

## A Comparison of the Predictive Ability of Three-Factor and Five-Factor Future Cash Flow Statements

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**Abstract:** Because of the importance of cash flows in the success of economic units and its necessity for their survival, cash flows prediction is specifically regarded by managers of economic units as one of the essential parts of economic planning. The final result of an economic unit's activity is cash flow and not profit. Thus, the goal of this article is to compare the predictive ability of three-factor and five-factor future cash flow statements. The statistical population of the research includes companies accepted in Tehran Stock Exchange before 1998. We chose cash flow information of 90 companies in a period of 9 years and then, computed the difference estimation of net increase (decrease) in cash and true net increase (decrease) in cash and compared them using t-Test for independent samples. The results show that a model with five factors predicts net increase (decrease) in cash more precisely. However, considering the significance level of t-Test at error level less than 0.05, this difference is not significant.

**Key words:** Cash Flow, Operating Activities, Return on Investments and Interest Paid on Financing, Income Tax, Investment Activities, Financing Activities.

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### INTRODUCTION

Because of the importance of cash flow forecasting for managers and external users, it is of utmost importance to have a model that can predict cash flows using historical data of financial statements. It must be noted that classification of cash flows in cash flow statements is somewhat different in various countries, but generally they are classified under operating activities, investing activities, and financing activities. However, in Iran, they are classified under the following five sections:

1. Operating Activities
2. Return on Capital and Interest Paid on Financing
3. Income Tax
4. Investing Activities
5. Financing Activities

Considering the foresaid difference in the presentation of cash flow statements and the notion that one of the main qualitative properties of accounting data is its ability to predict, in this research, the three-factor and five-factor cash flow statement models are compared on the basis of their predictive ability.

#### ***Problem Statement and the Importance of Research:***

Generally, in order to predict the events that will occur in the future, we rely on the data obtained from historical events. Past data is analyzed in order to make a generable model for the future. This process that is applied in most prediction methods is based on the hypothesis that the relationship between variables will continue in the future. In this article, we will compare the predictive ability of three-factor model five-factor models and will identify the superior model.

#### ***Research Hypothesis:***

The five-factor cash flow statement model has no superiority over the three-factor model regarding predictive ability.

#### ***Research Literature:***

The results of Fisher's research show that commitment items have a better predictive ability than operating

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cash flows. In order to predict cash flows, Fisher didn't use cash items and commitment items simultaneously. (Fisher, J.H., 1990)

The results of the research of Marry et al. showed that accrual components of profit significantly increase the ability to predict future cash flows. (Marry, Donald and Karen, 2001)

The results of Finger's research showed that for predicting cash flows, net profit is not a better predictor than cash flow. (Finger, C.A., 2004)

The results of the research of Bowen et al. were not consistent with the view of Financial Accounting Standards Board (FASB) indicating superiority of profit in predicting cash flows. (Bowen, R.M., 1996)

The results of the research of Greenberg et al. proved contrary to the results obtained by Bowen et al. that for predicting future cash flows, net profit is better than cash flow. (Greenberg, R.R., 1999)

The results of the research of Lorek and Willinger showed that multivariate time-series models better predict operating cash flows. According to the findings of this research, using commitment items has better ability to predict cash flows than cash flow themselves and this notion was consistent with FASB claim. (Lorek, K.S. and G.L. Willinger, 1993)

Costigan examined the notion whether using commitment items of financial statements along with operating cash flow will increase the ability to predict future operating cash flow. The results of this research showed that working capital and profit before depreciation increase this ability. (Costigan, M.L., 1995)

The results of Gaharan's research showed that working capital from operations and temporary net operating capital can better predict future operating cash flow. Moreover, the results showed that for different industries, the ability of the examined independent variables to predict future cash flows is different. (Gaharan, K.L., 1988)

The results of Ghasemi's research signify that there is a significant relationship between operating profit and working capital from operations and also between profit and cash flow from operations. (Ghasemi, Mahmoud, 1999)

The collection of results of Arabmazar Yazdi signified that cash flows data had no more incremental information content than commitment items data and that there is no significant relationship between unexpected cash flow changes caused by unexpected operations of stock market. (Arabmazar, Mohammad Ali, 1998)

The researches of Noorvash (Noorvash, Iraj, Mashayekhi, Bitar, 2007) and Mashayekhi (Noorvash, Iraj, Mashayekhi, 2007) approved this matter.

The results of the research of Raiyat Kashani show that accrual profit cannot give a clear interpretation of cash flows or provide any data about it. (Raiyat Kashani, Mohammad, 2004)

In a research, Kang showed that frequency of accrual-related disclosures has a positive relationship with true prediction of analysts and has stated that disclosing the details related to commitment items increases the ability of people in the market to predict profit. (Kang, Tony, 2005)

Subramanyam et al. showed that accrual profit is superior to operating cash flows as a summarized criterion for intrinsic value of securities before public distribution. (Subramanyam, K.R., 2007)

***Population of Research and Data Collection Method:***

The statistical population of this research includes all the companies accepted in Tehran Stock Exchange before 1998 of which, 90 companies that had complete data of cash flow statements were chosen as statistical sample using systematic random sampling method.

***Hypothesis Testing Methodology:***

In order to compare predictive ability of three-factor and five-factor cash flow statements, we used SPSS software and applied multivariate linear regression and t-Test for independent samples.

***The Results and Analysis of Research Data:***

Presenting a predictive model for net change of cash flows in five-section model

The results of analysis of variance are reflected in the following table in order to examine the significance of regression in five-factor model.

**Table 1:** The results of analysis of variance testing significance of the regression in the five-factor model.

	Sum of Squares	Degree of Freedom	Mean Squares	R <sup>2</sup>	F Distribution	Significance Level
Regression	8×10 <sup>12</sup>	5	1.6×10 <sup>12</sup>	0.686	351.705	0.0001
Residual	3.6×10 <sup>12</sup>	804	4.5×10 <sup>9</sup>			
Total	1.2×10 <sup>13</sup>	5	809			

As shown in Table 1, presence of 3 of the 5 variables in the regression is significant and the presence of Return of Investment and Financing Activities in the regression is not significant. According to the value of  $R^2$  (0.686) and the obtained F-distribution value (351.705), theregression is statistically significant at the error level less than 0.01 ( $p < 0.01$ ) which signifies that it is reliable.

**Table 2:** Regression coefficients predicting net increase (decrease) in cash flows in the five-factor model

Model	B	Standard Deviation	Beta	T	Significance Level
Fixed Value	10659.073	2550.788		4.179	0.0001
Operating Activities	0.08877	0.021	0.366	4.181	0.0001
Return of Investment and Interest Paid on Financing	0.01938	0.022	0.062	0.901	0.368
Tax Paid	-0.476	0.074	-0.146	-6.424	0.0001
Investment Activities	-0.132	0.027	-0.45	-4.895	0.0001
Financing Activities	0.01584	0.023	0.061	0.677	0.499

Regression coefficients are presented in Table 2. Considering the table, we can see that the value of Beta is 0.366 for Operating Activities variable, that is, if there is a standard deviation change in Operating Activities variable, the Net Increase (Decrease) in Cash variable will change in the same direction up to 0.366 and considering t-value and its significance level for Operating Activities variable (0.0001), the presence of Operating Activities variable in the regression is significant.

Considering the value of Beta for Return of Investment and Interest Paid on Financing variable (0.062), if there is a standard deviation change in Return of Investment and Interest Paid on Financing variable, the Net Increase (Decrease) in Cash variable will change in the same direction up to 0.366 and considering t-value and its significance level (0.368), the presence of Return of Investment and Interest Paid on Financing variable in the regression is not significant.

Considering the value of Beta for Tax Paid variable (-0.146), if there is a standard deviation change in Tax Paid variable, the Net Increase (Decrease) in Cash variable will change in the opposite direction up to -0.146 and considering t-value and its significance level (0.0001), the presence of this variable in the regression is significant too.

Considering the value of Beta for Investment Activities variable (-0.45), if there is a standard deviation change in Investment Activities variable, the Net Increase (Decrease) in Cash variable in the five-factor model will change in the opposite direction up to -0.45 and considering t-value and its significance level (0.0001), the presence of Investment Activities variable in the regression is significant.

Considering the value of Beta for Financing Activities variable in five-factor model (0.061), if there is a standard deviation change in Financing Activities variable, the Net Increase (Decrease) in Cash variable in five-factor model will change in the same direction up to 0.061 and considering t-value and its significance level (0.499), the presence of Financing Activities variable in the regression of prediction of net increase (decrease) in cash is not significant in five-factor model.

According to the results of regression coefficients and using standard values, we can introduce the regression equation for predicting net increase (decrease) in cash in five-factor model as

$$\hat{Y} = (\beta_1 x_1) + (\beta_2 x_2) + (\beta_3 x_3) + (\beta_4 x_4) + (\beta_5 x_5)$$

$$C.F.S_i = (0.366 * C.F.O) + (0.062 * C.F.I.R)_i$$

$$- (0.146 * C.F.I.T) - (0.145 * C.F.I.A) + (0.061 * C.F.F.A)$$

Where

CFS: estimation of net increase (decrease) in cash flow

CFO: net cash flow from operations

CFIR: net cash flow from return of investment and interest and wage paid for financing

CFIT: net cash outflow from tax paid

CFIA: net cash flow from investment activities

CFFA: net cash flow from financing activities

Presenting a predictive model for net increase (decrease) in cash flow in the three-factor model

**Table 3:** Results of analysis of variance testing significance of the three-factor regression.

	Sum of Squares	Degree of Freedom	Mean Squares	R <sup>2</sup>	F Distribution	Significance Level
Regression	7.6×10 <sup>12</sup>	5	2.5×10 <sup>12</sup>	0.657	513.744	0.0001
Residual	4×10 <sup>12</sup>	806	4.9×10 <sup>9</sup>			
Total	1.2×10 <sup>13</sup>	809				

As presented in Table 3, presence of all 3 variables of the mentioned three-factor model in the regression is significant and considering the value of R<sup>2</sup> (0.657) and the obtained value of F (513.744), the regression is statistically significant at error level less than 0.01 (p<0.01) which signifies its reliability.

**Table 4:** Regression coefficients predicting net increase (decrease) in cash in the three-factor model

Model	B	Standard Deviation	Beta	T	Significance Level
Fixed Value	19374.779	2513.299		7.709	0.0001
Operating Activities	0.267	0.008	0.895	35.2	0.0001
Investment Activities	0.06651	0.009	0.23	7.458	0.0001
Financing Activities	0.242	0.01	0.801	23.857	0.0001

Regression coefficients are shown in Table 4. According to the table, we can see that the value of Beta is 0.895 for Operating Activities, that is, if there is a standard deviation change in Operating Activities variable, the Net Increase (Decrease) in Cash variable will change in the same direction up to 0.895 and considering t-value and its significance level for Operating Activities variable (0.0001), the presence of Operating Activities variable in the regression is significant.

Considering the value of Beta for Investment Activities variable (0.23), if there is a standard deviation change in Investment Activities variable of the three-factor model, the Net Increase (Decrease) in Cash variable will change up to 0.23 and considering t-value and its significance level (0.0001), the presence of Investment Activities variable in the regression is significant.

Considering the value of Beta for Financing Activities variable (0.801), if there is a standard deviation change in Financing Activities variable of the three-factor model, the Net Increase (Decrease) in Cash variable will change up to 0.801 and considering t-value and its significance level (0.0001), the presence of this variable in the regression is significant too.

Considering the regression coefficients and using standard values, we can present the regression equation for predicting net increase (decrease) in cash in three-factor model as

$$C.F.S_i = \square (0.895 * C.F.O) + (0.25 * C.F.I.A) + (0.801 * C.F.F.A)$$

Computing estimation difference of net increase (decrease) in cash and true net increase (decrease) in cash In this stage, we computed the difference of expected values of increase (decrease) in cash and their true values and used the absolute value of the difference in order to compare the predictive ability of the two models.

Comparison of the results (foresaid differences) obtained from adopting three-factor and five-factor models for predicting net increase (decrease) in cash

Table 5 presents a summary of the results of adopting three-factor and five-factor models for predicting net increase (decrease) in cash.

**Table 5:** Summary of data related to prediction errors of net increase (decrease) in cash using three-factor and five-factor models

Test Subject	Sample Number	Average	Standard Deviation	Mean Difference	Value of t	Significance Level
Three-Factor Model	810	57784	230060.8	16883.156	1.751	0.08
Five-Factor Model	810	40900.84	149533.6			

According to Table 5, mean difference (errors from net increase (decrease) in cash and net change obtained from the regression) is 16883.156 in both three-factor and five-factor models indicating more errors in the three-factor model, and this suggests that the five-factor model has a more precise predictive ability for net increase (decrease) in cash. However, considering the value of t=1.751 and the significance level which is 0.08, this difference is not statistically significant and the main hypothesis is not approved, that is, we can be 95% sure that the five-factor model for presenting net increase (decrease) in cash has no superiority over the three-factor model.

## REFERENCES

- Arabmazar, Mohammad Ali, 1998. "Incremental Information Content of Accrual and Cash Flows", M.Sc. Thesis, University of Tehran.
- Bowen, R.M., D. Burgstahler and L.A. Dakey, 1996. "Evidence on the Relationships between Earnings and Various Measures of Cash Flows", *The Accounting Review*, pp: 7-25.
- Costigan, M.L., 1995. "The Marginal Predictive Ability of Accrual Accounting Information with Respect to Future Cash Flows from Operations", Unpublished Ph.D.Dissertation.
- Fisher, J.H., 1990. "New Income as an Indicator of Future Net Income from Operation", Unpublished Ph.D. Dissertation, University of Kansas.
- Finger, C.A., 2004. "The Ability of Earnings to Predict Future Earnings and Cash Flow", *Journal of Accounting Research*, 32: 210-223.
- Greenberg, R.R., G.L. Johnson and K. Ramesh, 1999. "Earnings versus Cash Flow as a Predictor of Future Cash Flow Measures", *Journal of Accounting, Auditing and Finance*, pp: 266-77.
- Gaharan, K.L., 1988. "A Comparison of Effectiveness of the Operating Fund Flow Measures of Cash, Net Quick Assets, and Working Capital in Predicting Future Cash Flow", Unpublished Ph.D. Dissertation, Louisiana State University.
- Ghasemi, Mahmoud, 1999. "A Survey of the Relationship between Profit, Working Capital from Operations, and Cash Flows from Operations", M.Sc. Thesis, Shahid Beheshti University.
- Kang, Tony, 2005. "Earnings Prediction and the Role of Accrual-Related Disclosure: International Evidence", *Accounting Research Journal*, 18(1): 6-12.
- Lorek, K.S. and G.L. Willinger, 1993. "A Multivariate Time-Series Prediction Model for Cash Flow Data", *Accounting Review*, 71(1): 81-101.
- Marry, Donald and Karen, 2001. 8.1 "Accruals and the Prediction of Future Cash Flows." *The Accounting Review*, 76(1): 2y-58.
- Noorvash, Iraj, Mashayekhi, Bit, 2007. "Usefulness of Surplus Value in Predicting Accounting Income of Companies Accepted in Tehran Stock Exchange during 1998 to 2005" *Accounting and Auditing Journal*, No.36.
- Noorvash, Iraj, Mashayekhi, Bit, 2007. "Incremental Information Content of Economic Surplus Value and Cash Surplus Value versus Accounting Income and Cash from Operations", *Financial Research Journal*, No. 17.
- Raiyatkashani, Mohammad, 2004. "Evidence on a Relationship between Accounting Income and Cash Flow Measures", M.Sc. Thesis, Tarbiat Modares University.
- Subramanyam, K.R., Venkatachalam, Mohan, 2007. "Earnings, Cash Flows, and Ex post Intrinsic Value of Equity" *the Accounting Review*, 82(2): 457-481.