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Decision usefulness of the positive and negative operating cash flows: A mathematical approach

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Abstract

The principal goal of this article is to investigate the effect of operating cash flow on decision-making considering the variables of the financial statements in the listed companies on the Iranian stock exchange. From the viewpoint of accounting standards, information content is applied to the particulars that will result in the information presented within the financial report being useful in the decision-making. The amount of data content for accounting for making a useful decision was evaluated in this article using the Ohlson model [35]. To realize the research objective, financial reports from 167 enterprises were accepted/listed on the Tehran Stock Exchange between 2011 and 2020. In addition, the research hypothesis was tested by applying multiple regression models with mixed data. The results show that the variable "operating cash flow" has a significant influence on the relationship between earnings per share, the book value of the share, and the stock price. This matter is in line with the information content theory. In other words, operating cash flow includes information content and will lead to an improvement in effective decision-making.

Keywords: Decision usefulness, Information Content of Accounting, Operating Cash Flow
2020 MSC: 90C70, 90C33, 90C29, 90C32

1 Introduction

Decision-making is one of the main parts of human life. Investigating is required about the ways and methods of decision-making to provide the essential information for improving the decision-making capability. The more improvement of human decision-making, the more improvement of human life quality will be. Naturally, this fact is also seen in the financial decision-making of humans [46]. The accounting environment is highly complex and challenging and information is the only result/product of the accounting. One of the reasons behind the complexity of information is related to different responses people are giving toward it. Information efficiency has transformed into one of the crucial principles of accounting theory for decision-making. Another reason for information complexity is related to the amount of work more than the effect on the individual decisions. Not only does the information influence the decisions, but also the capital market [16]. Growth of the capital market and its importance in investing absorption in developing the current companies and creating new ones is undeniable. Information about the capital market's performance plays a crucial role in reaching this purpose and correctly conducting decisions. So this information should have specific characteristics and be able to usefully help in the decision-making of financial statements' users

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[25]. The goal of accounting is to provide useful information for the decision-making of investment and attestation. So useful information is information that has qualitative features [7]. Relevance and being reliable are two qualitative features of information content. The more related information leads to more reliable financial statements for investors' decision-making and a stronger connection between financial statements accounting and stock price or return [43].The concept of value relevance is known in the usefulness approach in decisions. According to this concept, an accounting variable such as book value of per share or the earning of per share has value when it can clarify the values and market indicators. Also, in this approach, it is assumed that the market reacts to every data about itself [44]. So far, various researches about value relevance has been conducted in different places of the world, most of which were in developed markets. The results indicate that information of accounting earnings has more information content than the other accounting data [18].

Different from previous researches conducted in Iran, the influence of the information content of the operating cash flow variable on firm value is reviewed. In other words, the influence of operating cash flow on the relationship between earnings per share and the book value of the share on one hand, and the stock price on the other hand has not been reviewed in the previous researches. Hence, the main question of the present objective is "Does the financial reporting include enough information content for the investors and analysts?"

In the same vein, the objective of the present study is to expand the theoretical foundation of previous researches written about the influence of information content of accounting numbers in company valuation. Some of the academic accomplishments of the present research are as follows:

(1) The theoretical foundation of previous researches written about stock evaluation using information content approach will be expanded and will benefit decisions in accounting.

(2) The results will illustrate that whether the information content of the operating cash flow is an influential factor on the stock valuation or not. This matter can provide useful information for decision-making to the investors, Stock Exchange, and legislation bodies associated with accounting.

(3) This article can provide a better understanding of how the operating cash flow variable is affecting the relationship between earnings per share and book value of stock price according to the information content approach and theory of utilitarianism, to help the reader in decision-making.

(4) The results of this research can suggest novel ideas for conducting new researches about the matters such as stock valuation based on the information content of the accounting numbers.

In the next chapters, theoretical framework, experimental background, research method, research model and its variables, results analysis, and conclusion are presented.

2 Theoretical Foundation

2.1 Theory of Information Economics

Information is the most valuable component of the capital market and investors are seeking to increase return by relying on information and hence, utilizing the profitable market opportunities [40]. With the transition from the industrial age to the information age, the role of information has been increased significantly in the decision-making process. In this period, information is considered a valuable commodity, access to which will help gain competitive advantage [14]. Hence, accounting information is one of the most needed information, which is the product/branch of the accounting information system [48] Accounting information can influence decision-making although there might be different information resources for a variety of decisions [10]. In fact, as the number of times investors using the account information increases, more rational and suitable decisions are expected to be made [48]. Organizing the accounting information is significantly important. Users are not eager to overwhelm themselves with too much information; instead, they are seeking efficient ways to categorize the information easily. Hence, simplification and easy access to information is the optimal objective of the users. However, there is a concern that over-simplification may result in information losing its universality [38].

With the emergence of the theory of information economics, an information approach was generated in the accounting thoughts, which later was utilized in the studies of a number of scholars in the field of accounting including [4] and [8]. In this informational paradigm, information is considered a scarce resource, just as other resources that are utilized for production and exchange in the economy. Demand for information results from the need to improve decision-making under uncertain situations. One of the major teachings of information economics is associated with

the uncertain nature of the value of each certain resource [48]. When an investor attempts to invest, he or she is entering an uncertain situation (risk) where the chance of obtaining a high return is swapped with the chance of losing the investment [41].

The main subject matter of this theory is as follows: (1) information is considered an economic commodity, (2) obtaining information will result in an economic selection problem. Financial information is given to the investors and decision-makers by the Stock Exchange, issuers of securities, financial intermediaries, analysts, and media. Information value is determined based on the cost-benefit constraint, theoretical decision-making structure, and economic theory. The accounting information is assessed based on this view "How far can it improve the optimal quality of the selection problem that a person or number of different individuals should solve?" [40].

2.2 Information Content Approach and Theory of Decision Usefulness

Issued financial reports are considered as the crucial source of information in order to make economic decisions. Therefore, they should be prepared and issued in a way that people will understand them and make the right decision about resource allocation. In other words, the content of accounting information is highly important and can play a significant role in decision-making. Also, users' decision to use accounting information is influenced by the information content [3]. According to the Accounting Standards, the main objective behind the preparation of financial reports and financial information is to provide valuable information about the financial situation and the results of business enterprise and help the users to make their decisions [6]. From the viewpoint of accounting standards, information content is applied to the particulars that will result in the information presented within the financial reports being useful in the decision-making [12]. On the other hand, one of the crucial pillars of responsiveness and making conscious decisions, which will influence economic growth and development, is clear and comparable financial information. Although financial information is extracted from different resources, financial reports are considered the main source of financial information [21]. The main features of clear financial reporting are as follows: accessibility, being able to rely on, comprehensiveness, appositeness, and being on-demand [6].

A positive theory, as a substitute for the normative theory, in order to prepare the standards has been presented long time ago, and then, this theory focused on accounting information usefulness for the investors' decision-making. After the accounting positive theory was identified, more research was conducted and numerous concepts were reviewed that were capable of predicting and interpreting the firm value [47]. On the other hand, the theory of decision usefulness is focusing on the informational needs of those who are using the financial reports, exclusively investors and creditors. In this approach, it is assumed that information can have an impact on the users' decisions. the existence of suitable and related information and its influence on the market values are highly important for the investors and creditors in order to predict cash flows. Researches associated with the decision usefulness approach are conducted based on the efficient-market hypothesis [5]. Therefore, it plays one of the major roles in accounting and audit in order to determine securities and stock prices, to make right and conscious decisions in investment, and to report suitable and useful information for the users and investors [15].

Investors are constantly faced with decision-making between various options and supplying the required information [34]. The accounting information has a specific spot among all of this information. Lack of recognition of the natural and logical decision-making process in an economic environment is one of the main problems in accounting standard-setting. Theoretical frameworks of financial reporting consider providing helpful information in decision-making as one of the main goals of accounting. The more investors use accounting information; the more logical decision-making is expected [46]. There is considerable evidence about using basic information in investment selecting. By pioneering Graham and Dodd [19], and then Ball and Braun [4], a specific spot was created for researches about value relevance. The investigations of this field have shown that fundamental analysis by logically using accounting information has potential economic benefits [49]. The researches of the value relevance field are based on the fact that financial statements are the principal tools in transferring the information to investors, and the accounting information is effective in the price and earning of the shares [31]. In fact, the market factors are dependent on the financial reporting of companies. Financial reporting effectiveness is dependent on the information relevance and reliability. The first investigation that brought up the accounting information relevance was conducted by Amir, Harris, and Venuti [2]. The researches by Ohlson [35] and Fletham and Ohlsen [17] established a foundation to redefine the goal of the research about the relationship between financial statements and company value and provided a structure for modeling in this field [35]. In fact, value relevance is one of the qualitative and basic features of accounting information. Providing the relevant information helps the decision-makers to make a rational decision and can be a factor that can prevent ambiguity and confusion in investigating and analyzing the financial information because the relevance of information is relative, and its content is dependent on the financial information users and their demands. Generally, it can be said that a piece of information is relevant when it is effective and plays a crucial role in making decisions. So

the value relevance can be defined as accounting information effectiveness on the users' decisions about previous events results and predicting the effects of current and future events, and confirming or adjusting the previous expectations [16].

2.3 Operating Cash Flow

Due to the importance of cash flows in the business enterprises' success and the necessity of their survival, managers and investors are utilizing cash flow, exclusively operating cash flow, for new financial analysis. In other words, cash flows are highly focused on as one of the inseparable components for financial planning. Due to the importance of such matter, cash flow within the business enterprises can be compared with blood circulation in the body [15]. On the other hand, cash flows are highly important for the constant growth of a business enterprise. Although the significant income of a business enterprise shows that it is financially healthy, it can be misleading. It is possible for the company to exit the market due to reports of positive incomes (competition cycle) since cash is normally required to purchase materials or pay the operating costs such as lease rate or workforce wages. Even though a business enterprise is gaining profit, it will not grow without cash. If a company is unable to replenish inventory, there will be no new sales. Along with this matter, failure to pay the operating costs will have a negative influence on investors' decision-making. Hence, they will hesitate to invest in the business enterprise and the business enterprise will face financial limitations and this will lead to a decline in the firm value [27]. In addition, understanding the enterprise's ability to pay is one of the necessities and although income statement is not capable of providing the full information, it can be done by the cash flow statement. Since the capital market response is connected to the investors' response, it can be explained that presenting information that lacks the information content will have no influence on the capital market and will not excite the capital market [33]. On the other hand, investors and creditors are focusing on the cash flow of the business enterprise to make managerial decisions. From the extra organizational view, cash flow-related information (exclusively operating cash flows) are providing a suitable basis for the beneficiary groups within the organization to make economic decisions [23].

2.4 International Research Review

In [28] authors reviewed the Market responses to cash dividends distributed from capital reserves. They found out that investors can clearly distinguish between the information content of cash dividends from capital reserves and that of cash dividends from retained earnings. The research results illustrate that just like traditional cash dividends distributed from retained earnings, variations in the dividend payout ratio are positively correlated with market responses if cash dividends are distributed from capital reserves. In a research titled "Stock Price and Cost of Debt Reaction to Changes in Cash Flow from Operations", [45] reviewed the relationship between operating cash flow and stock price return. The results shows that there is a correlation between cash flows and stock price return, as an index for the firm value.

In [11] authors reviewed the usefulness of financial reporting for Australian investors and creditors.results showed that financial reporting is not the only tool the company can use to gather information, and hence, investors and creditors are using other resources to obtain the needed information. [36] reviewed the information content of financial reports in the users' decision-making in countries with a transforming economy. The results confirm that the information content of financial reporting is based on a systematic approach. Based on this approach, the company will be required to disclose financial and non-financial information in financial reports.

[20] review the influence of intellectual capital on the information content of financial reporting in Indonesia. The results showed that disclosing intellectual capital may increase the information content of financial reporting.

[22] review whether the relationship between the market value of the stock and two variables, namely earnings per share and book value of the stock return is a linear or non-linear one. Also, they approved that the relation between the above-mentioned variables is non-linear.

In [9] authors reviewed the impact of R&D expenditures on stock valuation, by taking cooperate governance role into account. results showed that R&D expenditures have a positive and significant influence on the market value of each share and good governance is able to prevent potential over-investment in R&D expends more than the actual value of the stock. [29] show that information content of accounting variables of Romanian companies have increased from 2011 after adopting International Financial Reporting Standards (IFRS).

2.5 Domestic Research Review

Some of the important researches conducted in Iran are as follows:

[15] review the influence of accounting information on operating cash flow. The results showed that quality of accruals, stable profit/earning, predictability, and income smoothing have an influence on the operating cash flow.

In [1] author reviewed the impact of firm growth on the relationship between the market value of the stock and two variables, namely earnings per share and book value. The results illustrated that if the company profitability increases, the company growth will have a positive impact on market value and earnings per share. Also, it will have a negative impact on the relationship between market value and the book value of the stock.

In [26] authors reviewed the influence of variables, namely currency rate, inflation rate, interest rate, and economic growth (as the other data) using Olsen's linear valuation model. The results showed that currency rate, inflation rate, and interest rate will result in a non-linear relationship between two variables, namely book value and earnings per share, and market value of each share.

[13] review the influence of investment in capital assets on the relationship between two variables, namely book value and earnings per share. The results showed that growing investments will intensify the relationship between the market value of the stock and earnings per share for the firms that have to potential to be highly profitable.

[24] reviewed the relationship between accruals, operating cash flows, and book value with the market value of the stock. Results showed that operating cash flows and book value has a direct relationship with the market value of the stock but accruals have an inverse relationship with the market value of the stock.
[32] reviewed the performance of Feltham and Ohlson's [17] valuation model and they found out that mentioned model is not fully capable of determining the intrinsic value of company stock.

[42] reviewed the predictability of book value, net income, and cash flow from operations and investment in the relationship with the market value of company stock. Results showed that accounting profit (income) and book value are performing well in predicting the market value of the stock. Also, adding the variable "cash flow from operations and investments" will not improve the ability to clarify the models.

[39] reviewed the relationship between profit and book value with the market value of the stock. Results showed that the major changes in the market value of the stock are explained by the profit and the major power of clarifying the profit and book value of the stock is associated with the accounting profit.
Based on the above researches, it can be said that using only book value data and earning per share will not lead to suitable results in order to clarify the market value of the stock. In this vein, the roles of other information should be taken into account. Based on the theoretical basics extracted from domestic and international researches, the following hypothesis has been tested:

Hypothesis: There is a significant relationship between positive operating cash flow and negative operating cash flow.

3 Research Methodology

3.1 Models and Research Variables

Multiple linear regression models have been utilized in order to test the research hypothesis. The reason for using the regression model is research variables are continuous and have a quantitative nature.

The first model of Ohlson [35] associated with research hypothesis test:

$$P_{i,t} = a + \beta 1 EPS_{i,t} + \beta 2 BV_{i,t} + \xi. \tag{3.1}$$

Adjusted model (2) associated with research hypothesis test after adding positive and negative operating cash flow variables:

$$P_{i,t} = a + \beta 1 EPS_{i,t} + \beta 2 BV_{i,t} + \beta 3 CFO_{i,t} + \xi. \tag{3.2}$$

The variables in the above-mentioned model are as follows:

3.1.1 Dependent Variable

Pi,t: Market value of each share of the company i at the end of period t (after stakeholders' general meeting at the end of Tir – Equivalent to July).

3.1.2 Independent Variable

EPSi,t: Earnings per common share of the company i at the end of period t – It is calculated by dividing net income by the weighted average of the firm common stock.
BVi,t: Book value of a common share of the company i at the end of period t – It is calculated by dividing shareholders' equity by the number of the firm's common stock.
CFOi,t: Operating cash flow.

3.2 Research Method

This research is applied research in terms of objective. Linear regression and hybrid/mixed data have been used in this research in order to test the research hypothesis. The data in this research are extracted from previous literature and documents using the "Rahavard Novin" database and they were compared with the company's financial reports archives in order to validate the data. Statistical population includes enterprises accepted/listed in the Tehran Stock Exchange between 2011 and 2020. To obtain a homogenous statistical population, the data screening method was utilized in the present research. The following items are the screening criterion in order to obtain the statistical population.

1- The selected firms should be listed on the Tehran Stock Exchange in the above-mentioned years.

2- Firms that did not experience any delay in their transaction for the period of not more than 8 months.

3- Firms that were not listed in the Tehran Stock Exchange after 2011.

4- Banks and credit institutions, insurance companies and pension organizations, and financial intermediaries, and monetary and investment institutions are not included.

5- The fiscal year should be based on the Solar Hijri calendar and not be changed during the mentioned period.

After applying the above constraint, the statistical population reached to be 167 companies, and the data were utilized in order to estimate the models and test the research hypostasis.

4 Research Results

4.1 Descriptive Statistics

The descriptive statistics are showing the general view of the data conditions that are illustrated in Table 1. The results showed that the average (median) market value of each share, earning per share, and the book value of each share are as follows respectively: 5123 (3091) IRR, 725 (419) IRR, and 2166 (1772) IRR. The average statistic associated with operating cash flow (CFO) is 636733 IRR.

Table 1: Descriptive statistics

Variable	Symbol	Average	Median	Least Value	Maximum Value	Standard Deviation	Coefficient of Kurtosis	Coefficient of Skewness
Market value of each share	P	5123	3091	158	50670	5619.20	14.55	2.88
Earnings per share	EPS	725	419	-4020	9276	1180.29	13.73	2.33
Book value of each share	BV	2166	1772	-6913	14494	1768.13	10.88	1.63
Operating cash flow	CFO	636733	75467	-248939	351892	273495	6.43	68.58

4.2 Linear Regression Analysis

To test the research hypothesis, the data from companies have been divided into two categories: companies with negative operating cash flow and positive operating cash flow. Based on the statistical population equal to 167 companies, the number of negative data (negative operating cash flow) and the number of positive data (positive operating cash flow) has been divided into 207 year-company and 1463 year-company.

4.2.1 Testing research hypothesis for the companies with negative operating cash flow

4.2.2 Testing research hypothesis without negative operating cash flow variable

Using one of the two options, namely pooled data model and panel data models, depends on whether the vertical intercept of the model is constant or changing. Limer test (Chow test) is utilized in order to determine a suitable structure for the model [7]. Results of the Limer test (Chow test), which is shown in Table 2, illustrates that the panel data model is suitable for the companies with negative operating cash flow (207 year-company from 1670 year-company) due to having Chow statistic (prob) less than 5%. If this value is more than 5%, the pooled data model can be utilized.

Hausman test has also been used to choose between the fixed-effect model or random-effect model. This matter is associated with the relationship between the changes in vertical intercept and explanatory variables in the model [7]. Results of the Hausman test, which is shown in Table 2, illustrate that the significant level of the Hausman statistic is less than 5%. Therefore, the Hausman statistic is more significant than random-effect model is more suitable.

Table 2: Findings of Chow test and Hausman test

Test	Coefficients	Significant Level	Comparison Against 5%	Result
Chow test	5.7558	0.00	Less than5%	Panel data model
Hausman test	12.4327	0.00	Less than5%	Fixed effect

To test the research hypothesis, the results of model (1) estimation are presented in Table 3 and next, the results of model (1) estimation for complementary analysis are illustrated in Table 3. In general, F represents the optimal fitness of the model. R2 model shows that 90.47% of the changes in the dependent variable (firm value) can be explained significant explanatory variables (independent). Also, the significant level of T that is 0.00 that is less than 5% is associated with coefficients of earnings per share and book value of each share with the values of 2.26 and 0.39, respectively. The results showed that independent variables, namely earnings per share and book value of each share, have an influence on the dependent variable, the market value of each share, within the companies that have negative operating cost flow. Hence, the research hypothesis will not be rejected based on the results given in Table 3 with a confidence level of 95%.

Table 3: Results of estimating model (1)

Variable	Symbol	Coefficients of Variables	Standard Deviation	T statistic	Significant Level	Comparison Against 5%	Result
Vertical intercept	C	2860.81	401.16	7.11	0.00		
Earnings per common share	EPS	2.26	0.47	4.71	0.00	Less than5%	Influential
Book value of each common share	BV	0.39	0.29	1.32	0.018	Less than5%	Influential
Durbin-Watson statistic	$DW-stat$	2.09	Since the Durbin-Watson statistic has a value between 1.5 and 2.5 the assumption about the two errors being independent is accepted				
Coefficient of determination of the model	$R2$	0.9047	90.47% of changes in the dependent variable can be explained by significant explanatory variables (independent)				
Fisher statistic	$F-sat$	10.88	In this level, the model is accepted to be significant				
Model's significant level	$P-value$	0.00	The assumption about the model being significant is accepted. In other words, the model is linear since the significant level of Fisher statistics is less than 5%				

4.2.3 Testing research hypothesis after adding negative operating cash flow variable

To test the research hypothesis, the results of model (2) estimation are presented in Table 4 and next, the results of model (2) estimation for complementary analysis are illustrated in Table 4. In general, F represents the optimal fitness of the model. R2 model shows that 90.80% of the changes in the dependent variable (firm value) can be explained significant explanatory variables (independent). Also, the significant level of T that is 0.00 that is less than 5% is associated with the variable coefficient of negative operating cash flow with the value -0.0008. The results showed that the negative operating cash flow variable has an influence on the relationship between independent variables "earnings per share" (book value of each share) and dependent variable "market value of each share". Hence, the research hypothesis will not be rejected based on the results given in Table 4 with a confidence level of 95%.

Table 4: Results of estimating model (2)

Variable	Symbol	Coefficients of Variables	Standard Deviation	T statistic	Significant Level	Comparison Against 5%	Result
Vertical intercept	C	2272	492.72	4.61	0.00		
Earnings per common share	EPS	2.06	0.48	4.27	0.00	Less than5%	Influential
Book value of each common share	BV	0.67	0.32	2.08	0.03	Less than5%	Influential
Negative operating cash flow	CFO	−0.0008	0.0004	−2.01	0.04	Less than5%	Influential
Durbin-Watson statistic	$DW-stat$	1.600	Since the Durbin-Watson statistic has a value between 1.5 and 2.5 the assumption about the two errors being independent is accepted				
Coefficient of determination of the model	$R2$	0.9081	90.81% of changes in the dependent variable can be explained by significant explanatory variables (independent)				
Fisher statistic	$F-sat$	11.11	At this level, the model is accepted to be significant				
Model's significant level	$P-value$	0.00	The assumption about the model being significant is accepted. In other words, the model is linear since the significant level of Fisher statistics is less than 5%				

The result of each stock price evaluation within the companies with negative operating cash flow (207 year –company from 1670 year-company) showed that if negative operating cash flow variable is added to the model, coefficient of determination (R2) will increase. This shows that a better model will be fitted and also, a better model will be obtained.

4.2.4 Testing research hypothesis for the companies with positive operating cash flow

4.2.5 Testing research hypothesis without negative operating cash flow variable

According to Table 5, the results of the Chow test show that the Panel model can be applied to the data structures for companies with positive operating cash flow (1462 year-company from 1670 year-company) due to the fact that Chow statistic (prob) is less than 5%. Also, based on Table 4, Hausman test results show that Hausman statistics has a significant level of less than 5%. Therefore, Hausman's statistic is significant and using the random-effects model is more suitable.

Table 5: Findings of Chow test (Limer) and Hausman test

Test	Coefficients	Significant Level	Comparison Against 5%	Result
Chow test(Limer)	3.6138	0.00	Less than5%	Panel data model
Hausman test	64.3042	0.00	Less than5%	Fixed effect

To test the research hypothesis, the results of model (1) estimation are presented in Table 6 and next, the results of model (2) estimation for complementary analysis are illustrated in Table 4. In general, F represents the optimal fitness of the model. R2 model shows that 71.22% of the changes in the dependent variable (firm value) can be explained

significant explanatory variables (independent). Also, the significant level of T that is 0.00 that is less than 5% is associated with the variable coefficient of earnings per share and book value of each share with the values of 1.61 and 0.80, respectively. The results showed that independent variables, "earnings per share" and "book value of each share" have an influence on the dependent variable "market value of each share" within the companies with positive operating cash flow. Hence, the research hypothesis will not be rejected based on the results given in Table 6 with a confidence level of 95%.

Table 6: Results of estimating model (1)

Variable	Symbol	Coefficients of Variables	Standard Deviation	T statistic	Significant Level	Comparison Against 5%	Result
Vertical intercept	C	2177.17	177.60	12.25	0.00		
Earnings per common share	EPS	1.61	0.15	10.39	0.00	Less than5%	Influential
Book value of each common share	BV	0.80	0.09	8.29	0.03	Less than5%	Influential
Durbin-Watson statistic	$DW-stat$	1.49	Since the Durbin-Watson statistic has a value between 1.5 and 2.5 the assumption about the two errors being independent is accepted				
Coefficient of determination of the model	$R2$	0.7122	71.22% of changes in the dependent variable can be explained by significant explanatory variables (independent)				
Fisher statistic	$F-sat$	19.04	At this level, the model is accepted to be significant				
Model's significant level	$P-value$	0.00	The assumption about the model being significant is accepted. In other words, the model is linear since the significant level of Fisher statistics is less than 5%				

4.2.6 Testing research hypothesis after adding negative operating cash flow variable

To test the research hypothesis, the results of model (2) estimation are presented in Table 2 and next, the results of model (2) estimation for complementary analysis are illustrated in Table 7. In general, F represents the optimal fitness of the model. R2 model shows that 71.24% of the changes in the dependent variable (firm value) can be explained significant explanatory variables (independent). Also, the significant level of T that is 0.00 that is less than 5% is associated with the variable coefficient of positive operating cash flow with the values of 5.72. The results showed that the variable "positive operating cash flow" has an influence on the relationship between independent variables, namely earnings per share (book value of each share) and dependent variable "market value of each share". Hence, the research hypothesis will not be rejected based on the results given in Table 7 with a confidence level of 95%.

Table 7: Results of estimating model (2)

Variable	Symbol	Coefficients of Variables	Standard Deviation	T statistic	Significant Level	Comparison Against 5%	Result
Vertical intercept	C	2130.46	184.02	11.58	0.00		
Earnings per common share	EPS	1.161	0.15	10.39	0.00	Less than5%	Influential
Book value of each common share	BV	0.80	0.09	8.30	0.03	Less than5%	Influential
Operating cash flow	CFO	5.72	5.90	0.96	0.03	Less than5%	Influential
Durbin-Watson statistic	$DW-stat$	1.89	Since the Durbin-Watson statistic has a value between 1.5 and 2.5 the assumption about the two errors being independent is accepted				
Coefficient of determination of the model	$R2$	0.7124	73% of changes in the dependent variable can be explained by significant explanatory variables (independent and control)				
Fisher statistic	$F-sat$	18.94	At this level, the model is accepted to be significant				
Model's significant level	$P-value$	0.00	The assumption about the model being significant is accepted. In other words, the model is linear since the significant level of Fisher statistics is less than 5%				

In general, testing of companies with positive operating cash flow (1462 year – company from 1670 year-company) illustrated that if positive operating cash flow variable is added to the model, coefficient of determination (R2) will increase. This shows that a better model will be fitted and also, a better model will be obtained.

5 Discussion and Conclusion

After testing the research hypothesis, it was found that positive (negative) operating cash flow has a significant influence on the relationship between earnings per share (book value of each share) and share value. Also, the results illustrated that if positive (negative) operating cash flow variable is added to the evaluation model of company stock value, coefficient of determination (R2) will increase. This also shows that the model has been improved by adding a positive (negative) operating cash flow variable. On the other hand, after the coefficient of determination of two variables (positive and negative operating cash flow) was reviewed in the evaluation model of company stock price, it was determined that the coefficient of determination in the price evaluation model is significantly higher when negative operating cash flow is added in comparison to adding positive operating cash flow. This matter tells that market is giving a quicker response to bad news (negative) in comparison to good news (positive), leading to a decline in the price of each share. Then, the research hypothesis was tested and the coefficient of determination in the evaluation model of each share value was compared after adding positive and negative operating cash flow and it can be concluded that there is a significant difference between content information of positive and negative operating cash flow.

In general, this means that positive (negative) operating cash flow can have information content as an adjusting variable. Theoretically, these findings are in line with the theory of information economics since, according to this theory, information is considered a scarce resource, just as other resources and demand for information (and value in turn) result from the need to improve decision-making under uncertain situations. Moreover, based on the information content theory, useful information in financial reporting is significantly important due to the fact that useful, suitable, and right information will simplify the decision-making. Here, the ability to predict and evaluate the financial reports numbers is among the characteristics. These findings are consistent with findings of the following studies: [1, 13, 15, 20, 26, 29, 36, 39, 42, 45]. However, the results of the first and second hypotheses are not consistent with the results by [11].

In general, the findings of this research illustrate that positive (negative) operating cash flow has a significant impact on the firm value. Theoretically, these findings are consistent with the theory of information economics, theory of information content, and theory of decision usefulness. Hence, information appositeness and its impact on the market values are highly important for the investors and creditors in order to stock prediction and evaluation. Hence, it is recommended that investors and creditors should consider the influence of positive (negative) operating cash flow variable on the relationship between earnings per share (book value of each share) and price of each share in order to evaluate the firm value and to apply it into the decision-making models. It is also recommended to the experts at the Stock Exchange, as the legislative authority, to provide certain measures in order to disclose more clear information about the positive (negative) operating cash flow index and make more attempts in order to rate the companies using this index. Ultimately, it is suggested to the professors and students to utilize the results of this research in order to assess the company's evaluation models both in teachings and research.

References

[1] A. Aflatooni, *The influence of company growth on the relationship between market value, book value, and earnings*, J. Financ. Account. Audit. Res. **8** (2016), no. 31, 1–21.

[2] E. Amir, T.S. Harris and E.K. Venuti, *A comparison of the value-relevance of US versus non-US GAAP accounting measures using form 20-F reconciliations*, J. Account. Res. **31** (1993), 230–264.

[3] K. Azadi, H.A. Mohammadlou, M.J. Tasadi Kari and H. Khedmatgozar, *The readability effect of financial statements on stock price risk and shareholder behavior*, J. Financ. Account. Knowledge **8** (2021), no. 28, 121–144.

[4] R. Ball and P. Brown, *An empirical evaluation of accounting income mumbers*, J. Account. Res. **6** (1968), 103–126.

[5] B. Bani Mahd and S.A. Ahmadi, *A review on the usefulness of audit reports in market capital*, J. Account. Knowledge **2** (2013), no. 6, 13–30.

[6] A.A. Bandarian, M.R. Bandarian, S. Bozorgmehrian and F. Maghsoodi, *The influence of corporate internet quality reporting and cooperate characteristics on the content information of equity capital*, J. Financ. Account. Audit. Res. **11** (2019), no. 43, 219–245.

[7] B. Bani Mahd and G. Rahman Nejad, *Valuable content of dividends in companies*, J. Financ. Account. Audit. Res. **9** (2017), no. 33, 17–28.

[8] W.H. Beaver, *The information Content of Annual Earnings Announcements*, J. Account. Res. **6** (1968), 67–92.

[9] K. Chen, H.K. Chen, L.H. Hong and Y. wang, *Stock market valustion of R&D expenditurse-the role corporate governance*, Pacific-Basin Finance J. **31** (2015), 78–94.

[10] J.A. Christensen and J.S. Demski, *Accounting theory*, Boston, MA: McGraw-Hill/ Irwin, 2003.

[11] M. Davern, G. Nikole, H. Dean and P. MatthEew, *Is financial reporting still useful?, Australian Evidence*, J. Account. Finance Bus. Stud. **55** (2019), no. 1, 237–272.

[12] H. Didar and S. Vakili, *Information content of consolidated versus parent company financial statements with emphasis on the role of international financial reporting standards. Evidence from the two capital markets (Iran and Singapore)*, J. Empirical Res. Account. **6** (2017), no. 4, 25–46.

[13] H. Etemadi and M. Saeedi, *The influence of investment in capital assets on the relationship between stock current value, book value and earnings per share*, Journal of Financ. Knowledge Secur. Anal. **6** (2013), no. 4, 45–61.

[14] H. Fakhari and Y. Rezaei Pitenoei, *A model for measuring cooperate information setting*, Quart. J. Financ. Account. **9** (2017), no. 39, 121–147.

[15] A. Farhangian and F. Heydarpoor, *The impact of information content quality on the operating cash flow*, J. Empir. Res. Account. **9** (2019), no. 32, 121–141.

[16] D. Farid and M. Ghadak Forooshan, *Asset management and relevance of accounting information*, J. Financ. Account. Audit. Res. **11** (2019), no. 44, 79–100.

[17] G.A. Feltham and J.A. Ohlson, *Valuation and clean surplus accounting for operating and financial activities*, Contemp. Account. Res. **11** (1995), no. 2, 689–731.

[18] Ø. Gjerde, K. Knivsfla and F. Sættem, *The value relevance of financial reporting in Norway 1965—2004*, Scand. J. Manag. **27** (2011), 113–125.

[19] B. Graham and D.L. Dodd, *Security analysis*, Columbia Business School, 1934.

[20] M. Hayati, Y. Urniwati and R. Putra, *The effect of international capital to value relevance of accounting information based on PSAK convergence*, Proc. Soc. Behav. Sci. **21** (2016), no. 1, 125–153.

[21] R. Hejazi and S. Meyhami, *Survey adoption of fair value accounting standards and its impact on accounting profit*, J. Empir. Res. Account. **6** (2017), no. 4, 127–150.

[22] J. Heo and J. Yong, *Stock price prediction based on financial statements using SVM*, Int. J. Hybrid Inf. Technol. **9** (2016), no. 2, 57–66.

[23] J. Kangaravi, S. Mansoor Fard and M. Motavassel, *The impact of operating cash flows on financial leverage adjustments in firms listed on Tehran Stock Exchange (TSE)*, J. Financ. Manag. Strategy **2** (2014), no. 1, 93–75.

[24] A. Khajepoor and D. Gorjizadeh, *A review on the relationship between accruals, operating cash flow, and book value with market value of stock*, J. Ind. Strategic Manag. **9** (2012), 1–15.

[25] A. Khodamipour and A. Torkzadeh, *Taxation and financial reporting and the relevance of accounting information*, J. Financ. Account. **3** (2011), no. 9, 127–145.

[26] V. Khodadadi, H. Farazmand and S. Shibe, *A review of valuation model based on non-normal earnings (Olsen) from the viewpoint of macroeconomics using the generalized method of moments (GMM)*, J. Financ. Account. **5**§(2013), no. 3, 41–58.

[27] J. Lee and E. Kim, *Foreign monitoring and predictability of future cash flow*, Sustain. **11** (2019), no. 18, 4832.

[28] YU. Liu, and S. Lee, *Market responses to cash dividends distributed from capital reserves*, Finance Res. Lett. **46** (2022), 102389.

[29] M. Mironiuc, M. Carp and I.C. Chersan, *The relevance of financial reporting on the performance of quoted Romanian Companies in the context of adopting the IFRS*, Proc. Econ. Financ. **20** (2015), no. 2, 404–413.

[30] M. Moradi and S. Hosein Zadeh, *The role of corporate governance in firm's financial distress: pre- and post-internal controls instruction*, J. Financ. Account. **9** (2017), no. 3, 67–89.

[31] MJ. Mulenga, *International financial reporting standards' adoption and value relevance of accounting information: a brief literature review*, Int. J. Econ. Commerce Manag. **4** (2016), no. 6.

[32] F. Nasirzadeh and F. Karimipoor, *A review on the performance of Olsen-Feltham valuation model in companies listen on Tehran Stock Exchange*, J. Account. Knowledge **2** (2011), no. 7, 141–160.

[33] H. Nikoomaram, M. Taghavi and H. Ahmadzadeh, *Economic consequences of accounting information quality focused on earnings persistence*, J. Account. **21** (2014), 1–16.

[34] W. Nyamute, M. Oloko and J. Lishenga, *The effect of investment style on portfolio performance: evidence from the Nairobi securities exchange*, International Journal of Multidiscip. Res. Dev. **2** (2015), no. 5, 552–554.

[35] J. Ohlson, *Earnings, book values, and dividends in equity valuation*, Contemp. Account. Res. **11** (1995), no. 2, 661–687.

[36] E.A. Osadchy, E.M. Akhmetshin, E.F. Amirova, T.N. Bochkareva, Y. Gazizyanova and A.V. Yumashev, *Financial statements of a company as an information base for decision making in a transforming economy*, Eur. Res. Stud. J. **21** (2018), no. 2, 339–350.

[37] R.P.G.C.A. Parsons and J. Shen, *Global relation between financial distress and equity the review of financial studies*, Rev. Financ. Stud. **10** (2017).

[38] S.H. Penman, *Financial statement analysis and security valuation*, McGraw-Hill/Irwin, New York, 2013.

[39] O. Poorheydari, G. Amiri and M. Safajoo, *Analysis of the relationship between earnings per share and book value with the stock value of companies listed on Tehran Stock Exchange*, J. Account. Audit. Rev. §**12** (2005), no. 42, 3–19.

[40] F. Rahnamarodposhti and A.K. Salehi, *Financial and accounting articles and theories (including theories, hypotheses, models, techniques, and tools*, Ashk Zar Press, 2nd edition, Tehran, 2010.

[41] J.F. Ross, *The information content of accounting reports: an information theory perspective*, Inf. **7** (2016), no. 3, 1–23.

[42] A. Saidi and E. Qadiri, *Examining the relevance of accounting profit, book value and operating cash flow and investment in price-based valuation models*, Account. Audit. Stud. **14** (2006), no. 50, 47–64.

[43] H. Sami and H. Zhou, *A comparison of value relevance of accounting information in different segments of the Chinese Stock Market*, Int. J. Account. **39** (2004), no. 4, 403–427.

[44] W. Scott, *Financial accounting theory*, Fifth Edition, Prentice Hall, Canada, 2009.

[45] A. Shuja'a and A. Hiasat, *Stock price and cost of debt reaction to c changes in cash flow from operation*, PhD diss., Instituto Superior de Economia e Gestão, 2020.

[46] M. Soleymani Mareshk, A. Hashemi and S. Samadi, *Analysis of the application of accounting information in style investing*, Account. Audit. Res. **46** (2020), 97–112.

[47] Z.L. Swanson and G.D. Moyes, *Supply and demand of information influencing firm valuation*, Working paper, University of Central Oklahoma, 2020.

[48] R. Tehrani, G. Talebnia and S. Jalili, *The influence of accounting and non-accounting data on the investing decisions of traders within Tehran Stock Exchange*, J. Account. Res. **8** (2006), no. 21, 27–46.

[49] H.J. Turtle and K. Wang, *The value in fundamental accounting information*, J. Financ. Res. **40** (2017), no. 1, 113–140.