DECISION SCIENCES INSTITUTE
Analysis of the Incremental Value Relevance of Earnings and Cash Flows in Brazilian Companies

Jorge Eduardo Scarpin
Concordia College
e-mail: jscarpin@cord.edu

Ivonaldo Brandani Gusmão
Federal University of Paraná, UFPR
e-mail: ivonaldo@unicentro.br

ABSTRACT

This study analyzes if operating cash flow improves value relevance beyond earning. The results show that moderate and extreme net earnings have incremental value relevance beyond moderate and extreme cash flows. Moderate cash flows have incremental value relevance beyond moderate and extreme net earnings.

KEYWORDS: Emerging markets, Earnings, Fair value, Accounting estimates, Cash Flows.

INTRODUCTION

Accounting estimate improves the evaluation of a company's performance and is essential for the accuracy of revenues and expenses. Therefore, it attracts the attention of researches in this area, as it stands out as an important indicator of the quality of the net earning and is useful for the evaluation of the company's result. However, the efficiency of the accrual system has been doubted, due to the arbitrary allocations and problems inherent in this system. In addition, the flexibility inherent in generally accepted accounting principles (GAAP) in accounting earnings, standardized by the International Financial Reporting Standards (IFRS), provides managers with the opportunity to manipulate earnings for the benefit of their own interests, by exploring the accounting choices made based on these principles. Kothari (2001) states that this would be distorting the earnings as a measure of company's performance. However, proponents of the accounting view of cash flow state that it is an objective facilitator of financial reporting, avoiding the problem of asset valuation and the measurement of results, thus providing a reliable guide about the company's past performance and how the company is likely to make earnings in the future (Ashton, 1976). In addition, cash flow information can help predict the likelihood of financial failure and provide useful information to assess a company's liquidity and solvency, indicating whether the company will be able to pay dividends and meet its obligations. It is possible to observe, therefore, that accrual accounting says little about the liquidity of the company and its long-term solvency. So, this problem can be minimized by the use of cash flow information.

The debate about cash and accrual accounting has shown that the two accounting systems should be considered complementary to one another, rather than distinct alternatives (Ashton, 1976). Each system is designed to meet specific needs of financial statement users. Accrual basis accounting evaluates earning ability, while cash basis accounting measures the liquidity of a company. Questions remain as to whether cash flow information is incrementally informative when compared to accrual accounting to evaluate the company at present, as well as its future performance.

In this study about incremental value relevance, we examined whether a measure (accrual accounting) adds more information content, beyond that contained in another measure (cash accounting) or another set of measures. Ewert and Wagenhofer (2011) say that value relevance is a measure that allows adjusting the ability of earnings to elucidate the variations of returns in companies, that is, the use of the financial statements information, since the greater the capacity to clarify the earnings in relation to the returns, the greater the relevance of this information and of the fact that earnings are adequate to explain the value of a company's market return. Brown, Lo & Lys (1999) and Kothari (2001) state that studies on value relevance have shown that the relevance of accounting information differs from accounting standards. Ball and Brown (1968) showed that, in the market values of US capital, stock prices and returns are associated with accounting earnings, and that earnings have value relevance in addition to cash flow. Studies on incremental value relevance of earnings and cash flow in the U.S. and the UK provided limited support or mixed and inconclusive results as to the incremental value relevance of cash flows beyond the results and its assessment role (in the US, Schaefer & Kennelley, 1986; Wilson, 1986; Rayburn, 1986; Bowen et al., 1987; Bernard & Stober, 1989; in the UK, Board & Day, 1989). Studies have shown that cash flow is incrementally value relevance (Cheng et al., 1996, 1997; Cheng & Yang, 2003; Kumar & Krishnan, 2008; Barton et al., 2010; Mostafa & Dixon, 2013).

Surveys provide significant results on the incremental value relevance of cash flows beyond those contained in earnings, especially in the case of studies examining the effect of earnings on the incremental value relevance of cash flows (Ali, 1994; Cheng et al. (2003). In the US, Ali (1994) tested the value relevance of the cash flows of operations in the presence of their end value, verifying that extreme cash flows are less informative than moderate cash flows. Cheng et al. (1996) examined the effect of extreme earnings on the relevance of the incremental cash flow value of the operations, verifying that the market places more weight on cash flows when earnings are extreme than when earnings are moderate. Cheng and Yang (2003) examined the impact of extreme earnings on the relevance of the incremental value of cash flows and earnings, while controlling for cash flows extremities. To measure cash flow and earnings extremities, they combined Ali's paper (1994) and Cheng et al. (1996), arguing that extreme gains lead to greater incremental relevance only for moderate cash flows, rather than for extreme cash flows. That is to say, the market places more weight on moderate (not extreme) cash flows information when earnings are extreme than when earnings are moderate, noting that extreme earnings are less informative than moderate gains, regardless of whether the cash flows are moderate or extreme.

Based on the UK data, Mostafa and Dixon (2013) partially replicated Cheng and Yang's (2003) study regarding the impact of extreme earnings on the incremental value relevance of cash flows, and could observe the same results as Cheng and Yang (2003).

The objective of this study is to contribute with the knowledge about the incremental value relevance of earnings and operational cash flows, analyzing whether the operational cash flow improves the value relevance besides the earnings in the companies, replicated partially Mostafa's (2016) study. The hypothesis to be tested is that operating cash flow improves the value relevance beyond earnings. The underlying assumption is that moderate operating cash flow improves the value relevance beyond moderate earnings; extreme operational cash flow improves value relevance in addition to extreme earnings. The study was conducted in the Brazilian companies listed on the BM&FBOVESPA whose financial statements and other financial information were obtained from the Bloomberg® database in November 2016. Regarding the period of analysis, we work with the data of the companies' quarterly financial statements, between the periods from 2006 to 2015, totaling 10 years.

This study differs from the study by Cheng and Yang (2003), Mostafa and Dixon (2013) and Mostafa (2016) because it focuses on analyzing the value relevance of cash flows and net

earnings in the following cases: moderate earnings and moderate cash flows; moderate earnings and extreme cash flows; extreme earnings and moderate cash flows; and extreme earnings and extreme cash flows (Mostafa, 2016), in the Brazilian companies.

It is argued that, considering that extreme earnings and extreme cash flows affect the value relevance negatively, we expect to observe changes in the incremental value relevance of earnings and cash flows after controlling for their extremities. Following Cheng and Yang (2003) and Mostafa and Dixon (2013), earnings extremities (cash flows) are determined by the distribution of earnings (cash flows) to the market value rates. The incremental value relevance of earnings and cash flows is examined for the whole sample and for each of the four groups described and evaluated by the statistical significance of the slope coefficients for regression of returns, on both unexpected earnings and unexpected cash flows from operations.

The research is related to the topics value incremental and operational cash, which are studied, developed and published in national and international journals, demonstrating the interest of scholars in this line of research, both theoretically and empirically. The analysis of the relationship between incremental value relevance and cash flow, and the control of earnings and cash flows extremities in Brazilian companies, is a gap in the work already developed on this topic, and represents one of the contributions of this work.

LITERATURE REVIEW

The value relevance of cash flows and earnings, studied by Patell and Kaplan (1977), analyzes the incremental value relevance of cash flows defined as working capital of operations. However, in that study, they were unable to find value relevance of the working capital of operations beyond the accruals' earnings. Beaver et al. (1982) dealt with the incremental association of cash flows and earnings with investment returns, defining cash flows as the simple addition of the return of depreciation, exhaustion and amortization to net income. The results obtained did not report incremental value relevance for cash flow beyond earnings, and the grouped regression showed some additional explanatory power for cash flows in relation to earnings. Addressed the question of whether earnings components have additional value relevance beyond each other, Rayburn (1986) showing that operating cash flows, capital changes, short-term investments and current maturities of long-term liabilities have greater value relevance in the value of the depreciation and change in the deferred tax.

Bowen et al. (1987) investigated whether cash flow information has additional value relevance beyond earnings and the results pointed out that cash flows, operating cash flows and cash flows after investments, both individually and in groups, have incremental value relevance beyond measures of accumulation of net income before extraordinary items, discontinued operations and capital of operations. The results of the annual cross-sectional regressions reported mixed results on the incremental value relevance of measures of cash flows.

In an event study, Wilson (1987) examined the market reaction to a company's disclosures about cash flows, investigating whether the accruals component and income transaction resources have value relevance beyond earnings, stating that an operations has additional value relevance when this component has been defined as operating cash flow and not as working capital of operations. Bernard and Stober (1989) found that Wilson's results (1987) could not be generalized beyond the two quarters examined in his study. Board and Day (1989), in the United Kingdom (UK), examined the incremental value relevance of net income, cash flows and operating cash flows. The results confirmed the view that earnings have additional value relevance beyond cash flows, but the results do not support that these flows have additional value relevance beyond earnings. Board and Day (1989) defined fund flows as net proceeds plus depreciation and deferred taxes, and defined operating cash flows as resource

flows plus inventory change and work in progress. However, they determined the cash flow of operations as flow of funds adjusted by current accrual.

These studies evaluated the incremental value relevance of cash flows of operations and earnings provided by limited support or mixed and inconclusive results as to the relevance of the incremental value of cash flows. The weak evidence in the value relevance of cash flows can be attributed, in parts, to the fact that these studies use an estimate of cash flows, since these cash flows were not available at the time of these studies; and estimates of cash flows are weak proxies for real cash flows (Bahnson et al., 1996; Cheng et al., 1997). In addition, these studies used a measure of gross cash flows as an indicator of cash flows of operations (Patell & Kaplan, 1977; Beaver et al., 1982), being defined as earnings before depreciation, exhaustion and amortization deductions.

In the United States (Cheng et al., 1996; Cheng & Yang, 2003), and studies in the United Kingdom (Akbar et al., 2011; Mostafa & Dixon, 2013; Arkadani, Arkadani & Heyrani, 2013) have documented the relevance of the incremental value for cash flows and earnings beyond each other. In contrast to previous studies, these studies used the actual cash flow data derived from cash flow statements. Thus, they used an appropriate measure for cash flows and eliminated the need to develop a proxy for cash flow. Kumar and Krishnan (2008) suggest that the coefficients of cash flows and accruals vary according to the investment opportunity defined in the US (Barton et al., 2010). Akbar et al. (2011), in the UK, have shown that operating cash flows may have separated value relevance from total and current additions.

The researches of Bowen et al. (1987), Bernard and Stober (1989) and Board and Day, (1989) conclude that there is only weak and inconsistent evidence that cash flows from operations have additional value relevance beyond earnings. However, Cheng and Yang (2003), Kumar and Krishnan (2008); Barton et al. (2010); Akbar et al. (2011); Mostafa and Dixon (2013); and Arkadani, Arkadani, and Heyrani (2013) have shown that cash flows of operations can play an important role in explaining returns, in addition to that explained by earnings.

Kormendi and Lipe (1987) states that the relationship between earnings and return is affected by extreme earnings. Specifically, (transient) extreme earnings have lower value relevance than moderate (permanent) earnings, so earnings may contain extreme items with limited valuation implications. The items of extreme earnings include: current and long-term assets, such as gains or losses on securities, or the conversion of adjusted foreign currency; losses due to restructuring; current recognition through sales of assets from prior periods or current period; increase in market value; and the time of change gains and losses in accounting standards (Cheng et al., 1996; Christensen et al., 2005). Considering that compensation and debt contracts are often based on accounting earnings, managers can try to introduce extreme gains and revenue losses (Kothari, 2001). Cash flows may also contain extreme components, because managers may intentionally postpone or postpone the recognition of revenues or expenses that accompany the cashier. The smaller effect of extreme earnings on stock returns can also be applied to extreme cash flows.

Freeman and Tse (1992) have demonstrated that the return ratio of earnings is not linear, and extreme earnings have lower persistence than moderate earnings, documenting a high marginal price after controlling for extreme components in the errors of financial analysts' prediction. It is also argued that the reason for the expectation of a higher coefficient of earnings, in the case of moderate incomes, is that the increase in revenue or cost of saving will persist, while there is expectation of a lower coefficient of earnings when it comes to extreme earnings, because there is no reason for these unexpected earnings to take place.

There are ways to measure the extreme components in the result. Collins and Kothari (1989), O'Hanlon et al. (1992), Donnelly and Walker (1995) used time-series estimates to measure earnings persistence. Ali and Zarowin (1992a), used earnings for the analysis of the price relation to measure the extreme components of earnings. Freeman and Tse (1992) used the

absolute variation in deflated errors of analysts' prediction at the initial price of the period to isolate extreme components in earnings, in addition to moderate components, demonstrating that the earnings response coefficient is more sensitive to predicting magnitude error than the firm-specific average persistence, concluding that the measurement of permanent earnings using the absolute change in earnings is better than the time-series estimates, because investors can attribute, to each earnings surprise, a measure of single persistence that depends on the absolute magnitude of the surprise. These studies have documented that moderate earnings have more value relevance than extreme earnings (in the United States, Freeman & Tse, 1992; Ali & Zarowin, 1992a, 1992b; Das & Lev, 1994; in the UK, O'Hanlon et al.,1992; Donnelly & Walker, 1995). In addition, studies have reported that moderate cash flows have more value relevance than extreme cash flows (Ali, 1994; Cheng & Yang, 2003).

Kean and Wells (2007) investigated the existence of systematic differences in persistence among the components of earnings. The evidence is provided by the difference in persistence among the components of earnings, arguing that it supports the decomposition of earnings into components and their separate valuation in the analysis of financial statements. Doukakis (2010) examines whether the adoption of International Financial Reporting Standards (IFRS) affects the persistence of earnings and components of earnings. The results showed that guidelines for reporting and measurement of IFRS do not seem to improve the persistence of yields and components of earnings for future earning ability. According to Doukakis (2010), these results can be attributed to the IFRS fair value orientation.

Hee (2011) investigated whether up-to-date earnings are more persistent than the earnings originally reported. The results showed that the updated portion of earnings is incrementally persistent, relative to the earnings reported originally, and the incremental persistence, albeit subdued, is still significant after the passage of the Sarbanes-Oxley Act. More recently, Amir et al. (2013) propose a new measure of sustainable earnings based on deviations from normal earning margins. They argued that while some other sustainable earning metrics try to identify transitory components on a line-by-line basis, their proposed measure of sustainable earnings uses a vertical cut to extract the transitory part of incomes from all items in that line, demonstrating that this proposed measure of sustainable earnings is positively associated with the persistence of earning, greater predictability of results, and strong reaction of the market to unexpected earnings.

Wang (2014) examines whether the assessment of investors' persistence earnings is affected by the extent to which earnings are smoothed. After controlling for the persistence of time series, he found that the assessment of persistent investor earnings is negatively associated with the smoothed earnings level, suggesting that investors understand that the high persistence of income smoothing is not real, and they discount the actual persistence smoothing earnings when they react to earnings reports.

In the United Kingdom, Green (1999) investigated whether the quality of earnings, measured by the specific relationship between earning ability and cash generation capacity, affects the market price differentiation of cash flows from current operations and provisions, stating that the incremental value of cash flows exists when the quality of the earnings is low.

In an article in the US and the UK on incremental value relevance of cash flows and earnings, Cheng and Yang (2003) and Mostafa and Dixon (2013) have shown that it is easier for operating cash flows to have higher incremental value relevance when earnings are extremes. The reason is that the market will value the secondary measure, the operating cash flows, instead of the main measure, earnings, provided that this primary measure is more extreme than the secondary one. In the US, Ali (1994) found that extreme cash flows are less informative than moderate cash flows. Pfeiffer et al. (1998) replicated the Ali's study (1994), and reported the same results as Ali (1994), either through the use of components from a random-walk model

or from a model that incorporates historical data and structure cross-correlation in the components.

Cheng et al. (1996) found that the market places a greater burden on cash flows when earnings are extreme than when earnings are moderate. However, in the United Kingdom, Charitou et al. (2001) were not able to find the incremental value relevance for the cash flows of the operations when the earnings are extreme. Cheng and Yang (2003) have found that the effect of extreme gains leads to greater incremental relevance only for moderate cash flows, rather than for extreme cash flows, and that the effect of extreme cash flows leads to a higher incremental value relevance only for moderate earnings, and not for extreme earnings. In the UK, as well as Cheng and Yang (2003) and Mostafa and Dixon (2013), Mostafa (2016) reported a higher to moderate (not extreme) incremental value relevance of operating cash flow when earnings were extreme.

The literature indicates that the value of extreme earnings is less than that of moderate results. However, both moderates and extremes earnings have value relevance (Freeman and Tse, 1992; Ali & Zarowin, 1992a; O'Hanlon et al., 1992; Das & Lev, 1994). Also, it indicates that both moderate and extreme earnings provide additional value relevance beyond moderate and extreme operating cash flows (Cheng & Yang, 2003, Mostafa & Dixon, 2013, Mostafa, 2016). Therefore, in all four cases listed in this research (moderate earnings and moderate cash flows, moderate earnings and extreme cash flows, extreme earnings and moderate cash flows and extreme earnings and extreme cash flows), earnings will have additional value relevance beyond operating cash flow, regardless of moderate or extreme earnings or cash flows, due to the fact that earnings are seen as a measure of primary earning ability.

Thus, even if this measure of primary earning ability (revenue) is extreme and has limited value relevance, it still provides additional value relevance beyond operating cash flows.

HYPOTHESES AND MODEL

Considering that the objective of this research is to contribute with the knowledge about incremental value relevance of earnings and operating cash flow, analyzing whether operating cash flow improves the value relevance beyond to earnings in the companies listed in BM&FBOVESPA, the hypothesis to be tested is that operating cash flow improves the value relevance beyond earnings. The underlying assumption is that moderate operating cash flow improves the value relevance beyond moderate earnings; and the extreme operating cash flow improves the value relevance beyond extreme earnings, so we analyze the value relevance of cash flows and earnings in the following cases (Mostafa, 2016): 1) moderate earnings and moderate cash flows; 2) moderate earnings and extreme cash flows; 3) extreme earnings and moderate cash flows; and 4) extreme earnings and extreme cash flows.

Regarding operating cash flows, it is argued that when earnings are moderate, the incremental value relevance of cash flows is conditioned to their permanence, implying that when earnings are moderate, the incremental value relevance of cash flows does not exist for extreme cash flows, but only for moderate cash flows. Based on these arguments, the following hypotheses are developed.

H1: Operating cash flow provides value relevance beyond that provided by earnings.

When both the earning and the cash flow are moderate, both have value relevance, which leads to the second hypothesis:

H2: Moderate operating cash flow provides value relevance beyond that provided by moderate earnings.

When earnings are moderate with high value relevance and operating cash flows are extreme with less value relevance, the market will depend only on the measure of primary earning ability (earnings), as the market will value this primary measure, instead of the secondary measure

(cash flow) when this secondary measure is more extreme than the main measure. Therefore, the third hypothesis is developed:

H3: Extreme operating cash flow does not provide value relevance beyond that provided by moderate earnings.

When earnings are extreme and have limited value relevance, the market will seek another measure of additional value relevance, and a good measure to supplement earnings, in this case, is the operating cash flow. As such, the fourth and fifth hypotheses are defined as follows:

H4: Moderate operating flow provides value relevance beyond that provided by extreme earnings.

H5: Extreme operating cash flow provides value relevance beyond that provided by extreme earnings.

METHODS

In this study, we analyze the incremental value relevance of earnings and cash flows in the following four groups: moderate earnings and moderate cash flows; moderate earnings and extreme cash flows; extreme earnings and moderate cash flows; and extreme earnings and extreme cash flows.

The objective is to contribute with the knowledge about the incremental value relevance of earnings and operating cash flows, analyzing the control of earnings and cash flows extremities. Earnings are considered a measure of primary earning ability (revenue) and operating cash flow is considered a measure of secondary earning ability.

This study was conducted on the Brazilian companies listed on the BM&FBOVESPA, whose financial statements and other financial information were obtained from the Bloomberg® database in November 2016. Regarding the period of analysis, we worked with the data of the quarterly financial statements of the companies, published between the periods of 2006 and 2015, totaling 10 years.

For the analysis of the results, we used the GRETL (Gnu Regression, Econometrics and Time-series Library) software, using the Panel Data methodology (Fixed Effects Model), because we intend to control the effects of the omitted variables which vary between individuals and remain constant over time. For the regression analysis and the comparisons of the means, we used the Statistical Package for the Social Sciences (SPSS).

The variables used in this study are thus defined. Earnings are defined as net income before extraordinary items and preferred and ordinary dividends, but after operating and non-operating income and expenses, reserves, income taxes, minority interest and equity income. Cash flows are defined as net cash flows from operating activities, and represent the net receipts and payments resulting from the operations of the company.

We use the 12-month period to calculate market-adjusted returns, which ends four months after the end of the fiscal year. We assume that the listed companies have published their financial statements within the four months following the end of the fiscal year, therefore, four periods of lag.

We use a larger lagged payback period as an attempt to better match the stock returns with the period during which the accounting information is potentially disclosed in the annual report. With a four month period of delay, we assume that the information of the financial statements for year t, for a firm whose end of the fiscal year is December, is released neither before May of the year launched nor later than April of year $t + 1$. The annual return adjusted on the market is equal to the initial annual return less the company's final annual return, both of which are measured during the 12-month period commencing in the fifth month of the end of each fiscal year.

The Return Index (RI) for each company's share is used to calculate returns rather than share price because it is adjusted for dividends and equity shares, such as share repurchases and

stock splits. The market value of the shares is defined as the price at the end of the market closing year multiplied by the number of common shares outstanding.

The sample consisted of a list of all companies listed on the BM&FBOVESPA covering the period from 2006 to 2015. The universe is composed of 412 companies. The following requirements were applied on the data in order to determine the sample of this study: companies must have the financial statement data for at least two years during the study period (2006 to 2015); companies must not operate in the financial sector; and the companies must not have changed their end of the financial year during the period from 2006 to 2015. The financial entities listed on BM&FBOVESPA were excluded from the sample because banks have large amounts of assets and liabilities that need to be disclosed in accordance with IFRS 13 Fair Value Measurement. Table 1 presents the data from the research sample.

Table 1: Sample Size of the Research over the Period 2006-2015			
	COMPANIES		
DESCRIPTION	NUMBER OF COMPANIES	%	NUMBER OF VARIABLES
a) List of Companies (Initial sample)	412	100	16,480
b) (-) Financial Sector Companies (banks, insurance companies, consortium)	41	9.95	1,640
c) (-) Firms with data in the incomplete financial statements in the period of analysis (2006-2015)	33	8.01	1,320
d) (-) Firms with incomplete share prices data in the review period (2006-2015)	144	34.95	5,760
e) (-) Firms that changed their financial year-ends in the review period (2006-2015)	26	6.31	1,040
f) (=) Sample size before excluding firms with insufficient data in the period to calculate the study variables (F = A -B -C -D-E)	168	40.78	6,720

To investigate the incremental value relevance of earnings and operating cash flows while controlling earnings extremities and operating cash flows extremities, we divided the entire sample into four groups, based on persistence of earnings and cash flows. For each year, the entire sample was divided into two groups based on persistent earning, which are the moderate earnings compared to the extreme earnings, and two other groups based on persistent cash flows, which are the moderate cash flows and the extreme cash flows. Table 2 shows the data of the sample classified into groups of persistence of earnings and persistence of cash flows.

Table 2: Classification of the Sample by Earnings and Cash Flows Persistence Groups			
Sample Group Ranked by Earnings and Cash Flows			
Persistence of Earnings		Persistence of Cash Flows	
I	II	III	IV
Extreme Earnings	Moderate Earnings	Moderate Cash Flows	Extreme Cash Flows

Considering the classification of the data in Table 2, for each year, we combined the total group of samples into four groups as follows: 1) moderate earnings and moderate cash flows; 2)

moderate earnings and extreme cash flows; 3) extreme earnings and moderate cash flows; and 4) extreme earnings and extreme cash flows (Mostafa, 2016).

According to Cheng and Yang (2003), Mostafa and Dixon (2013) and Mostafa (2016), the proportions of earnings to the market value of the shares at the end of year *t* are used to determine moderate and extreme earnings. The companies were classified in decile, which is any of the nine values that divide the ordered data of a variable into ten equal parts, so that each part represents 1/10 of the sample or population. Thus, each year, companies with positive results are classified into nine groups, considering their market value at the end of the year, with approximately equal number of companies per group, where the first group includes companies with negative results. The companies are classified into six groups with moderate earnings, and the companies of the remaining four groups, as the extreme earnings. The 1st decile is the cutoff point for 10% of the lowest data and the 9th decile is the limit for 90% of the lowest data. Table 3 presents the sample data classified by cash flow groups.

Table 3: Classification of the Sample by Cash Flows Groups									
Firms ranked by Cash Flows (Negative and Positive Results)									
Firms Groups (I, II, III and IV)									
Negative Results			Positive Results						
I		II	III					IV	
1		2	3	4	5	6	7	8	9	10
Extreme Cash Flows			Moderate Cash Flows					Extreme Cash Flows	

The operating cash flow indices to market value of shareholders' equity at the end of year *t* are used to determine the moderate and extreme cash flows of operations. In each year, all the companies in the sample with positive cash flows from operations are classified into nine groups by their cash flows ending the year from the market value of the operations, with an approximately equal number of companies per group, where the first group includes companies with only negative cash flows. The six middle groups are classified as moderate operating cash flows, and the remaining four groups are classified as extreme operating cash flows.

To test the hypotheses investigated, we examined the incremental value relevance of earnings and cash flows for the whole sample and for each of the four groups using the regression model described in Equation 1. We note that the reason behind the estimate of the regression model in this study, gathering data across all the years of the study rather than running the tests from year to year, is that the number of observations of each year is reduced in each group, being necessary to combine and group the total samples in four groups, to estimate the association between annual returns of stocks and the level and change of income and the level and change of operating cash flow. In the model described, α_{0t} represents the intercepts to be estimated, one for each variable. Considering that the parameters do not change between the variables, nor during the analyzed period, the behavior differences of the variables must be captured by the intercept, therefore α_{0t} can be interpreted as the effect of the variables omitted in the model.

$$R_{it} = \alpha_{0t} + \alpha_{1t}\Delta Earning_{it} + \alpha_{2t}\Delta OCF_{it} + \alpha_{3t}Earning_{it} + \alpha_{4t}OCF_{it} + \qquad (1)$$
$$\alpha_{5t}ROA + \alpha_{6t}SIZE + \alpha_{7t}EBITDA + \varepsilon_{it}$$

Where: R_{it} is the adjusted annual market returns or annual gross return, where this model is estimated for both (market returns and adjusted gross returns) as a dependent variable, for firm

i in year t, accumulated from the fifth month of year t until the fourth month of year $t + 1$; $\Delta Earning_{it}$ is the change in earnings, and $Earning_{it}$ is the earnings level for company i in year t; ΔOCF_{it} is the change in operating cash flow, OCF_{it} is the level of operating cash flows for firm i in year t; and ε_{it} is the regression error. The company's performance (ROA), expressed by the ratio between the company's net earnings or the totals of the asset; EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization), is a financial indicator and represents how much a company generates resources through its operational activities, not counting taxes and other financial effects; and the size of the firm (SIZE) is a proxy of the company size measured by the natural logarithm of the company's total assets.

Replicating Mostafa (2016), which states that the change and the level of earnings and cash flows are deflated by the market value at the beginning of each fiscal year as suggested by Christie (1987) to reduce the potential problems of heteroscedasticity. The sum $(\alpha_1 + \alpha_3)$ combines the estimated coefficients of change and earning level; and $(\alpha_2 + \alpha_4)$ combines the estimated coefficients of change and the cash flow level of the operations.

To test whether operating earnings and cash flows have incremental value relevance beyond each other, we examined the statistical significance of the sum of the two coefficients of slope on the level and the change in earnings and variable cash flows. A positive and significant value of $(\alpha_1 + \alpha_3)$ means that the earnings have incremental value relevance beyond those contained in the operating cash flows. A positive and significant value of $(\alpha_2 + \alpha_4)$ means that operating cash flows have incremental value relevance beyond those in earnings.

As for the analysis of the persistence of earnings, the earnings are decomposed into the components of cash flow and accruals (Dechow & Dichev, 2002), and it is believed that α_1 is less than α_2, suggesting that accruals are less persistent than the components of cash flows.

$$LL_{it+1} = \alpha_0 + \alpha_1 Accruals_{it} + \alpha_2 OCF_{it} + \alpha_3 Extreme\_Accruals + \alpha_4 Extreme\_Accruals \times Accruals_{it} + \alpha_5 Extreme\_OCF_{it} + \alpha_6 Extreme\_OCF_{it} \times OCF_{it} + \alpha_7 ROA + \alpha_8 SIZE + \alpha_9 EBITDA + \varepsilon_{it} \quad (2)$$

Where: LL_{it+1} is the value of the variable earnings in firm i of year $t + 1$; $Accruals_{it}$ is the value of the variable accruals in company i of year t, calculated by the variation of the current assets of year t in relation to period t-1; OCF_{it} is the value of the variable cash flow in firm i of year t; Extreme_Accruals and Extreme_OCF are dummy variables that assume 1 when cash flow/accruals are considered extreme and 0 in other cases; Extreme_Accruals x $Accruals_{it}$ is the variable interaction between the accruals and the extreme dummy; Extreme x OCF_{it} is the integration variable between the cash flow and the extreme dummy; and ε_{it} is the regression error. The control variables are: the company's performance (ROA) expressed by the ratio between the company's net earnings or the totals of the asset; EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization) is a financial indicator and represents how much a company generates resources through its operational activities, not counting taxes and other financial effects; and the size of the firm (SIZE) is a proxy of the company size measured by the natural logarithm of the company's total assets.

In Table 4 we describe the independent variables of the research and their operational definitions.

Table 4: Study Variables					
Variables	Acronyms	Definition	MethodofCalculation / Measurement	ExpectedRatio	References

Anual Market AdjustedReturns	R_{it}	Anual Market AdjustedReturns	Obtained by grouping the metrics of equation 1		Cheng& Yang (2003); Mostafa&Dixon (2013)
ValueofEarnings	$L L_{it}$	Value of the variable earnings in the firms	Obtained by grouping the metrics of equation 1		Cheng& Yang (2003); Mostafa&Dixon (2013)
Change in earnings	$\Delta Earning_{it}$	Change in the value of earnings in the firms	Calculated by the change in earnings of year t in relation to period t + 1	+	Cheng& Yang (2003); Mostafa&Dixon (2013)
Change in Cash Flows	ΔOCF_{it}	Change in Cash Flows from operations	Calculated by the variation of the operating cash flow of year t in relation to period t + 1	+	Cheng& Yang (2003); Mostafa&Dixon (2013)
Earnings	$Earning_{it}$	Level of earnings for year t	Earnings of the year t	+	Cheng& Yang (2003); Mostafa&Dixon (2013)
Cash Flows	OCF_{it}	Operating cash flow level of year t	Cash flow from year t	+	Cheng& Yang (2003); Mostafa&Dixon (2013)
VariableAccruals	$Accruals_{it}$	Value of the accrual variable	Calculated by the variation of the current assets of year t in relation to period t-1	+	Cheng& Yang (2003); Mostafa&Dixon (2013)
Extreme Accruals	Extreme_Accruals	Extreme Acrruals	Dummy variables assuming 1 when cash flows / accruals are considered extreme and 0 in other cases	+	
Extreme OCF	Extreme_OCF	Extreme Cash Flows from operations		+	
FirmsSize	SIZE	FirmsSize Proxy	Natural logarithm of the company's total assets	-	Gu, Lee & Rosset (2005)
Performance	ROA	Verifies the performance of the Firms	Calculated by the ratio of the firm's net income to the total assets	+	
EBITDA	EBITDA	It represents how much a company generates resources through its operating activities, not counting taxes and other financial effects	Represented by the amount of liabilities divided by the total assets of the company	+	

RESULTS

For the analysis of the results, we used the descriptive statistics to present the behavior and characteristics of the variables of the sample. In Table 5, we present the correlation coefficient, measuring the degree of linear association between the variables, which presented a R^2 equal to 0.791941 in the estimated final model, indicating a high association between the variables. It should be noted that R^2 is between 0 and 1, with 1 being the regression line adjusted and explaining 100% of the variation, and 0 when the model explains nothing of the variation, so the fit of the model is better the closer R^2 is to 1. We performed the test to detect the serial correlation between the variables using the Durbin-Watson Test, verifying if the underlying residues are correlated and testing the hypothesis of error interdependence. We verified that there is no autocorrelation, and Durbin-Watson statistics assumed a value of 2.001 indicating a negative correlation, stating that the error independence hypothesis is satisfied. We also showed the test f with a result of approximately 171303.241, which is significant. The test f and the R^2 relate, for they vary directly. When $R^2 = 0$, f then is zero; the larger the R^2, the greater the value of f, and when $R^2 = 1$, f is infinite. The test f is a measure of the global significance of the estimated regression, thus a test of significance of R^2.

Table 5: Analysis of Descriptive Statistics of Variables				
R	R²	Adjusted R²	Durbin-Watson	*F*
0.799757	0.791941	0.79941	2.0001	171303.241

We present, in Table 6, the descriptive statistics of the total sample of the variables. The correlation between the variables shows the degree of association between them, a factor that can alert some problem in the regression estimators. We observed that the OCF_{it} variable has a stronger correlation ($R^2 = 0.919$, $p < 0.001$), which may suggest the existence of greater expectation with information contained in operating cash flow; and the variables $\Delta Earning_{it}$ and ΔOCF_{it} have a significant correlation ($R^2 = 0.236$, $p < 0.001$ and $R^2 = 0.263$, $p < 0.001$ respectively), suggesting that the variation in earnings and cash flows helps in the analysis of the results in the disclosure of financial statements.

Table 6: Analysis of Descriptive Statistics of Variables												
StudyVariables	No.	Mean	Standard deviation	VIF	Pearson'sCorrelation							
					R_{it}	$\Delta Earning_{it}$	ΔOCF_{it}	$Earning_{it}$	OCF_{it}	SIZE	ROA	EBITDA
R_{it}	6720	3.2961	816.92556		1							
$\Delta Earning_{it}$	6720	3.7289	233.68558	1.003	0.236	1						
ΔOCF_{it}	6720	3.7294	233.68557	1.001	0.263	-0.008	1					
$Earning_{it}$	6720	0.031	9.25564	1.001	0.131	0.041	0.0001	1				
OCF_{it}	6720	-3.3869	762.39556	1.003	0.919	-0.051	0.0001	0.0001	1			
SIZE	6720	7.0645	2.06329	2.248	-0.023	-0.0232	-0.01	0.0001	-0.001	1		
ROA	6720	-16.9451	1865.86916	1.001	-0.001	0.0001	-0.025	0.012	-0.011	-0.005	1	
EBITDA	6720	3.7702	2.16828	2.246	-0.019	-0, .017	-0.17	0.012	-0.010	0.007	0.745	1

The control variables (ROA, EBITDA and SIZE) used in this study show that the companies present an average return of 16.9451% on total assets. They have a capital structure composed of predominantly equity capital, and third-party capital represents, on average, 31.36% of the sources of funds. We also verified that the companies have, on average, a Total Asset of $ 7.0645 million. Regarding VIF (Variance Inflation Factor), which measures how much the variance of the estimated regression coefficients is inflated compared to when the predictor variables are not linearly related, we observed that all the variables presented scores between 1 and 10, providing indications of the absence of collinearity problem.

Regarding the analysis of the value relevance of cash flows and earnings, in Table 7 we present the results of the incremental value relevance test of earnings and operating cash flows for the whole sample. We found in Panel A, with adjusted returns to the market as a dependent variable, that the added coefficients of the level ($\alpha_1 + \alpha_3$) and earnings variance are positive at the 1 percent level (0.77656, t = 12.55521), that is, p <0.01 indicating a statistically significant difference at the 0.01 level (99%). The added coefficients of the level ($\alpha_2 + \alpha_4$) and change in cash flow are significantly positive at the 1 percent level (0.57853, t = 1.92474). We observed in similar results Panel B, taking the gross returns as a dependent variable. These results suggest that earnings and cash flows have incremental value relevance beyond each other. The value 0.93462 is significantly positive at the 1 percent level. In Panel B, the results of estimating gross returns, as a dependent variable, generated similar results. However, we observed that the sum of coefficients (α_3) and change in cash flow (α_4) are positive, but not significant at any conventional level (0.54723, t = 1.78821).

Table 7: Sample Results for Incremental Value Relevance of Operating Cash Flows								
Model of changes in and levels of earnings and cash flows from operations								
$R_{it} = \alpha_{0t} + \alpha_{1t}\Delta Earning_{it} + \alpha_{2t}\Delta OCF_{it} + \alpha_{3t}Earning_{it} + \alpha_{4t}OCF_{it} + \varepsilon_{it}$								
Coefficients on the level and change (*t*-statistics and *p*-values)						Earnings Variation	Cash Flows Variation	
Data		Earnings		Cash Flows				R^2
		Level	Change	Level	Change	Sum of ($\alpha_1 + \alpha_3$)	Sum of ($\alpha_2 + \alpha_4$)	Adjusted
	α_0	α_1	α_2	α_3	α_4			
Panel A: cross-sectional time-series regression with adjusted market returns								
	-0.21656	0.33455	-0.08891	0.44200	0.56744	0.77656	0.57853	0.21988
t-statistics	-4.65456	4.88633	-0.91575	6.66888	2.84049	10.55521	1.92474	
p-value	0.00000	0.00000	0.45477	0.00000	0.01166	0.00000	0.00047	
Panel B: cross-sectional time-series regression with annual returns								
	-0.17094	0.24198	-0.06549	0.69264	0.61272	0.93462	0.54723	0.24752
t-statistics	-2.36874	2.96592	-0.67932	8.09856	2.46753	11.06448	1.78821	
p-value	0.03652	0.00844	0.60018	0.00000	0.02908	0.00000	0.00063	

We point out that using market returns as a dependent variable is recommended when performing annual cross-sectional regressions, so it is not necessary to perform the market adjustment (return of market-adjusted stocks), since in the case of annual cross-regressions, the return of the market is a constant.

From the results obtained and described in Table 7, we confirm hypothesis 1 (H1). Thus, the assumption that operating cash flows provide incremental value relevance beyond that provided by earnings is accepted. These results are consistent with those found in other studies (Cheng et al., 2003; Akbar et al., 2011; Mostafa & Dixon, 2013; Mostafa, 2016).

The accounting interpretation of these results, in terms of disclosure of the components of earnings, reveals that operating cash flows and total accruals are valued (associated with returns) differently from each other. These results indicate that operating cash flows have a higher appreciation than total accruals. Investors prefer to observe both, operating cash flows and total accruals, separately.

In Table 7, we show the regression model, where R_{it} is the annual adjusted return (Panel A) or annual gross returns (Panel B) of firm i in year t. Both are measured during the fifth month of year t and the fourth month of year $t + 1$, where the model is estimated in both cases (adjusted returns and gross returns) as a dependent variable. The $\alpha_{2t}\Delta Earning_{it}$ ($Earning_{it}$) is the change (level) in earnings, and $\alpha_{2t}\Delta OCF_{it}$ (CFO) is the change (level) in operating cash flows for firm i in year t. These variables are deflated by the market value of shareholders' equity at the beginning of year t. We used 6.720 observations for a sample of 168 Brazilian companies listed on the BM&FBOVESPA over the period of 2006-2015, therefore, 10 years. We combine the estimated coefficients of change and income level $(\alpha_1 + \alpha_3)$; the $(\alpha_2 + \alpha_4)$ combines the estimated coefficients of the change and the level of operating cash flows; the cross-sectional method is used to control the potential effects of heteroscedasticity and autocorrelation on errors; t-statistic is the t statistic along with the p-value of the corresponding estimate.

Regarding the analysis of the incremental value relevance of moderate cash flows and moderate earnings, we present, in Table 8, the results of the incremental value relevance test of moderate earnings and moderate cash flows of operations.

Table 8: Sample Results for the Incremental Value Relevance of Moderate Operating Cash Flows and Moderate Earnings								
Model of changes in and levels of earnings and cash flows from operations $R_{it} = \alpha_{0t} + \alpha_{1t}\Delta Earning_{it} + \alpha_{2t}\Delta OCF_{it} + \alpha_{3t}Earning_{it} + \alpha_{4t}OCF_{it} + \varepsilon_{it}$								
Coefficients on the level and change (t-statistics and *p*-values)						Earnings Variation	Cash Flows Variation	R2 Adjusted
Data		Earnings		Cash Flows		Variation Sum of $(\alpha_1 + \alpha_3)$	Variation Sum of $(\alpha_2 + \alpha_4)$	
		Level	Change	Level	Change			
	α_0	α_1	α_2	α_3	α_4			
Panel A: cross-sectional time-series regression with adjusted market returns								
	-0.31783	0.37897	-0.10879	3.39175	1.09499	3.77071	0.98620	0.40306
t-statistics	-8.77776	3.01215	-1.66143	4.31831	3.00216	12.33045	2.34074	
p-value	0.00000	0.00744	0.61254	0.00000	0.00767	0.00744	0.00021	
Panel B: cross-sectional time-series regression with annual returns								
	-0.35981	0.27770	0.14659	4.47626	0.31252	4.75396	0v45911	0.42858
t-statistics	-6.85247	2.34840	0.49629	8.88366	0.85162	11.23205	1.34791	
p-value	0.00000	0.03841	0.38290	0.00000	0.42920	0.00039	0.12098	

It is possible to observe in Panel A, Table 8, with market adjusted returns as the dependent variable, that the summed coefficients of the level and the change in earnings is 3.77071 (t = 12.33045). The value of 3.77071 was positive at the level ($\alpha_1 + \alpha_3$) of 1 percent, that is, p <0.01 indicating a statistically significant difference at the 0.01 level (99%). The combined coefficients of the level ($\alpha_2 + \alpha4$) and change in cash flows are 0.98620 (t = 2.34074).

The results described in Table 8 indicate that the incremental value relevance for moderate earnings is beyond moderate cash flows, and for moderate cash flows is beyond moderate earnings. These results confirm hypothesis 2 (H2). Thus, the assumption that moderate operating cash flows provide value relevance beyond that provided by moderate earnings is accepted.

We report in Table 8 the observations of the moderate earnings and moderate cash flows group, which consisted of 3.360 observations over the period from 2006 to 2015. In each year, all companies with positive results (cash flows) were classified into nine groups by their final year revenue (cash flows) value of market return rates, with approximately equal number of companies per group, where the tenth group included companies with only negative results (cash flows). The six average groups were classified as moderate earnings (cash flows) and the remaining four groups were classified as extreme earnings (cash flows).

Regarding the analysis of the value relevance of extreme cash flows and moderate earnings, we present, in Table 9, the results of the incremental value relevance of moderate earnings and extreme operating cash flows.

Table 9: Sample Results for the Incremental Value Relevance of Extreme Cash Flows from Operations and Moderate Earnings							
Model of changes in and levels of earnings and cash flows from operations $R_{it} = \alpha_{0t} + \alpha_{1t}\Delta Earning_{it} + \alpha_{2t}\Delta OCF_{it} + \alpha_{3t}E_{it} + \alpha_{4t}OCF_{it} + \varepsilon_{it}$							
Coefficients on the level and change (*t*-statistics and *p*-values)					Earnings Variation	Cash Flows Variation	R^2
		Earnings		Cash Flows			
Data		Level	Change	Level	Change	Sum of ($\alpha_1 + \alpha_3$)	Sum of($\alpha_2 + \alpha_4$)	Adjusted
	α_0	α_1	α_2	α_3	α_4			
Panel A: cross-sectional time-series regression with adjusted market returns								
	-0.38794	0.21262	0.04123	3.36814	0.16231	3.58076	0.20354	0.43822
t-statistics	-14.55719	2.00204	0.32404	6.56747	0.99379	8.56951	1.31783	
p-value	0.00000	0.00798	0.85654	0.00000	0.44273	0.00000	0.01253	
Panel B: cross-sectional time-series regression with annual returns								
	-0.34285	0.05475	0.12939	4.02124	0.02701	4.07599	0.15640	0.41651
t-statistics	-6.20885	0.41938	1.01440	6.84696	0.17093	7.26635	1.18533	
p-value	0.00000	0.07846	0.40205	0.00000	0.97596	0.00000	0.15570	

We found in Panel A, in Table 9, with the adjusted market returns as the dependent variable, that the sum of the coefficients of the level and variation of the remunerations ($\alpha_1 + \alpha_3$) is 3.58076 (t = 8.56951). The value 3.58076 is positive at the 1 percent level, that is, p <0.01 indicating a statistically significant difference at the 0.01 level (99%). The added coefficients of

the level and change in the cash flows ($\alpha_2 + \alpha_4$) is 0.20354 (t = 1.31783). The value 0.20354 is positive, but not significant at any conventional level. In Panel (B), the same results are obtained when using the gross returns as a dependent variable.

Considering these results, we suggest that moderate earnings have incremental value relevance beyond extreme cash flows. However, these results do not show incremental value relevance for extreme cash flows relative to moderate earnings. These results confirm hypothesis (H3). Thus, the assumption that extreme operating cash flows do not provide incremental value relevance beyond that provided by the moderate earnings is accepted.

We present in Table 10 the observations of the group of moderate earnings and extreme cash flows, composed of 1.120 observations over the period from 2006 to 2015.

Regarding the analysis of the value relevance of moderate cash flows and extreme earnings, we present in Table 10 the results for the incremental value relevance of extreme earnings and moderate operating cash flows. In Panel A, with returns adjusted to market value as a dependent variable, we find that the sum of the coefficients of the level and variation of earnings is positive at the 1 percent level (0.60973, t = 10.62947) . The coefficients added to the level and change in the cash flows were significantly positive at 1 percent level (2.74319, t = 5.29460), that is, p <0.01 indicating a statistically significant difference at the 0.01 (99%) level. In Panel B, the same results were obtained when using gross returns as the dependent variable. These results suggest that extreme earnings and moderate cash flows have incremental value relevance beyond each other. These results confirm hypothesis 4 (H4). Thus, the assumption that moderate operating cash flows provide value relevance beyond that provided by extreme earnings is accepted.

Table 10: Sample results for the Incremental Value Relevance of Moderate Operating Cash Flows and Extreme Earnings							
Model of change in and levels of earnings and cash flows from operations							
$R_{it} = \alpha_{0t} + \alpha_{1t}\Delta Earning_{it} + \alpha_{2t}\Delta OCF_{it} + \alpha_{3t}Earning_{it} + \alpha_{4t}OCF_{it} + \varepsilon_{it}$							
Coefficients on the level and change (t-statistics and p-values)						Earnings Variation	Cash Flows Variation
Data		Earnings		Cash Flows		Earnings Variation Sum of ($\alpha_1 + \alpha_3$)	Cash Flows Variation Sum of ($\alpha_2 + \alpha_4$)	R^2 Adjusted
		Level	Change	Level	Change			
	α_0	α_1	α_2	α_3	α_4			
Panel A: cross-sectional time-series regression with adjusted market returns								
	-0.46372	0.22567	-0.21002	0.38405	2.95322	0.60973	2.74319	0.46466
t-statistics	-8.87197	4.32735	-2.43456	6.30212	7.72916	10.62947	5.29460	
p-value	0.00000	0.00019	0.03195	0.00000	0.00000	0.00000	0.00000	
Panel B: cross-sectional time-series regression with annual returns								
	-0.41821	0.10726	-0.20808	0.59552	2.72309	0.70278	2.51501	0.43163
t-statistics	-2.19779	1.74140	-1.95204	6.32475	6.04574	8.06616	4.09370	
p-value	0.00000	0.01306	0.08804	0.00000	0.00000	0.00000	0.00000	

We present in Table 10 the observations of the group of extreme earnings and moderate cash flows, which consist of 1.360 observations over the period from 2006 to 2015.

Regarding the analysis of the value relevance of extreme cash flows and extreme earnings, we present the results of the test in Table 11.

We verify, in Panel A, Table 11, with market-adjusted returns as the dependent variable, that the sum of the coefficients of the level and variation of earnings is positive at 1 percent level (0.62971, t = 9, 59015), that is, p <0.01 indicating a statistically significant difference at the 0.01 level (99%). The added coefficients of the level and change in cash flow are significantly positive at the 1 percent level (0.51823, t = 1.82045). In Panel B, estimation results with gross returns as a dependent variable generate results similar to those of adjusted market returns. However, the added coefficients of the level and change in cash flow are significantly positive at the 1 percent level (0.450112, t = 1.27824).

Table 11: Sample Results for the Incremental Value Relevance of Extreme Operating Cash Flows and Extreme Earnings								
Model of change in and levels of earnings and cash flows from operations								
$R_{it} = \alpha_{0t} + \alpha_{1t}\Delta Earning_{it} + \alpha_{2t}\Delta OCF_{it} + \alpha_{3t}Earning_{it} + \alpha_{4t}OCF_{it} + \varepsilon_{it}$								
Coefficients on the level and change (*t*-statistics and *p*-values)						Earnings Variation	Clash Flows Variation	
Data		Earnings		Cash Flows				R^2 Adjusted
		Level	Change	Level	Change	Sum of ($\alpha_1 + \alpha_3$)	Sum of ($\alpha_2 + \alpha_4$)	
	α_0	α_1	α_2	α_3	α_4			
Panel A: cross-sectional time-series regression with adjusted market returns								
	-0.34742	0.34107	-0.03468	0.28863	0.55292	0.62971	0.51823	0.41480
t-statistics	-5.72567	4.49697	-0.28566	5.09318	2.10611	9.59015	1.82045	
p-value	0.00002	0.00039	1.00885	0.00000	0.10875	0.00000	0.00101	
Panel B: cross-sectional time-series regression with annual returns								
	-0.29155	0.26120	-0.06897	0.43501	0.51909	0.69622	0.45012	0.42044
t-statistics	-2.72772	2.89053	-0.59110	4.83011	1.86934	7.72064	1.27824	
p-value	0.01584	0.01046	0.06610	0.00000	0.10311	0.00000	0.00300	

We notice, in Table, 11 that these results suggest that extreme earnings and extreme cash flows have incremental value relevance beyond each other. These results confirm hypothesis 5 (H5). Thus, the assumption that extreme operating cash flows provide value relevance beyond those provided by extreme earnings is accepted.

In Table 12, we present a summary comparing the results of the impact of the earnings and extreme cash flow on the value relevance.

Concerning the effect of the weighting of earnings on the incremental value of cash flows (the additional role of cash flows in earnings), we expect the market to put a greater weight on moderate (not extreme) cash flows. Therefore, the aggregate ratios of the cash flows of the

extreme earnings will be greater than the moderate earnings with only moderate (non-extreme) cash flows.

We reported, in Panel A (table 12), the impact of earnings and cash flows extremities. In Panels A1 and A2, we compared the regression coefficients between moderate and extreme earnings with moderate cash flows (group 1 versus group 3) and with extreme cash flows (group 2 versus group 4), respectively. The combined coefficients of moderate and extreme earnings are 3.77071 (H2); 0.60973 (H4); 3.58076 (H3); and 0.62971 (H5), in Panels A1 and A2, respectively. In the column Moderate versus Moderate cash flow, we observed -0.78266 and -2.22496, for B1 and B2, respectively. This confirms that the market places less weight on extreme cash flows than moderate cash flows regardless of whether the earnings are moderate or extreme, meaning that extreme cash flows are less informative than moderate cash flows.

We compared, in Panel B1, the sum of the coefficients of earnings between the extreme cash flows for moderate earnings. The added coefficients are 3.77071 and 3.58076, respectively. The difference between the coefficients of earnings added between extreme and moderate cash flows is negative, since we observe that the sum of the coefficients of the extreme cash flows minus the sum of the coefficients of the moderate cash flows is -0.18995. This result does not support our assumption that the market places heavier weight on moderate earnings when cash flows are extreme than when cash flows are moderate. This implies that moderate earnings do not play an extra role to the extreme cash flows in the evaluation of the companies.

We compared, in Panel B2, the added coefficients of earnings between moderate and extreme flows for extreme earnings. The added coefficients of earnings are 0.60973 and 0.62971, respectively. The difference is negative, but substantially small, since we find that the sum of the coefficients of earnings of the extreme cash flows less the summed coefficients of the earnings of the moderate cash flows is 0.01998. This means that the market almost equals extreme earnings when cash flows are extreme compared to when cash flows are moderate. This result presents an insignificant additional result of extreme earnings for extreme cash flows. We present, in Table 12, a summary comparing the results of the impact of the earnings and extreme cash flow on the value relevance.

Table 12: Comparison of the Results of the Impact of the Earnings and Extreme Cash Flows on the Value Relevance							
Model of changes in and levels of earnings and cash flows from operations $R_{it} = \alpha_{0t} + \alpha_{1t}\Delta Earning_{it} + \alpha_{2t}\Delta OCF_{it} + \alpha_{3t}Earning_{it} + \alpha_{4t}OCF_{it} + \varepsilon_{it}$							
Panel A: impact of Extreme Earnings on the Incremental Value Relevance of Earnings and Cash Flows							
Moderate Earnings (LM) A.1(Table 8) & A.2 (Table 9)			Extreme Earnings (LE) A.1 (Table 10) & A.2 (Table 11)			Extreme versus Moderate Earnings	
Adjusted R^2	Sum of $(\alpha_1 + \alpha_3)$	Sum of $(\alpha_2 + \alpha_4)$	Adjusted R^2	Sum of $(\alpha_1 + \alpha_3)$	Sum of $(\alpha_2 + \alpha_4)$	Sum of $(\alpha_1 + \alpha_3)^{LE} - (\alpha_1 + \alpha_3)^{LM}$	Sum of $(\alpha_2 + \alpha_4)^{LE} - (\alpha_2 + \alpha_4)^{LM}$
Panel A.1 – Moderate Cash Flows							
0.403057	3.770714	0.986203	0.464658	0.609725	2.743194	-3.16099	1.75699
Panel A.2 – Extreme cash flows							
0.438216	3.580765	0.203539	0.414796	0.629706	0.518233	-2.95106	0.31469

Panel B: Impact of Extreme Earnings on the Incremental Value Relevance of Earnings and Cash Flows							
Moderate Cash Flows (FCM) B.1(Table 8) & B.2 (Table 10)			Extreme Cash Flows (FCE) B.1(Table 9) & B.2 (Table 11)			Extreme versus Moderate Cash Flows	
R^2 Adjusted	Sum of $(\alpha_1 + \alpha_3)$	Sum of $(\alpha_2 + \alpha_4)$	R^2 Adjusted	Sum of $(\alpha_1 + \alpha_3)$	Sum of $(\alpha_2 + \alpha_4)$	Sum of $(\alpha_1 + \alpha_3)^{FCE}$- $(\alpha_1 + \alpha_3)^{FCM}$	Sum of $(\alpha_2 + \alpha_4)^{FCE}$ - $(\alpha_2 + \alpha_4)^{FCM}$
Panel B.1 – Moderate Earnings							
0.403057	3.770714	0.986203	0.438216	3.580765	0.203539	-0.18995	-0.78266
Panel B.2 – Extreme Earnings							
0.464658	0.609725	2.743194	0.414796	0.629706	0.518233	0.01998	-2.22496

According to the our results described in Table 12, we have found that the end-effect of extreme earnings and cash flows on the incremental value relevance indicates that: extreme earnings are less informative than moderate earnings, regardless of whether cash flows are moderate or extreme; extreme earnings lead to greater incremental value relevance for moderate cash flow; extreme earnings do not lead to greater incremental value relevance for cash flows; extreme cash flows are less informative than moderate cash flows, regardless of whether the earnings are moderate or extreme; and extreme cash flows do not lead to increased incremental value relevance for earnings.

These results are consistent with the US study (Cheng & Yang, 2003; Mostafa, 2016). In addition, it turns out that extreme cash flows do not lead to value relevance for moderate earnings. This result is not consistent with the US study (Cheng & Yang, 2003), which states that extreme cash flows lead to greater incremental value relevance for moderate (not extreme) earnings. The discrepancy can be attributed to the relative persistence and embedded edge of US earnings and cash flows relative to Brazil.

We conclude that, in Brazil, the earnings extremity has a positive effect on moderate cash flows and no (negative) effect on extreme cash flows, and that cash flows extremity has no positive effect on the moderate earnings and no (negative) effect on the extreme earnings.

DISCUSSION AND CONCLUSIONS

This study aimed to contribute with the knowledge about the incremental value relevance of earnings and operating cash flows, analyzing the control of the extremities of earnings and cash flows in companies. The hypothesis was that operating cash flows improved the value relevance beyond earnings. The underlying hypothesis was that moderate operating cash flows improved the value relevance beyond moderate earnings; and extreme operating cash flows improved the value relevance beyond extreme earnings. To do this, we analyzed the value relevance of earnings and cash flows in the following four different cases: moderate earnings and moderate cash flows; moderate results and extreme cash flows; extreme results and moderate cash flows; and extreme earnings and extreme cash flows.

Our results indicate that earnings and cash flows have incremental value relevance, yet one is beyond the other. When we examine the elements of the cash flows with the components of

earnings, we find the opposite for the cash flows, that is, extreme cash flows have potentially no incremental value relevance beyond moderate earnings. Therefore, earnings have incremental value relevance beyond cash flows. However, we note that cash flows do not always have incremental value relevance beyond earnings. Specifically, we have verified that extreme cash flows do not have incremental value relevance beyond moderate earnings. In a more in-depth analysis, we note that the effect of extreme earnings on the incremental value relevance of earnings is negatively significant, that is, extreme earnings are less informative than moderate earnings. Besides, the effect of extreme cash flows on the incremental value of the cash flow is significantly negative, that is, extreme cash flows are less informative than moderate cash flows. It is also observed that the market places more weight on information when cash flows are moderate (not extreme) and when earnings are extreme than when earnings are moderate. These results confirm that cash flows supplement earnings in the equity valuation. However, these results suggest that extreme cash flows are not reliable for valuation, especially when earnings are moderate. Therefore, investors and researchers should pay attention to both earnings extremities and cash flows extremities in the value of companies.

Considering that earnings are not susceptible to persist over the years, the results of this study can be interpreted as indicating that cash flows and earnings information are jointly used by investors. It would be expected that these results are not specific in Brazil. Therefore, we suggest carrying out research using data from other countries in order to verify this expectation comparatively.

REFERENCES

Akbar, S., Shah, S.Z.A., & Stark, A.W. (2011). The value relevance of cash flows, current accruals, and non-current accruals in the UK, *International Review of Financial Analysis*, 20(1), 311-319.

Arkadani, S. S., Arkadani, M. D., & Heyrani, F. (2013). The Impact of High Earnings on the Informational Content of Cash Flows in the Listed Companies on Tehran Stock Exchange.Internacional, *Journal of Academic Research in Accounting*, *Finance and Management Sciences*, 3(4), 215-223

Ali, A. (1994). The incremental information content of earnings, working capital from operations, and cash flows, *Journal of Accounting Research*, 32(1), 61-74.

Ali, A., & Zarowin, P. (1992a). The role of earnings levels in annual earnings-returns studies, *Journal of Accounting Research*, 30 (2), 286-296.

Ali, A. & Zarowin, P. (1992b). Permanent versus transitory components of annual earnings and estimation error in earnings response coefficients, *Journal of Accounting and Economics*, 15(2-3), 249-264.

Amir, E., Einhorn, E. & Kama, I. (2013).Extracting sustainable earnings from earning margins, *European Accounting Review*, 22(4), 685-718.

Ashton, R. (1976). Cash flow accounting: a review and critique. *Journal of Business Finance & Accounting*, 3(4), 63-81.

Ball, R., & Brown, P. (1968). An empirical evaluation of accounting income numbers, *Journal of Accounting Research*, 6(2), 159-178.

Barton, J., Hansen, T.B., & Pownall, G. (2010). Which performance measures do investors around the world value the most-and why? *The Accounting Review*, 85(3), 753-789.

Bahnson, P.R., Miller, P.B.W., & Budge, B.P. (1996).Nonarticulation in cash flow statements and implications for education, research and practice, *Accounting Horizons*, 10(4), 1-15.

Beaver, W.H., Griffin, P.A. & Landsman, W.R. (1982). The incremental information content of replacement cost earnings, *Journal of Accounting and Economics*, 4(1), 15-39.

Bernard, V.L., & Stober, T.L. (1989).The nature and amount of information in cash flows and accruals, *The Accounting Review*, 64(4), 624-652.

Board, J.L.G., & Day, J.F.S. (1989).The information content of cash flow figures, *Accounting and Business Research*, 20(77), 3-11.

Bowen, R.M., Burgstahler, D., & Daley, L.A. (1987).The incremental information content of accrual versus cash flows, *The Accounting Review*, 62(4), 723-747.

Brown, S.; Lo, K.; Lys, T. (1999). Use of R2 in accounting research: measuring canges in value relevance over the last four decades. Journal of Accounting and Economics, 28, 83-115.

Charitou, A., Clubb, C., & Andreou, A. (2001). The effect of earnings permanence, growth and firm size on the usefulness of cash flows and earnings in explaining security returns: empirical evidence for The UK, *Journal of Business Finance & Accounting*, 28(5-6), 563-594.

Cheng, C.S.A., & Yang, S.S.M. (2003).The incremental information content of earnings and cash flows from operations affected by their extremity, *Journal of Business Finance & Accounting*, 30(2), 73-116.

Cheng, C.S.A., Liu, C.S., & Schaefer, T.F. (1996). Earnings permanence and the incremental information content of cash flows from operations, *Journal of Accounting Research*, 34(1), 173-181.

Cheng, C.S.A., Liu, C.S., & Schaefer, T.F. (1997). The value-relevance of SFAS No. 95 cash flows from operations as assessed by security market effects, *Accounting Horizons*, 11(3), 1-15.

Christensen, P.O., Feltham, G.A. & Sabac, F. (2005).A contracting perspective on earnings quality.*Journal of Accounting and Economics*, 39(1), 265-294.

Christie, A.A. (1987). On cross-sectional analysis in accounting research, *Journal of Accounting and Economics*, 9 (3), 231-258.

Collins, D.W., & Kothari, S.P. (1989).An analysis of intertemporal and cross-sectional determinants of earnings response coefficients.*Journal of Accounting and Economics*, 11(2/3), 143-181.

Das, S., & Lev, B. (1994). Nonlinearity in the returns-earnings relation: tests of alternative specifications and explanations, *Contemporary Accounting Research*, 11(1-2), 353-379.

Dechow, P. M., & Dichev, I. D. (2002). The quality of accruals and earnings: The role of accrual estimation errors, *The Accounting Review*, 77, 35-59.

Donnelly, R., & Walker, M. (1995).Share price anticipation of earnings and the effect of earnings persistence and firm size, *Journal of Business Finance & Accounting*, 22 (1), 5-18.

Doukakis, L.C. (2010). The persistence of earnings and earnings components after the adoption of IFRS, *Managerial Finance*, 36(11), 969-980.

Ewert, R, & Wagenhofer, A. (2011). Earnings quality metrics and what they measure. Social Science Research Network.Working Paper.University of Graz.

Field, A. (2009). Descobrindo a estatística usando o SPSS**.** Trad. LoríViali. 2. ed. Porto Alegre: Artmed.

Freeman, R.N., & Tse, S.Y. (1992).A nonlinear model of security price responses to unexpected earnings, *Journal of Accounting Research*, 30(2), 185-209.

Gu, Z.; Lee, C.W.J.; & Rosset, J.G. (2005). What determines the variability of accounting accruals? Review of Quantitative Finance and Accounting, 24, 313-334.

Green, J.P. (1999). The impact of the quality of earnings on the valuation relevance of cash flow disclosures, *British Accounting Review*, 31(4), 387-413.

Hair Jr., J.F.; Babin, B.; Money, A.H.; & Samouel, P. (2005).Fundamentos de métodos de pesquisa em administração.Trad.LeneBelon Ribeiro. Porto Alegre: Bookman.

Hee, K.W. (2011). Changes in the predictive ability of earnings around earnings restatements, *Review of Accounting and Finance*, 10(2), 155-175.

Kean, S., & Wells, P. (2007).Earnings decomposition and the persistence of earnings, *Accounting Research Journal*, 20(2), 111-127.

Kothari, S.P. (2001). Capital markets research in accounting. *Journal of Accounting and Economics*, 31(3), 105-231.

Kormendi, R., & Lipe, R. (1987). Earnings innovations, earnings persistence, and stock returns, *Journal of Business*, 60(3), 323-345.

Kumar, K.R., & Krishnan, G.V. (2008). The value-relevance of cash flows and accruals: the role of investment opportunities, *The Accounting Review*, 83(4), 997-1040.

Mostafa, W., & Dixon, R. (2013).The impact of earnings extremity on information content of cash flow, *Review of Accounting and Finance*, 12(1), 81-104.

Mostafa, W. (2016). The incremental value relevance of cash flows and earnings affected by their extremity: UK evidence, *Management Research Review*, 39(7), 742-767.

O'Hanlon, J., Poon, S., & Yaansah, R.A. (1992). Market recognition of differences in earnings persistence: UK evidence, *Journal of Business Finance & Accounting*, 19(4), 625-639.

Ou, J.A., & Penman, S.H. (1989). Accounting measurement, price-earnings ratio, and the information content of security prices, *Journal of Accounting Research*, 27, 111-144.

Patell, J.M., & Kaplan, R.S. (1977). The information content of cash flows data relative to annual earnings: preliminary tests, Working Paper, Standford University, Standford.

Pfeiffer, J.R.J., Elgers, P.T., Lo, M.H. & Rees, L.L. (1998). Additional evidence on the incremental information content of cash flows and accruals: the impact of errors in measuring market expectations, *The Accounting Review*, 73(3), 373-385.

Rayburn, J. (1986). The association of operating cash flow and accruals with security returns, *Journal of Accounting Research*, 24(3), 112-133.

Schaefer, T., & Kennelley, M. (1986). Alternative cash flow measures and risk-adjusted returns, *Journal of Accounting, Auditing & Finance*, 1(4), 278-287.

Wang, Z. (2014). Measuring investors assessment of earnings persistence: do investors see through smoothed earnings? *Review of Quantitative Finance and Accounting*, 42(1), 691-708.

Wilson, G.P. (1986). The relative information content of accruals and cash flows: combined evidence at the earnings announcement and annual report release date, *Journal of Accounting Research*, 24(3), 165-200.

Wilson, G.P. (1987). The incremental information content of the accrual and funds components of earnings after controlling for earnings, *The Accounting Review*, 62(2), 293-322.