in section 4.1.1.

4.2 Cash Flow Statement Approach vs. Balance Sheet Approach

The second hypothesis follows after the first hypothesis is tested. For this hypothesis the models used to determine the future cash flow according to the different approaches are used again. The outcomes of equations 1, 2, 5 and 6 are compared with each other. The model with the highest adjusted R-squared has the most explanatory power to predict the future cash flow. The approach and independent variable used in the model with the highest R-squared is qualified as

the best approach and predictor for future cash flow. The same test is done for equation 3 and 4 to test which approach and which independent variable are the best predictors for future cash flow in the long run. The outcome of these tests determine if the hypothesis will be accepted or rejected.

4.3 Accruals

This section discusses hypothesis 3. Accruals are added to the models to test if they have a significant effect on the explanatory power of predicting the future cash flow. Section 4.3.1 is about the effect of the total accruals and section 4.3.2 is about the effect of the different types of accruals.

4.3.1 Total Accruals

Accruals represent the difference between the earnings and cash flow. It is a tool for managers to use earning management. With accruals they can increase or decrease the earnings to show better or worse results to the stakeholders. Accruals are temporarily and need to be adjusted in the future. In the long run they are zero. Therefore this test is only done by models in the short run. This test tries to find evidence that accruals have a significant contribution to the explanatory power of predicting the future cash flow. The estimation of accruals according to the different approaches is stated in section 3.3. The standard rule for earnings is the sum of cash flow and accruals. When earnings and accruals are both variables in the equation accruals are double presented in the model. Therefore the following models are used for this test:

$$CF_t^{CF} = \beta_0 + \beta_1^{CF} CF_{i,t-1} + \beta_2^{CF} ACC_{i,t-1} + \varepsilon_{i,t} \quad (7)$$

$$CF_{i,t}^{BS} = \beta_0 + \beta_1^{BS} CF_{i,t-1} + \beta_2^{BS} ACC_{i,t-1} + \varepsilon_{i,t} \quad (8)$$

Equation 7 is the model where cash flow and accruals are calculated according to the cash flow statement approach. Equation 8 represents the balance sheet method. The R-squared of both models will be compared to conclude which approach is better in predicting the future cash flow.

4.3.2 Different Types of Accruals

There are several types of accruals. One of the most common known ones is depreciation. Depreciation affects the earnings but does not affect the cash flow. For this research a set of types are identified in the data. The different types are change in accounts receivable, the change in inventory, the change in accounts payable, depreciations, amortization and other items. For every item a model is created to test its effect on predicting the future cash flow. The adjusted R-squared of all models are compared to test which types add the most explanatory power in predicting the future cash flow. The types of accruals are mostly constructed from balance sheet item, therefore only the balance sheet approach is used to find the results. In the following models ACC_TYPE stands for one of the different types of accruals.

$$CF_{i,t}^{BS} = \beta_0 + \beta_1^{BS} CF_{i,t-1} + \beta_2^{BS} ACC\_TYPE_{i,t-1} + \varepsilon_{i,t} \quad (9)$$

All models described will help to answer the research question of this thesis.

5. Results

This section covers the results of this thesis to answer the research question. This research tries to find evidence for the prediction that according to the cash flow statement approach cash flow is the best predictor to predict the future cash flow. First the balance sheet approach and cash flow statement approach are separately tested by hypotheses 1a and 1b. For both approaches it is tested if cash flow or earnings is the best statement item to predict future cash flow. Thereafter the results of both approaches are compared to find out which approach is the best method. Finally accruals are added to the model to see if they contribute significantly in predicting the future cash flow. After testing the three hypotheses the research question can be answered.

5.1 Cash Flow Statement Approach

5.1.1 Main Result

Hypothesis 1a tests which predictor, cash flow or earnings, has a higher explanatory power in predicting future cash flow using the cash flow statement approach. This hypothesis is tested by using equations 1 and 2 explained in section 4.1.2. Table 2 presents the results using these models. In models 3 and 4 country fixed effects are added to the model. According to the results of model 1 and 2 Cash flow has more explanatory power in predicting future cash flow. This is visible by the results of the adjusted R-Squared of both models. Model 1 shows a adjusted R-squared of 0.5620. This result suggests that this model explains 56.20% of the variation in the independent variable. Model 2 shows a adjusted R-squared of 0.1487, meaning that this model only explains 14.87% of the variation in future cash flow. An important note is that this result is build on a model with one period lag so it is a short term effect. When looking at the models using country fixed effect the same result is observed. The adjusted R-squared is 0.5637 when cash flow is the independent variable and 0.1644 when earnings is the independent variable. This means that one year lagged cash flow explains 56.37% of the variance in future cash flow and earnings only 16.44%. An interesting result is that the absolute growth in the adjusted R-squared is higher for earnings (1.57 percentage points) than for cash flow (0,17 percentage points). When adding the country fixed effect the explanatory power of earnings growths more than the explanatory power of cash flow to predict future cash flow. But still the explanatory power of cash flow is significantly higher in predicting the future cash flow.

For equation 3 and 4 the same results are found. The results are shown in table A2 of the appendix. Models 1 and 3 cover this approach. The model holding all lags (19 lags) only has 219 observations left, because there are 219 firms with a observation for every year in the sample. Using this sample the adjusted R-squared when all the lags for cash flow are added is 0.6731 and when all lags for earnings are added 0.3847. A drawback for this result is that the models only cover 219 observations.

The year-to-year results in table A3 of the appendix show that the predictability power of both measurers increases over time (model 1 and 3). When cash flow is the independent variable the adjusted R-squared starts at 0.4025 in 2001 and ends with 0.6352 in 2019 (model 1). When earnings is the independent variable the adjusted R-squared starts at 0.1441 in 2001 and ends with 0.3773 in 2019. The increase of the adjusted R-squared when earnings is the independent variable is larger then when cash flow is the independent variable.

Table 2

Cash flow statement approach

	(1)	(2)	(3)	(4)
Predicters	CF	CF	CF	CF
L.CF	0.75***		0.75***	
	(163.34)		(160.43)	
L.EARN		0.44***		0.43***
		(60.27)		(59.23)
Constant	0.05***	0.16***	0.07***	0.21***
	(32.87)	(90.20)	(9.69)	(22.16)
Country FE	No	No	Yes	Yes
Observations	20,791	20,791	20,791	20,791
Adjusted R^2	0.5620	0.1487	0.5637	0.1644

Table 2 presents the results of hypothesis 1a. The t-values are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The values of interest is the adjusted R^2 of the models.

5.1.2 Robustness Tests

The sample covers data that can be biased, because some firms miss many firm years. Therefore sub samples are created to do some robustness tests. The first sample covers firms that have at least eight firm-year observations. The second sample includes firms with at least 12 firm-year observations, The third includes firms with at least 16 firm-year observations. The last sample covers firms with a observation for every year. The models for the different samples are shown in table A4 of the appendix. First model one and two that cover the sample with firms that have at least 8 firm-year observations. The models do not show a significant difference with the results of the full sample. The adjusted R-squared when the one year lag of cash flow is the independent variable is 0.5661 and when the one year lag of earnings is the independent variable the adjusted R-squared is 0.1482. When observing the results for the sample including firms with at least 12 firm-year observations shows a small decrease of the adjusted R-squared for current cash flow as independent variable (from 0.5620 to 0.5552) and a increase of the adjusted R-squared when earnings is the independent variable (from 0.1487 to 0.1725). When there is more information about a company, the explanatory power of cash flow decreases and the explanatory power of earnings increases to predict the future cash flow. This trend holds when only firms with at least 16 firm-year observations are included in the sample. Now the adjusted R-squared is 0.5419 when one year lagged cash flow is the independent variable and the adjusted R-squared is 0.2043 when one year lagged earnings is the independent variable. But when only firms with firm-year observations for every year the results show both an increase in the adjusted R-squared for cash flow and earnings (0.6040 and 0.2174) respectively. These results show that the explanatory power increases more for earnings than for cash flow when only firms with more firm-year observations are included in the sample.

An other check is removing the years 2000 and 2001. For this years the euro was already used for making up the financial statements, but not for transactions. On the first of January 2002 the Euro became the only accepted means of payment in the countries in the sample. Also the years 2002 to 2004 will be removed in models 5 and 6, because IFRS became mandated from 2005 onwards. The results are shown in table A5 of the appendix. The results are not

significantly different from the main results. These tests are done according to the cash flow statement approach. They will also be performed for the balance sheet approach.

5.2 Balance Sheet Approach

5.2.1 Main Results

The other method to determine cash flow is the balance sheet approach. By using changes in certain items from the balance sheet the cash flow is determined. This process is explained in sections 2.1.2 and 3.2. The results of equations 5 and 6 are visible in table 3. Model 1 shows that the adjusted R-squared is 0.2168 when one year lagged cash flow is the independent variable and according to model 2 the adjusted R-squared is 0.1348 when one year lagged earnings is the independent variable. This means that current cash flow explains 21.68% of the variation in future cash flow and earnings only 13.48% when the balance sheet approach is used. This suggests that cash flow has more explanatory in predicting future cash flow than earnings. In these models country fixed effects are not added to the model. Model 3 and 4 show the results when these effects are added. The adjusted R-squared increases for both predictors. For cash flow it increases to 0.2214 and for earnings to 0.1455.

For this hypothesis equation 3 and 4 are also used to determine if the explanatory power of the predictors change when increasing the amount of lags. Models 2 and 4 in table A2 of the appendix show the results of this test. For both predictors the explanatory power increases when the amount of lags added to the model increases. The results are not comparable to the results of the models in table 3, because this models are based on 213 observations. A conclusion from this table can be that when a company has more information from the past it is more capable to predict the future according to this models.

The year-to-year models in table 2 show that the explanatory power of the predictors change from year to year (model 2 and 4). The most notable results are the high adjusted R-squared for earnings in 2002. It is the highest adjusted R-squared for earnings using the balance sheet approach to determine cash flow. For both predictors the explanatory power is very low in 2005. For earnings it is even negative. Also there is a dip in 2009 for both predictors. This can be explained by the financial crisis in 2008. The results do not show a clear trend through the years.

Table 3

Balance sheet approach

	(1)	(2)	(3)	(4)
Predictor	CF	CF	CF	CF
L.CF_BS	0.48***		0.47***	
	(75.88)		(73.97)	
L.EARN		0.50***		0.49***
		(56.93)		(56.02)
Constant	0.10***	0.15***	0.14***	0.20***
	(41.81)	(68.57)	(12.17)	(17.41)
Country FE	No	No	Yes	Yes
Observations	20,791	20,791	20,791	20,791
Adjusted R^2	0.2168	0.1348	0.2214	0.1455

Table 3 presents the results of hypothesis 1b. The t-values are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The values of interest is the adjusted R^2 of the models.

5.2.2 Robustness Tests

The results of these tests can be strengthened by doing the robustness tests that are also done for the cash flow statement approach. First the results of the different samples where firms are included with a minimum amount of firm-year observations. The results are shown in table A6 of the appendix. The adjusted R-squared increases for both models when only firms are included with the minimum amount of firm-years also increases. Models 7 and 8 show that when only firms that have observations for every year are included, the adjusted R-squared increases to 0.2613 when cash flow is the independent variable and to 0.1893 when earnings is the independent variable. Cash flow still has a higher explanatory power to predict the future cash flow than earnings. The conclusion of the main results does not change using this robustness test.

For the last robustness test both the years 2000 and 2001 are removed from the sample, since the euro became the means of payment on the first of January 2002. The explanatory power for both predictors stay approximately the same. The results are shown in table A5 of the appendix in models 3 and 4. The adjusted R-squared is 0.2182 when cash flow is the predictor and 0.1332 when earnings is the predictor. When the years 2000 to 2004 are removed the adjusted R-squared is 0.2530 when current cash flow is the independent variable and 0.1603 when earnings is the independent variable. Overall the results of these tests suggest that cash flow has a high explanatory power in predicting the future cash flow than earnings according to the balance sheet approach.

5.3 Cash Flow Statement Approach vs. Balance Sheet Approach

In section 5.2 both approaches to compute the cash flow are covered. In both cases it is tested which predictor, cash flow or earnings, has a higher explanatory power to predict the future cash flow. First the cash flow statement approach. The main results suggest that current cash flow has a higher explanatory power than current earnings to predict the future cash flow. The results are shown in table 2 and 3. When one year lagged cash flow is the independent variable the adjusted R-squared is 0.5620 (model 1) and even 0.5637 when country fixed effects are added to the model. This means that current cash flow explains more than 56% of the variation in future cash flow. Models 2 and 4 of table 2 show that earnings predict 14.87% or 16.44% when country fixed effect are added to the model, of the variation in future cash flow. The explanatory power of cash flow is higher than the explanatory power of earnings. The balance sheet approach shows the same results but with different numbers. Current cash flow explains 21.68% of the variation in future cash flow and earnings only 13.48% according to model 1 and 2 of table 3. Also when country fixed effects are added to the model the model with cash flow as independent variable has a higher adjusted R-squared. However, the results show that the explanatory power is higher for both predictors when the cash flow statement approach is used. A side note is that for earnings the adjusted R-squared of both models are close to each other. Despite that the conclusion of the main results is that the cash flow statement approach is the better approach to estimate the cash flow for a company in Europe. When looking to the results for every year the results show that when earnings is the predictor the explanatory power for both approaches shifts some years. Some years the balance sheet approach has a higher adjusted

R-squared. But when the cash flow statement approach is used and cash flow is the predictor, the explanatory power is always the highest. When more lags are added to the model (table A2 of the appendix) the results when the balance sheet approach is used increases significant more than when the cash flow statement approach is used. Using 213 observations model 4 has a higher adjusted R-squared than model 2. Model 4 used the balance sheet approach and model 2 the cash flow statement approach to estimate the cash flow. The results of this test are questionable, because of the amount of observations available. The number of observations must be constant to compare the results.

The robustness tests also show that the cash flow statement is the better approach to estimate the cash flow to predict the future cash flow. When the sample changes to a sample only including firms with a minimum amount of observations (8, 12, 16 and 19 observations) the conclusion does not change. Although, when using the cash flow statement approach the explanatory power of cash flow to predict the future cash flow decreases and the explanatory power of earnings increases first when increasing the minimum amount of firm-year observations, cash flow stays a significant better proxy to predict the future cash flow. For the balance sheet approach both predictors show a increase in the adjusted R-squared (table A4 and A6 of the appendix). After removing the years 2000 and 2001 an the years 2000 to 2004 from the sample the adjusted R-squared does not change significantly. The models in table A5 of the appendix show the results of this robustness test. Therefore the overall conclusion for this tests is that the cash flow statement approach is the best approach to compute the cash flow to predict future cash flow and that current cash flow has the highest explanatory power to predict the future cash flow.

5.4 Accruals

The final hypothesis tests if accruals contribute significantly to the explanatory power to predict future cash flow. First the total accruals will be added to both models and thereafter the single types of accruals are tested.

5.4.1 Contribution of Total Accruals

The results of this test are based on using equation 7 and 8 discussed in section 4.3.1. The results are shown in table 4 and will be compared to the results shown in table 2 and 3. First the results of the cash flow statement approach will be discussed. The model using this method is model 1. After adding accruals to the model the adjusted R-squared moves from 0.5620 to 0.5677, so an increase of 0.57 percentage points in the explanatory power of predicting future cash flow. Including accruals to the model does not increase the explanatory power significantly. The balance sheet approach almost has the same result. Without accruals the explanatory power of the model is 21.68% and with accruals this increases to 22.23% (model 2 of table 4). This is an increase of 0.55 percentage points. The conclusions of both approaches are the same, accruals do not contribute significantly to the explanatory power of predicting the future cash flow.

5.4.2 Contribution of The Different Accrual Types

The results of table 4 already suggests that accruals do not attribute significantly to the explanatory power of future cash flow. The results of this tests only suggest which type of accruals contribute more to the adjusted R-squared than other types of accruals. Equation 9

explained in section 4.3.2 is used to test this hypothesis. Table A7 of the appendix show the results. The adjusted R-squared of the different models are compared with the adjusted R-squared of model 1 in table 3 which is 0.2168. This is the model where only the current cash flow according to the balance sheet approach is the independent variable. The accrual that attributes the most is depreciation. This is also the most common and known. It is also an accrual which can be managed a lot. Amortization contributes negatively to the adjusted R-squared. The change in accounts receivable, change in inventory and change in accounts payable contribute approximately the same, but those contributions are almost zero. So depreciation is the accrual that contributes the most to the explanatory power to predict future cash flow according to table A7 of the appendix.

Table 4

Accruals added to the models

	(1)	(2)
Predicters	CF	CF_BS
L.CF	0.75***	
	(163.34)	
L.CF_BS		0.55***
		(65.99)
L.ACC	0.09***	
	(16.62)	
L.ACC_BS		0.14***
		(13.20)
Constant	0.05***	0.10***
	(33.44)	(43.24)
Observations	20,791	20,791
Adjusted R^2	0.5677	0.2233

Table 3 presents the results of hypothesis 3. The t-values are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The values of interest is the adjusted R^2 of the models.

6. Conclusion

This thesis tries to answer the following research question: Is the cash flow statement or balance sheet approach a better approach to predict the future cash flow? Nallaredy et al. (2020) do this for US firms. They discover that different research use different approaches to determine the cash flow for predicting the future cash flow, the cash flow statement approach and the balance sheet approach. After testing both approaches they conclude that the cash flow statement approach is the better approach to determine cash flow and that current cash flow has a higher explanatory power than earnings to predict the future cash flow. But when the balance sheet approach is used, earnings have a higher explanatory power than cash flow.

This thesis tries to find evidence that this is also the case in Europe and as a contribution this thesis also test of adding more lags to the model increase the explanatory power of future cash flow. Three hypotheses are tested to contribute to the answer of this question. The first hypothesis tested if earnings or cash flow has the highest explanatory power to predict future cash flow for both approaches. The second hypothesis tests which approach is a better approach to predict the future cash flow. This is done by the outcomes of the models of hypothesis 1.

Hypothesis 3 test the contribution of accruals to the explanatory power to predict future cash flow.

The results show the same result for the cash flow statement approach as prior research. Current cash flow has a higher explanatory power than earnings to predict future cash flow when the cash flow is determined according to this method. But the results when the balance sheet approach is used to determine cash flow are different from the prior research. This research finds evidence that cash flow has a higher explanatory power than earnings to predict the future cash flow using the balance sheet approach. So both approaches lead to the same conclusion. For European countries current cash flow says more about future cash flow than earnings. It could be that the type of accounting standard explains this. European firms use IFRS and US firms use US GAAP. A difference between the standards is revenue recognition. Under IFRS a firm can recognize revenues faster than firms using US GAAP (PwC, 2014). This differences can cause the different result that is found in this research. The results show that the explanatory power of all models increases when there are more variables added tot the model. The effect is larger for revenue than for cash flow as proxy to predict future cash flow. This means that more information about the past of a company increases the predictability of the future.

Based on the findings of hypothesis 1 the result of hypothesis 2 is found. This thesis finds evidence that cash flow under the cash flow statement approach has the highest explanatory power to predict the future cash flow. Therefore this research concludes that there is evidence that the cash flow statement approach is the best approach to determine cash flow to predict future cash flow.

The results of the last hypothesis about accruals suggests that accruals do not add significant additional power to the predicting model of future cash flow. If accruals are used to determine future cash flow, depreciation is the type of accrual that adds the most power to the model to predict future cash flow.

The scientific contribution of this research is that the cash flow using the cash flow statement approach had the highest explanatory power in the model predicting the future cash flow. This holds for European firms since the sample only include European firms. The robustness tests for hypothesis 1 confirm this result. Additionally, an other contribution that adding accruals to the model do not increase the power of the model significantly. The societal relevance of this research is that the results can help investors in choosing investments. When they use the information of this research they can make a prediction for the future cash flow of European firms in the best way. This information can help to see if a company is sufficiently liquid to pay dividends or has enough cash to do investments which can increase future revenues for the company.

This research has limitations that will be addressed. First the sample does not cover firms in all European Union countries, but only the countries where the euro is the currency from the start of the Euro. These are on average western and more wealthy countries of the European Union. It also does not include Scandinavian countries except for Finland, so the sample only covers a select group of countries which might not all be representative for the whole European Union. The data covers the years 2000 until 2019 to avoid the influence of the Covid crisis on the

financial numbers of firms, but it could be that other events between 2000 and 2019, for example the financial crisis of 2008, influence the results. Also the data only covers big firms, because firm-years with less than 10 million euros in sales are removed from the data. Not removing them would also include not stable firms which can cause biases in the results. Because of these limitations the findings of this research needs to be used with caution. Future research could try to find the difference what causes the different results of the balance sheet approach for US firms and European firms.

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Appendix

Table A1

Definition of the variables

Variable	Abbreviation	Definition
Earnings	EARN	Income before extraordinary items and discontinued operations
Cash flow according to the cash flow statement approach	CF	net cash flow from operating activities less the accrual portion of extraordinary items and discontinued operations reported on the cash flow statement
Cash flow according to the balance sheet approach	CF_BS	working capital from operations in period *t* plus the difference between the change in current liabilities of period *t* and the change of debt in current liabilities of period *t* minus the difference between the change in current assets of period t and the change in cash in hand of period *t*
Accruals according to the cash flow statement approach	ACC	Earnings minus cash flow according to the cash flow statement approach
Accruals according to the balance sheet approach	ACC_BS	The change in noncash current assets less change in non-debt current liabilities less depreciation expenses.
Change in account receivable	CHG_AR	the chance in accounts receivable on the balance sheet of period t
Change in accounts payable	CHG_AP	The change in accounts payable on the balance sheet of period t
Change in inventory	CHG_INV	The change in inventory on the balance sheet of period t
Amortization	AM	Amortization of period t
Depreciation	DEPR	Depreciation of period t
Other	OTHER	Total accruals minus the identified accruals

Table A1 of the appendix describes all variables that are used in the models to test the hypotheses.

Table A2

Adjusted R-squared for models with lags

	Current cash flow is independent variable		Earnings is independent variable	
	(1)	(2)	(3)	(4)
Number of lags	CF	CF_BS	CF	CF_BS
1	0.5353	0.3728	0.3115	0.3403
2	0.5965	0.4437	0.3148	0.3676
3	0.5963	0.4976	0.3401	0.3752
4	0.6425	0.5407	0.3379	0.3722
5	0.6408	0.5402	0.3426	0.3723
6	0.6406	0.5439	0.3442	0.3717
7	0.6442	0.5505	0.3530	0.3859
8	0.6471	0.5496	0.3603	0.4007
9	0.6605	0.5488	0.3635	0.4033
10	0.6625	0.5470	0.3804	0.4203
11	0.6728	0.5447	0.3773	0.4175
12	0.6716	0.5433	0.3742	0.4147
13	0.6701	0.5465	0.3749	0.4201
14	0.6707	0.5455	0.3719	0.4172
15	0.6721	0.5537	0.3763	0.4249
16	0.6705	0.5847	0.3744	0.4255
17	0.6720	0.5828	0.3894	0.4437
18	0.6743	0.5813	0.3874	0.4409
19	0.6731	0.5811	0.3847	0.4392
N	213	213	213	213

Table A2 of the appendix presents the results for the test of adding more lags to the model. The values are the adjusted R-squared of every model. Model (1) and (2) cover the models with current cash flow as independent variable and model (3) and (4) cover the models with earnings as independent

Table A3

The Adjusted R-squared of the Year-to-year models

	Current cash flow is independent variable		Earnings is independent variable		
	(1)	(2)	(3)	(4)	
Years	CF	CF_BS	CF	CF_BS	N
2001	0.4025	0.1452	0.1441	0.0236	260
2002	0.5365	0.1849	0.1774	0.2982	445
2003	0.4886	0.0653	0.1001	0.0801	857
2004	0.5613	0.1628	0.0960	0.1003	954
2005	0.4331	0.2888	0.0286	-0.0010	1,007
2006	0.5745	0.2635	0.1858	0.1695	1,052
2007	0.5993	0.1916	0.2989	0.1601	1,096
2008	0.5700	0.2368	0.2783	0.2355	1,129
2009	0.5010	0.1451	0.1510	0.0991	1,155
2010	0.5563	0.1716	0.2227	0.2089	1,170
2011	0.6320	0.0838	0.2951	0.2147	1,178
2012	0.5607	0.1473	0.2225	0.1919	1,201
2013	0.5878	0.1874	0.1284	0.1427	1,249
2014	0.5682	0.0480	0.1527	0.0782	1,254
2015	0.5904	0.0928	0.2127	0.1172	1,286
2016	0.6560	0.1828	0.3379	0.1804	1,316
2017	0.6780	0.1266	0.3192	0.1071	1,375
2018	0.4077	0.1902	0.3703	0.2544	1,416
2019	0.6352	0.2176	0.3773	0.2368	1,391
AVG adj-R^2	0.5547	0.1648	0.2157	0.1525	

Table A3 of the appendix presents the adjusted R-squared of all year-to-year models. Models (1) and (3) are according to the cash flow statement approach and model (2) and (4) are according to the balance sheet approach.

Table A4

Cash flow statement approach with different samples

	8 or more firm-year observations		12 or more firm-year observations		16 or more firm-year observations		All firm-years	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	CF	CF	CF	CF	CF	CF	CF	CF
L.CF	0.75***		0.74***		0.74***		0.78***	
	(161.16)		(153.12)		(143.11)		(102.04)	
L.EARN		0.45***		0.49***		0.54***		0.56***
		(58.87)		(62.58)		(65.71)		(43.56)
Constant	0.05***	0.16***	0.05***	0.16***	0.05***	0.15***	0.05***	0.17***
	(32.78)	(89.62)	(33.30)	(87.77)	(33.21)	(83.89)	(20.76)	(60.95)
Observations	19,910	19,910	18,785	18,785	16,817	16,817	6,828	6,828
Adjusted R^2	0.5661	0.1482	0.5552	0.1725	0.5491	0.2043	0.6040	0.2174

Table A4 of the appendix presents a robustness test of the cash flow statement approach. Model (1) and (2) present the results of the sample holding firms with at least 8 firm-year observations. Model (3) and (4) presents the results of the sample holding firms with at least 12 firm-year observations, model (5) and (6) for the sample holding firms with at least 16 firm-year observations. Finally model (7) and (8) present the results for the samples holding firms with all year observations. The t-values are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The values of interest is the adjusted R^2 of the models.

Table A5

Models cash flow statement approach and balance sheet approach with less years

	2000 and 2001 removed				2000 to 2004 removed			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	CF	CF	CF_BS	CF_BS	CF	CF	CF_BS	CF_BS
L.CF	0.76***				0.76***			
	(161.13)				(152.36)			
L.CF_BS			0.48***				0.51***	
			(74.88)				(76.47)	
L.EARN		0.44***		0.50***		0.45***		0.54***
		(59.14)		(55.58)		(54.15)		(57.42)
Constant	0.05***	0.16***	0.10***	0.15***	0.05***	0.16***	0.09***	0.14***
	(31.77)	(88.25)	(41.10)	(67.32)	(29.00)	(80.37)	(36.00)	(59.93)
Observations	20,086	20,086	20,086	20,086	17,268	17,268	17,268	17,268
Adjusted R^2	0.5638	0.1483	0.2182	0.1332	0.5734	0.1451	0.2530	0.1603

Table A4 of the appendix presents the results of a robustness test for both approaches. Models (1), (2), (5) and (6) are according to the cash flow statement approach and models (3), (4), (7) and (8) are according to the balance sheet approach. Models (1) to (4) covers a sample without the years 2000 and 2001. Models (5) to (8) covers a sample without the years 2000 to 2004. The t-values are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The values of interest is the adjusted R^2 of the models.

Table A6

Balance sheet approach with different samples

	8 or more firm-year observations		12 or more firm-year observations		16 or more firm-year observations		All years	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	CF_BS	CF_BS	CF_BS	CF_BS	CF_BS	CF_BS	CF_BS	CF_BS
L.CF_BS	0.49***		0.50***		0.48***		0.51***	
	(77.00)		(76.53)		(71.20)		(49.15)	
L.EARN		0.54***		0.57***		0.56***		0.61***
		(60.04)		(61.63)		(57.17)		(39.94)
Constant	0.09***	0.15***	0.09***	0.15***	0.10***	0.15***	0.10***	0.15***
	(41.49)	(68.43)	(40.97)	(67.24)	(43.00)	(67.97)	(29.24)	(47.36)
Observations	19,910	19,910	18,785	18,785	16,817	16,817	6,828	6,828
Adjusted R^2	0.2294	0.1533	0.2377	0.1682	0.2316	0.1627	0.2613	0.1893

Table A6 of the appendix presents a robustness test of the balance sheet approach. Model (1) and (2) present the results of the sample holding firms with at least 8 firm-year observations. Model (3) and (4) presents the results of the sample holding firms with at least 12 firm-year observations, model (5) and (6) for the sample holding firms with at least 16 firm-year observations. Finally model (7) and (8) present the results for the samples holding firms with all year observations. The t-values are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The values of interest is the adjusted R^2 of the models.

Table A7

Adding single accrual types to the model

	(1) CF_BS	(2) CF_BS	(3) CF_BS	(4) CF_BS	(5) CF_BS	(6) CF_BS	(7) CF_BS
L.CF_BS	0.32***	0.48***	0.48***	0.48***	0.32***	0.43***	0.49***
	(39.94)	(75.86)	(75.91)	(75.92)	(41.34)	(58.49)	(76.25)
L.CHG_AR	0.04*	0.05***					
	(1.81)	(2.92)					
L.CHG_INV	0.00		0.04**				
	(0.14)		(2.19)				
L.CHG_AP	-0.01			-0.09***			
	(-0.29)			(-3.72)			
L.DEPR	0.71***				0.73***		
	(32.13)				(33.85)		
L.AM	0.12***					0.22***	
	(3.92)					(6.67)	
L.OTHER	-0.03***						-0.06***
	(-2.71)						(-8.24)
Constant	0.05***	0.10***	0.10***	0.10***	0.06***	0.09***	0.09***
	(19.90)	(41.53)	(41.47)	(41.95)	(21.67)	(36.63)	(40.14)
N	17,475	20,791	20,791	20,791	17,475	17,475	20,791
Adj R^2	0.2246	0.2171	0.2170	0.2173	0.2230	0.1741	0.2193

Table A7 presents the results of hypothesis 3. In model (1) all accrual types are added to the model. Models (2) to (7) present models where only one accrual type is added to the model. The t-values are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The values of interest is the adjusted R^2 of the models.