

* Neil Garrod

** Mahdi Hadi

* University of Glasgow, Scotland

** Kuwait University, Kuwait

AN EMPIRICAL INVESTIGATION OF THE INFORMATION CONTENT OF CASH FLOW AND CASH FLOW PER SHARE

Key Words

Cash flow, Earnings, Abnormal Returns, Incremental information content, Financial Reporting Standard No. 1 (FRS No.1).

Abstract

This study investigates the information content of cash flow and earning measures. The investigation is based on the association between cash flow measures and earnings measures with Cumulative Abnormal Returns (CAR). The intention is to evaluate the usefulness of cash flow data as required by Financial Reporting Standard No. 1 (FRS1) and introduce cash flow per share as a possible development that may contain information value for security markets. The current study findings suggest that some disaggregated cash flow components contain information beyond aggregate cash flow. On the other hand, it is found that the disaggregation required under FRS1 is not optimal from an information standpoint. Cash flow and earning measures have information content for the security markets.

Introduction

Much research has been carried out on cash flow data mainly in the United States by Wilson (1986, 1987), Bowen et al (1986, 1987), Bernard and Stober (1989), Livnat and Zarowin (1990), and others. In addition, Board et al (1989) and Board, Day and Napier (1993) investigate the situation in UK firms. The current study is an extension to the previous research, investigating the information content of cash flow in aggregate, disaggregate and per share basis. This research will provide UK evidence of the usefulness of cash flow data under FRS1. It

will also introduce cash flow per share as the first test of its kind to examine the information content of cash flow per share according to FRS1 standard headings.

Cash flow per share has been mentioned in the previous studies usually with a negative point of view about its usefulness while some authors like Greene (1984) say "Critics of cash flow per share, of course, point out that this money is not actually available to investors. While a firm could conceivably pay out every dollar of earning as dividends much of cash flow is necessary for replacement of assets or capital expansion. A fair point, but so what?

The two figures measure different things - and one isn't necessarily better or more accurate, than the other" (Greene, 1984). The current position of FASB in regard to cash flow per share is given in FASB statement No. 95, paragraph 33: "Financial statements shall not report an amount of cash flow per share. Neither cash flow nor any component of it is an alternative to net income as an indicator of an enterprise's performance, as reporting per share amounts might imply."

In the U.K. ED 54 contained a similar prohibition for publishing cash flow per share. It is argued that the presentation of such figures might suggest cash flow information is comparable to earnings information and might be considered a substitute to it. Also, cash flow per share might be misleading for the annual report users because it ignores the limitations of cash flow data when presented for a single period.

However, FRS1 did not prohibit the publication of cash flow per share data and hence, the need for empirical research to investigate the information content of such data. Empirical research using US data has been carried out by Sommerville (1991), which address the explanatory power of cash flow per share. She found that operating cash flow (OCF) and operating cash flow per share (OCFPS) are separate statistical measures, and there might be information content in OCFPS not found in OCF.

Sample and Data Collection

The firms included in this study satisfy the following criteria:

- 1- U.K. industrial firms quoted on London Stock Exchange.
- 2- Data availability for all items required to calculate the cash flow and earnings variables over the period 1977 to 1991.
- 3- Availability of the monthly returns from LSPD for testing and estimation period from Jan 1971 to Dec 1991.
- 4- The year end must be constant for the period 1971 to 1991.

The initial sample consists of 1000 firms and is collected from DATASTREAM. The first criterion was imposed to make sure that the firms are industrial firms and comply with all stock exchange regulations as industrial firms have disaggregated cash flow components entirely different from financial groups (i.e. Banks, and Insurance companies). Four hundred and twenty-eight firms satisfy the first and second criteria, 188 firms are dropped from the sample due to incomplete data set of returns from LSPD. Eighty four firms are eliminated from the sample due to the change in the year end during the period 1971-1991. After the imposition of the last criterion, the sample firms were reduced to 156 (see Table 1).

Table 1
The Distribution of The Sample Firms Across Industries

Industrial Classification	Number of Companies	%
Miscellaneous Mechanical Engineering	25	16.03%
Industrial and Building Materials	9	5.77%
Breweries, Catering and Leisure	18	11.54%
Electrical and Electronics	11	7.05%
Stores	10	6.41%
Food	14	8.97%
News Papers, Publishing and Printing	6	3.85%
Other Capital Goods	6	3.85%
Construction	9	5.77%
Chemicals and Oil	10	6.41%
Clothing and Carpet	4	2.56%
Miscellaneous Industrial	20	12.82%
Health Products	6	3.85%
Shipping and Transport	6	3.85%
Business Services	2	1.28%
	156	100.00%

The percentage of the total London market, by capitalisation, covered by the sample is indicated in Table 2.

Table 2
The Percentage of The Sample Firm Market Values to The Total UK Market* -- Over The Years

Year	MV For Sample Firms (In Thousand)	MV For Total UK Market (In Thousand)	The Percentage of Sample Firms to UK Market
1977	13386860	30259000	44.24%
1978	18758470	41641000	45.05%
1979	20092400	43813000	45.86%
1980	22144180	47510000	46.61%
1981	28704910	62939000	45.61%
1982	32191950	69945000	46.02%
1983	42218760	86690000	48.70%
1984	51402190	110690000	46.44%

Table 2 (cont)
The Percentage of The Sample Firm Market Values to The Total UK Market* -- Over The Years

Year	MV For Sample Firms (In Thousand)	MV For Total UK Market (In Thousand)	The Percentage of Sample Firms to UK Market
1985	63995810	154732000	41.36%
1986	78069490	190032000	41.08%
1987	98875000	258606000	38.23%
1988	107441360	284758000	37.73%
1989	112207330	314238000	35.71%
1990	141945270	440458000	32.23%
1991	128638550	397861000	32.33%

* Market value for total UK market is item code TOTMKUK in the DATASTREAM data base.

Research Method

Multiple regression is used to test the association of cash flow and earnings measures with security return. The independent variables are cash flow and earnings measures while the dependent variable is Cumulative Abnormal Return (CAR). Aggregate and disaggregate cash flow and earning variables are in first difference form deflated by market value at the beginning of the year, according to the following equation:

$$(X_t - X_{t-1}) / MV_{t-1}$$

where,

X_t = any cash flow or earning variable for year t.

X_{t-1} = any cash flow or earning variable for year t-1.

MV_{t-1} = Market value for equity at the beginning of the year.

By this process the unexpected cash flow and earnings components are scaled by market value to minimize any heteroscedasticity in the data (Christie, 1987).

On the other hand, cash flow per share and earning per share are in unexpected form only as they are already scaled by the number of shares.

Cumulative abnormal return (CAR) is the dependent variable and is calculated using monthly return data as adopted in previous market based accounting research such as Brown and Warner (1980), Pettit (1984), Mensah (1990), Strong and Walker (1991), and Strong (1992).

The calculation for the security return is :

$$R_{it} = \text{LN} (P_{it} + D_{it}) / P_{it-1} \quad \text{..... (1)}$$

where,

R_{it} = the return for firm i in period t.

P_{it} = the share price for firm i in period t.

P_{it-1} = the share price for firm i in period t-1.

D_{it} = the dividends for firm i in period t.

LN = the logarithms to the base of e
(natural log).

The annual CAR is calculated using monthly returns from May to April (for companies

that have December year-end). The four-month lag period after the calendar year end is used because, in general, the annual report will not be available to the market before four months after the close of the year end.

Equation 1 provides actual security return. Next, expected return is generated by using the Market Model:

$$R_{i,t} = a + b R_{m,t} + e_{i,t}$$

$R_{i,t}$ = Return on security i in period t .

$R_{m,t}$ = Return on market portfolio in period t .

$e_{i,t}$ = Error terms.

a, b = The parameters (intercept and slope)

Based on previous market research in the U.K., the most reliable market index for $R_{m,t}$ is the Financial Times index (F.T. All Share Index, item code FTALLSH). This index also represents all the shares on the market. "The theoretically correct market index is a value weighted index of the entire universe of capital assets." (Strong, 1992). The parameters a and b are estimated using a 60 month estimation period.

FRS1 identifies five sub categories of cash flows which need to be differentiated in the cash flow statement. One important consideration in the evaluation of FRS1 as a piece of regulation is the extent to which the disaggregation of the total cash flow figure can be considered optimal. The first model for evaluation is, therefore, a multiple regression of these individual cash flow items on the cumulative abnormal return.

$$CAR = g_0 + g_1 OCF + g_2 RIF + g_3 TCF + g_4 ICF + g_5 FCF + g_6 CC + g_7 \text{Accruals 1} + e \dots \dots \dots (M1)$$

where:

OCF = cash flow from operations

RIF = net cash flow from return on investment and servicing of finance

TCF = cash flow from taxation

ICF = net cash flow from investments

FCF = net cash flow from financing

CC = net change in cash

$$\text{Accruals 1} = \text{Earnings} - (\text{OCF} + \text{RIF} + \text{TCF} + \text{ICF} + \text{FCF})$$

Finance theory suggests that further disaggregation may prove useful. Miller and Rock (1985) suggest that dividend changes are positively associated with security return whilst interest payments will tend to have a negative impact on security returns. Similarly the association between market reaction and financing cash flow components is likely to be mixed. For debt issuance, Leland and Pyle (1977) suggest a positive association with market reaction because owners retain a larger proportion of equity than when stock is issued, whilst Miller and Rock (1985) suggest a negative market reaction because more debt implies a lower future cash flow for equity holders than had previously been expected. Both theory and previous empirical research suggest a positive market reaction to stock issues. Also, theory suggests a smaller market reaction to the announcement of the issue of preferred stock compared to the issue of ordinary stock, Livnat and Zarowin (1990).

This leads to the development of the second model which is designed to test whether the ASB went far enough in its disaggregation of cash flow items.

$$CAR = a_0 + a_1 \text{ Collections} + a_2 \text{ Payment} + b_1 \text{ Net Interest} + b_2 \text{ Dividends Pmt.} + c_1 \text{ Taxes} + d_1 \text{ P.Investment} + d_2 \text{ Sale Fixed} + e_1 \text{ Debt} + e_2 \text{ Stock} + f_1 \text{ Accruals 2} + e \dots \dots \dots (M2)$$

Where: Collect = cash inflow that results from operating or trading activities.

Payment = cash outflow that results from operating or trading activities.

Net interest = net cash flow from lending and borrowing activities.

Dividends = cash dividends paid to ordinary and preferred shareholders

Taxes = cash outflow to taxes

P. Investment = cash outflow for the acquisition of assets and purchase of subsidiaries.

Sale fixed = cash flow from the sale of tangible fixed assets.

Debt = net cash received from the issuance and retirement of debt.

Stock = net cash received from the issuance and retirement of stock.

Accruals 2 = earnings - the sum of cash flow items.

Model 3 is developed to test the information content of per share (PS) cash flow data.

$$\text{CAR} = h_0 + h_1\text{OCFPS} + h_2\text{RIFPS} + h_3\text{TCFPS} + h_4\text{ICFPS} + h_5\text{FCFPS} + h_6\text{CCPS} + \text{Accruals3} + e \dots\dots\dots x(\text{M3})$$

Finally models 4 and 5 are used as benchmarks against which the information content of the cash flow models can be evaluated.

$$\text{CAR} = I_0 + I_1\text{EARN} + e \dots\dots\dots (\text{M4})$$

Where: EARN = net profit after tax, minority interest and preferred dividends.

$$\text{CAR} = j_0 + j_1\text{EPS} + e \dots\dots\dots (\text{M5})$$

Where: EPS = earnings per share.

Before utilizing the above models to test for the market reaction associated with each

cash flow and earning variable, it is necessary to ensure that they comply with all Ordinary Least Square (OLS) assumptions and that there is no serious departure from them. The models are tested for non-normality, for misspecification error, for non constant error variance and for multicollinearity.

These tests are performed on the pooled data for all firms over all years. Any serious departure from OLS assumptions will be remedied appropriately in order to ensure the Best Linear Unbiased Estimator (BLUE) for all the models.

The normality test is performed using the Jarque and Bera (1987) test and the results suggest that all the models have normality problems. This problem is solved by eliminating the observations with large standardized residuals¹, as well as performing a Box and Cox transformation if necessary. Ramsey's RESET test for misspecification is performed and confirms that all the models are free from misspecification problem.

For heteroscedasticity, the Glejser and Ramsey test is used and confirms that all the models are free from heteroscedasticity problem.

The current study uses cross sectional data therefore we did not expect any autocorrelation problem. Finally, Variance Inflation Factor (VIF) and pair wise correlation analysis are performed to detect any Multicollinearity problems in M1, M2 and M3. The tests confirm that, multicollinearity problems exist in model 2 but after eliminating Payment from M2 the problem is solved.

The final models that will be used in the empirical analysis are the following:

(1) The percentage of omitted observations are 7.37%, 13.4%, 8.38%, 6.18%, and 5.8% for M1, M2, M3, M4 and M5 respectively. The omitted observations are randomly distributed across industries.

$$\text{CAR} = g_0 + g_1\text{OCF} + g_2\text{RIF} + g_3\text{TCF} + g_4\text{ICF} + g_5\text{FCF} + g_6\text{CC} + g_7\text{Accruals 1} + e \dots\dots\dots (\text{M1})$$

$$\text{CAR} = a_0 + a_1 \text{Collections} + b_1 \text{Net Interest} + b_2 \text{Dividends Pmt.} + c_1 \text{Taxes} + d_1 \text{P.Investment} + d_2 \text{Sale Fixed} + e_1 \text{Debt} + e_2 \text{Stock} + f_1 \text{Accruals2} + e \dots\dots\dots (\text{M2})$$

$$\text{CAR} = h_0 + h_1\text{OCFPS} + h_2\text{RIFPS} + h_3\text{TCFPS} + h_4\text{ICFPS} + h_5\text{FCFPS} + h_6\text{CCPS} + h_7 \text{Accruals 3} + e \dots\dots\dots (\text{M3})$$

$$\text{CAR} = I_0 + I_1\text{EARN} + e \dots\dots\dots (\text{M4})$$

$$\text{CAR} = j_0 + j_1\text{EPS} + e \dots\dots\dots (\text{M5})$$

The above models were run using the pooled data and by individual year.

Results

Table 3 present summary statistics by pooling all the firms over the years for all the models.

Table 3
Statistical Description for all Models

Model	Var.	Mean	Median	St.dev	Min	Max	Corr. with CAR
M1	CAR	1.974	1.982	0.272	1.04	3.07	-
	OCF	0.037	0.0287	0.282	-1.956	1.979	0.049
	RIF	0.011	0.0077	0.048	-0.352	0.448	-0.126
	ICF	-0.002	-0.002	0.289	-2.26	2.13	-0.095
	FCF	0.0087	0.00004	0.207	-1.412	1.45	-0.018
	CC	0.012	0.0007	0.327	-2.77	2.95	0.064
	TCF	0.007	0.0052	0.063	-0.67	0.52	-0.033
M2	ACCRUALS 1	0.024	0.014	0.391	-2.863	2.99	0.045
	COLLECT	0.288	0.185	0.5053	-1.49	2.46	0.029
	NETINT	0.0005	0.0003	0.0246	-0.11	0.126	-0.185
	DIVID	0.0082	0.0053	0.0165	-0.048	0.146	-0.003
	TCF	0.0074	0.0052	0.0586	-0.615	0.52	-0.024
	P.INVS	0.029	0.016	0.163	-0.95	0.96	0.032
	S.FIXED	0.0039	0.0011	0.063	-0.387	0.397	-0.033
	DEBT	0.0055	0.000	0.172	-0.97	0.97	0.004
	STOCK	0.003	0.000	0.084	-0.455	0.468	0.002
M3	ACCRUALS 2	0.017	0.015	0.304	-1.41	1.50	0.064
	OCFPS	1.699	1.388	20.384	-93.45	92.75	0.003
	RIFPS	0.7378	0.424	3.176	-19.94	19.79	-0.188
	ICFPS	1.335	-0.070	31.437	-193.7	198.4	-0.030
	FCFPS	0.43	0.000	21.76	-148.9	147.5	-0.009
	TCFPS	0.381	0.2484	3.99	-19.93	19.65	-0.012
	CCPS	-0.171	-0.090	22.11	-99.87	95.92	0.037
M4	ACCRUALS 3	2.42	0.790	35.18	-190.5	194.9	-0.006
	EARN	0.0184	0.016	0.064	-0.414	0.450	0.335
M5	EPS	0.720	0.880	4.904	-34.41	33.77	0.230

The mean for aggregate and disaggregate cash flow variables as well as earning variables are close to zero. This is to be expected as all the variables are in unexpected form and for models 1,2 and 4 deflated by market value. The variables Collect, OCF, OCFPS, CC, CCPS, ICF, ICFPS, FCFPS and Accruals 1, 2 and 3 have high standard deviation due to the presence of extreme observations that can be confirmed from the Min and Max columns. The standard deviation of the per share variables are higher than aggregate variables as the former are not deflated by market value. The finance cash flow components, Stock and Debt, have a zero mode indicating the relative infrequency of stock or debt issuances for cash over the years.

The correlation between cash flow and earning components with cumulative abnormal return reveals that earnings, EPS, net interest and return on investment and services of finance exhibit the most significant associa-

tion with security return and with signs that are consistent with prior expectations. On the other hand, finance cash flow components and dividends exhibit the least significant correlation. These results are consistent with Livnat and Zarowin (1990).

Individual Coefficient Testing

Aggregate Cash Flow and Earning Regression Results

In this section of the paper we report the results from Models M1 and M4. The results for M1 are exhibited in Table 4 and reveal that operating cash flow has a positive sign and significant at .01 level. This finding is consistent with theory, which suggests positive market reaction associated with operating cash flow. Also, this result is consistent with Rayburn (1986), Wilson (1986, 1987), Bowen *et al* (1987), Livnat and Zarowin (1990), and Clubb (1993). On the other hand, it is inconsistent with Casey and Bartczak (1984), Board *et al* (1989) and Board *et al* (1993).

Table 4
Association Between Car and Cash Flow Data Summary of Pooled Regression Results, 1978-1991

Variables	Estimated Coefficients	T-Ratio	P-Value	R ²	(Adj) R2	F-Ratio	P- value
a	2.328	266.5	0.000	5.1%	4.8%	15.52	0.000
OCF	0.170	3.63	0.000				
RIF	-1.286	-6.21	0.000				
ICF	-0.1088	-3.60	0.000				
FCF	0.0313	0.68	0.499				
TCF	-0.0727	-0.47	0.638				
CC	0.166	3.93	0.000				
Accruals 1	0.228	6.71	0.000				

$$CAR = g_0 + g_1OCF + g_2RIF + g_3TCF + g_4ICF + g_5FCF + g_6CC + g_7 \text{ Accruals 1} + e \dots\dots\dots (M1)$$

Return on investment and services of finance (RIF) has a negative coefficient which is significant at .01 level. This result is consistent with Livnat and Zarowin (1990) who found a sig-

nificant negative association between security return and net interest payments.

Investment cash flow (ICF) is significant at .01 level and has a negative coefficient. This

negative reaction might be the result of managers engaging in negative net present value acquisitions to diversify their firms and indirectly their own portfolio, Amihud and Lev (1981). Conversely, Assiri (1993) found a strong positive relationship between capital expenditure and stock market abnormal returns. A possible reason for the contradiction between the empirical results reported here and those of Assiri is that the latter research investigates the impact of investment announcements on security returns, whilst the current study focuses on the reporting of actual cash payments resulting from earlier investment decisions. Consequently, any positive association between investment and security returns appears to be related to the investment announcement rather than the actual investment payments as reported in cash flow statements.

The coefficient for finance cash flow is positive and insignificant. This result is consistent with Livnat and Zarowin (1990).

The tax cash flow is insignificant but has positive sign. In brief, the investor can generate tax payment figures from earlier accounting numbers. Therefore at tax payment

information release date, it has no information because the investors already have an accurate forecast of the value.

The examination of the coefficient of total change in cash reveals a positive and significant coefficient, which suggests that there is an information content in total change in cash figure. This result is inconsistent with Arnold et al (1991) because they found the association between earning and change in cash flow insignificant. Accruals coefficient is significant at .01 level which mean a strong market reaction associated with accruals. This result is consistent with the theory and previous research such as Wilson (1986 and 1987). The cash flow model is significant at .001 level and has an adjusted R2 of 4.8%.

Turning to the earnings model M4 (Table 5), we find that the earnings coefficient is positive and significant at .001 level. This result is consistent with theory and previous empirical research such as Livnat and Zarowin (1990), Strong and Walker (1991), Easton (1992), Kothari and Sloan (1992) and more. The model is significant at 0.01 level and has an adjusted R2 of 11.2%.

Table 5
Association Between Car and Earnings Data Summary of Pooled Regression Results, 1978-1991

Variables	Estimated Coefficients	T- Ratio	P-Value	R ²	(Adj) R2	F- Ratio	P- Value
Intercept (M4)	21.133	308.46	0.000	11.2%	11.2%	258.49	0.000
EARN (M4)	1.763	16.08	0.000				

$$CAR = I_0 + I_1 EARN + e \dots\dots\dots (M4)$$

Disaggregate Cash Flow Components Regression Results:

Disaggregate cash flow components are pooled for a period of eleven years from 1981

to 1991. The results of the multiple regression are presented in Table 6.

Table 6
Association Between Car and Disaggregate Cash Flow Summary of Pooled Regression Results, 1981-1991

Variables	Estimated Coefficients	T-Ratio	P-Value	R²	(Adj) R²	F-Ratio	P-value
Intercept	1.95	240.3	0.000	5.8%	5.3%	10.16	0.000
Collect	0.07	4.65	0.000				
Netint	-2.61	-8.39	0.000				
Divid	-0.747	-1.25	0.211				
TCF	-0.056	-0.36	0.721				
S.Fixed	0.0289	0.24	0.814				
P.Invs	-0.0074	-0.14	0.889				
Stock	0.0044	0.05	0.959				
Debt	0.05515	1.14	0.253				
Accruals2	0.10558	3.24	0.001				

$$CAR = a_0 + a_1 \text{ Collections} + b_1 \text{ Net Interest} + b_2 \text{ Dividends Pmt.} + c_1 \text{ Taxes} + d_1 \text{ P.Investment} + d_2 \text{ Sale Fixed} + e_1 \text{ Debt} + e_2 \text{ Stock} + f_1 \text{ Accruals2} + e. (M2)$$

Collect is significant at .01 level which indicates that disaggregated operating cash flow components are associated with security returns. This finding is consistent with theory and previous empirical research. This result has interesting implications for the generation of operating cash flow figures. They would indicate that the direct, rather than the indirect, method of generating operating cash flows would prove more useful to investors.

Return on investment and services of finance (RIF) consists of net interest and dividend payments. It can be seen in Table 6 that net interest has a negative coefficient and is significant at .01 level. This result is consistent with the findings of Livnat and Zarowin (1990).

Dividend is insignificant and has the wrong sign which is inconsistent with previous research such as Livnat and Zarowin (1990) and Abeyratna, Lonie, Power and

Sinclair (1993). The theory suggests positive market reaction associated with dividend payment. The question with cash flow data is the timing relevance of payment items. In an efficient market any response to dividends should occur at the time of their announcement, rather than their payment. We believe that earlier studies have investigated the impact of dividend announcements rather than payments and that this difference explains the discrepancy in the results.

Cash flows to tax payments are seen to be insignificant. Here again the issue of timing arises. The tax payments figure can readily and accurately be estimated from earlier periods accounting numbers. On that basis we would not expect any surprise in the market with respect to tax payment release information. This result is consistent with Livnat and Zarowin (1990).

Investment cash flow is broken down into two components of sale and purchase of fixed assets. The results in this research exhibit

insignificant coefficients for both sale of fixed assets and purchase of investment. These results are in line with those of McConnell and Muscarella (1985) who suggest that capital investment expenditures could be anticipated by investors.

Turning to finance cash flow components, we find that all variables are insignificant. The accruals variable has a positive sign and is significant at 0.01 level, indicating a strong market reaction associated with accruals. This result is consistent with previous empirical research such as Wilson (1986, 1987), Rayburn (1986), Livnat and Zarowin (1990) and Dechow (1994). The model is significant at .001 level and the adjusted R² is 5.3%.

A Comparison Across Models

A primary purpose of carrying out research of this kind is not simply to find relationships between individual accounting numbers and security returns, but also to assist regulators in identifying an 'optimal' disclosure pattern for investor information. It is, therefore, useful at this stage to make comparisons across the five models investigated to try to identify any patterns which may emerge.

The results from the previous sections suggest that in some cases further disaggregation of the five major subheadings required under FRS1 prove informative whilst others do not. Whilst operating cash flow is itself significant, also its constituent parts of payments or receipts have a significant impact on security returns. This result provides indirect

support for the use of the direct method when generating the cash flow statements.

Both investment cash flow components and finance cash flow components are insignificant, but in aggregate form investment cash flow is significant. These results provide support for the FRS1 categorizations. On the other hand, further disaggregation of the RIF variable identifies subdivisions which are themselves significant. More pertinently the constituent parts have significant coefficients of opposite sign, clearly indicating the information content of this further disaggregation.

Consistent with previous research, the earnings coefficient from M4 is significant at .01 level. This provides further support for the importance of earnings to investors when making their investment decisions. Equally the results reported above indicate that some cash flow variables also contain information content. However, the adjusted R² is only 4.8% for the cash flow model (M1) as compared to an adjusted R² of 11.2% for the earnings model (M4).

The results of cash flow per share variables (Table 7) are not significantly different from aggregate cash flow variables. Operating cash flow per share (OCFPS) is insignificant but has a positive sign. This result is inconsistent with Karels, Gordon and Prakash (1987) and Sommerville (1991), who suggest that OCFPS might have information content not found in OCF. On the other hand, it is consistent with Belkaoui (1983).

Table 7
Association Between Car and Cash Flow Per Share Data Summary of Pooled Regression Results, 1978-1991

Variables	Estimated Coefficients	T-Ratio	P-Value	R²	(Adj) R²	F-Ratio	P-value
a	0.987	155.47	0.000	4.3%	4.0%	12.81	0.000
OCFPS	0.00044	1.03	0.302				
RIFPS	-0.0188	-8.92	0.000				
ICFPS	-0.00062	-2.75	0.006				
FCFPS	0.00009	0.25	0.803				
TCFPS	0.0017	1.01	0.313				
CCPS	0.00064	1.60	0.109				
Accruals 3	0.00061	2.26	0.024				

$$CAR = h_0 + h_1OCFPS + h_2RIFPS + h_3TCFPS + h_4ICFPS + h_5FCFPS + h_6CCPS + h_7 \text{ Accruals } 3 + e \dots (M3)$$

RIFPS and ICFPS are significant at .01 level and both have negative signs as in the aggregate cash flow case. On the other hand, FCFPS is insignificant and has a positive sign. Tax cash flow per share (TCFPS) and change in cash per share (CCPS) are insignificant and both have positive sign. Accruals 3 has positive coefficient and significant at 0.05 level.

Turning to EPS in model 5 (Table 8), we find that EPS is significant at .01 level and has a positive sign. The result is consistent with theory and previous empirical research such as Rice (1978), Belkaoui (1983), Foster (1973), and Kothari and Zimmerman (1993).

Table 8
Association Between Car and EPS Data Summary of Pooled Regression Results, 1978-1991

Variables	Estimated Coefficients	T- Ratio	P-Value	R²	(Adj) R²	F- Ratio	P- Value
Intercept (M5)	2.181	310.09	0.000	5.3%	5.2%	114.68	0.000
EPS (M5)	0.0153	10.71	0.000				

$$CAR = j_0 + j_1EPS + e \dots (M5)$$

The explanatory power, as represented by Adj R², for M1 and M3 in Tables 4 and 7 is very similar. There is also consistency between M1 and M3 for most of the aggregate and per share variable coefficients. For instance, we find FCF and FCFPS are not significant, while RIF and RIFPS are significant. From this we might conclude that cash flow per share provides information content similar to the information that we might find in aggregate cash flow figures.

Results of Incremental Information Testing

The previous comparison has been based on R² values and coefficient significance. For a more complete and statistically sound analysis a methodology for investigating incremental information content is adopted. The statistical techniques for these tests consist of three steps (Board *et al*, 1989). Let us assume that we want to test for the

incremental information content of OCF over EARN, and that the null hypothesis is this:

H_0 : OCF has no incremental explanatory value over EARN.

Then the procedure to be followed would be:

Step 1: Perform a cross-sectional ordinary least square regression as follows:

$$CAR_{it} = a + b EARN_{it} + U_{it} \dots\dots\dots (A)$$

U_{it} is the fitted regression residuals of the i th observations.

The purpose of this step is to remove the influence of EARN on CAR so that U_{it} represents the information that explains the variation of CAR which is not found in EARN.

Step 2: Perform annual cross-sectional regression as follows:

$$OCF_{it} = a + b EARN_{it} + e_{it} \dots\dots\dots (B)$$

The purpose of this step is to remove the influence of EARN on OCF, and e_{it} represents the variation in OCF that is not explained by EARN.

Step 3: Perform annual cross-sectional regression as follows:

$$U_{it} = a + b e_{it} + w_{it} \dots\dots\dots (C)$$

The purpose of this step is to test whether any of the cross-sectional variation in CAR that is not explained by EARN can be explained by cross-sectional variation in OCF that is not explained by EARN.

The decision rule for this test is that after solving equation (C), if b is negative or not significantly different from zero, this is evidence consistent with the null hypothesis that OCF has no incremental explanatory value

over EARN. Furthermore, a positive significance value for b supports the alternative hypothesis that OCF has an incremental information content over EARN.

This form of the analysis is applied to eight separate null hypotheses. Each will be presented separately along with the empirical results and their interpretation. The results are reported in table 9. The pooled results are presented in this paper and they are generally consistent with annual results. The annual results are available from the authors upon request.

H_1 : Cash flow per share variables have no incremental explanatory value over cash flow variables.

The results from table 9-Panel (A) suggest that cash flow per share variables do not contain any incremental information content beyond cash flow variables. This is clear evidence against cash flow per share variables, because they in general did not reveal any incremental information content beyond cash flow variables.

H_2 : Cash flow variables have no incremental explanatory value over cash flow per share variables.

Table 9-Panel (B) reveals that cash flow variables do not have any incremental information content over cash flow per share variables except for operating cash flow which is significant at the .05 level . Therefore, we can reject the null hypothesis for this case only, while for other cases we are unable to reject the null hypothesis. Thus cash flow

variables do not have any incremental explanatory value beyond cash flow per share variables.

Furthermore, we can conclude that cash flow and cash flow per share have similar information content, and neither provides different information from the other.

H₃ : Cash flow variables have no incremental explanatory value over earnings.

From Table 9-Panel (C) we can conclude that cash flow variables have no incremental information content beyond earnings. This result is consistent with Board, Day and Walker (1989), and Dechow (1994).

H₄ : Earnings have no incremental explanatory value over cash flow variables.

The results from Table 9-Panel (D) suggest that we can reject the null hypothesis at .01 level for all the variables over all the fourteen years. Thus our results confirm that earnings do indeed contain incremental explanatory value over cash flow variables. This result is consistent with Bowen *et al.*(1987), Board *et al* (1989) and Dechow (1994).

H₅ : Cash flow per share variables have no incremental explanatory value over EPS.

The results of this test shown in Table 9-Panel (E), suggest results similar to H3. Given the overwhelming insignificance of the results we conclude that cash flow per share did not reveal any incremental information content beyond EPS.

H₆ : EPS have no incremental explanatory value over cash flow per share variables.

We can reject the null hypothesis for all cases and confirms that EPS have incremental information value over all cash flow variables (table 9-Panel (F)).

H₇ : Earnings have no incremental explanatory value over EPS.

The result of this hypothesis is reported in Table 9-Panel (G), and suggests that earnings contain incremental explanatory value beyond EPS and the t-ratio is significant at .01 level. This result suggests that earnings do indeed have incremental explanatory value beyond EPS.

H₈ : EPS have no incremental explanatory value over earnings.

From Table 9-Panel (G) we can also reject the null hypothesis but at low significant level 10% compare with H7. The results indicate that EPS does have an incremental explanatory value over earnings for a few years.

Furthermore, Table 9-Panel (G) reveals that Earnings have incremental explanatory value beyond all cash flow variables taken together, and EPS has incremental information value beyond all cash flow per share variables taken together.

Table 9
The results of the Incremental Information Content Tests Pooled Results, From 1978-1991

Panel (A) Cash Flow Per Share Over Cash Flow Variable						
Variables	OCFPS v OCF	RIFPS v RIF	ICFPS v ICF	FCFPS v FCF	TCFPS v TCF	CCPS v CC
Coefficient	-0.00105	-0.0217	0.007	0.002	-0.0018	-0.0001
(T-Ratio)	(-1.86)	(-6.76)	(1.80)*	(0.40)	(-0.72)	(-0.20)
Panel (B) Cash Flow Over Cash Flow Per Share						
Variables	OCF v OCFPS	RIF v RIFPS	ICF v ICFPS	FCF v FCFPS	TCF v TCFPS	CC v CCPS
Coefficient	(T-Ratio)	0.0699	(2.19)**	0.134	(0.84)	-0.0997
(-2.90)	-0.024	(-0.53)	0.07	(0.56)	0.0415	(1.53)
Panel (C) Cash Flow Over Earning						
Variables	OCF v EARN	RIF v EARN	ICF v EARN	FCF v EARN	TCF v EARN	CC v EARN
Coefficient	0.012	-0.689	-0.062	-0.052	-0.144	0.0174
(T-Ratio)	(0.50)	(-4.11)	(-2.55)	(-1.56)	(-1.15)	(0.75)
Panel (D) Earnings Over Cash Flow						
Variables	EARN v OCF	EARN v RIF	EARN v ICF	EARN v FCF	EARN v TCF	EARN v CC
Coefficient	1.53	1.45	1.587	1.516	1.585	1.53
(T-Ratio)	(11.44)***	(11.13)***	(12.14)***	(11.55)***	(11.86)***	(11.53)***
Panel (E) Cash Flow Per Share Over EPS						
Variables	OCFPS v EPS	RIFPS v EPS	ICFPS v EPS	FCFPS v EPS	TCFPS v EPS	CCPS v EPS
Coefficient	-0.00024	-0.0158	-0.00064	-0.0002	-0.0025	0.0004
(T-Ratio)	(-0.70)	(-7.16)	(-2.84)	(-0.64)	(-1.40)	(1.25)
Panel (F) EPS Over Cash Flow Per Share						
Variables	EPS v OCFPS	EPS v RIFPS	EPS v ICFPS	EPS v FCFPS	EPS v TCFPS	EPS v CCPS
Coefficient	0.0103	0.0092	0.011	0.0105	0.0106	0.0102
(T-Ratio)	(7.92)***	(7.41)***	(8.36)***	(8.28)***	(8.28)***	(8.08)***
Panel (G) Other						
Variables	EARN v EPS	EPS v EARN	EARN v all CFs	EPS v all CFPs		
Coefficient	1.122	0.0032	1.595	0.0104		
(T-Ratio)	(8.47)***	(1.95)*	(11.79)***	(7.72)***		

* Significant at 10% level, ** Significant at 5% level and *** Significant at 1% level.
 CFs = all cash flow variables and CFPs are all cash flow per share variables

Summary and Conclusion

Operating cash flow reveals an information content based on its association with security returns. Cash flow and cash flow per share have similar information content based on their association with security returns.

This research provides evidence about the importance of disaggregate cash flow components. However, some disaggregate cash flow components have information content beyond aggregate cash flow such as OCF and collect. On the other hand, some aggregate cash flows have more information content than the disaggregated cash flow variables, this was the case for investment cash flows. For return on investment cash flows, however, we found both aggregate and disaggregate cash flow components reveal information content.

Earnings appear to be superior to cash flow variables because Adj R^2 for the earnings model is higher than Adj R^2 for cash flow models.

The results of the incremental information test provide further evidence about the superiority of earnings to both EPS and cash flow. EPS contains incremental explanatory value beyond both earnings and cash flow per share.

On the other hand, cash flow per share did not reveal any incremental information content beyond cash flow variables. Neither do

cash flow variables exhibit any incremental information content beyond cash flow per share variables. This result confirms that cash flow and cash flow per share variables contain similar information content.

Finally, earnings are found to have incremental explanatory power beyond all cash flow variables, while cash flow variables did not reveal any incremental information content beyond earnings. This result is consistent with Bowen *et al* (1987) and Board, *et al* (1989).

There is a limitation for this study about the R-Square, it was low for all models, however the authors observe this problem and made another study with varying parameters model and using both change and level variables, Hadi and Garrod (1996).

There is another chance to extend this research in the future using returns or price instead of using CAR that might increase the R-Square.

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الملخص

فحوى المعلومات في التدفقات النقدية والتدفقات النقدية للسهم الواحد: دراسة ميدانية

مهدي محمد هادي
جامعة الكويت

نيل قارود
جامعة جلاسجو

تناولت هذه الدراسة البحث الميداني عن فحوى المعلومات في التدفقات النقدية والأرباح، وانتهجت لبلوغ هذا الهدف بحث الارتباط بين التدفقات النقدية والأرباح مع العائد التراكمي غير العادي Cumulative Abnormal Return (CAR). وتهدف الدراسة إلى تقييم فائدة معلومات التدفقات النقدية حسب المعيار المحاسبي البريطاني Financial Reporting Standards FRS No.1 وتقديم التدفقات النقدية للسهم الواحد كتطوير محتمل لقائمة التدفقات النقدية، إذا ثبت احتوائه على معلومات قيمة لسوق الأوراق المالية. وتقتصر نتائج الدراسة احتواء مكونات التدفقات النقدية معلومات أكبر من العناوين الرئيسية، ومن جهة أخرى فإن تقسيمات التدفقات النقدية وفق المعيار FRS1 ليس مثالياً من ناحية أهمية المعلومات.

Neil Garrod, Department of Accounting and Finance, University of Glasgow. His Area of Interest, Segmental Reporting, accounting Changes in Eastern Europe, and Market Responses to Accounting Information.

Mahdi M. Hadi (Ph.D. in Accounting and Finance, University of Glasgow, Scotland, UK, 1996). His Area of Interest, Accounting Market-Based Research, The Information Content of Accounting Information, Cash Flow, International Accounting, Financial Reporting and Financial Institutions.

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للمؤسسات: سبعة ونصف ديناراً كويتياً أو ما يعادلها

لأفراد: ثلاثة دنانير كويتية أو ما يعادلها