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

BY

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ABSTRACT

This study investigates the information content of cash flow and earnings 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 FRS 1 and introduce cash flow per share as a possible development that may contain information value for security markets.

This study is an attempt to answer the following questions:

1- Are accruals accounting earnings and cash flow measures highly correlated ?

2- Do cash flow components disaggregated further than the 5 sub headings required under FRS.1 have incremental information content ?

3- Does cash flow per share have any information content beyond total cash flow variables ?

4- Do cash flow and cash flow per share have a significant information content beyond earnings and earnings per share ?

Previous research by Bowen, Burgstahler and Daley (1987), Rayburn (1986) , Livnat and Zarowin (1990) and Ali and Pope (1994) provide evidence about the positive association between unexpected cash flow and abnormal returns. On the other hand, Board, Day and Walker (1989) and Board, Day and Napier (1993) cannot find any information content for cash flow measures. The inconclusive and contradictory results of these previous studies indicate that further research is needed. In addition the specific requirements of FRS have not been perviously tested.

The sample for this study consists of 156 industrial firms quoted on the London Stock Exchange which were in existence for the fifteen-year period 1977 to 1991 inclusive. The primary data sources are DATA STREAM database and LONDON SHARE PRICE DATABASE. Five multiple regression models are used in this investigation. The current study findings indicate that some greater disaggregation of cash flows than that required under FRS.1 does have additional information content. Additionally, it is found that the disaggregation required under FRS 1 is not optimal from an information standpoint.

The results suggest similarity in the information content in both cash flow and cash flow per share, and there is no evidence that either one has incremental information value beyond the other. Cash flow variables do not exhibit any incremental information content beyond earnings, and in addition, cash flow per share variables do not indicate any incremental explanatory value over EPS. However, earnings and EPS do contain incremental explanatory value beyond cash flow and cash flow per share variables. Also, earnings has incremental explanatory value over EPS. Furthermore, incorporation of change and level variables with the varying parameter model reveals the highest explanatory power.

To investigate the important of firm size on the market reaction to the release of cash flow information the sample is divided into three sub samples small, medium and large firms based on sales value. The results suggest that firm size is an important factor in determining the explanatory power of the models. We find that models for small and medium firms have more explanatory power than models for large firms.

DECLARATION

No portion of the work referred to in the thesis has been submitted in support of an application for another degree for this or any another university or other institution.

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LIST OF ABBREVIATIONS

ABP	Accounting Principle Board
ASB	Accounting Standard Board
BLUE	Best Linear Unbiased Estimator
CAR	Cumulative Abnormal Return
CC	Change in Cash
CCPS	Change in Cash Per Share
CLRM	Classic Linear Regression Model
DIVID	Cash Dividends
EARN	Net Income Before Extraordinary Items and Discontinuing of the Operation
ED	Exposure Draft
EPS	Basic Earnings Per Share
ESS	Explained Sum of Squares
FASB	Financial Accounting Standard Board
FCF	Net Cash Flows from Finance
FCFPS	Financing Cash Flows Per Share
FRS	Financial Reporting Standard
GMM	Generalized Method of Moment
IASC	International Accounting Standard Committee
ICF	Net Cash Flows from Investment
ICFPS	Investment cash flows per share
LM	Lagrange Multiplier, Bera and Jarque Test for Non Normality.
LSE	London Stock Exchange
LSPD	London Share Price Database
MAD	Minimizing the Sum of the Absolute Deviation
MDA	Multiple Discriminate Analysis
MV	Market Value
NDA	Nonmetric Discriminate Analysis
NETINT	Net Interest Paid
OCF	Net Cash Flows from Operation
OCFPS	Operating Cash Flow Per Share
OLS	Ordinary Least Square
PINVS	Purchase of Investment
PMT	Payment
RESET	Ramsey 's Regression Error Specification Test
RIF	Net Cash Flows from Return on Investment and Servicing of Finance
RIFPS	Return on Investment and Servicing of Finance Cash Flow Per Share
RSS	Residual Sum of Square
S.FIXED	Sales of Fixed Assets
SUR	Zellner's Seemingly Unrelated Regression
TCF	Cash Flows from Taxation

TCFPS	Taxation Cash Flows Per Share
TSS	Total Sum of Square
UK GAAP	UK General Accepted Accounting Practise
US GAAP	US General Accepted Accounting Principles
VIF	Variance Inflation Factors

CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION:

In recent years financial statement users have become increasingly interested in cash flow data. In the UK, the continued interest in cash flow is apparent from Financial Reporting Standard No. 1 (FRS 1) "Cash Flow Statement". This statement, which was issued in 1991, requires that the previously mandated Statement of Source and Application of Funds be replaced by a Statement of Cash Flows.

Investors and creditors are interested in cash flow data as it reflects the result of their cash investment in non-cash resources to receive cash returns. The cash flow statement provides information about the company's ability to pay dividends and interest. Creditors can use cash flow data to determine the probability of repayment of a loan and its interest charge.

1.2 CURRENT POSITION OF STANDARD-SETTING BODIES ON CASH FLOW:

1.2.1 Financial Accounting Standard Board (FASB):

The growing interest in cash flow data in the U.S. is often traced to W. T. Grant company's bankruptcy in 1973. Grant's inability to generate cash flow from operations should have provided an early signal about the problems facing the company long before the accrual earnings or the market share price did (Largay and Stickney, 1980). In addition writers such as Seed (1984) claimed that cash flow was more objective than funds flow. He justified this by stating that during inflationary times the inventory value is rising and this causes cautious management to minimize the accounting receivable and cash holdings. As a result the working capital fund would be rising but its most liquid element would be falling and these figures will confuse the financial statement users.

FASB 95 was issued in November 1987 and came into effect in the fiscal year ending July 1988. The purpose of the statement of cash flow is

> *"...to provide relevant information about the cash receipts and cash payments of an enterprise during a period... " (FASB, Paragraph: 4).*

Cash flow statement under FASB 95 is classified into three standard headings: operating, investing and financing activities. FASB states that cash flow statement should help investors, creditors and others to

> *" a) assess the enterprise's ability to generate positive future net cash flows; b) assess the enterprise's ability to meet its obligation, its ability to pay dividends and its need for external financing."*

There have been several empirical studies investigating the usefulness of cash flow data under FASB 95. Livnat and Zarowin (1990) investigated the usefulness of cash flow components to the stockholders in security markets. O'Bryan (1992) examined the bondholders' reactions to the release of cash flow components. El-Shamy (1989) investigated the ability of cash flow data in predicting failed and non-failed firms. The results of these studies provide inconclusive evidence about the usefulness of cash flow data.

The current position of the FASB in regard to cash flow per share is stated in the 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."*

FASB justifies its position in appendix B of the statement, paragraphs 122-124:

> *"The Board considered whether cash flow per share should be reported. The Board concluded that reporting cash flow per share would falsely imply that cash flow, or some component of it, is a possible alternative to earnings per share as a measure of performance. The Board also noted other problems with calculating cash flow per share including differing opinions about the appropriate numerator for the indicator (for example, whether it should be net cash flow from operating activities or an amount after deducting principle repayments on debt) and the appropriate denominator for the indicator (for example, whether it should be the same as the number of shares outstanding used for the earnings per share calculation).*
>
> *A major problem in reporting cash flow per share data is investor understanding. Investors over many years become accustomed to seeing operating data per share computed only for earnings. Moreover, the measurement problems associated with reporting earnings on a per share*

> *basis have been considered and largely settled. To report other data on a per share basis invites the danger that investors, creditors, and others may confuse those measures with the conventional accounting measure of earnings per share.*
> *Earnings per share focuses attention on earnings available for common stockholders, and that concept guides the calculation of, and adjustments to, the numerator and denominator of the ratio. Earnings are suitable for the numerator of the ratio because the concepts underlying its calculation, such as capital maintenance (the distinction between the return of capital and return on capital), focus on return to stockholders on their investment. Net cash flow from operating activities is not comparable to net income because recovery of capital is not a factor in its calculation, and net cash flow from operating activities includes both returns on and returns of investment."*

The logic of the FASB position is difficult to follow the appropriateness of the denominator and numerator is a problem which also occurs in the calculation of EPS, and yet EPS is considered an important element of the annual report.

Another argument used by the FASB is lack of investor understanding. However, in SFAC No. 1, paragraph 40, the FASB asserts:

> *" Financial information is a tool, and, like most tools, cannot be of much direct help to those who are unable or unwilling to use it or who misuse it. Its use can be learned however, and financial reporting should provide information that can be used by all non-professionals as well as professionals who are willing to learn to use it properly."*

Therefore the investor who understands primary and fully diluted EPS will understand primary or fully diluted cash flow per share or their equivalents in the UK standards.

Paragraph 124 of FASB states that operating cash flow is not comparable to net income because the recovery of capital is not a factor in its calculation, which is true, and FASB accepts that earnings and operating cash flow measure different things and that neither of them substitutes for the other. Therefore, we expect EPS and cash flow per share to be two different measures for two separate things with neither of them a substitute for the other, and that cash flow per share may have additional information content beyond EPS.

1.2.2 Accounting Standard Board (ASB):

The growing interest in cash flow data in the UK culminated in the issuance of FRS 1 "Cash Flow Statements". FRS 1 was issued in 1991 and superseded Statement of Standard Accounting Practice No. 10 (SSAP10) "Statement of Source and Application of Funds", which was issued in July 1975. FRS 1 was issued in an attempt to overcome some of the perceived limitations in funds statements. These limitations were the following: a) There is a flexibility in presenting the funds statement, which results in a wide variety of different presentations. This reduced the comparability of the funds statement and consequently its usefulness; b) The funds statement simply presents the movement of assets, liabilities and capital, but it explains little about the firm's ability to meet its obligation or to pay dividends, or about its need for external financing; c) There are numerous definitions of the word *funds*, such as "net liquid", "working capital" and "net borrowing". Large listed UK companies prefer the term "net liquid funds" and "net borrowing", while unlisted companies use the "working capital" definition of *funds*.

The objective of FRS No. 1 was set out in its first paragraph:

> *" The objective of the FRS is to require reporting entities falling within its scope to report on a standard basis their cash generation and cash absorption for a period. To this end reporting entities are required to provide a primary financial statement analysing cash flow under the standard headings of 'operating activities', ' return on investments and servicing of finance', 'taxation', ' investing activities, and financing, disclosed in that sequence in order to assist users of the financial statements in their assessment of the reporting entity's liquidity, viability and financial adaptability. "*

Therefore, ASB required five standard headings as compared to the FASB's 3 headings. Hong Kong is the only other country that has adopted a standard similar to FRS 1.

There is some empirical research investigating the usefulness of cash flow data to the investors in security markets using UK firms: Board, Day and Walker (1989), Board, Day and Napier (1993), Clubb (1993) and Ali and Pope (1994). The results of the previous research provide inconclusive evidence about the usefulness of cash flow data. The current research investigates the ASB assertion about the usefulness of FRS 1 to financial reporting users and in particular to the investors in the security markets.

Although FRS 1 did not carry the prohibition of publishing cash flow per share data, Exposure Draft 54 (ED 54) asserted that cash flow per share was not a useful tool for financial reporting users, as mentioned in paragraph 36:

> *"It is not considered useful to report calculation of cash flow per share and thus it is not recommended. To present such a figure might suggest*

> *that cash flow information is comparable to earnings information and could be regarded as substitute for it. This would be misleading and would ignore the limitations of cash flow information presented for a single period."*

To date no empirical work has investigated this assertion.

1.2.3 International Accounting Standard Committee (IASC):

The growing interest in reporting cash flow data internationally can be seen from the IASC issuing IAS7 (revised 1992), which took effect from 1 January 1994 and superseded IAS7 " Statement of Changes in Financial Position" issued in July 1977. The objective of IAS7 (revised 1992) is to provide information about the historical change in cash and cash equivalent by means of cash statement. The cash flow statement is classified under three standard headings: cash flow from operations, investment, and financing activities. IAS7 (revised 1992) did not require or ban the disclosure of cash flow per share.

1.3 THE IMPORTANCE OF THE CURRENT STUDY:

The previous legislations FASB, ASB and IASC provide clear evidence of the increasing interest in cash flow data; however previous research provides inconclusive evidence about the usefulness of cash flow data. The conflict between previous research results may be due to the following: different variable calculations, different research methods and different study periods. This study will resolve these conflicts by using a uniform calculation of cash flow data as required by FRS 1, using more sophisticated research methods and using a large sample for a long period.

In some of the previous research Ordinary Least Square (OLS) assumptions have not been tested, which implies their results might not be reliable (see ch 2 for literature survey and ch 3 for OLS assumptions). Thus, the current research will thoroughly test the validity of the models and implicit assumptions imposed on the data set.

Change and level of earnings have been investigated in US literature using US firms, and they provide evidence about the presence of transitory and permanent components of earnings. The current research will explore this issue more deeply by using both cash flows and earnings measures for UK firms (see ch 7).

FASB prohibits cash flow per share to be reported in the annual report on the grounds that the investors might confuse it with the earnings per share figure. However, empirical evidence by Karel and Prakah (1987) and Sommerville (1991) proves its usefulness. Therefore, this study will investigate the information content of cash flow per share to the investors in security markets.

1.4 THE RESEARCH QUESTIONS:

This research is an attempt to answer the following questions: -

Q1- Are accruals accounting earnings and cash flow measures highly correlated ?

Q2- Do cash flow components disaggregated further than the 5 sub headings required under FRS.1 have incremental information content ?

Q3- Does cash flow per share have any information content beyond cash flow components ?

Q4- Do cash flow and cash flow per share have a significant value beyond earnings and earnings per share ?

1.5 JUSTIFICATIONS FOR THE RESEARCH:

Financial Reporting Standard No. 1 (FRS 1) is a new UK standard and there is no study investigating the usefulness of its components. Therefore, this research is the first empirical study which addresses the FRS 1 classification and tests its usefulness.

Inconclusive evidence from earlier research (see chapter 2) shows contradictions about the usefulness of cash flow data. For instance, Bowen, Burgstahler and Daley (1987), Rayburn (1986) , Livnat and Zarowin (1990) and Ali and Pope (1994) provide evidence about the positive association between unexpected cash flow and abnormal returns. On the other hand, Board, Day and Walker (1989) and Board, Day and Napier (1993) cannot find any information content for cash flow measures. The previous results do not provide sufficient evidence regarding the usefulness of cash flow measures. Thus, further research is needed.

Since the current position of ASB does not deny or allow the publication of cash flow per share (see section 1.2.2), this research will provide UK evidence about the information content of cash flow per share. This can clarify the ASB position about cash flow per share and set a standard for UK firms to follow in an uniform calculation of cash flow per share. At present there is no clear guidance in this matter.

1.6 REVIEW OF CHAPTERS:

A review of the literature about the usefulness of cash flow data is presented in chapter two. Econometric issues are presented in chapter three. Chapter four explains the research design and closes with the models that will be used in the empirical analysis. Chapter five presents the correlation analysis and interpretation. The regression results for both the incremental and information content tests are presented in chapter six. In chapter seven, change and level variables as well as varying parameter models are explained and implemented. The study closes with a summary and conclusion in chapter eight.

CHAPTER TWO

LITERATURE SURVEY

2.1 INTRODUCTION:

The purpose of this chapter is to review the relevant literature. The survey will establish the starting point for developing the models for the current study and consists of the following: first, a review of cash flow prediction studies; then, a review of bankruptcy studies that relate to cash flow data, followed by a review of security market studies.

A review of the other relevant studies is presented in section five. In section six, the motivation for the current study is presented. Finally, section seven contains some conclusions.

2.1 CASH FLOW PREDICTION STUDIES:

Bowen, Burgstahler, and Daley (1986):

The authors address the following issues:

> *" a) Are traditional CF (Cash Flow) measures highly correlated with alterative measures of CF ? b) Are accruals accounting earnings and*

> *cash flow measures highly correlated ? c) Do earnings or CF variables best predict future cash flow ?."* (Bowen, Burgstahler, and Daley, 1986).

They selected 324 firms (using US data) over the period 1971-1981. Their research distinguishes between two cash flow measurements. The first group treats traditional cash flow measurements: NIDPR (Net income+Deprecation +Amortization) and WCF (working capital from operation); the second group treats alternative measurements: CFO (cash flow from operation), CFAI (cash flow after investments but before finance activity) and CC (change in cash). The Earnings variable is NIBE (net income before extraordinary items). The analysis starts by examining the correlation coefficient (R^2) for the previous measurements. The correlation between earnings and traditional cash flow measurements is significantly greater than the correlation between earnings and alternative measures and the correlation between traditional CF measures and alterative CF measures.

> *"This result is consistent with NIDPR and WCFO being similar to earnings for most firms while the alterative measures of CF are substantially different from earnings for most firms."* (Bowen.,*et. al.*, 1986).

This implies that alternative CF measures have an information content not found in traditional CF measures. Then they used a simple prediction model (Random Walk Model) to test accrual versus cash flow as predictors of future CF. They found that traditional CF measures (NIDPR, WCFO) provide the best predicted future cash flow from operations. A possible weak point in this research is the simplicity of the model. Also, since all the models in this study use unexpected operating cash flows and unexpected returns, the problem of defining the variable correctly arises.

Waldron (1988):

Waldron (1988) develops two multiple regression models: a cash based model and an accrual based model, and he tests them to see which model better predicts cash flow from operation (CFO). The primary purpose of his study is to test for the contention of the FASB that accrual basis accounting measures have more value than cash basis accounting measures in predicting cash flow.

Waldron selects thirty companies from the oil and gas industry in the U.S. market, and collects quarterly data from the first quarter of 1977 to the last quarter of 1986 (forty quarters). Waldron develops his models by identifying the definition of CFO, which is; " adjusted working capital provided by operation for change in the non-cash working capital account". Then, he provides a theoretical basis for each independent variable that is to be included in the models. Two multiple regression models are developed: the accrual basis model and the cash basis model; the dependent variable for both models is CFO and not all the independent variables are the same for the two models. The independent variables for the accrual basis model are: Account Receivable Turnover (ARTO), Inventory Turnover (INVTO), Account Payable Turnover (APTO), Ratio of Working Capital to Sales (WC), Percentage Change in Long Term Assets (CHALTA), Debt to Equity Ratio (DE), Sales (SALES), Cost of Goods Sold (COGS), Rate of Inflation[1] (INF), and Interest Rate (INT) (Prime Rate).

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1 The inflation rate is based on the change in the product price index for petroleum-related products, which is based primarily on the oil price.

The independent variables for the cash basis model are: Cash Basis Inventory Turnover (INVTO), Ratio of Cash Working Capital to Cash Basis Sales (WC), Percentage Change in Long Term Assets (CHALTA), Cash Basis Sales (SALES), Cash Basis Cost of Goods Sold (COGS), Rate of Inflation (INF), and Interest Rate (INT).

Waldron distinguishes between two groups of independent variables on the lagged period basis. The first group which consists of (ARTO), (INVTO), (APT), (WC), (SALES), and (COGS), is lagged for one period (one quarter), because of the effect of the previous independent variables on cash flow from operations is immediate. The second group, consisting of (CHALTA), (INT), and (DE), is lagged for four quarters because their effect on cash flow from operation is not immediate.

Next, Waldron develops a regression model using data pooled over 30 companies and 40 quarters in order to test for the theoretical soundness of the models. He does this by examining the signs of the coefficient of the equation and the t- value. The results of the test are as expected[2] and the models are indeed theoretically sound. Then he

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2 In the accrual basis model ARTO, INVTO, WC, CHALTA, DE, SALES, and INF have a positive coefficient, which implies that when the variables increase, then the cash flow from operation increases too. On the other hand, APTO, COGS, and INT have a negative coefficient, which implies that when the variables increase the CFO decreases.

In the cash basis model INVTO, WC, CHALTA, SALES, and INF have a positive coefficient, which implies that, when the variables increase, cash flow from operation also increases. On the other hand, COGS and INT have a negative coefficient, which implies that when the variables increase, the CFO decreases.

applies Ordinary Least Square (OLS) and tests for OLS assumptions in order to ensure that the parameters are the Best Linear Unbiased Estimation (BLUE). For those models that violated the assumptions, an appropriate remedial measure is performed to yield models that conformed with OLS assumptions.

Finally Waldron tests the predictive ability of the multiple regression models. He obtains the result that: (R^2s of the models for each company)

> *"...21 R^2s for the accrual models were higher than the R^2s for the corresponding cash basis models."* (Waldron, 1988).

Then he carries out a residual analysis on the models, which is done by examining the mean of Percentage Prediction Error[3] (PPE). The result of the mean PPE analysis revealed

> *"...that there was little statistical difference between the means of the accrual basis models and the cash basis models for the thirty company in the sample."* (Waldron, 1988:100).

Waldron concludes that accrual accounting measures are not superior to cash basis accounting measures in predicting cash flow from operations, and that both of them are useful in this regard.

There are many weak points in Waldron's dissertation that are worth mentioning. First, the study is based on only one industry, i.e. the gas and oil industry. Second,

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3 PPE = (Predicted CFO-Actual CFO/Actual CFO) * 100
Mean PPE = PPE/40 (quarters).

the sample in this study is very small. Third, the accrual models have more independent variables than the cash basis models, and that might have reduced the degree of the success of the comparison between the two models. Finally, this study concentrates only on cash flow from operations, whereas there are many cash flow elements such as cash flow from financing , cash flow from investment which might well be important and worth further investigation.

Arnold, Clubb, Manson and Wearing (1991):

The purpose of this study is to provide evidence for the relationship between earnings, cash flows and fund flows using UK data. The sample for this research consists of 171 quoted companies on the London Stock Exchange for twenty years from 1965 to 1984. Seven variables are selected by the authors: NI (Net Income), WC (Working Capital Flow), NQ (Net Quick Flow), CO (Cash Flow from Operation), CI (Cash flow from operation and investment activity), CC (Change in cash), and CIC (Entity Cash Flow)[4]. The analysis begins by testing for the correlation between the previous variables at 5% significant level. Next, the test for the predictive ability of the variables is performed on the basis of Naive Model and Random Walk Model in order to forecast one and two periods. The results of this study are consistent with Bowen,.*et. al.* (1986) (US data).

> *"Earnings and working capital flows were significantly correlated for the majority of companies, while the association between earnings and*

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[4] For further information about the variable definitions read Arnold, Clubb, Manson and Wearing. 1991. The relationship between Earnings, Fund flows and Cash flows: Evidence for the UK. Accounting and Business Research. Vol. 22. No. 85 pp. 13-19.

the remaining cash flows and fund flows (net quick flow) variables were not significant for the majority of companies. "(Arnold,.*et.al.*, 1991).

Working capital flow is the best predictor of cash flow from operation and net quick flow.

Sommerville (1991):

Sommerville (1991) addresses the following questions in her dissertation

> *"Do cash flow variables explain future cash flow better than earnings variables ? Is cash flow per share a statistic consistent with aggregate cash flow, in that cash flow per share would give similar, while not necessarily identical, information to aggregate cash flow ? Are cash flow variables superior to earnings variables, in their long-term statistical relationships, to operating cash flow OCF and operating cash flow per share OCFPS ? Can cash flow per share be calculated and published at little incremental cost ?"* (Sommerville, 1991).

Sommerville uses cross-sectional data from forty-three manufacturing firms that are listed in New York Stock Exchange over the period from 1972 to 1988.

She uses the Multiple Regression Model (Waldron 1988 model) and performs regression analysis to test for the relationship between OCF and OCFPS with accrual variables and cash flow variables. There are two dependent variables, OCF and OCFPS, in the regression analysis.

> *"Each of the dependent variables is tested with the accrual model and with the cash model, making a total of four multiple regression tests for each year for each company in the sample."* (Sommerville 1991).

The independent variables for the accrual basis model are the following: Account Receivable Turnover (ARTO), Inventory Turnover (ITO), Account Payable Turnover (APTO), Ratio of Working Capital to Sales (WCS), Percentage Change in Long Term

Assets (PCH), Debt to Equity Ratio (DE), Sales (SALES), Cost of Goods Sold (COGS), Rate of Inflation[5] (INFL), and Interest Rate (INT) (Prime Rate). The independent variables for the cash basis model are the following: Cash Basis Inventory Turnover (CBITO), Ratio of Cash Basis Working Capital to Cash Basis Sales (CBWC), Percentage Change in Long Term Assets (PCH), Cash Basis Sales (CBSALES), Cash Basis Cost of Goods Sold (CBCOGS), Rate of Inflation (INFL), and Interest Rate (INT). All the variables are annual data, and all are lagged. The analysis is performed as follow: first the data is lagged for one year, then for two and three years to determine if there is any significant difference in long term statistical association between accrual variables and cash flow variables. Next, she tests the validity of the models by examining the signs of the coefficient for each independent variable. The results of the tests for some independent variables are inconsistent with theory (as explained in Waldron's dissertation 1988, footnote No.2). The test for the mis-specification of the model is performed and the appropriate remedies are employed by transforming the variables and calculating the natural log of the original variables or by taking the square root of the original variables. Next, the test for the assumptions of the linear regression is performed. Finally, the R^2 value and F ratio are examined in order to determine the association between the dependent variable and the independent variables for both the accrual basis model and the cash basis model. Sommerville concludes the following from her dissertation: a) Accrual variables are better than cash flow variables in predicting long term cash flow. b)

[5] The inflation rate was based on the percentage change in the purchasing power of the U.S. dollar.

OCF and OCFPS are separate statistics with separate information content. c) Earnings variables are superior in both short term and long term statistical relationships to OCF and OCFPS than are cash flow variables. d) OCFPS can be calculated and published at little or no incremental cost. e) There might be incremental information value in OCFPS that is not found in OCF.

There are some possible weak points in Sommerville's dissertation which are worth mentioning in this review: a) The sample is small and restricted to firms that reported net income over all the periods, and this might have resulted in the sample not representing its own population. b) Some coefficient signs of the independent variables (for OCFPS as dependent variable) are inconsistent with theory even after transformation, which implies that the current models do not have as strong association with OCFPS as with OCF. Therefore, there is a need for a different model to improve the result and to test for the information content of OCFPS. c) The inflation rate definition is the percentage rate of increase in the economy's average level of price (Gordon, 1990). In her study Sommerville selects the percentage change in the purchasing power of US dollar; a definition which might not be appropriate for all firms. d) She restricts her study to OCF and OCFPS, whereas it appears that there are many cash flow elements which are important and worth further investigation.

This dissertation illustrates the data effect of different industry membership, because Waldron uses the same variables and models in the oil and gas industry and found results inconsistent with Sommerville's results. Much of the previous research in the oil industry sector found evidence in favour of cash flow data which is consistent with

Waldron's results. However, for general manufacturing firms the results are inconclusive and often conflicting regarding the importance of cash flow data.

McBeth (1993):

This study examines whether actual cash flow variables or earnings measures are superior in forecasting future cash flow. McBeth introduces actual cash flow as reported in cash flow statements according to FASB 95. His test is the first test that has used actual cash flow statements. Two variables are employed in his study Net Income (NI) and Operating Cash Flow (OCF). 4415 firms are selected from Compact disclosure (USA data) for the period 1988 to 1990.

Six regression models are developed to carry out the empirical testing. OCF is the dependent variable while the independent variables are OCF_{t-1}, OCF_{t-2}, NI_{t-1} and NI_{t-2}. For some regression equations the explanatory variables are lagged one or two periods of the dependent variables. R^2 is used as a measure for the comparison among various regression models.

He concludes the following: a) Cash flow variables that have been used in previous research are much less adequate than was previously thought. b) OCF is a better predictor than earnings of future OCF in 1990; on the other hand, earnings is a better predictor than OCF of future OCF in 1989. c) There is a considerable increase in the explanatory power for the model based on net income after adding OCF, while there is no appreciable increase for the model that is based on OCF after adding net income.

McBeth's study has some weak points, i.e. he uses regression models and does not test for OLS assumptions. Therefore, it is not possible to be sure about the internal validity of the model and whether his results are reliable or not. His model appears to suffer from multicollinearity problems, because, judging by table 1, OCF_{t-1} and OCF_{t-2} are highly correlated, 78.3% in 1990. The multicollinearity might be the reason for the negative sign of OCF_{t-2}. Finally the data is limited to three years which might make it impossible to generalise his results.

2.3 BANKRUPTCY STUDIES:

Casey and Barteczak (1984, 1985):

Casey and Barteczak (1984) find that operating cash flow data do not distinguish accurately between failed and non-failed firms, which raises the question of the importance of operating cash flow data as a performance measure. Also, Casey and Barteczak (1985) assess whether operating cash flow data and related measures have any predictive ability for forecasting bankrupt and non-bankrupt firms. They select 60 failed companies and 230 non-failed companies covering the period 1971 to 1982. Then, they use multiple discriminant analysis (MDA) and conditional stepwise logit analyses and find that operating cash flow ratios do not have predictive power beyond accrual based ratios.

Gentry, Newbold and Whitford (1985):

The objective of their study is to examine whether cash-based funds flow ratios can successfully classify failed and non-failed companies and whether they can be used as alternatives to accrual based ratios. They select two samples; the first one is the primary sample, which consists of 33 failed and 33 non-failed firms over the period 1970 to 1981. The second one is called the secondary sample and consists of 23 weak and 23 non weak firms over the period 1978 to 1980.

The following eight funds flow components are used in their study: funds flow from operations, working capital, financial, fixed coverage expenses, capital expenditures, dividends, other assets and liability flows, and the change in cash and marketable securities. All the previous variables are deflated by total net flow. Multiple Discriminant Analysis (MDA), Probit and Logit techniques are used to examine the predictive power of funds flow components.

They find that the logit coefficient and their asymptotic T ratio for dividends are highly significant at .05 level, which means the smaller the dividend components the higher the probability of failure. Therefore, they find dividends provide significant information in classifying failed and non-failed firms. The general conclusion of the study is that cash flow based components are an alternative for classifying failed and non-failed firms. On the other hand, cash flow from operations cannot improve the classification of failed and non-failed firms.

The possible weak point in this study is that they did not test for normality conditions. As ratios distribution are usually non normal such deviations might be expected and thus their results might not be reliable.

Karels and Prakash (1987):

This research investigates whether financial ratios used in previous bankruptcy studies satisfy the joint normality condition as required by the Multiple Discriminant Analysis (MDA) technique. If the sets are not normal they construct selective ratios that satisfy the normality condition and use them in predicting failed and non-failed companies. 50 US companies are selected from COMPUSTAT data tape for the period 1972-76. Fifty ratios are selected for univariate normality testing by using Shapire W- statistic procedures. They are also tested for multivariate normality using Mardin's test. The results suggest that eleven ratios[6] satisfy the joint normality condition. Multiple Discriminant Analysis is used to test the usefulness of these selected ratios for prediction purpose. Karels and Prakash (1987) conclude the following: non ad hoc selection of financial ratios does increase the accuracy of the predictive power for the models. Cash flow per share and sales per inventory are significant discriminators and can be used to identify the firms that might face cash flow problems and possible bankruptcy. Inventory accumulation without significant sales is an important indicator in impending bankruptcy. Market price per share is not a significant discriminator, except one year before bankruptcy.

EL Shamy (1989):

The purpose of his dissertation is to examine the predictive ability of the new Nonmetric Discriminants Analysis (NDA) method that has been proposed by Raveh

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[6] Working capital ratio, gross profit margin, earning per share, total debt to total capital, total debt to total assets, cash flow per share, natural logarithms of tangible assets turnover, market value of common stock, sales per share, sales per inventory, and sales per receivable. Also, all variables were lagged over a three year period.

(1989) in predicting corporate failure and bond rating. Also, he examines the incremental information content of cash flow variables beyond accruals earnings in the prediction of corporate failure and bond rating. Furthermore, he tests if earnings have incremental information value after controlling for cash flows.

His sample consists of 46 failed companies and 46 matched non-failed companies in the same industry and of the same size. Data is collected from the COMPUSTAT Annual Research file for the period 1974 to 1983. He compares the results from the NDA and LDA methods to find which one outperforms the other. Eleven multiple linear discriminant and nonmetric models are developed and ten variables are used in predicting bankruptcy as follows: the first five (NIBEI, WCFO, CFO, CFAI, and CC)[7] are all divided by total debt. The remaining variables are NIBEI/total assets, total debt/total assets, current assets/current liability, working capital/total assets, and retained earnings/total assets.

For the bond rating predictive test, the sample consists of 164 bonds issue for selected firms in 1986. All these bonds are rated B or above according to Standard & Poor's and Fitch. The previous ratios are used with slight changes[8] and dummy variables (0,1) for subordination status are included in the model.

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The definitions of these variables are the same in Bowen, Burgstahler and Daley (1986) in the cash flow prediction section.

8

For bond rating prediction analysis the following ratios are included: long term debt/invested capital, interest coverage, and total assets; while total debt/total assets, working capital/total assets, and retain earning/total assets are dropped.

He concludes from corporate failure analysis that cash flow measures have no information content over and above accruals earnings in predicting corporate failure. On the other hand, accruals earnings exhibit an information content beyond cash flow measures. Furthermore, he provides evidence that nonmetric discriminant analysis is superior to linear discriminant analysis in discriminating between healthy and failing companies.

From the bond rating analysis, he reports that neither cash flow measures nor accruals earnings substantially improve the accuracy of classifying bond ratings. However, the use of nonmetric discriminant analysis reduces the number of misclassifications in bond ratings.

2.4 SECURITY MARKET STUDIES:

Belkaoui (1983):

Belkaoui (1983) empirically investigates accrual and cash accounting number indicators in terms of variability and persistency. Also, he hypothesizes that the accounting numbers that give low variability and high persistency will be more favoured by the market and reflected in the market price. Belkaoui selects 66 firms (US data) for nineteen years from 1959 until 1977. He uses the following variables: Cash flow per share/Stock price ratio (CFP), Common equity per share/Stock price ratio (CEP) and Earning per share/stock price ratio (EPSP).

Belkaoui concludes that balance sheet oriented numbers and accruals accounting based numbers show lower variability and higher persistence than cash flow accounting based numbers and income statement based numbers; in other words, EPSP is the most variable measure and CEP the least variable.

> *"In short, the evidence argues for an asset/liability view of earnings rather than either a revenue/expense view or cash flow view." (Belkaoui, 1983).*

The possible weakness of this study concerns the indirect test of cash flow. Since this study adjusts net income for current account and non cash charges, the possibility exists of measuring cash flow data differently from the way in which sample firms would have reported.

Wilson (1986, 1987):

Wilson (1987) examines the incremental information content of the accrual and funds components of earnings beyond earnings itself. He uses 322 firm-year observations for US companies over the test period 1981-1982, where there was at least an 8-day interval between the fourth-quarter earnings announcement in the Wall Street Journal and the subsequent release of the annual report or 10-K which reveals the funds and accrual components of fourth-quarter earnings.

The results of his research for a nine day event interval, indicate that the cash from operations regression coefficient is positive and significantly different from zero, whereas the working capital from operations is not significant. He also uses a portfolio approach to measure the information content of the components of earnings at the annual report release date. This approach involves the division of firm-year observation into low, medium, and high forecast error portfolios for cash from operations, working capital from operations and the calculation of cumulative average residuals for the 9-day return interval.

The hypothesis that the mean portfolio returns are the same for low, medium and high forecast error portfolios is rejected for cash from operations but cannot be rejected for the working capital from operations.

Wilson (1986) investigates the relative information content of total accruals and cash flow from operations. He address the following hypothesises to be tested:

> "*H_1: The accrual and funds components of earnings, taken together, have no incremental information content beyond earnings. H_2: Accruals have no incremental information content beyond funds from operations.*" Wilson (1986:167)

The variables that used in his study are: revenue, cash from operations, current accruals, non current accruals, total accruals, earnings and capital expenditures. Current accruals are defined as cash from operations less working capital from operations, whilst the non-current accruals are working capital from operations minus earnings. Total accruals equals the sum of current and non-current accruals. The sample used in this study is the same as in Wilson (1987) 322 firm-year from US market covering the years 1981-1982.

Wilson (1986) uses two narrow return intervals, the first one around the fourth-quarter of earnings release date and the second one around the financial statement release date. He considers using two return intervals to enable him to test the incremental information content of accruals beyond funds flow.

The results are based on regressions of the sum of the average market model residual over a two day interval around the earnings's release date and a nine day interval around the financial statements release date on unexpected funds from operations and unexpected accruals. The results indicate that non-current accruals have no incremental information content beyond working capital from operations. On the other hand, there is evidence that there is significant incremental information value for current accruals beyond cash from operations.

Furthermore, univariate regression of the two-interval measures of unexpected returns on unexpected working capital from operations and unexpected earnings indicate that working capital from operations is successfully predicted at the date earnings announcement. Therefore, the abnormal returns are positively related to unexpected working capital from operations but unrelated to non-current accruals at the earnings release date. In addition Wilson (1986) confirms the incremental information content of current accruals beyond cash flow from operations. Also, the decomposition of earnings into cash flow from operation and total accruals has information content beyond and over earnings.

Wilson (1986, 1987) provides empirical evidence which supports the argument that both cash flow from operations and current accruals have significant explanatory power for share returns. On the other hand, the Wilson studies can not detect any significant association between share returns and non-current accruals, but he acknowledges that his methodology might have insufficient power to detect the information content.

> *"These result do not preclude the possibility that non current accruals have information content at a date prior to the earnings announcement date. Furthermore, considering the poor explanatory power of the non current accruals prediction equation used here, it is possible that the tests have insufficient power to detect information content."* Wilson, 1986:192.

Bowen, Burgstahler, and Daley (1987):

This paper examines the information content of unexpected cash flow data beyond unexpected earnings and unexpected working capital. Also, the authors investigate whether accruals variables add any value to the information contained in cash flow numbers. Furthermore, they examine the association between unexpected earnings and unexpected security returns after controlling for the relation between unexpected cash flow and unexpected returns.

They select 98 USA firms for the period 1972 to 1981 from the COMPUSTAT file. Five independent variables are selected: UE (unexpected earnings), UCFO (unexpected cash flow from operation), UWCFO (unexpected working capital from operation), and UCFAI (unexpected cash flow after investment). The dependent variable is CSUR (unexpected return to common equity). Five regression models are used and they find that the cash flow data contain incremental information content relative to that found in earnings. Cash flow data have incremental information content over both earnings and working capital. Accrual data jointly and separately have additional information content beyond that contained in cash flow data. There is no evidence that working capital has incremental explanatory power beyond that contained in earnings.

There are some possible weak points in the Bowen, *et. al.* (1987) paper that relate to possible violations of OLS assumptions. In model three[9] UE and UWCFO are highly correlated for several years as presented in table 2, and this might be an indication of a multicollinearity problem.

Ainsworth (1988):

Ainsworth (1988) examines the association between cash flows and stock prices as compared to the association between accrual accounting earnings and stock prices. Also, he tests the information content of accrual earnings data beyond cash flow data. Two equal samples are selected from the New York Stock Exchange; each sample has seventy-four firms. The first sample consists of cash basis companies, and the second sample consists of working capital based companies. This dissertation covers the period from 1983 to 1986. He finds the relationship between stock price returns and net income, cash flow or working capital are essentially the same. The Hotelling's T^2 test is performed to test whether the two samples are equivalent with respect to size, risk, industry classification, and profitability. There are two differences between the samples in terms of beta, which made it necessary to revise the original model. The multiple regression analysis generated the following results: a) Cash flow numbers do have information content but their usefulness is not constant over time; b) Working capital numbers do have information content.

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$$CSUR_{it}=B_0+B_1UE_{it}+B_2UWCFO_{it}+e_{it}\ldots.. \quad (M3)$$

Board, Day and Walker (1989):

They investigate the information content of three measures of unexpected accounting performance: accounting income, working capital funds flow, and cash flow from operations.

They use two sets of data, covering USA and UK markets. For the USA sample, 193 firms are selected for the period 1965-1982. For the UK, they select 39 firms over the period 1962-1977.

The results of their study are: unexpected accounting income has a more significant association with security returns than unexpected funds flow and unexpected cash flow. Unexpected accounting income has incremental explanatory power beyond unexpected funds flow and unexpected cash flow. However, unexpected cash flow does not exhibit any incremental value beyond unexpected accounting income and unexpected funds flow. On the other hand, unexpected funds flows have incremental information content beyond unexpected cash flows.

There are some shortcomings in this paper: first, there is a big difference in the number of the firms between the USA and the UK samples. Therefore, the two results might be not comparable. Second, the incremental information content test is based on the comparison between two variables, but earnings are an aggregate figure, whilst cash flow from operation is some portion of earnings. Thus, according to their test, earnings must exhibit incremental information content beyond cash flow from operation, as they found.

Livnat and Zarowin (1990):

The purpose of their study is to investigate whether disaggregate cash flow components are more associated with security returns than aggregate cash flow components, and whether these associations are consistent with finance theory. They select 281 firms from the US market over the period 1974-1986. Livnat and Zarowin conclude that operating cash flow is strongly associated with security returns and has the expected sign. Investment cash flows have a lower association with security returns and this implies that capital investments might be anticipated by investors.

Ali and Pope (1994):

This study reexamines the incremental information content of three measures of performance, earnings, working capital from operation and operating cash flow. They implement some of the recent innovations in market based research methodology like the non-linear regression model, change versus level variable and the varying parameters model.

They select 247 firms in the UK market from Global Vantage data base for the period 1984 to 1990. They find that for the return-earning model, the explanatory power significantly increases from linear without time varying parameters, to linear with time varying parameters and Adj R^2 increases from 15.23% to 18.53%. However, for the non-linear model, Adj R^2 increases from 17.06% to 20.84 when there is a shift from without varying parameters to with varying parameter variables. For the funds flow-return and cash flow-return models, the explanatory power of the model is increased from the linear model to the non-linear model. This also occurs when there is a switch from the model without time varying parameters to the model with time varying parameters model.

The overall conclusion from their study is that earnings exhibit higher relative information content than funds flow and cash flow. Therefore, the earning return model has the highest explanatory power followed respectively by the funds flow-returns and the cash flow returns models. The response coefficients are consistently positive across the years for unexpected components of earnings and funds flow but not for cash flow.

The possible weak points in this paper are: there is a high correlation between earnings and WCFO 75% and that might be a sign of a multicollinearity problem[10]. Also, there are some shortcomings in using a non-linear model, because the researcher must depend on his / her judgment when selecting the initial starting value for the beta in the model. This step is very important in the Guass-Newton method. Furthermore, the computer might not reach the Global[11] value for the beta; in which case a non-linear model will be irrelevant to solving this issue. Neter, Wasserman and Kutner (1989) suggest that some properties of linear least square do not hold for the non-linear model, e.g. the residual does not necessarily sum to zero in non-linear least square. The error sum of square and regression sum of square do not necessarily

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10 The same problem found in Bowen, *et.al.* (1987)

11 Because Guass-Newton method may produce iterations which oscillate widely or result in increase in the error some of squares (Neter, Wasserman and Kutner, 1989:562).

equal the total sum of square. Consequently, the coefficient of multiple determinants R^2 is not necessarily a relevant explanatory power for the non-linear model, which also might lead to negative R^2.

2.5 OTHER RELEVANT RESEARCH:

This section reviews some of the remaining empirical research in cash flow data: Beaver (1968) conducted a study involving the predictive power of funds flow, and the main conclusion from his study is that funds flow predicted failure accurately in 76% of the cases.

Gombola and Ketz (1983) examine the impact of cash flow measures upon the classification pattern of financial ratios. They conclude that there is a distinct difference between profitability measures and cash flow measures. Cash flow ratios may contain some information content not found in profitability ratios. Harmon (1984) investigates the relative importance of earnings versus funds flow, by examining the association between market reaction with earnings variables and funds variables. He finds that earnings are more associated with market reaction than funds flow.

Rayburn (1986) examines the ability of operating cash flow and accrual data to explain the relative change in equity value (returns). She finds that cash flow measures, aggregate accruals and current accruals are consistent with the information set used in equity valuation.

Wilson (1987) reports a positive association between total accruals and cash flow from operation with stock returns. He concludes from his research that total accruals and cash flow from operations taken together have incremental information content beyond earnings. Bernard and Stober (1989) attempt to generalize Wilson's (1987) finding to a longer period and assess the alternative economic argument by re-examining the information content of cash flow and current accruals. They report that they are unable to generalize Wilson's (1986, 1987) results to a longer test period. Their overall conclusion is that security price reaction to the release of cash flow and accrual information in the financial statements is

> *"...too highly contextual to be modelled parsimoniously or important uncertainties about the contents of detailed financial statements are resolved prior to their public release."* (Bernard and Stober, 1989).

Kochanek and Norgaard (1988) investigate the relationship between earnings, earnings quality and operating cash flow for the chartered companies which filed for relief under chapter eleven. They find no evidence to support the information content of earnings or share prices for assisting the prediction of bankruptcy, while they find that operating cash flows, change in operating current assets and current liabilities, are important indicators of future bankruptcy.

Charitou and Venieris (1990) provide evidence from Greece about the importance of cash flow data. They examine the relationship between operating earnings, working capital from operations, and cash flow from operations. They find that operating net income and working capital are correlated measures of profitability, while cash flow from operation is a better measure for liquidity and solvency. They report that cash flow from operations could provide an indication of the liquidity and solvency problems of the failed firms several years before bankruptcy. Their main conclusion is that cash flow from operations provides information to the investors and management and is different from the information that may be found in earnings.

Mensah (1990) investigates the validity of the economy-based theory which suggests that the association between unexpected stock returns and unexpected operating cash flow is not homogeneous in all the years. He finds that cash flow coefficients are not homogeneous over the years because they have negative coefficients for 5 out of 13 years.

Hanna (1991) examines the incremental information content of cash flow and accruals announcements, and the effect of firm size, default risk and industry membership upon the strength of any cash flow relationship. He finds that balance sheet proxy cash flow variables capture different or more noisy information than do statement of change in financial position (SCFP) proxy variables. The information that is captured by SCFP variables is highly correlated with abnormal returns. The firms with high default risk have a stronger and positive market reaction to cash flow announcements. There is weak evidence for lessened market reaction to cash flow information for small firms. Cash flow relationships are affected by firm industry membership in many ways.

O'Bryan (1992) replicates Livnat and Zarowin's (1990) study, although he uses corporate bond returns as the dependent variable instead of CAR (Cumulative

Abnormal Return). He proposes several objectives in his dissertation: first, to examine the potential source of variation in Debt Earning Response Coefficient (DERC); second, to examine the valuation of firm earnings and cash flow components. He reports a positive association between earnings and bond returns as well as between default risk premium and DERCs. Cash flow from operations have a positive association with bond returns and its response coefficient exceeds the total accrual response coefficient. The valuation of cash flow from operations systematically changes over the business cycle. Furthermore, operating cash flow exhibits incremental information content beyond finance cash flow, investment cash flow and accruals. There is no evidence to support the incremental information content of finance cash flow or investment cash flow. However, some of his models suffer from multicollinearity problems as explained in table 5-27 for NCFO and TACC and table 5-32 for COLL, PMTS and TACC[12] .

Percy and Stockes (1992) examine the external validity of Bowen,*et.al.* (1986) in Australia. They provide evidence for the relationship between earnings and cash flow measures. Their results are generally consistent with Bowen.*et.al.* (1986) who find that traditional cash flow measures are highly correlated with earnings, while more refined cash flow variables exhibit low correlation with earnings. The traditional cash flow based model outperforms the earnings model and refined cash flow model in

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NCFO = Net cash flow from operation= VIF (Variance Inflation Factor) = 24
TACC (table 5-27)= Total Accruals = VIF = 24
COLL = Collect from customers = VIF = 102
PMTS = Payments = VIF = 109
TACC (table 5-32)= Total Accruals = VIF = 58

forecasting cash flow using one or two periods. Furthermore, El Shamy (1989) re-examines the information content of cash flow measures as adopted by Bowen, *et.al.* (1986) in bankruptcy firms and does not find any information content in cash flow measures.

Charitou and Ketz (1991) examine the association of cash flow from operations, financing and investing activities with the market value of the firms. They report that cash flow from operations, financing and investment activities are all associated with security returns. Also, they find that cash flow from operations is the primary support for capital expenditures.

Moses (1991) tests for the association between earnings forecast revisions and accounting cash flow signals. He reports that

> *" Information on both earnings and cash flow signals appears to be incorporated into earnings forecast gradually over time."* (Moses, 1991).

Also, he finds that working capital flow from operations is statistically more strongly related to forecast revisions than is cash flow from operations or cash flow after investments.

Ali (1994) reports a non-linear relationship between return and each unexpected component of earnings, working capital from operations and cash flows.

Ball and Brown (1968) examine the association between residual behaviour and forecast errors via the abnormal performance index. They conclude that funds flow (operating and net income before non-recurring items) is not as successful as EPS and net income in predicting residual behaviour. Beaver and Dukes (1972) extend Ball and Brown's research and report that API (Abnormal Performance Index) following the announcement month is consistent with an efficient security market. Also, they find that deferral earnings is more consistent with information that set security price, while cash flow data is the least consistent.

Board and Day (1989) examine the link between historical cost earnings and cash flow measures with share prices for UK firms. They report that there is no evidence to support the information content of cash flow. However, there is some evidence for the incremental information content of ROI (Return On Investment) over all cash flow and earnings measures. Furthermore, working capital is superior to net cash assets earnings measures in explaining the variations in security returns.

Murdoch and Krause (1989) examine the relative information content of accrual accounting and cash flow measures in predicting future cash flow. They report the following: accruals earnings are better for predicting operating cash flow than operating cash flow itself. Sales and working capital are better for predicting operating cash flow than earnings. Furthermore, earnings, working capital, and sales each individually contain incremental information value beyond operating cash flow measures. Based on the previous results, they conclude that operating cash flow is not a useful tool in forecasting cash flow from operations. Murdoch and Krause (1990) address the issue of whether current or non-current earnings components and cash flow from operations are a better prediction of cash flow from operations. They conclude the following: earnings are better than operating cash flow in forecasting future operating cash flow. The current components of earnings are more important than non-current components of earnings in forecasting future operating cash flow.

Board, Day and Napier (1993) investigate the share price reaction to earnings and cash flow disclosures. They conclude that cash flow variables are unlikely to prove superior to operating profit and earnings numbers in terms of their association with cumulative abnormal returns.

Clubb (1995) addresses the information content of several cash flow variables: unexpected operating cash flow; unexpected investment cash flow; unexpected finance cash flow; and unexpected dividends. All the variables are in first difference form scaled by real share price. The real share price is the retail price index expressed on a per share basis. For his study Clubb uses time series data for 48 UK firms to carry out the information content test. He reports significant operating cash flow which is inconsistent with almost all UK studies, and he finds a significant association between unexpected investment, unexpected finance and unexpected dividends with unexpected returns.

Table 2-1 provides a summary for some of the previous studies

TABLE 2-1
SUMMARY OF SOME SELECTED LITERATURE

Authors Year	Sample Size & Industry Group	Years of Coverage	Cash Flows V. Earnings	Cash Flow Per Share	Type of Study			Methods	General Conclusion
					Prediction	Security Market	Bankruptcy		
Bowen. *et. al* (1986)	324 USA firms *	1971-1981	x		x			Square Correlation Coefficient and Random Walk Model	Tradition cash flow measures (NIDPR, WCFO) are the best predictors of future cash flow from operation.
Waldron (1988)	Using 30 USA firms from oil and gas Industry.	1977-1986	x		x			Multiple Regression	Accruals accounting measures are not superior to cash basis accounting measures in predicting cash flow from operation and both of them are useful in this regard.
Arnold, *et.al* (1991)	171 UK firms *	1965-1984	x		x			Correlation Coefficient, Naive Model and Random Walk Model	Working capital flow was the best predictor of cash flow from operation than net quick flow.
Sommerville (1991)	43 USA firms from general manufacturing group	1972-1988	x	x	x			Multiple Regression	a) Accrual variables are better than cash flow variables in predicting long term cash flow. b) OCF and OCFPS are sperate statistic with sperate information content.
McBeth (1993)	4415 USA firms *	1988-1990	x		x			Multiple Regression	OCF and Net income are useful in predicting future OCF.
Casey and Barteczak (1985)	Using USA data, 60 failed firms and 230 non-failed firms from several industry membership	1971-1982	x				x	Multiple Discriminate Analysis	Operating cash flow ratios did not have predictive power beyond accrual based ratios.
Gentry, *et.al* (1985)	Using USA data. For primary sample, 33 failed firms and 33 non-failed firms. For secondary sample, 23 weak firms and 23 non-weak firms. from general manufacturing firms	1970-1981	x				x	Multiple Discriminant Analysis and Logit Techniques	Cash flow based component are an alternative for accruals based ratios for classifying failed and non-failed firms.
Karels and Prakah (1987)	50 USA firms *	1972-1976	x	x			x	Multiple Discriminant Analysis	Cash flow per share is significant in determining the firms that might face possible bankruptcy.

Authors Year	Sample Size & Industry Group	Years of Coverage	Cash Flows V. Earnings	Cash Flow Per Share	Type of Study			Methods	General Conclusion
					Prediction	Security Market	Bankruptcy		
EL Shamy (1989)	Using USA data, 46 failed firms and 46 non-failed firms from manufacturing group	1974-1983	x				x	Nonmetric Discriminant Analysis and Linear Discriminant Analysis	Cash flow measures have no information content over and above accruals earnings in predicting corporate failure.
Belkaoui (1983)	66 USA firms *	1959-1977	x	x		x		Correlation Coefficient	The evidence argues for an assets/liability view of earnings rather than either a revenue/expense view or cash flow view.
Wilson (1986, 1987)	322 (Firms-Years observations) manufacturing U.S. firm	1981-1982	x			x		Multiple Regression and Portfolio analysis	Both cash flow from operations and current accruals have significant explanatory power for share returns
Bowen, *et.al* (1987)	98 USA firms *	1972-1981	x			x		Multiple Regression	Cash flow data contain incremental information content relative to that found in earnings.
Ainsworth (1988)	Using USA data for two equal samples and each sample has 74 firms from manufacturing group.	1983-1986	x			x		Multiple Regression	Cash flow numbers do have information content
Board, Day and Walker (1989)	Two markets: 193 USA firms and 39 UK firms. *	1961-1982 for USA firms and 1962-1977 for UK firms	x			x		Regression Models	Earnings has more significant association with security returns than fund flow and cash flow.
Livnat and Zarowin (1990)	281 USA firms from manufacturing group	1974-1986	x			x		Multiple Regression	Operating cash flow is strongly associated with security returns with positive coefficient.
Ali and Pope (1994)	247 UK firms *	1984-1990	x			x		Linear and Non-Linear Regression, Varying Parameter Model, and Changes and Levels Variable	Earnings return model has the highest explanatory power followed by funds flow returns and cash flow returns models.

* The authors did not provide information about the industry membership.

2.6 MOTIVATIONS FOR THE CURRENT RESEARCH:

The previous research review reveals the contradiction about the information content and the predictive ability of cash flow data. The contradictions among these studies are due to each study having different variables, different calculations for cash flow measures, different data set and industry, different research methods and time interval and years.

The current research will attempt to resolve some of the previous conflicts by the following:

a- Focus on a uniform calculation of cash flow variables using FRS 1 definitions. Both aggregate and disaggregated forms of the FRS 1 classifications are tested as well as cash flow per share.

b- The shortcomings in model building in the previous studies is rectified by the author by building a model which is verified for both its internal and external validity. This will be the subject of chapter three. The development of the hypotheses tests which are able to answer the research questions and the practical applications of OLS assumptions will be covered in chapter four.

c- The current research will examine the market reaction to the release of cash flow information, and that test will be performed by using both traditional multiple regression techniques and new methods in market based research. Such tests are carried out in a more comprehensive manner than has been used before.

2.7 CONCLUSION:

Although a large amount of research had been compiled in the United States about the usefulness of cash flow data, in the UK the amount of such research is limited. Current research explores the usefulness of cash flow data and investigates the information content of cash flow data on aggregate, disaggregate and per share bases for UK firms according to FRS no.1 standards headings. This research will provide a comprehensive investigation into the usefulness of all cash flow elements.

Furthermore, some of the recent innovations in empirical research will be used to test if the time varying parameters model, as well as change versus level variables, have any impact on the explanatory power of the models.

CHAPTER THREE

ECONOMETRIC ISSUES

3.1 INTRODUCTION:

Econometrics is the application of statistical techniques in economics' and social sciences' research. The current research uses multiple regression techniques to answer various research questions. The Ordinary Least Square (OLS) method is used to estimate the parameters of the models. There are many assumptions underlining the OLS technique which must be met before relying on OLS estimators. These assumptions are: zero mean value of the error term , no autocorrelation between the error terms, homoscedasticity or equal variance of error terms, zero covariance between the error terms and the explanatory variables , no specification bias or error, the error term is normally distributed , and no multicollinearity among the explanatory variables.

This chapter deals with the nature of OLS assumptions and discusses selected tests used to detect any departure from OLS assumptions. It also explains the consequences of any violation of OLS assumptions. Then, various measures that can be used to remedy any violations are presented. The cross-sectional dependence in the residual is explained in section eight. A dummy variable model will be used for models that combine time series and cross sectional data and varying parameter models.

3.2 ORDINARY LEAST SQUARE (OLS):

OLS is used to estimate the parameters which have the smallest possible Residual Sum of Square (RSS). The regression equation consists of one dependent variable Y and one or more independent variables X.

The typical multiple regression equation is in this form:

$$Y_{it}=\alpha+\beta_1 X1_{it}+\beta_2 X2_{it}+\ldots\ldots.\beta_k Xk_{it}+u_{it}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3.1)$$

Where,

Y_{it}= Dependent variable.

$X1_{it}\ldots Xk_{it}$=Independent variables.

α= Intercept.

$\beta_1\ldots.\beta_k$= Slope.

u= Error term

The purpose of the regression equation is to test if any of the variations in the explanatory variables ($X1_{it}\ldots Xk_{it}$) can explain the variation in the dependent variable (Y_{it}). R^2 measures the degree of explanatory power in the regression model, which indicates the variation in the dependent variable that can be explained by the variation in the independent variables.

The F test will be used to test for the goodness of fit of the model. The coefficient of determination R^2 is a measure of overall goodness of fit by the following formula:

$$R^2=\frac{ESS}{TSS}$$

Where,

ESS = Explained sum of squares

TSS = Total sum of squares (TSS=ESS+RSS)[1]

RSS = Residual sum of square.

On the other hand, F ratio tests the joint hypotheses that non of the explanatory variables have any impact on Y, and the null hypotheses $H_0: B_1 = B_2 = \ldots B_k = 0$.

$$F = \frac{ESS/d.f.}{RSS/d.f.}$$

Where,

d.f. in the numerator (k-1), k= number of the parameters including the intercept.

d.f. in the denominator (n-k), n= number of the observations.

Thus, if the numerator is larger than the denominator, the variance of Y which is explained by the regression (Xs), will be larger than the variance that is not explained by the regression. This will lead to an increase in the F ratio and an increase in the probability of the rejection of the null hypothesis $H_0: B_1 = B_2 = \ldots B_k = 0$.

The relationship between R^2 and F ratio can be illustrated by the following:

$$F = \frac{R^2/(k-1)}{(1-R^2)/(n-k)}$$

where,

n = number of observations.

k = number of parameters including the intercept.

From the previous equation, the F ratio and R^2 are directly related. When $R^2 = 0$ then F =0, and the larger the R^2 the larger the F ratio and if $R^2 = 1$ then F=

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[1] TSS =ESS+RSS

$$\sum Y_t^2 = b_2 \sum Y_t X_{2t} + b_3 \sum Y_t X_{3t} + \sum e_t^2$$

infinity. Therefore, the F test measures the significance of the regression line as well as the significance of R^2 by testing $H_0: R^2 = 0$. The t statistic is used to test the explanatory contribution for each individual independent variable.

The OLS method has been widely used in empirical research. The reason for this is its unique theoretical properties, as stated by Guass-Markov theorem:

> *" Given the assumption of the classical linear regression model, the OLS estimators, in the class of unbiased linear estimators, have minimum variance, that is, they are BLUE (Best Linear Unbiased Estimators). "* (Gujarati, 1992:150).

The desirable properties of estimators are unbiasedness, efficiency, and consistency. The first two are small sample properties, while the third one is the property of large samples. Unbiased estimators can be defined as follows: if there are several estimators of a population parameter and one or more of these estimators on average equals the true value of the population parameter, then these estimators are unbiased estimators:

If $E(b)=B$, then b is an unbiased estimator;

and if $E(b) \neq B$, then b is a biased estimator.

Therefore, in the repeated applications and on average, b will coincide with true value B, and $E(\sigma^2)$-the estimated variance of the disturbance term u_i - will coincide with true σ^2. On the other hand, the property of efficiency is related to the variance of estimators. If b is an unbiased estimator and has the minimum variance, then we can say that b is an efficient estimator and a Minimum Variance Unbiased Estimator (MVUE). Therefore, the estimator b must have a small variance because if we have an estimator with a large variance, our estimate may be far from the true value.

Furthermore, if b is a linear function estimator of the random dependent variable (Y), then b is a BLUE (Best Linear Unbiased Estimator).

The property of consistency assumes that

> " *an estimator X is said to be a consistent estimator if it approaches the true value of the parameter as the sample size gets larger and larger.* " (Gujarati, 1992:96).

Thus the OLS method is used because it can estimate the true value of B more accurately than any other method.

There are several assumptions for the OLS method that must be complied with before relying on it. The OLS assumptions are the following: zero mean value of u_{it}, no autocorrelation between the u's, homoscedasticity or equal variance of u_{it}, zero covariance between u_{it} and X_{it}, no specification bias or error, the error term is normally distributed , and no multicollinearity among the explanatory variables. This section discuses in detail the assumptions that might be violated.

3.3 NORMALITY:

The hypothesis testing for normality assumes that the error term u follows the normal distribution with mean zero and (homoscedastic) variance σ^2 . The mathematical expression for normality assumption is:

$$u_i \sim N(0, \sigma^2)$$

The properties of the OLS estimators under normality assumptions are the following:

1- The least square estimator β is unbiased and has minimum variance and is consistent.

2- The variance estimator σ^2 is unbiased and consistent.

3- The estimators β and σ^2 are efficient.

4- β has the minimum variance in the entire class of unbiased estimators whether linear or not.

Hence, the consequences of the departure from normality are: the distributions of β is no longer normal and the F and t tests based on β are not necessarily valid.

Previous empirical research in financial ratios provides evidence for a non-normality problem in such studies. The current study employs some variables that are in their first difference form and deflated by market value. Therefore, the normality assumption is very important because the departure from this assumption is associated with the type of data used in this study.

3.3.1 Testing for the Normality Assumption:

There are several tests for normality: White and Macdonal (1980), Franck (1981) and Bera and Jarque (1987). The current research will use the Bera and Jarque test (1987) because it is highly recommended by many econometricians in empirical research.

The Bera and Jarque test (1987):

The basic concept for this test is first compute lagrange multiplier (LM):

$$LM = N\left(\frac{g_1^2}{6} + \frac{g_2^2}{24}\right)$$

where g_1 and g_2 are the coefficients of residual skewness and excess kurtosis (Kenneth J.White 1993). The decision rule for this test is the following:

Testing for the null hypothesis:

H_0: No normality problem exists in the residual.

If the LM statistic is greater than the critical value from chi-square distribution with 2 degrees of freedom, we can reject the null hypothesis and conclude there is evidence for non-normal residual. The LM statistic can be generated directly from Shazam the statistical package used in this study. If identified three steps can be used to solve the non normality in the residual.

Step1: Eliminate the observations that cause a large standard residual. After that, rerun the Bera- Jarque test and examine the LM value; if it drops to the acceptable level, stop at this stage; if not, go to the next step.

Step2: Perform a Box and Cox transformation to find the appropriate power for the dependent variable (Box, Cox, 1964). The regression equation must be in this form:

$$(Y+u)^{\lambda} = A + B1X1 + B2X2 + \ldots\ldots BkXk + e \ldots\ldots (A)$$

where,

u= Any number between 1 and 100 to eliminate the zero and negative values in the variables in order to make the transformation possible.

λ = The optimal value of the power for the dependent variable. The criteria for selecting the best LAMBDA are a high R^2 and the lowest SSE (Sum Square of Error). After finishing this step, rerun the regression analysis according to equation (A) and examine the LM value; if it drops to an acceptable level, stop; if not, move to the next step.

Step3: Perform the extended Box-Cox Model: the Box-Cox model can be extended by transforming both the dependent and the independent variables by using the same LAMBDA as follows:

$$(Y+u)^{\lambda}=A+B1(X1+u)^{\lambda}+B2(X2+u)^{\lambda}+..+Bk(Xk+u)^{\lambda}+e.....(B)$$

And after that test for LM if its value drops to an acceptable level.

There is another transformation method if necessary, called the Box-Tidwell Model (Box and Tidwell, 1962). The transformation according to this method will take effect only on the independent variables with different LAMBDA for each variable, as follows:

$$(Y+u)=A+B1(X1+u)^{\lambda 1}+B2(X2+u)^{\lambda 2}+..+Bk(Xk+u)^{\lambda k}+e.....(C)$$

Box and Cox Transformation:

The classical Box and Cox model can be identified for variable Y as:

$$Y_t^{(\lambda)}=(Y_t^{(\lambda)}-1)/\lambda \quad \text{if } \lambda \neq 0$$

$$=\ln Y_t \qquad \text{if } \lambda=0$$

The linear model results if $\lambda=1$, while a log-linear model results if $\lambda=0$. The other values of λ produce many different functional forms. For instance, if $\lambda=-1$, then the equation will involve the reciprocal of Y. It should be noted that this transformation is only defined for all values of λ if Y is every where strictly positive. Therefore, u must be added to Y to eliminate the non-positive values.

The Log-likelihood function is given by:

$$L(\lambda,\beta,\delta^2;Y,X)=-\frac{N}{2}\ln(2\pi\delta^2)-\frac{1}{2\delta^2}(Y^{(\lambda)}-X\beta)'(Y^{(\lambda)}-X\beta)+\ln J$$

Where, $J=\det\left(\frac{\partial Y^{(\lambda)'}}{\partial Y}\right)=\prod_{t=1}^{N} Y_t^{\lambda-1}$

is the Jacobian of transformation on the dependent variable. The maximization of the above Log-likelihood function with respect to δ^2 and β given λ produces the estimators:

$$\beta(\lambda) = (X'X)^{-1}XY^{(\lambda)}$$

$$\delta^2(\lambda) = \frac{1}{N}(Y^{(\lambda)} - X\beta(\lambda))'(Y^{(\lambda)} - X\beta(\lambda)).$$

Substitution gives the concentrated Log-likelihood function:

$$L^*(\lambda;Y,X) = -\frac{N}{2}[\ln(2\pi)+1] - \frac{N}{2}\ln\delta^2(\lambda) + (\lambda-1)\sum_{t=1}^{N}\ln Y_t$$

Shazam starts the Box and Cox regression estimation by an iterative algorithm to find an estimate of λ to maximize L^*. Likelihood ratio tests can be used to test the hypothesis of the reliability of λ values. The test statistic for a linear model is: $2[L(\lambda^*)-L(\lambda=1)]$, where $L(\lambda^*)$ equals the log-likelihood function for the best λ as chosen by Shazam. This test statistic can be compared with χ^2 distribution with one degree of freedom. The decision rule is this, if the computed ratio is more than $\chi^2_{(1)}$ then, the linear model $L(\lambda=1)$ is rejected in favour of other functional forms. In spite of the very complex functional form of the λ, these models are intrinsically linear because they can be placed directly in form of equation (3.1) (Greene, 1993).

Minimizing the Sum of the Absolute Deviation (MAD):

MAD is a natural analog of the sample median as an estimator of the population mean or median. This estimator is less influenced by extreme deviation than is the OLS estimation, so it has been suggested by (Kmenta 1986:264): *"...that it be used in all cases when a fat-tailed distribution of the disturbance can not be ruled out."*

MAD estimator of a regression coefficient is asymptotically unbiased and normally distributed, and its asymptotic variance is smaller than that of the OLS for a large class of fat-tailed distributions. On the other hand, when the distribution of the disturbance is normal the MAD estimator is inefficient.

The estimators of this sort are called robust estimators and can be generated by using the robust command under Shazam. If the previous steps 1 to 3 can not eliminate the non-normality problem entirely from the model, then, both OLS and MAD estimates of the regression coefficient are computed. If the two sets of estimators are not too far apart, then it can be concluded the non-normality is not a serious problem in the model.

3.4 MISSPECIFICATION ERROR:

Misspecification errors occur when, instead of estimating the correct model, another model is estimated. This will result in either underfitting the model if there is a missing variable or overfitting the model if we have more variables than necessary in the model. The consequences of a misspecification error depend on the nature of the error, i.e. whether it is underfitting or overfitting.

The consequences of a misspecification error for an underfitted model are:

1-The coefficient of the variables, error variance and standard error of the OLS estimators are biased, (Gujarati, 1992:397).

2- The usual confidence interval and hypothesis testing procedure are not reliable.

The consequences of overfitting are less harmful than underfitting the model and the only penalty to be paid is that the estimated standard errors tend to be relatively larger. This will result in imprecise parameters in the model. OLS estimators are unbiased and consistent and the variance σ^2 is correct. The t test and F test remain valid.

3.4.1 Testing for Misspecification Errors:

Ramesy 's RESET test (Regression Error Specification Test):

This test is used to detect any misspecification problem in the model. The test procedures are as follows:

1- Regress Y on $X_1 \ldots X_k$ and get $\hat{y}$ (Fitted value).

2- Regress Y on $X_1 \ldots X_k$, $\hat{y}^2$, $\hat{y}^3$, $\hat{y}^4$, and after that test the hypothesis to see that the coefficients of the power of $\hat{y}$ are zero (Maddala, 1992:478).

Testing the second procedure is performed by applying the restricted least square technique to compute the F- value:

$$F = \frac{(R^2_{new} - R^2_{old})/M}{(1 - R^2_{new})/(N-K-M)}$$

Where,

R^2_{new} = R^2 for new model after including $\hat{y}^2$, $\hat{y}^3$, and $\hat{y}^4$.

R^2_{old} = R^2 for the original model.

K= the number of parameters including the intercept.

M= the number of new explanatory variables ($\hat{y}^2$, $\hat{y}^3$, $\hat{y}^4$,).

The decision rule for this test is this: if the computed F-value exceeds the critical F value, then the model contains a specification error (Maddala, 1992:478).

If the Ramesy test detects any misspecification problem in the model, the Box-Cox transformation is used to solve this problem, because it can find out the best functional form of the dependent variable.

3.5 HETEROSCEDASTICITY:

The Classic Linear Regression Model (CLRM) imposes the homoscedastic assumption, i.e., the variance of u (error term) is constant: Var $(u_i)=\sigma^2$. If this is not the case then we have heteroscedasticity. The consequences of heteroscedasticity are the following:

1- OLS estimators are still linear but no longer have the minimum variance, which means they are not efficient. These circumstances occur in small or large samples.

2- The usual confidence interval and convention hypothesis testing using t and F tests are not reliable.

3.5.1 Testing for Heteroscedasticity:

Three different methods are used to detect heteroscedasticity in the models: first, the graphic diagnostic method, by plotting the residual against $\hat{y}$, the fitted value, and against all the independent variables; the second method is the Glejser test; and the third method used is the Ramsey test. The second and third tests are considered formal tests and both tests have been selected because they are more widely used in large samples and in previous empirical research.

The Glejser test:

The method of employing the Glejser test is this: after solving the regression equation, regress the absolute value of the residual $|u|$ against each independent variable separately and test for the null hypothesis $B_1 = 0$.

The Ramesy test:

The Ramsey test for heteroscedasticity is different from the Ramsey test for misspecification error as discussed before. The Ramsey test here deals with the model not with individual variables. The basic application for the Ramsey test is this: after solving the regression equation by the normal way, take the second, third and fourth powers of the fitted value $\hat{y}$, and regress the residual on $\hat{y}^2$, $\hat{y}^3$, and $\hat{y}^4$ as independent variables and test for the null hypothesis $B_1 = B_2 = B_3 = 0$ (There is no heteroscedasticity). If we can reject the null hypothesis, by using the F test heteroscedasticity exists in the model.

Heteroscedasticity is often found in cross-sectional data, not in time series data; therefore, the violation of this assumption is associated with the current research. Market Value is used as a deflator for some variables. Christie (1987) concluded that the market value of equity at the beginning of the period is the correct deflator in return studies.

> *" The advantages of solving the deflator problem in return studies are that 'surprising' results are attributed to the right problem, mismeasurement of the expectations of future cash flows, and the interpretation problems associated with different results for different deflators are eliminated."* (Christie, 1987).

The Box-Cox transformation is often a solution to any heteroscedasticity in the model. If the heteroscedasticity problem still exists the Robust Standard Error using White's

(1980) Heteroscedasticity-Consistent Covariance Matrix estimation can be used.

White (1980) presents a covariance matrix estimator which is consistent in the presence of heteroscedasticity. Thus, he confirms that even when the heteroscedasticity is not completely eliminated proper inferences can be drawn.

If $Y=\beta X+\varepsilon$, and the error term is heteroscedastic, while procedure permits inference from the OLS estimators by the following design:

In the regression: $Y=\beta X+\varepsilon$

The true variance of β is given by $V(\beta)=\delta^2(X'X)^{-1}X'\Omega X\ (X'X)^{-1}$

and Ω is not known. Now $V(\varepsilon_t)=E(\varepsilon^2_t)=\delta^2\lambda_t$, is not observable and the weights, λ_t is not known; however, the OLS residuals, u, provide a proxy for the unobservable and unkownable errors, ε. Having been specified as the proxy for ε_t, u_t might be viewed as a sample of size 1 from the distribution of the $t^{\underline{th}}$ residual and so u^2_t might be viewed as an estimator of δ^2_t, the true variance of ε_t. In spite of u^2_t not being a consistent estimator of $V(\varepsilon)$, it is possible, under a general condition, to produce a consistent estimator of $\delta^2 X'\Omega X$. Let $\Phi=\text{diag}\ \{u^2_1,\ldots,u^2_N)$, then $X'\Phi X$ can be written as: $X'\Phi X=\sum_{t=1}^{N} u_t^2 X_t X_t'$

This yields a consistent estimator for $V(\beta)$ as:

$$V(\hat{\beta})=(X'X)^{-1}\left(\sum_{t=1}^{N} u_t^2 X_t X_t'\right)(X'X)^{-1}$$

Where,

$V(\beta)$ = Consistent estimator of covariance b.

X = Matrix of variable X.

X' = Transpose of matrix X.

$(X' X)^{-1}$ =Inverse of (X' multiply by X).

u_t = Least square residual.

According to this method, a heteroscedasticity-consistent estimator of the variance of the OLS estimator can be constructed in the absence of any specific assumption about the form of the heteroscedasticity. The White method provides a consistent estimator of the variance of the linear unbiased but inefficient OLS estimators of the regression coefficients and that enables inference to be made using the conventional techniques of t and F tests, which in this case, are asymptotically valid.

3.6 MULTICOLLINEARITY:

Multicollinearity exists in the model if two or more of the independent variables are highly correlated. This problem is often encountered in accounting and economics studies because there are many variables influencing each other in the model.

Multicollinearity is essentially a sample phenomenon. The current research is a non-experimental study because historical data is used, which means the researcher has no control of the data. In the case of non-experimental data one could find a near collinearity among the explanatory variables, unlike in experimental data, when the researcher can control the events and intervene in order to prevent collinearity from occurring.

The consequences of multicollinearity are the following:

1- A large variance and standard errors of OLS estimators.

2- A wider confidence interval, owing to a larger standard error.

3- Multicollinearity might lead to an insignificant t-ratio, when in reality it is significant.

4- A high R^2 but few significant t-ratios.

5- OLS estimators and their standard error become unstable, because they become very sensitive to any small change in the data.

6- The regression coefficient might have a wrong sign.

7- In the presence of multicollinearity it is difficult to evaluate the contribution for each independent variable that explains the overall R^2.

Even with the previous consequences of multicollinearity, the OLS estimators are BLUE.

The presence of multicollinearity may not be a problem if the purpose of the model is to use it in prediction or forecasting. On the other hand, if the purpose of the model is to draw inferences based on a reliable estimation of the individual parameters, then serious multicollinearity may be unacceptable, because multicollinearity will lead to large errors of estimators. This applies to this research.

3.6.1 Testing for Multicollinearity:

Two methods are used for identifying multicollinearity: the first one is an informal one, called Pairwise correlation, and the second one is the formal method, called Variance Inflation Factors (VIF). If the correlation between two explanatory variables is 70% or more, this may be an indication that multicollinearity could have a bad effect on the model (Murphy, 1989).

VIF is a formal method widely used to detect multicollinearity: the basic concept of this method is this:

> "*These factors measure how much the variance of the estimated regression coefficients are inflated as compared to when the independent variables are not linearly related.*" (Neter, Wasserman, and Kutner, 1989:408).

The largest VIF value among X variables is often an indication of the severity of multicollinearity among them. Also, as Neter, Wasserman and Kutner mention, a maximum VIF value in excess of 10 is often taken as an indication that multicollinearity may be unduly influencing the least square estimates, while the ideal VIF value is 1.

Although there are other methods to remedy the multicollinearity problem such as Ridge regression and Principle Component Model[2], it is found that dropping one of the independent variables is the best choice for the current study. Dropping one of the independent variables is the least harmful solution for the multicollinearity problem in the models. The variable to drop is the one which correlates highly with other independent variables. Then the regression is re-run and the VIF values examined. This method of dropping an independent variables from a model might result in a misspecification error.

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For further information about these methods (Ridge Regression and Principle Components Model) read Maddala (1992:283) and Neter, Wasserman and Kutner (1989).

3.7 CROSS-SECTIONAL DEPENDENCE:

3.7.1 The Nature of the Problem:

For the case of return studies when the dependent variable is a market model residual, the regression residuals are potentially correlated in cross-section. Even though OLS can give efficient unbiased coefficient estimates, the OLS-based estimates of the corresponding standard errors will generally be biased leading to potential incorrect inference.

3.7.2 Empirical Evidence:

The previous literature provides mixed results about the seriousness of bias that might arise when the cross-sectional dependence in the data is ignored. Christie (1986) reports that "residual dependence may have a relatively small influence on significant levels, at least in studies that include a spectrum of industries, even when the event date is common to all firms". Christie's conclusion was for daily and weekly returns. Brown and Warner (1980, 1985), found results consistent with Christie.

Ball (1975) has shown that, as long as the sample is well diversified across different industries , the average cross-sectional correlation among the residuals approaches an amount that is negative and close to zero. This observation leads to the conclusion that as long as a sample is well diversified, cross-sectional dependence should not create a serious bias in standard error estimates.

Schipper and Thompson (1983) and Hughes and Ricks (1984) describe empirical studies in which significant levels vary substantially, depending on whether residual cross-sectional correlation is taken into account when calculating t value.

Bernard (1987) tests the degree of cross-sectional correlation in the market model residual using different observation intervals, daily, weekly, monthly, quarterly and annual. He found that the degree of the cross-sectional correlation rises dramatically as the observation interval is extended.

> *"It is troublesome that the degree of bias may be most serious in the studies based on quarterly or annual data. For these studies, alternatives to OLS are infrequently infeasible, and no attempt to estimate the resulting bias yet been undertaken. The reason is that, given the number of quarterly or annual cross-sections that is typically available, it is difficult to estimate the residual correlation matrix."* (Bernard, 1987:25).

Bernard (1987) concludes that, it appears that standard errors based on OLS cross-sectional regression of quarterly or yearly return metrics against firm-specific variable might frequently contains substantial bias.

3.7.3 Selected Methods to Deal with Cross-Sectional Dependence:

Various approaches can be used to test for cross-sectional dependence such as Zellner's Seemingly Unrelated Regression (SUR), Generalized Method of Moment (GMM) and Kmenta Model[3]. In practise with the data from this study none of these are able to terminate. Therefore, the cross-sectional dependence can not be tested for in the present study and this is consistent with almost all previous market based

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For more details about these methods please refer to Bernard (1987), Froot (1989) and Kmenta (1986).

research studies.

3.7.4 The Implications of Cross-sectional Dependence in the Current Study:

This study uses annual market model residual as the dependent variable, and the analysis will be conducted in several forms, annual cross-sectional and pooled regression. Furthermore, the approaches noted above are not helpful in identifying this problem for the data used in this study. Therefore, it seems reasonable to accept the fact that a potential bias might be included in the standard error of OLS estimators. However, relying on the fact that the sample is well diversified across industries and Ball's (1975) result our results will be used to generate conclusion regarding cash flow data and their information content.

3.8 SUMMARY AND CONCLUSION:

In this chapter I have discussed some of the econometric problems that I might face in the data. The OLS technique was introduced in the first section, followed by the assumptions that underlie the OLS technique. Also, various methods are explained for determining any departure from OLS assumptions followed by selecting the appropriate remedy to fix any violations. A Box-Cox transformation is considered a general tool to solve error term related problems such as non-normality, misspecification and heteroscedasticity. For the multicollinearity problem, it was found that dropping one of the explanatory variables is the least harmful remedy to solve the problem. Also, a potential bias might be contained in the standard error of OLS estimators due to cross-sectional dependence in the residuals.

Shazam Econometric software is a powerful computer package that can compute all OLS diagnostic tests as well as performing the Box-Cox transformation. Therefore, Shazam will be used in the model analysis for the current study.

CHAPTER FOUR

RESEARCH DESIGN

4.1 INTRODUCTION:

The main issues that are addressed in this study can be tested by examining the association between cash flow measures and earning measures with abnormal returns.

The theoretical basis for cash flow components and earnings measures is given in the next section. Accounting and finance theory following by empirical evidences are explained for each cash flow measure. This will improve our understanding about the expected signs of the variables and will guide us to build a theoretically sound model.

The variables used in this study consist of four groups, cash flow measures, disaggregated cash flow measures, cash flow per share variables and earnings measures. Cash flow measures are according to cash flow statement standard headings (FRS. 1). Abnormal returns is explained in section four. The research methods and initial empirical models are explained in sections five and six respectively. A discussion of several incremental information content test methodologies is given in section seven which concludes with the selection of the relevant technique for the current research. The sample selection criteria and data sources are explained in section eight. The practical application of OLS assumptions tests is given in section nine. The final models are presented in section ten, and the hypotheses tests for the information and incremental information content are presented in section eleven. The chapter closes with conclusions in section twelve.

4.2 THEORETICAL BASIS:

The theoretical bases for cash flow components can be explained by reviewing the accounting and finance theory as well as by previous empirical research. The theory provides the basis that can help to predict the sign of the coefficient and its significance level in the multiple regression equation.

4.2.1 Earnings (EARN):

Accounting theory suggests a positive market reaction associated with the release of earnings data. There is much empirical evidence which supports that theory and establishes a positive association between unexpected stock returns and unexpected earnings. Such evidence is given by Strong and Walker (1991), Livnat and Zarowin (1990), Strong (1992), Ali and Pope (1995), Donnelly and Walker (1995) and others. The current study will use earnings as a bench mark against which to test the information content of cash flow.

4.2.2 Cash Flow Measures:

4.2.2.1 Cash Flow from Operation (OCF):

Livnat and Zarowin (1990) and O'Bryan (1992) report a positive market reaction associated with the release of operating cash flow information. Thus, based on this, a positive market reaction associated with operating cash flow components is expected.

4.2.2.2 Return on Investment and Services of Finance (RIF):

The theoretical model of Miller and Modigliani (1961) suggests that dividend policy has no effect on the current value of firms or their cost of capital. If firms adopt a stable dividend policy, then investors have a good reason to interpret any change in dividends as an indication of a change in management's view about future profits of the firm.

The theoretical model of Miller and Rock (1985) suggests that dividend changes are associated with security returns. Increases in dividends indicate greater future cash flow; therefore, a positive market reaction is associated with dividend increases. Interest payments will be significantly associated with security returns.

Empirical evidence by Livnat and Zarowin (1990), Abeyrantna *et al.* (1993), O'Bryan (1992) and Clubb (1993) found positive association between dividends and security returns. Also, Livnat and Zarowin (1990) and Lipe (1986) reported a significant coefficient for interest expense with a negative sign.

4.2.2.3 Tax Cash Flow (TCF):

Tax cash flows are reported separately according to Financial Reporting Standard 1 (FRS 1). Previous research by Livnat and Zarowin (1990) and O'Bryan (1992) found insignificant coefficient for tax payments.

4.2.2.4 Investment Cash Flow (ICF):

The "Market Value Maximization Hypothesis" states that managers seek to maximize the value of the firm in making corporate investment decisions. McConnell and Muscarella (1985) assumed that

> *"If managers follow the market value maximization rule, then, according to traditional valuation theory, an announcement of an unexpected increase in capital expenditures should have a positive impact on the market value of the firm and an announcement of an unexpected decrease in capital expenditures should have a negative impact on the market value of the firm."*

The theory suggests two opposite points of view about the coefficient signs of investment cash flow. The positive association is expected because the greater investment cash flows imply more growth and high future cash flow. Alternatively, it is possible that market reaction to the announcement of capital expenditure takes place because such announcements contain signals of current earnings of the project already in place. Hence, significant positive association is expected between cash flow from investment (owing to the announcement of new investment) and security returns. However, some investment in other firms might result in negative market reaction, because some managers may accept negative present value on their investment decision on acquisition to diversify their portfolio, Amihud and Lev (1981). Also, the increase in proportion of ownership through the increase in minority interest will be positively associated with security returns, owing to the increase in the owner share of the firm, Livnat and Zarowin, (1990).

Empirical evidence of the market reaction associated with capital expenditure can be found in McConnell and Muscarella (1985), Livnat and Zarowin (1990), Assiri (1993) and others. The evidence found by McConnell and Muscarella (1985) is generally consistent with market value maximization hypothesis. They reported for industrial firms that announcement of increase or (decrease) in planned capital expenditures is associated with significant positive or (negative) excess stock returns. On the other hand, for public utility firms, there is no market reaction associated with either increase or decrease in planned capital expenditures. Livnat and Zarowin (1990) reported negative market response to the release of investment cash flow information. Assiri (1993) provided evidence supporting the shareholders' value maximization approach and concluded that the increase in capital expenditure will increase shareholders' wealth. Also, she found that the market response for the investment announcement varied according to the company life cycle. The investors will react positively to the investment announcement when they anticipate the firms are in growth stage and react negatively when they feel the firms are in decline stage.

4.2.2.5 Finance Cash Flow (FCF):

Theory suggests two opposite points of view about the market reaction to the release of FCF information. Leland and Pyle (1977) suggest that debt issuance is associated with a positive market reaction, because owners retain a larger proportion of equity than when stock is issued, while Miller and Rock (1985) suggest a negative market reaction because by using more external finance, future cash flow will be lower than expected. Miller and Rock (1985) argue that:

> *"The sign and size of the price change following an announcement of new financing will then depend on the relation of optimal investment to the preannouncement expectation of earnings."*

Finance theory and previous empirical research suggest a positive market reaction associated with announcement of stock issue, and a negative market reaction associated with announcement of stock repurchase. Also, the theory suggests little market reaction to the announcement of the issue of preferred stock compared with reaction to the announcements of the issue of ordinary stock (Livnat and Zarowin 1990).

Previous empirical research reported inconclusive evidence about the market reaction following the announcement of financing cash flows. Livnat and Zarowin (1990) found an insignificant coefficient for finance cash flow, while Clubb (1995) reported a significant coefficient. O'Bryan (1992) reported negative market reaction associated with the finance cash flow information.

4.3 DEFINITION OF VARIABLES:

The variables in this study consist of four groups: cash flow measures, disaggregated cash flow components, cash flow per share variables and earning components. The variable definitions and calculation for each group will be explained as follows:

4.3.1 Cash Flow Measures:

Cash flow measures are calculated according to FRS 1 standard headings. Cash flow measures consist of operating, investing, financing, return on investment and services of finance and taxation cash flows. Also, change in cash is used in this analysis.

1- Cash flow from operation (OCF):

OCF will be calculated as follows using an indirect method:

Operating profit (item No. 137)
(+) depreciation (item No.402)
(-) change in stock (item No. 445)
(-) change in debtors (item No. 448)
(+) (profit) or loss on sales of tangible fixed assets (item No. 198)
(+) change on creditors (item No. 417)
(+) other adjustments (item No. 404)
(+) extraordinary item and exception (item No. 490)

For years 1992-1994, OCF has item No. 1015.

2- Net cash flow from return on investment and servicing of finance (RIF):

The calculation of RIF is:

(-) interest income received (item No. 143)
(+) interest paid (item No. 153)
(-) income from investments (item No. 139)
(+) dividends paid (item No. 434)

For years 1992-1994, RIF has item No. 1022. The positive RIF or RIFPS means cash outflow and the negative figure means cash inflow.

3- Net cash flow from investments (ICF):

(+) purchase of tangible fixed assets (item No. 431)
(+) purchase of investments (item No. 439)
(-) sales of tangible fixed assets (item No. 423)
(-) sales of investments (item No. 428)[1]
(+) intangible purchase (item No. 438)
(+) cash issue for acquisition (item No. 454)

For years 1992-1994, ICF has item No. 1040. The positive ICF or ICFPS means cash outflow and the negative figure means cash inflow.

4- Net cash flow from finance (FCF):

The calculation for FCF is:

(+) issue of ordinary share capital (item No. 412)
(+,-) change in loan capital (item No. 418)
(-) capital elements of finance lease rental payment (item No. 267)
(+) Preference capital issued/repaid (item No. 407)

For years 1992-1994, FCF has item No. 1045. In this calculation, positive FCF or FCFPS indicates cash inflow and the negative figure reveals cash outflow.

5- Cash flow from taxation (TCF):

This variable relates to taxable profit, capital profit and payment of Advanced Corporate Tax (ACT). It was taken directly from the DATA STREAM (item No. 433) as an element of a previous fund statement as well as new cash flow statements.

6- Change in cash (CC):

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5 Item No. 428 includes profit/loss on disposal.

This variable consists of net change in cash and cash equivalents. It has item number 457 in DATA STREAM.

4.3.2 Disaggregated Cash Flow Components:

The disaggregated cash flow components are the following: collect, payments, dividends, purchase of investments, sales of fixed assets, debt, stock, and net interest. The previous variables are selected because they represent the most important elements of disaggregated cash flow components to the reader. Also, previous research by Livnat and Zarowin (1990) and O'Bryan (1992) used similar disaggregated cash flow components, which makes it possible to compare the current research results with previous research results.

1- Collection (COLLECT):

This item represents the cash inflow that results from operations or trading activities. The calculation for this variable is:

COLLECT = Sales (item 104) - Change in Account Receivable (item 448).

2- Payments (PMT).

This item represents cash outflow that results from operating activities and it is calculated thus:

PMT[2] = COLLECT - Net cash flow from operation before extraordinary and exceptional items.

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[2] An alternative way in calculation payment is this:
PMT= (Cost of goods sold+Change in inventory+Change in other current assets+Change in other assets)-(Change in account payable+Change in other current liabilities+Change in other labilities). This formula was used in previous research by Livnat and Zarowin (1990) and O'Bryan (1992) in US firms. Unfortunately, Cost of goods sold is not available for UK firms over the period 1977-1994. Thus, it was impossible to use that formula.

3- Dividends (DIVID):

Dividend item No. 434 represents dividends paid to ordinary and preferred shareholders during the period in question.

4- Purchase of investment (P. Investment):

This variable represents the cash outflow that results from investment activities:

a) acquiring fixed assets, and it has item No. 431;

b) cash issues for acquisition, item No. 454.

For years 1992-1994, purchase of investments has items No. 1024 and 1035 for payments for fixed assets and payments for subsidiaries respectively.

5- Sales of tangible fixed assets (S.FIXED):

This variable represents the cash inflow that results from the disposal of fixed assets, and it is item No. 423 for the years 1977-1991, while for the years 1992-1994 it has item No. 1025.

6- DEBT (item No. 418):

This shows the net increase/decrease in loan capital. This item excludes the conversion of loan stock into equity or preferred capital.

7- Stock issue for cash (Stock):

(+) Issue of ordinary shares (item No. 412).
(+) Issue/repayment of preferred stock (item No. 407).

8- Net interest:

(+) Interest paid (item No. 153).
(-) Interest income received (item No. 143).
(-) Income from investment (item No. 139).

For years 1992-1994 net interest has item No. 1018, and positive net interest represents interest payment cash outflows

4.3.3 Cash Flow Per Share Variables:

In this group each aggregated cash flow variable is divided by the number of shares (NS), which will result in the following cash flow per share variables:

1- OCFPS = OCF/NS.
2- RIFPS = RIF/NS.
3- ICFPS= ICF/NS.
4- FCFPS = FCF/NS.
5- TCFPS = TCF/NS.
6- CCPS= CC/NS.

4.3.4 Earning Measures:

1- Earnings (EARN):

This variable represents the net profit after tax, minority interest and preferred dividends. (item No. 182).

2- Earning per share (EPS):

This variable is item No. 183 and it represents the earnings (item No. 182) divided by the number of shares.

3- Accruals:

Accruals show the difference between earnings and net cash flow on each model.

4.3.5 Test for the Variable Validity:

Since the present study used proxy cash flow variables due to unavailability of real cash flow data, the validity of cash flow variables must be checked to ensure a reliable estimation of these variables and to overcome some of the limitations of the previous research regarding the calculation of cash flow variables.

The variable validity for cash flow variables is checked as follows: first, collect the actual comparative cash flow variables for 1992 directly from the 1993 cash flow statements (most of the variables have new item numbers); then, generate the proxy cash flow variables for 1992 according to the proxy calculation outlined above; next, perform a correlation analysis between each actual cash flow figure and its proxy number. The results for the correlation coefficients are: 95.5% for OCF, 99.9% for CC, 98.9% for FCF, 99.6% for RIF, and 96.8% for ICF. These results suggest that our proxy variables have estimated the actual cash flow variables adequately.

4.4 ABNORMAL RETURN:

Cumulative abnormal return (CAR) is the dependent variable in this analysis and it represents the market reaction associated with each cash flow and earnings measure. This study will use monthly returns, based on Morse's (1984) recommendations and recent empirical research. Morse (1984) examined some econometric issues on the choice between daily and monthly returns, and assumed that

> *"The effect on the bias and efficiency of the mean abnormal return estimate depends on whether daily or monthly returns are used. The most powerful estimate of mean abnormal returns is generated by the return series that minimize bias and maximize efficiency." (Morse, 1984:606)*

He provided evidence in favour of using daily return with the exception of using monthly returns if there is uncertainty about the announcement or the release date of the information. Since the exact release date of cash flow information is unknown, the monthly return will be used in the current research. Also, using monthly return is consistent with previous association studies such as Livnat and Zarowin (1990), Strong and Walker (1991) and others.

The calculation for the security return[3] is:

$R_{it} = LN\ (P_{it}+D_{it})/P_{it-1}$. ....(2.1)

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 e (Natural Log).

Strong (1992) supports using logarithmic returns and argues that it is better than discrete returns due to the absence of normality problems when using logarithmic returns and because it generates returns that comply more with standard statistical assumptions. However, in this study it is found that both methods have a normality problem. Thus, using either method should provide essentially the same results. The results for logarithmic returns are reported in the results section.

4.4.1 Assessment of Different Returns Window Intervals:

Table 4.1 presents important dates for selected firms from different firm sizes. The intention is to determine the best returns window interval to detect the relevant abnormal returns. Earnings response studies in the UK tend to use a four month delay i.e. security returns are calculated May to April if the financial year end is

[3] There is another method to compute security return, called (Discrete Return) $R_{it}=(P_{it}-P_{it-1}+D_{it})/P_{it-1}$. In the present study both methods were calculated and no significant difference was found in the results generated by either one. Therefore, the following formula was used in calculating security return: Logarithmic Return: $R_{it}=LN(P_{it}+D_{it})/P_{it-1}$

December. This is due to delays in earnings announcements. However, cash flow information does not officially reach the market until the annual report is published. This may take longer than four months. The indicative analysis tabulated in table 4.1 indicates that the appropriate returns window delay might be 4 months for large companies but as much as 6 months for small companies.

TABLE 4.1
INFORMATION ABOUT IMPORTANT DATES FOR SELECTIVE FIRMS FROM EACH GROUP

Firm Sizes	Firm Name	Market Value (000) (in 1986)	Year End	Annual General Meeting Date (AGM)	Dividends Declare	Availability of the finial audited results to the shareholders	Abnormal Returns for Different Lag			Optimal lag
							4 Months lag	5 Months lag	6 Months lag	
	MARKS & SPENCER	4656150	31 / March	15 / July/1993 14 /July/1994 2 / July/ 1995	Dividends for year end 31 March to be paid on 30 July next year (according to annual report 1993).	Circulation of annual report in June.	31/8---31/7	31/9--31/8	31/10-31/9	4
	BOOTS	1903710	31 / March	23 / July/1992 21 / July/1994			31/8---31/7	31/9--31/8	31/10-31/9	4
Large Firms	BOC GROUP	1247340	31/ Sept	14 Jan 1993 20 Jan 1994 19 Jan 1995			31/2---31/1	31/3--31/2	31/4-31/3	4
	BICC	460580	31/ Dec	14 April 1993 12 April 1994			31/5---31/4	31/6--31/5	31/7-31/6	4
	BET	803260	31 / March	22 July 1993 29 Jun 1994 29 Jun 1995			31/8---31/7	31/9--31/8	31/10-31/9	4
	BP	10200500	31 / Dec	7 April 1994 13 April 1995			31/5---31/4	31/6--31/5	31/7-31/6	4
	BTR	4112770	31 /Dec	20 May 1993	Declare of dividends at the (AGM)	Posting annual report at 15 April.	31/5---31/4	31/6--31/5	31/7-31/6	4
	GKN	623730	31 /Dec	18 May 1995	Final dividends to be paid 31 May 1995	Initial announcement of the results is on March of each year	31/5---31/4	31/6--31/5	31/7-31/6	4
	BAA Group	127920	31 / Dec	25 July 1989 26 April 1994 21 April 1995	Declare final dividends at the (AGM)	Year results announcements on March	31/5---31/4	31/6--31/5	31/7-31/6	4
	BRIDON	65070	31/ Dec	18 May 1983			31/5---31/4	31/6--31/5	31/7-31/6	5
Medium Firms	APV	77660	31/ Dec	19 May 1981 24 May 1983			31/5---31/4	31/6--31/5	31/7-31/6	5
	BSG INTL.	36640	31/ Dec	22 Jun 1981			31/5---31/4	31/6--31/5	31/7-31/6	6
	BUMER H. P.	77270	31/ April	8 Sept 1977 5 Sept 1985 6 Sept 1986	Declare dividends at AGM		31/9--31/8	31/10--31/9	31/11--31/10	5

Firm Sizes	Firm Name	Market Value (000) (in 1986)	Year End	Annual General Meeting Date (AGM)	Dividends Declare	Availability of the finial audited results to the shareholders	Abnormal Returns for Different Lag			Optimal lag
							4 Months lag	5 Months lag	6 Months lag	
Small Firms	ELLIS & EVERAD	28100	31/ April	13 Oct 1993		The annual report were available on 26/8/1993. Full year audited results were announced on 12/7/93	31/9--31/8	31/10--31/9	31/11--31/10	6
	HALL ENGINEERING	19860	31/ Dec	23 April 1981 19 April 1984	Declare of dividends at AGM	Received financial statements at AGM	31/5---31/4	31/6--31/5	31/7-31/6	4
	HUNTING	19620	31 /Dec	4 June 1981 9 June 1982	Declare dividends at AGM		31/5---31/4	31/6--31/5	31/7-31/6	6
	LIBERTY N.V.	10910	31/ Jan	May 1993			31/6--31/5	31/7--31/6	31/8--31/7	4

4.4.2 Market Model:

Equation 2.1 (Page 96) provides actual security return. Expected return is generated by using the Market Model:

$R_{i,t} = \alpha + \beta R_{m,t} + e_{i,t}$

Where,

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

$R_{m,t}$ = Return on market portfolio in period t (the value-weighted London Stock Exchange(LSE)[4] market return in period t).

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

α, β =The parameters (intercept and slope).

[4] The market index (FT. All Share) is a value-weighted 915 firms in LSE.

The estimation period used for calculating α and β is 60 months. Therefore, t-60 months are needed to estimate the company return in month t as illustrated in figure 4-1.

FIGURE 4-1
ESTIMATION AND TESTING PERIOD TO GENERATE EXPECTED RETURN FOR X FIRM
YEAR END 31 December (4 Month Lag)

Estimation rolling period		Testing rolling period	
1-5-1972	1-4-1977	1-5-1977	1-4-1991

After finding the estimated monthly return, the monthly abnormal return is:

$AR = R_{it} - E(R_{it})$

Where,

AR = Monthly Abnormal Return.

R_{it} = Actual Monthly Return for period t.

$E(R_{it})$ = Expected Monthly Return for period t.

Finally, Cumulative Abnormal Return (CAR) is aggregated twelve months of monthly abnormal return to represent annual CAR.

4.5 RESEARCH METHODS:

Multiple regression techniques are used to test the association of cash flow and earnings measures with security returns.

The unexpected cash flows and earnings components are scaled by market value to minimize the heteroscedasticity in the data as suggested by Christie (1987). Cash flow per share and earnings per share are in unexpected form only, because they are already scaled by the number of shares.

4.6 INITIAL EMPIRICAL MODELS:

The initial models and related variables are the following:

$$CAR = a_0 + a_1\,\textit{Collections} + a_2\,\textit{Payment} + b_1\,\textit{Net Interest} + b_2\,\textit{Dividends Pmt.} + c_1\,\text{Taxes} + d_1\,\textit{P.Investment} + d_2\,\textit{Sale Fixed} + e_1\,\textit{Debt} + e_2\,\textit{Stock} + f_1\,\textit{Accruals1} + e \ldots\ldots \text{(M1)}$$

$$CAR = g_0 + g_1OCF + g_2RIF + g_3TCF + g_4ICF + g_5FCF + g_6CC + \text{Accruals2} + e \ldots \text{(M2)}$$

$$CAR = h_0 + h_1OCFPS + h_2RIFPS + h_3TCFPS + h_4ICFPS + h_5FCFPS + h_6CCPS + \text{Accruals3} + e \ldots\ldots \text{(M3)}$$

$$CAR = I_0 + I_1EARN + e \ldots\ldots \text{(M4)}$$

$$CAR = j_0 + j_1EPS + e \ldots\ldots \text{(M5)}$$

4.7 INCREMENTAL INFORMATION CONTENT TEST METHODOLOGY:

There are several studies which implement the incremental information content tests such as Bowen, *et.al.* (1987), Board, Day and Walker (1989), Ali and Pope (1994) and Biddle, Seow and Siegel (1994). Bowen,*et.al* (1987) test the null hypothesis that H: cash flow measure have incremental information content beyond that contained in contemporaneous accruals earning data. They used the joint coefficient test and restricted regression for the incremental information content test. The following outcomes are possible from this test: a. Both accruals and cash flow are individually and incrementally important. b. Both are individually important, but neither is incrementally important. c. Each is individually important, but only earnings is incrementally important. d. Each is individually important, but only cash flow is incrementally important.

The incremental information content test methodology for Board, Day and Walker (1989) consisted of three steps, for testing the incremental information content of X over Y where is H_0 : X has no incremental information content beyond Y and CAR is the dependent variable.

Step 1: Perform a cross-section OLS regression as follows:

$$CAR_{it}=\alpha+\beta Y_{it}+u_{it}$$

u_{it} is the fitted residual.

Step 2: Perform a cross-section OLS regression as follows:

$$X_{it}=\alpha+\beta Y_{it}+e_{it}$$

Step 3: Perform a cross-section OLS regression as follows:

$$u_{it}=\alpha+\beta e_{it}+\mu_{it}$$

If β is positive and significantly different from zero this supports the alternative hypothesis and the conclusion is X has incremental information content value over Y.

The outcomes of this test are one of the following as presented by Board, Day and Walker (1989:5)

1. Neither measure reveals incremental explanatory value over the other.
2. Measure X reveals incremental explanatory value over measure Y but measure Y does not exhibit incremental explanatory value over measure X.
3. Measure Y reveals incremental explanatory value over measure X but measure X does not exhibit incremental explanatory value over measure Y.
4. Measure X reveals incremental explanatory value over measure Y and measure Y reveals explanatory value over measure X.

Pope and Ali (1994) introduced a new approach for testing the incremental information of change and level variables of unexpected accounting performance. They estimate multiple regression models of returns against unexpected earnings, unexpected funds and unexpected cash flow. The test of the incremental information content is based on the sum of the coefficient of change and level for each variable.

Biddle, Seow and Siegel (1994) examine the relation between incremental and relative information content and they demonstrate that each of them addresses different research questions and that different tests for statistical significance are required.

Previous studies use the terms "relative" and "incremental" interchangeably, and some studies use incremental tests to address the question of relative information content such as Wilson (1986), who refers to relative information content in his title, but tests only for incremental information content.

Biddle, Seow and Siegel (1994) define incremental information content as whether one accounting variable (or set of variables) provides information content beyond that provided by another. Relative information content, on the other hand asks whether one variable provides greater information content than another. In other words,

> *"Incremental comparison assess whether the information content of X and Y together is greater than that of one variable alone; if so, then the other variable provides incremental information content."* (Biddle, Seow and Siegel, 1994:2)

<u>Incremental Information Content Comparison</u>

Information Content (X,Y) $\geq$ Information Content (Y) ?

Information Content (X,Y) $\geq$ Information Content (X) ?

For relative comparison instead ask whether the information content of X alone is greater than, equal to, or less than the information content of Y alone.

<u>Relative Information Content Comparison</u>

Information Content (X) > or = or < Information Content (Y) ?

Biddle, *et.al* (1994) present the methodology of the incremental information content test following a standard methodology by Bowen, *et.al* (1987) for using the F-test for the null hypothesis (restriction):

$$D_t = \beta_0 + \beta_1 X_t + \beta_2 X_{t-1} + \beta_3 Y_t + \beta_4 Y_{t-1} + e_t$$

H_{oX}: $\beta_1=\beta_2=0$

H_{oY}: $\beta_3=\beta_4=0$

Since the present study is testing for incremental information, no further explanation will be given for the tests of relative information content. For more details see Biddle, Seow, and Siegel (1994)

4.7.1 The Incremental Information Content Test for the Current study:

The previous methodologies for testing the incremental information content are used in this study in Ch6 and Ch7. For Ch6, Board, Day and Walker (1989) methodology is used to test for the incremental information content of cash flow, cash flow per share, earnings, and earnings per share. Bowen, *et. al.* (1987) and Biddle, *et.al.* (1994) methodologies are used for testing the restricted null hypothesis of the information content of disaggregated cash flow components. Ali and Pope (1994) methodology is used in Ch7 for change and level variables.

4.8 SAMPLE AND DATA COLLECTION:

The firms that will be included in this study must satisfy the following criteria:

1- UK industrial firms quoted on London Stock Exchange.

2- Data availability for all the items that are required to calculate the variables over the period from 1977 to 1994.

3- Availability of the monthly return from London Share Price Database (LSPD) for testing and estimation period from Jan 1971 to Dec 1994.

4- The year end must be constant for all the firms from 1971 to 1994.

The initial sample consists of 1000 firms and it was collected from DATASTREAM after the imposition of the first criterion. The first criterion was imposed to make sure that the firms are industrial firms and comply with all stock exchange regulations. Also, the firms must be industrial groups, because they have disaggregated cash flow components entirely different from financial groups (i.e. banks, and insurance companies). Therefore, it is critical to maintain this criterion constant for each cash flow variable calculation in order to allow fair comparison among the firms. The second criterion restricted the sample to the firms that have the items for the required calculation for each variable. After the imposition of the second criterion, the sample was reduced to 428 firms (476 firms for years 1977-1986 and 428 for years 1987-1994) and that sample will be used in correlation analysis in chapter five. There is another reason for the second criterion, which is SSAP10 issued in July 1975. This had the objective of establishing the practice of providing source and application of funds statements. Obviously, the availability of this statement is important for collecting the required items. The third condition restricts the sample to the firms whose monthly returns data are available from January 1971 to December 1994. This period is necessary to cover the lag and estimation period to calculate abnormal returns. Due to non availability of the monthly returns after 31-December 1993 at the time of this study, it is not possible to continue the empirical test beyond year 1991. This limitation is necessary to have more time for the lag requirement and avoid any problem of the adjustment between proxy and real cash flow variables. 188 firms are dropped from the sample due to an incomplete data set for the whole period from 1971-1991. The last restriction is very important because the firms which will be included in the sample must have a fixed year end over the estimating and testing period. The reason for this is to ensure market reaction associated with the relevant annual report release date. 84 firms are eliminated from the sample owing to the change of the year end. After the imposition of the last criterion, the sample is reduced to 156 firms. These firms are eligible for the information content test.

Since the current research uses firms which are in existence between 1971 and 1994, failed firms during that period are excluded. This might lead to a potential survival bias in the results. As previous studies have identified cash flow as an important bankruptcy predictor this might limit the generalizability of the results. Further research is required to resolve this issue.

The sample in this analysis will be divided into three sub-samples according to the total sales value[5]. The reason for this division is to investigate the size effect among the firms. Also, the distribution of the firm sample across industries is presented in table 4-2, which indicates that the sample represents most industrial groups in the UK market reasonably well.

Table 4-3 exhibits the percentage of market value of the sample firms to the market value of all UK firms, which is approximately 40% for the entire testing period 1977-1991. The current study used 156 sample firms out of all UK firms (approximately 2,100 firms), which represent 7.43% of the UK market in terms of number of firms.

[5] Sales value is according to 1991, and the reason for selecting this year is that it is the last year in my study. The validity of the sales value to be constant across years was checked by performing correlation analysis between 1991 and each individual year for all the firms. The results suggest that the correlation coefficients are between 85.1% to 99.4%. Therefore, these results indicate that 1991 sales value is a reasonable key for firm size classification.

TABLE 4-2
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%

TABLE 4-3
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%
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.

4.9 OLS ASSUMPTION TESTS:

This section deals with the nature of OLS assumptions and the consequences of any violation of these assumptions. The appropriate tests will be used to detect any departure from the OLS assumptions. Then, the relevant remedies will be performed to ensure that the parameters of the model are the Best Linear Unbiased Estimator (BLUE). The analysis is conducted for each model in the three different lags, as outlined above but since their results are almost the same for all three lags the four months lag is presented in this section.

4.9.1 Testing For Non-Normality:

The first OLS assumption is that the error term is normally distributed. The Bera, Jarque test (1987) is used as the formal test for non-normality. The results are presented in table 4-4.

According to the Bera and Jarque test (B, J hereafter), all the models have a normality problem. For instance in M1, LM=108.329 which indicates a serious normality problem because it is significantly greater than 9.21 the critical value of Chi-square with 2 d.f.

TABLE 4-4 NORMALITY TEST
Jarque-Bera Asymptotic LM Normality Test

Models				
M1	M2	M3	M4	M5
108.329	21.599	97.319	31.87	52.56

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1977-1991.

The Models can be written as

CAR= a_0+a_1 *Collections* + a_2 *Payment*+b_1 *Net Interest*+b_2 *Dividends Pmt.*
+c_1 Taxes + d_1 *P.Investment* + d_2 *Sale Fixed* + e_1 *Debt* +e_2 *Stock* + f_1 *Accruals1* +e.(M1)

CAR= g_0+g_1OCF+g_2RIF+g_3TCF+g_4ICF+g_5FCF+g_6CC+ Accruals2+ e...(M2)

CAR= h_0+h_1OCFPS+h_2RIFPS+h_3TCFPS+h_4ICFPS+h_5FCFPS+h_6CCPS+Accruals3+e...(M3)

CAR = I_0+I_1EARN+e ....(M4)

CAR = j_0+j_1EPS+e ....(M5)

The LM value is calculated thus

$$LM=N\left(\frac{g_1^2}{6}+\frac{g_2^2}{24}\right)$$

where g_1 and g_2 are the coefficients of residual skewness and excess kurtosis (White 1993)
This LM value is compared to χ = 9.21 at α = .01 with 2 d.f.

The solution for this problem consists of three steps as explained in chapter three, and when applying these steps, we find the following: in Model 1 the normality problem is solved after the first step and results in a reduction of the number of observations from 1716 to 1486. In Model 2 the normality problem is reduced after the second step and results in reducing the number of observations from 2184 to 2023, using u=2 and $\lambda=1.24$. The normality problem is reduced in M3 after the second step and the result is a reduction of the number of observations from 2184 to 2001, using u=2 and $\lambda = 1.100$. The normality problem in Model 4 is reduced after the second step and the number of observations is reduced from 2184 to 2049, using $\lambda = 1.13$ and u=2. Finally, the problem is reduced in Model 5 after the second step and results in a reduction of the number of observations from 2184 to 2058, using u=2 and $\lambda =1.15$. Table 4-5 contains summaries for the normality problem solutions. The test of hypothesis of λ values is given by likelihood ratio tests which is= $2*[L(\lambda^*)-L(\lambda=1)]$ as follows:

Models	λ^*	Log-likelihood Function for $(L\lambda=1)$	Log-likelihood Function for $L(\lambda^*)$	Test Statistic
M2	1.24	-85.4671	-83.9986	2.69622
M3	1.1	-60.3039	-59.0964	2.415
M4	1.13	-18.2989	-17.8143	0.9692
M5	1.15	-51.58404	-51.3176	1.0456

The results of these tests can be compared to $\chi^2_{(1)}$ at $\alpha=0.10$ which equals 2.71. The results suggest it is not possible to reject the linear model for $L(\lambda=1)$, however, Box and Cox transformation can reduce the influence of non-normality problem in the models.

Therefore, the normality problem is solved or reduced in all the models by the end of the first or second step. The omitted observations are examined and it is confirmed that they are random across industries and years. Finally, the estimators of the regression coefficients are obtained in two different methods Minimizing Absolute Deviation method (MAD) and OLS method. The results from both methods are similar, therefore it is confirmed that all the models are now free from the non-normality problem.

TABLE 4-5
SUMMARY FOR THE NORMALITY PROBLEM SOLUTION

Models	LM (Jarque-Bera Test)		u Value	λ Value	Number of Observations
	Before Box and Cox transformation*	After Box and Cox transformation			
M1	2.7375	2.7375	-	-	1486 OUT OF 1716
M2	19.9840	17.644	2	1.24	2023 OUT OF 2184
M3	19.1699	17.12	2	1.100	2001 OUT OF 2184
M4	15.5381	14.348	2	1.13	2049 OUT OF 2184
M5	22.7180	21.635	2	1.15	2058 OUT OF 2184

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1977-1991.
The Models can be written as

$CAR = a_0 + a_1$ *Collections* + a_2*Payment* + b_1 *Net Interest* + b_2 *Dividends Pmt.*
+ c_1 Taxes + d_1 *P.Investment* + d_2 *Sale Fixed* + e_1 *Debt* + e_2 *Stock* + f_1 *Accruals1* +e.(M1)

$CAR = g_0 + g_1OCF + g_2RIF + g_3TCF + g_4ICF + g_5FCF + g_6CC +$ Accruals2+ e...(M2)

$CAR = h_0 + h_1OCFPS + h_2RIFPS + h_3TCFPS + h_4ICFPS + h_5FCFPS + h_6CCPS +$ Accruals3+e...(M3)

$CAR = I_0 + I_1EARN + e$ ....(M4)

$CAR = j_0 + j_1EPS + e$ ....(M5)

The LM value is calculated thus

$$LM = N\left(\frac{g_1^2}{6} + \frac{g_2^2}{24}\right)$$

where g_1 and g_2 are the coefficients of residual skewness and excess kurtosis (White 1993)
This LM value is compared to $\chi = 9.21$ at $\alpha = .01$ with 2 d.f.
* LM values are after the elimination of the large standard residual but before Box and Cox transformation.

4.9.2 Testing For Misspecification Error:

Misspecification error will have the result of, either, underfitting the model if there is a missing variable, or overfitting the model if we have more variables than necessary in the model. Ramsey's RESET tests (Regression Error Specification Test) will be used to detect misspecification error in the models.

The results are presented in table 4-6. They indicate that all the models are free from a misspecification problem.

TABLE 4-6
RAMSEY'S RESET TESTS FOR
MISSPECIFICATION ERROR (POOL FORMS)

Model	M1	M2	M3	M4	M5
Calculated F statistic	1.623	0	0	0	2.179

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1977-1991.
The Models can be written as
CAR= a_0+a_1 *Collections* + a_2 *Payment*+b_1 *Net Interest*+b_2 *Dividends Pmt.*
+c_1 Taxes + d_1 *P.Investment* + d_2 *Sale Fixed* + e_1 *Debt* +e_2 *Stock* + f_1 *Accruals1* +e.(M1)
CAR= g_0+g_1OCF+g_2RIF+g_3TCF+g_4ICF+g_5FCF+g_6CC+ Accruals2+ e...(M2)
CAR= h_0+h_1OCFPS+h_2RIFPS+h_3TCFPS+h_4ICFPS+h_5FCFPS+h_6CCPS+Accruals3+e...(M3)
CAR = I_0+I_1EARN+e ....(M4)
CAR = j_0+j_1EPS+e ....(M5)

F- value:

$$F=\frac{(R^2_{new}-R^2_{old})/M}{(1-R^2_{new})/(N-K-M)}$$

Where,

R^2_{new}= R^2 for new model after including $\hat{y}^2$, $\hat{y}^3$, and $\hat{y}^4$.
R^2_{old} = R^2 for the original model.
K= the number of parameters including the intercept.
M= the number of new explanatory variables ($\hat{y}^2$, $\hat{y}^3$, $\hat{y}^4$,).
F critical for model 1 is 2.18 at .01 level, for model 2 is 2.64 at .01 level, for model 3 is 2.41 at .01 level, for model 4 is 4.61 at .01 level, and for model 5 is 4.61 at .01 level

4.9.3 Testing For Heteroscedasticity:

An important assumption imposed by classic linear regression model (CLRM) is that the error term u has a constant error variance, but if it varies from observation to observation we have a situation with heteroscedasticity or non-constant error term. Two different methods are used to detect heteroscedasticity in the models: Glejser Test; and the Ramsey Test.

The results for the Ramsey test are presented in table 4-7, which confirm that all models are free from a heteroscedasticity problem. The results for the Glejser test are presented in table 4-8 which confirm that all models are free from the heteroscedasticity problem.

TABLE 4-7
THE RESULT OF RAMSEY TESTS FOR HETEROSCEDASTICITY FOR ALL THE MODELS

MODEL1	MODEL 2	MODEL 3	MODEL 4	MODEL5
1.66	.03	.87	.04	1.29

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1977-1991.
The Models can be written as
CAR= a_0+a_1 *Collections* + a_2 *Payment*+b_1 *Net Interest*+b_2 *Dividends Pmt.*
+c_1 Taxes + d_1 *P.Investment* + d_2 *Sale Fixed* + e_1 *Debt* +e_2 *Stock* + f_1 *Accruals1* +e.(M1)
CAR= g_0+g_1OCF+g_2RIF+g_3TCF+g_4ICF+g_5FCF+g_6CC+ Accruals2+ e...(M2)
CAR= h_0+h_1OCFPS+h_2RIFPS+h_3TCFPS+h_4ICFPS+h_5FCFPS+h_6CCPS+Accruals3+e...(M3)
CAR = I_0+I_1EARN+e ....(M4)
CAR = j_0+j_1EPS+e ....(M5)

The F value is computed after regressed the residual e on $\hat{y}^2$, $\hat{y}^3$, and $\hat{y}^4$.
* F- critical value for all models is 3.78 at .01 level.

TABLE 4-8
GLEJSER TEST FOR HETEROSCEDASTICITY

M1		M2		M3		M4		M5	
VAR	T-RATIO	VAR	T-RATIO	VAR	T-RATIO	VAR	T-RATIO	VAR	T RATIO
Collect	.48	OCF	1.1	OCFPS	1.72	EARN	.13	EPS	.26
PMT	.67	RIF	.89	RIFPS	-.02				
NETINT	.16	ICF	1.13	ICFPS	1.0				
DIVID	1.01	FCF	-1.46	FCFPS	-1.60				
TCF	.07	TCF	-.20	TCFPS	1.56				
S.fixed	.20	CC	.75	CCPS	.25				
P.INVS	.30	Accruals 2	.06	Accruals 3	-1.15				
Stock	-1.20								
Debt	1.60								
Accrual 1	-.15								

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1977-1991 for M2 to M5 but for M1 it is from year 1981-1991. The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, Collect is collection from customers, PMT is payments to supplies, NETINT is net interest payment, DIVID is cash dividends, S.fixed is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 and 2 is earnings minus net cash flows in model 1 and 2 respectively. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity. The other variables are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, Accruals 3, and EPS is basic earnings per share. All per share variables are in first difference form only.

The Models can be written as

CAR= a_0+a_1 *Collections* + a_2 *Payment*+ b_1 *Net Interest*+ b_2 *Dividends Pmt.*
+ c_1 Taxes + d_1 *P.Investment* + d_2 *Sale Fixed* + e_1 *Debt* + e_2 *Stock* + f_1 *Accruals1* +e.(M1)

CAR= $g_0+g_1OCF+g_2RIF+g_3TCF+g_4ICF+g_5FCF+g_6CC+$ Accruals2+ e...(M2)

CAR= $h_0+h_1OCFPS+h_2RIFPS+h_3TCFPS+h_4ICFPS+h_5FCFPS+h_6CCPS+$Accruals3+e...(M3)

CAR = $I_0+I_1EARN+e$ ....(M4)

CAR = j_0+j_1EPS+e ....(M5)

The T- ration is computed by regressed the absolute value of the residual $|e|$ on each variable.
t- critical equals 2.326 at .01 level.

4.9.4 Testing For Multicollinearity:

Multicollinearity exists in the models if there are two or more of the independent variables highly correlated. This problem is often encountered in accounting and economics studies because there are many variables influencing each other in the models. Two methods will be used to discover this problem. The first one is an informal one called **Pairwise correlation,** and the second one is a formal method, **Variance Inflation Factors (VIF)**. The concept and application for each method is as follows:

First Test - Pairwise Correlation:

If the correlation between two explanatory variables is 70% or more, this might be an indication for multicollinearity, which will have a bad effect on the model (Murphy, 1989).

There is a high correlation coefficient in M1 between collect and payment, 85.5%, which indicates a serious multicollinearity problem in M1. Pair wise correlation did not detect any multicollinearity problem in M2. The highest correlation coefficient is between accruals 2 and CC, 60%, and it is 57.6% between accruals 2 and OCF. Finally, in M3 the correlation coefficient between accruals 3 and CCPS is -58.2%, and between accruals 3 and OCFPS it is 47.8%. Before we could draw any conclusions regarding these correlation results the second formal test (VIF) had to be performed to confirm any multicollinearity in the models.

Second Test-VIF:

This is a formal method widely used to detect multicollinearity. The largest VIF value among X variables is often an indication of the severity of multicollinearity among them. Also, as Neter, Wasserman and Kutner mention, a maximum VIF value in excess of 10 is often taken as an indication that multicollinearity may be unduly influencing the least square estimates, while the ideal VIF value is 1. An SPSS computer program was used to determine VIF for each independent variable in Models 1, 2, and 3. The results for this test are presented in table 4-9.

In M1 the VIF values for payment, collect and accruals 1 are 79.2, 78.6, and 24.1 respectively which represent a high VIF and indicate a serious multicollinearity in M1. The highest VIF values in M2 are 2.2, 2 and 2 for OCF, CC and accruals 2 respectively. Finally, in M3, the VIF values are 1.9, 1.9 and 2 for OCFPS, CCPS and accruals 3 respectively.

This test confirms the pairwise correlation results and the findings of O'Bryan (1992), who reported VIF values for collect, payment and accruals as 102, 109 and 58 respectively.

The multicollinearity detection tests reveal that a multicollinearity problem exists in model 1. The problem will be solved by dropping one of the independent variables that is highly correlated with other independent variables. Then the regression analysis will be rerun and the VIF values examined. For M1, dropping payment variable is the best choice to eliminate the multicollinearity.

TABLE 4-9
VARIANCE INFLATION FACTOR (VIF) FOR MODEL 1, 2 AND 3

M1@		M2		M3	
VARIABLE	VIF	VARIABLE	VIF	VAR	VIF
PMT	79.2	ACCRUAL 2	2.0	ACCRUAL3	2.0
COLLECT	78.6	FCF	1.3	FCFPS	1.3
NETINT	1.1	ICF	1.0	ICFPS	1.2
S.FIXED	2.2	RIF	1.0	RIFPS	1.1
DEBT	9.4	OCF	2.2	OCFPS	1.9
TCF	2	TCF	1.1	TCFPS	1.1
DIVID	1.3	CC	2.0	CCPS	1.9
STOCK	3.7				
P.INVS	9.9				
ACCRUAL 1	24.1				

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1977-1991 for M2 to M5 but for M1 it is from year 1981-1991. The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, Collect is collection from customers, PMT is payments to supplies, NETINT is net interest payment, DIVID is cash dividends, S.fixed is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 and 2 is earnings minus net cash flows in model 1 and 2 respectively. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity. The other variables are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and Accruals 3. All per share variables are in first difference form only.

The Models can be written as

CAR= a_0+a_1 *Collections* + a_2*Payment*+b_1 *Net Interest*+b_2 *Dividends Pmt.*
+c_1 Taxes + d_1 *P.Investment* + d_2 *Sale Fixed* + e_1 *Debt* +e_2 *Stock* + f_1 *Accruals1* +e.(M1)

CAR= g_0+g_1OCF+g_2RIF+g_3TCF+g_4ICF+g_5FCF+g_6CC+ Accruals2+ e...(M2)

CAR= h_0+h_1OCFPS+h_2RIFPS+h_3TCFPS+h_4ICFPS+h_5FCFPS+h_6CCPS+Accruals3+e...(M3)

The VIF value is obtained directly from SPSS program and if VIF is more than 10 this is evidence of multicollinearity problem.

The result of VIF for model 1 after dropping payment is presented in table 4-10, and shows that the multicollinearity no longer exists.

TABLE 4-10
VARIANCE INFLATION FACTOR (VIF) FOR MODEL 1 AFTER SOLVING MULTICOLLINEARITY PROBLEM

COLLECT	NETINT	S.FIXED	DEBT	TCF	DIVID	STOCK	P.INVS	Accruall
1.2	1.1	1.1	1.3	1.1	1.2	1.2	1.6	1.6

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1977-1991 for M2 to M5 but for M1 it is from year 1981-1991. The variables definitions are TCF is cash flows from taxation, Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.fixed is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 is earnings minus net cash flows in model 1. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The Models can be written as
$CAR = a_0 + a_1$ *Collections* $+ a_2$ *Payment* $+ b_1$ *Net Interest* $+ b_2$ *Dividends Pmt.*
$+ c_1$ Taxes $+ d_1$ *P.Investment* $+ d_2$ *Sale Fixed* $+ e_1$ *Debt* $+ e_2$ *Stock* $+ f_1$ *Accruals1* $+ e.$(M1)

The VIF value is obtained directly from SPSS program and if VIF is more than 10 this is evidence of multicollinearity problem.

4.10 THE FINAL MODELS:

After examining the OLS assumptions and ensuring that the models were BLUE, it is possible to present a summary of the model modifications and the final models that will be used in the next empirical analysis.

First model modifications are summarized in table 4-11:

TABLE 4-11
SUMMARY OF MODEL MODIFICATIONS

Models	Is the model after deflation by MV ?	Are there any transformations for the model ?	If Yes then u value equals	If yes then λ value equals	Is the transformation using Box Cox Method for CAR only ?	The variable that must be dropped owing to multicollinearity
M1	Yes	No	-	-	No	Payment
M2	Yes	Yes	2	1.24	Yes	-
M3	No	Yes	2	1.1	Yes	-
M4	Yes	Yes	2	1.13	Yes	-
M5	No	Yes	2	1.15	Yes	-

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1977-1991 for M2 to M5 but for M1 it covers the years 1981-1991.
The Models can be written as
CAR= a_0+a_1 *Collections* $+b_1$ *Net Interest* $+b_2$ *Dividends Pmt.* $+c_1$ Taxes $+ d_1$ *P.Investment* $+ d_2$ *Sale Fixed* $+ e_1$ *Debt* $+e_2$ *Stock* $+ f_1$ *Accruals1* +e.(M1)
CAR= $g_0+g_1OCF+g_2RIF+g_3TCF+g_4ICF+g_5FCF+g_6CC+$ Accruals2+ e...(M2)
CAR= $h_0+h_1OCFPS+h_2RIFPS+h_3TCFPS+h_4ICFPS+h_5FCFPS+h_6CCPS+$ Accruals3 +e...(M3)
CAR = $I_0+I_1EARN+e$ ....(M4)
CAR = j_0+j_1EPS+e ....(M5)

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

CAR= a_0+a_1 *Collections* $+b_1$ *Net Interest* $+b_2$ *Dividends Pmt.* $+c_1$ *Taxes* $+ d_1$ *P.Investment* $+ d_2$ *Sale Fixed* $+ e_1$ *Debt* $+e_2$ *Stock* $+ f_1$ *Accruals1* +e..(M1)

CAR= $g_0+g_1OCF+g_2RIF+g_3TCF+g_4ICF+g_5FCF+g_6CC+g_7$Accruals 2 + e..(M2)

CAR= $h_0+h_1OCFPS+h_2RIFPS+h_3TCFPS+h_4ICFPS+h_5FCFPS+h_6CCPS+g_7$ Accruals 3 +e .... (M3)

CAR = $I_0+I_1EARN+e$ ....(M4)

CAR = j_0+j_1EPS+e ....(M5)

The assessment of different lags for the dependent variable is presented in table 4.12. Although the difference among the returns windows is not material for cash flow models, it does have a big influence for earnings models. The results suggest that four-months lag is the best selection for the dependent variables (CAR) for all the models, because it reveals the highest explanatory power for all the models than other lags. Therefore, CAR that is based on four-months lag will be used in the analysis in chapters six and seven. Although four-months lag is the best selection, this issue will be reassessed in chapter six for different firm sizes.

TABLE 4.12
COMPARISON OF THE EXPLANATORY POWER OF THE MODELS AMONG DIFFERENT LAGS (For All Firms)

CAR Lags	The Explanatory Power of the Models as Represented by Adj R^2				
	M1	M2	M3	M4	M5
4 Months	5.3%	4.8%	4%	11.2%	5.2%
5 Months	4.3%	4.2%	4.3%	10.2%	5%
6 Months	4%	4%	3.9%	8.8%	5.1%

CAR_{it} is the Cumulative Abnormal Return. The sample consists of 156 firms covering the period from 1977-1991 for M2 to M5 but for M1 it covers 1981-1991.

The Models can be written as

CAR= a_0+a_1 *Collections* $+b_1$ *Net Interest* $+b_2$ *Dividends Pmt.* $+c_1$ Taxes $+$ d_1 *P.Investment* $+$ d_2 *Sale Fixed* $+$ e_1 *Debt* $+e_2$ *Stock* $+$ f_1 *Accruals1* +e.(M1)

CAR= $g_0+g_1OCF+g_2RIF+g_3TCF+g_4ICF+g_5FCF+g_6CC+$ Accruals2+ e...(M2)

CAR= $h_0+h_1OCFPS+h_2RIFPS+h_3TCFPS+h_4ICFPS+h_5FCFPS+h_6CCPS+$Accruals3+e...(M3)

CAR = $I_0+I_1EARN+e$ ....(M4)

CAR = j_0+j_1EPS+e ....(M5)

4.11 HYPOTHESIS TESTINGS:

Hypothesis testing involves three groups. The first group is the individual coefficient test; the second is the joint hypothesis test; and the third is the incremental information content test.

4.11.1 Hypothesis Testings for Individual Coefficients:

The analysis here is concerned with the test for the market reaction associated with cash flow measures and disaggregated cash flow components, cash flow per share variables, earnings and EPS measures. The market reaction testing can be done by using conventional statistical tests. The t-test is used to test the significance of the slope for each explanatory variable. The F-test is used to test the goodness of fit for M1, M2, M3, M4 and M5.

4.11.2 Hypothesis Testings for Group of Coefficients:

The market reaction that is associated with disaggregated cash flow components is tested by the following null hypotheses:

H_1: Financing cash flow components have identical association with security returns.

$$e_1 = e_2$$

H_2 : Investment cash flow components have identical association with security returns.

$$d_1 = -d_2$$

H_3 : Return of investment and services of finance components have identical association with security returns.

$$b_1 = -b_2$$

H_4: Collection and accruals have identical association with security returns.

$$a_1 = -f_1$$

The analysis for these hypotheses can be made by testing joint hypotheses for a pool of all the firms over the years. Then, the F- statistic can be calculated by employing restricted regression techniques. These procedures are accomplished by using SHAZAM econometric software.

4.11.3 Hypothesis Testings for Incremental Information Content:

H_5 : Cash flow per share variables have no incremental explanatory value over cash flow variables.

H_6 : Cash flow variables have no incremental explanatory value over cash flow per share variables.

H_7 : Cash flow variables have no incremental explanatory value over earnings.

H_8 : Earnings have no incremental explanatory value over cash flow variables.

H_9 : Cash flow per share variables have no incremental explanatory value over EPS.

H_{10} : EPS has no incremental explanatory value over cash flow per share variables.

H_{11} : Earnings have no incremental explanatory value over EPS.

H_{12} : EPS has no incremental explanatory value over earnings.

4.12 CONCLUSION:

In this chapter the model building and sample selection processes are discussed. The internal validity of the models is confirmed and all OLS assumptions are met for all the models. Box and Cox transformation is used occasionally to solve all error-terms related problems in the regression analysis and multicollinearity is solved by dropping one of the independent variables. The final models that will be used in the analysis in the next chapters are identified. Finally, the hypothesis tests that will be used in this research are developed.

CHAPTER FIVE

EMPIRICAL ANALYSIS: CORRELATION ANALYSIS

5.1 INTRODUCTION:

The analysis in this part of the study focuses on the correlation test among cash flow components and earning measures. The purpose of performing these tests is to answer the first question that was addressed in this thesis, "Are accrual accounting earnings and cash flow measures highly correlated ?" Another reason for this test is to identify the relationship between each pair and to interpret the result across the firms in the sample.

The sample is analysed in total split into 2 and 4 by sales size. By this method it is hoped to see whether size influences the results. The analysis is carried out by annual correlation among cash flows and earnings measures. The results are presented in this chapter based on the mean correlation coefficients. Yearly correlation coefficients are available from the author upon request and lead to substantially similar conclusions.

5.2 SAMPLE AND VARIABLES:

5.2.1 Sample:

476 firms for the years 1977-1986 and 428 firms for the years 1987-1994 will be included in the sample in this part of the analysis. This sample is used instead of 156 firms because it is not restricted to beta calculation for generating abnormal returns. Also, the global results are similar for both samples.

5.2.2 Variables:

The variables included in this analysis are:

1- OCF = cash flows from operation.
2- RIF = net cash flows from return on investment and servicing of finance.
3- TCF = cash flows from taxation.
4- ICF = net cash flows from investment.
5- FCF = net cash flows from finance.
6- CC = change in cash.
7- OCFPS = operating cash flow per share.
8- RIFPS = return on investment and servicing of finance cash flow per share.
9- TCFPS = taxation cash flows per share.
10-ICFPS= Investment cash flows per share.
11- FCFPS = financing cash flows per share.
12- CCPS = change in cash per share.
13- DIVID = cash dividends.
14 - EARN= net income before extraordinary items and discontinuing of the operation.
15- EPS = basic earnings per share
18 - NETINT =net interest paid.

The analysis is splitting into two groups, the proxy cash flow data (1977-1991) and real cash flow data (1992-1994).

5.3 CORRELATION RESULTS:

The relationship among cash flows and earnings measures is tested by examining the correlation coefficient between the previous variables. Previous research found high correlation between cash flow and earnings measures when cash flow was calculated as net income plus depreciation. Hence this issue will be reexamined by using cash flow variables as required under FRS 1.

5.3.1 Correlation Result Description:

Correlations of 50% or more are identified for the total sample between earnings and TCF, dividend, OCF, and RIF, between EPS and TCFPS, between dividend and RIF, OCF, and TCF, between RIF and net interest, TCF and OCF.

These high correlations are also found in the large sample and also the largest two quarters. However, in the small firm sample and the smallest two quarters there are a number of the relationships which become much less highly correlated. For small firms the correlation coefficients between earnings and OCF and RIF, between RIF, TCF and OCF and between dividend and OCF and RIF are less than 50%. Analysing the quartiles, this pattern is repeated in quartile are but with the RIF and dividend correlation coefficient increasing over 50% in quartile two.

5.3.2 Correlation Result Interpretation:

1- The correlation between each cash flow variable and its per share basis is relatively small for the majority of the variables. This might support the information content of cash flow per share, and suggests that both cash flows and cash flow per share explain different things.

2- The comparison between the correlation coefficients of the two groups of years indicates that proxy cash flow variables have the same behaviour as real cash flow statement data. This evidence provides more support for the reliability of the proxy cash flow data for years 1977-1991.

3 - The comparison for the correlation between RIF and EARN :

	For Years 1977-1991	For Years 1992-1994
a. Small Firms	24.3%	46.9%
b. Big Firms	86.2%	78.2%
c. Total Firms	87%	80.3%

The previous comparison suggests a significant difference between small and big firms, which may be explained by dividends and their relationship with earnings [RIF consists of net interest and dividends]. It would appear that more earnings are followed by more dividends for big firms whereas this is not the case for small firms. This is further confirmed by the comparison between EARN and DIVID and between EARN and

NETINT:

	EARN & NETINT		EARN & DIVID	
	For Years 1977-1991	For Years 1992-1994	For Years 1977-1991	For Years 1992-1994
a. Small Firms	-10.80%	-5.20%	72.80%	71.60%
b. Big Firms	25.70%	43.40%	93.70%	91.40%
c. Total Firms	29.40%	47.10%	94.00%	92.10%

The EARN DIVID result is further confirmed by the quartile results:

	For Years 1977-1991	For Years 1992-1994
Q1	76.8%	68.6%
Q2	61.5%	67.4%
Q3	77.2%	85.1%
Q4	93.1%	90.1%

4- A comparison of the correlation coefficients between EARN and OCF, presented below,

	For Years 1977-1991	For Years 1992-1994
a. Small Firms	30.3%	68.1%
b. Big Firms	58.2%	91.7%
c. Total Firms	60.2%	92.4%

indicate that OCF behaviour is similar to earnings, especially for large firms.

5- The correlation coefficients between OCF and DIVID are:

	For Years 1977-1991	For Years 1992-1994
Q1	-10.2%	67.4%
Q2	43.4%	42.6%
Q3	74.7%	92.6%
Q4	61.3%	87.3%

For medium and large firms cash dividends and OCF have a high correlation. This might indicate that small firms are more concerned with accruals earning measures when making dividend decisions than with cash basis measures, while for medium and large firms, both accruals and cash flow measures are important factors when making dividends decisions.

6- The correlation coefficient between ICF and FCF are as follows:

	For Years 1977-1991	For Years 1992-1994
Q1	43 %	79.9%
Q2	38.40%	62.6%
Q3	48.7%	27%
Q4	19.1%	23.2%
Small Firms	39.8%	68%
Large Firms	21%	22%

Thus the larger firms appear to depend less on external finance to finance their investment activities. This is further confirmed by examining the correlation coefficients between EARN and NETINT:

	For Years 1977-1991	For Years 1992-1994
Q1	-48.9%	-10.6%
Q2	-7.10%	-14.6%
Q3	19.2%	63.8%
Q4	19.8%	38.1%
Small Firms	-10.8%	-5.2%
Large Firms	25.7%	43.4%

The larger the firm size the lower the correlation coefficient between EARN and NETINT indicating that the larger the firm the less dependent on external finance which in turn will lead to a decrease in interest payments. This finding confirms study in the US by Wansley and Lane (1987). They found the firms in their sample tended to experience increased profitability, declining long term debt, falling interest payments, reduced dependence on trade credit as a source of funds when there was an increase in size (as measured by total assets).

7- The correlation coefficient between OCF and earnings for each quarter is the following:

	For Years 1977-1991	For Years 1992-1994
Q1	-12.6%	65.3%
Q2	50%	64%
Q3	61.6%	89.2%
Q4	54.5%	90.5%

This relationships indicate large firms in recent years become more concerned with operating cash flow. Thus, OCF in large firms is subject to similar manipulation as earnings by management.

5.4 CONCLUSION:

The correlation analyses reveal that the correlation between each pair of accounting earnings (EARN and EPS) and cash flow measures has a low correlation for the majority of the variables across all categories except for the correlation between EARN, RIF. The reason for this high correlation as the firm increased in size was DIVID item. Also, there is a positive high correlation between EARN, TCF and between EPS and TCFPS. This high correlation was due to the fact the more income that is earned the more the tax that has to be paid. On the other hand, the low correlation between other cash flow measures and earning measures might indicate separate information content for each of them and this investigation is the subject of the next chapters.

The correlation result reveals that the larger the firm the less its dependence on external finance to finance its investment activities and the more dependence on internal finance. On the other hand the smaller the firm the more dependent it is on external finance. Also, the dividend decisions for the small firms are more related to earnings condition than operating cash flow. However, for medium and large firms, they are concerned with both accruals and cash flow measures when making their dividends decisions.

TABLE 5-1
MEAN CORRELATION MATRIX FOR TOTAL FIRMS
FOR THE PERIOD 77-91

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.174							
FCF	0.330	0.059						
FCFPS	0.009	0.001	0.152					
TCF	0.912	0.129	0.163	-0.003				
TCFPS	0.142	0.564	0.019	-0.118	0.179			
DIVID	0.940	0.159	0.345	0.014	0.909	0.145		
OCF	0.602	0.135	0.176	0.009	0.477	0.117	0.663	
OCFPS	0.035	0.297	0.013	-0.039	0.025	0.437	0.052	0.164
RIF	0.870	0.154	0.294	0.018	0.863	0.148	0.927	0.620
RIFPS	0.036	0.367	0.030	0.191	0.033	0.293	0.056	0.061
CC	0.072	0.005	-0.031	0.012	0.124	0.002	0.026	0.187
CCPS	0.009	0.017	0.009	0.113	0.006	0.038	0.005	0.025
ICF	0.341	0.111	0.222	0.060	0.254	0.050	0.348	0.476
ICFPS	0.025	0.035	0.077	0.464	0.015	-0.159	0.035	0.067
NETINT	0.294	0.084	0.183	0.039	0.314	0.084	0.364	0.377
	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS	
RIF	0.067							
RIFPS	0.380	0.096						
CC	0.035	0.027	-0.004					
CCPS	0.358	0.007	-0.001	0.125				
ICF	0.063	0.386	0.042	-0.012	-0.026			
ICFPS	0.112	0.053	0.080	-0.033	-0.278	0.209		
NETINT	0.115	0.671	0.156	-0.069	0.006	0.272	0.068	

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, NETINT is net interest payment, DIVID is cash dividends, OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and EPS is basic earnings per share. All the previous variables are in level form without any deflator.

TABLE 5-2
MEAN CORRELATION MATRIX FOR SMALL FIRMS
FOR THE PERIOD 77-91

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.363							
FCF	-0.001	-0.027						
FCFPS	-0.024	-0.049	0.391					
TCF	0.606	0.144	-0.099	-0.036				
TCFPS	0.099	0.571	-0.071	-0.106	0.269			
DIVID	0.728	0.286	-0.031	-0.006	0.619	0.093		
OCF	0.303	-0.097	-0.058	-0.066	0.397	0.016	0.239	
OCFPS	-0.080	0.219	-0.075	-0.169	0.025	0.464	-0.084	0.340
RIF	0.243	-0.007	-0.035	0.024	0.251	-0.022	0.492	0.432
RIFPS	-0.092	0.344	0.018	0.190	-0.047	0.336	0.016	0.041
CC	0.063	-0.013	0.091	0.028	-0.031	-0.026	-0.045	0.410
CCPS	0.015	-0.010	0.020	-0.025	-0.023	0.025	-0.029	0.161
ICF	0.265	-0.077	0.398	0.189	0.165	-0.113	0.200	0.211
ICFPS	0.004	-0.069	0.194	0.401	-0.024	-0.175	0.004	-0.012
NETINT	-0.108	-0.185	-0.062	0.022	-0.020	-0.078	0.029	0.389

	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS
RIF	0.123						
RIFPS	0.459	0.274					
CC	0.151	-0.053	-0.011				
CCPS	0.227	0.011	0.020	0.377			
ICF	-0.005	0.125	-0.066	-0.170	-0.130		
ICFPS	0.055	-0.018	0.019	-0.135	-0.447	0.448	
NETINT	0.197	0.857	0.274	-0.035	0.035	0.056	-0.023

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, NETINT is net interest payment, DIVID is cash dividends, OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and EPS is basic earnings per share. All the previous variables are in level form without any deflator.

TABLE 5-3
MEAN CORRELATION MATRIX FOR LARGE FIRMS
FOR THE PERIOD 77-91

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.264							
FCF	0.311	0.087						
FCFPS	0.011	0.179	0.393					
TCF	0.910	0.187	0.144	-0.011				
TCFPS	0.251	0.608	0.035	-0.009	0.331			
DIVID	0.937	0.242	0.328	0.025	0.908	0.256		
OCF	0.582	0.203	0.151	-0.003	0.457	0.195	0.645	
OCFPS	0.053	0.457	0.010	0.096	0.031	0.379	0.089	0.300
RIF	0.862	0.231	0.276	0.036	0.860	0.263	0.924	0.598
RIFPS	0.071	0.455	0.072	0.208	0.064	0.294	0.121	0.128
CC	0.071	-0.020	-0.032	-0.005	0.121	-0.010	0.024	0.186
CCPS	0.008	-0.012	0.003	0.174	0.004	-0.162	-0.006	0.048
ICF	0.322	0.138	0.210	0.105	0.234	0.085	0.329	0.464
ICFPS	0.014	0.339	0.112	0.385	0.002	0.133	0.029	0.089
NETINT	0.257	0.129	0.162	0.099	0.283	0.162	0.331	0.339

	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS
RIF	0.115						
RIFPS	0.351	0.207					
CC	0.064	0.023	-0.025				
CCPS	0.406	-0.000	-0.166	0.291			
ICF	0.105	0.367	0.068	-0.017	-0.043		
ICFPS	0.230	0.064	0.295	-0.053	-0.119	0.404	
NETINT	0.206	0.653	0.358	-0.075	-0.007	0.252	0.083

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, NETINT is net interest payment, DIVID is cash dividends, OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and EPS is basic earnings per share. All the previous variables are in level form without any deflator.

TABLE 5-4
MEAN CORRELATION MATRIX FOR FIRMS LOCATED
IN FIRST QUARTER, FOR THE PERIOD 77-91

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.546							
FCF	0.031	-0.002						
FCFPS	-0.038	0.020	0.562					
TCF	0.559	0.272	0.002	-0.039				
TCFPS	0.212	0.603	-0.013	-0.059	0.426			
DIVID	0.768	0.455	0.006	-0.014	0.608	0.203		
OCF	-0.126	-0.293	-0.107	-0.048	0.159	-0.039	-0.102	
OCFPS	-0.249	0.109	-0.027	-0.018	-0.054	0.418	-0.262	0.497
RIF	0.080	-0.074	0.047	0.003	0.125	-0.083	0.235	0.276
RIFPS	-0.154	0.246	0.003	0.159	-0.101	0.252	-0.043	0.022
CC	0.041	0.022	0.059	0.049	-0.085	-0.042	0.013	0.322
CCPS	0.066	-0.001	0.038	-0.060	-0.024	-0.043	0.035	0.139
ICF	0.088	-0.036	0.430	0.233	0.064	-0.032	0.042	0.089
ICFPS	-0.008	0.046	0.248	0.554	-0.015	0.007	-0.026	0.053
NETINT	-0.489	-0.451	0.042	0.013	-0.285	-0.224	-0.500	0.402
	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS	
RIF	0.055							
RIFPS	0.325	0.340						
CC	0.114	-0.011	-0.043					
CCPS	0.190	-0.017	-0.204	0.504				
ICF	0.058	0.021	-0.035	-0.276	-0.128			
ICFPS	0.158	-0.031	0.096	-0.126	-0.338	0.522		
NETINT	0.281	0.653	0.254	-0.010	-0.030	0.004	-0.004	

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, NETINT is net interest payment, DIVID is cash dividends, OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and EPS is basic earnings per share. All the previous variables are in level form without any deflator.

TABLE 5-5
MEAN CORRELATION MATRIX FOR FIRMS LOCATED
IN SECOND QUARTER, FOR THE PERIOD 77-91

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.266							
FCF	-0.009	-0.043						
FCFPS	0.004	-0.068	0.563					
TCF	0.595	0.133	-0.135	-0.063				
TCFPS	0.070	0.665	-0.081	-0.061	0.290			
DIVID	0.615	0.109	-0.019	-0.033	0.621	0.057		
OCF	0.500	0.052	-0.074	-0.047	0.412	0.036	0.434	
OCFPS	0.048	0.320	-0.130	-0.196	0.076	0.405	0.051	0.387
RIF	0.169	-0.001	-0.027	-0.014	0.157	-0.014	0.546	0.326
RIFPS	-0.066	0.338	-0.042	0.048	0.007	0.355	0.124	0.071
CC	0.107	0.009	0.095	0.090	-0.000	-0.027	-0.071	0.502
CCPS	0.031	0.063	0.066	0.199	-0.058	-0.004	-0.084	0.261
ICF	0.314	-0.061	0.384	0.270	0.152	-0.119	0.251	0.227
ICFPS	0.066	0.006	0.251	0.274	0.002	-0.084	0.053	0.028
NETINT	-0.071	-0.039	-0.053	-0.021	-0.079	-0.023	0.187	0.185

	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS
RIF	0.167						
RIFPS	0.520	0.415					
CC	0.242	-0.081	-0.024				
CCPS	0.334	-0.050	0.128	0.554			
ICF	0.014	0.093	-0.041	-0.139	-0.143		
ICFPS	0.085	-0.005	-0.054	-0.154	-0.311	0.577	
NETINT	0.197	0.910	0.459	-0.067	-0.027	0.012	-0.024

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, NETINT is net interest payment, DIVID is cash dividends, OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and EPS is basic earnings per share. All the previous variables are in level form without any deflator.

TABLE 5-6
MEAN CORRELATION MATRIX FOR FIRMS LOCATED
IN THIRD QUARTER, FOR THE PERIOD 77-91

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.365							
FCF	0.201	0.021						
FCFPS	0.051	0.133	0.638					
TCF	0.685	0.204	0.283	0.091				
TCFPS	0.262	0.599	0.076	0.057	0.497			
DIVID	0.772	0.206	0.359	0.128	0.749	0.268		
OCF	0.616	0.190	0.258	0.069	0.730	0.301	0.747	
OCFPS	0.120	0.472	0.026	0.073	0.172	0.379	0.147	0.396
RIF	0.512	0.106	0.418	0.170	0.631	0.199	0.844	0.746
RIFPS	-0.021	0.367	0.081	0.144	0.048	0.185	0.153	0.130
CC	0.116	0.062	0.052	0.069	-0.033	-0.083	0.014	0.215
CCPS	0.094	0.028	0.070	0.164	-0.008	-0.152	0.003	0.171
ICF	0.390	0.095	0.487	0.258	0.427	0.132	0.534	0.461
ICFPS	0.042	0.339	0.245	0.385	0.078	0.187	0.110	0.084
NETINT	0.192	-0.014	0.346	0.156	0.391	0.069	0.522	0.574

	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS
RIF	0.182						
RIFPS	0.308	0.315					
CC	0.164	-0.015	-0.062				
CCPS	0.439	-0.020	-0.250	0.534			
ICF	0.106	0.559	0.076	-0.196	-0.054		
ICFPS	0.218	0.141	0.291	-0.152	-0.152	0.499	
NETINT	0.154	0.885	0.361	-0.017	-0.027	0.430	0.116

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, NETINT is net interest payment, DIVID is cash dividends, OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and EPS is basic earnings per share. All the previous variables are in level form without any deflator.

TABLE 5-7
MEAN CORRELATION MATRIX FOR FIRMS LOCATED
IN FOURTH QUARTER, FOR THE PERIOD 77-91

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.288							
FCF	0.282	0.083						
FCFPS	-0.012	0.168	0.467					
TCF	0.905	0.202	0.112	-0.037				
TCFPS	0.279	0.648	0.013	0.015	0.399			
DIVID	0.931	0.256	0.301	0.005	0.906	0.284		
OCF	0.545	0.200	0.111	-0.039	0.422	0.192	0.613	
OCFPS	0.023	0.480	-0.010	0.076	0.008	0.504	0.072	0.348
RIF	0.851	0.247	0.245	0.018	0.856	0.297	0.917	0.558
RIFPS	0.049	0.502	0.068	0.233	0.054	0.450	0.117	0.125
CC	0.064	-0.043	-0.037	-0.011	0.113	-0.019	0.014	0.183
CCPS	-0.008	-0.048	0.002	0.091	-0.013	-0.048	-0.023	0.053
ICF	0.288	0.146	0.191	0.124	0.198	0.078	0.295	0.442
ICFPS	-0.014	0.301	0.140	0.380	-0.027	0.184	-0.001	0.077
NETINT	0.198	0.127	0.129	0.093	0.234	0.180	0.275	0.275

	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS
RIF	0.111						
RIFPS	0.546	0.239					
CC	0.066	0.011	-0.042				
CCPS	0.320	-0.017	-0.006	0 433			
ICF	0.129	0.331	0.067	-0.027	-0.082		
ICFPS	0.316	0.043	0.218	-0.071	-0.107	0.479	
NETINT	0.240	0.622	0.452	-0.088	-0.021	0.215	0.074

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

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TABLE 5-8
MEAN CORRELATION MATRIX FOR TOTAL FIRMS
FOR THE PERIOD 92-94

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.311							
FCF	-0.125	0.030						
FCFPS	-0.025	-0.100	0.139					
TCF	0.960	0.273	-0.177	-0.023				
TCFPS	0.144	0.556	0.020	-0.066	0.185			
DIVID	0.921	0.251	-0.124	-0.030	0.910	0.152		
OCF	0.924	0.271	-0.218	-0.027	0.964	0.163	0.901	
OCFPS	0.120	0.478	0.012	-0.667	0.134	0.364	0.155	0.154
RIF	0.803	0.252	-0.248	-0.033	0.859	0.151	0.884	0.865
RIFPS	0.092	0.129	-0.006	0.679	0.106	0.027	0.167	0.122
CC	0.002	0.037	0.059	0.040	0.022	0.036	-0.033	0.016
CCPS	0.004	0.102	0.093	0.219	0.009	0.214	0.008	0.024
ICF	0.635	0.213	0.219	0.028	0.631	0.131	0.578	0.657
ICFPS	0.088	0.270	0.143	-0.095	0.091	-0.083	0.118	0.106
NETINT	0.471	0.134	-0.363	-0.037	0.594	0.090	0.553	0.722

	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS
RIF	0.141						
RIFPS	-0.422	0.156					
CC	0.046	-0.059	0.004				
CCPS	0.063	-0.004	0.103	0.289			
ICF	0.130	0.534	0.104	-0.554	-0.117		
ICFPS	0.524	0.085	-0.138	-0.090	-0.214	0.253	
NETINT	0.108	0.706	0.131	-0.116	-0.019	0.442	0.060

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, NETINT is net interest payment, DIVID is cash dividends, OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and EPS is basic earnings per share. All the previous variables are in level form without any deflator.

TABLE 5-9
MEAN CORRELATION MATRIX FOR SMALL FIRMS
FOR THE PERIOD 92-94

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.421							
FCF	0.218	0.095						
FCFPS	-0.034	0.086	0.275					
TCF	0.725	0.334	0.170	-0.018				
TCFPS	0.123	0.627	0.021	-0.052	0.216			
DIVID	0.716	0.210	0.216	0.023	0.737	0.091		
OCF	0.681	0.257	0.190	0.014	0.550	0.066	0.573	
OCFPS	0.153	0.401	0.051	-0.567	0.130	0.327	0.122	0.243
RIF	0.469	0.120	0.185	0.004	0.470	0.057	0.699	0.647
RIFPS	0.008	0.075	0.020	0.746	0.018	0.031	0.052	0.055
CC	0.062	0.045	0.303	0.054	-0.050	-0.023	-0.099	0.264
CCPS	0.011	0.136	0.131	0.311	-0.083	0.227	-0.066	0.109
ICF	0.469	0.171	0.680	0.197	0.361	0.045	0.417	0.555
ICFPS	0.196	0.272	0.386	0.011	0.165	-0.216	0.175	0.275
NETINT	-0.052	-0.058	0.073	0.020	-0.095	-0.029	0.012	0.336

	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS
RIF	0.171						
RIFPS	-0.461	0.171					
CC	0.055	-0.081	-0.032				
CCPS	-0.036	-0.057	0.263	0.538			
ICF	0.159	0.436	0.053	-0.193	-0.126		
ICFPS	0.478	0.198	-0.129	-0.085	-0.309	0.532	
NETINT	0.116	0.691	0.188	-0.020	-0.002	0.204	0.113

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

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TABLE 5-10
MEAN CORRELATION MATRIX FOR LARGE FIRMS
FOR THE PERIOD 92-94

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.352							
FCF	-0.134	0.035						
FCFPS	-0.048	-0.126	0.344					
TCF	0.956	0.302	-0.187	-0.049				
TCFPS	0.261	0.499	0.015	0.252	0.349			
DIVID	0.914	0.264	-0.133	-0.071	0.902	0.272		
OCF	0.917	0.296	-0.230	-0.059	0.961	0.303	0.891	
OCFPS	0.196	0.612	-0.010	0.088	0.239	0.613	0.217	0.281
RIF	0.782	0.262	-0.266	-0.074	0.845	0.275	0.871	0.850
RIFPS	0.107	0.179	-0.026	0.076	0.148	0.342	0.215	0.186
CC	-0.007	0.045	0.061	0.075	0.015	0.039	-0.042	0.008
CCPS	0.002	0.086	0.107	0.467	0.008	0.283	-0.006	0.025
ICF	0.620	0.231	0.220	0.075	0.616	0.236	0.559	0.643
ICFPS	0.096	0.337	0.244	0.419	0.108	0.275	0.101	0.130
NETINT	0.434	0.119	-0.376	-0.079	0.567	0.157	0.522	0.704

	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS
RIF	0.257						
RIFPS	0.661	0.292					
CC	0.050	-0.071	0.001				
CCPS	0.388	-0.012	0.111	0.326			
ICF	0.221	0.510	0.127	-0.568	-0.131		
ICFPS	0.420	0.091	0.243	-0.142	-0.172	0.350	
NETINT	0.207	0.685	0.254	-0.126	-0.026	0.417	0.060

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

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TABLE 5-11
MEAN CORRELATION MATRIX
FOR FIRMS LOCATED IN FIRST QUARTER
FOR THE PERIOD 92-94

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.513							
FCF	0.250	0.093						
FCFPS	0.027	0.070	0.345					
TCF	0.736	0.387	0.181	0.023				
TCFPS	0.168	0.718	0.020	-0.003	0.259			
DIVID	0.686	0.169	0.294	0.162	0.669	0.129		
OCF	0.653	0.276	0.291	0.093	0.540	0.094	0.674	
OCFPS	0.238	0.561	0.114	-0.515	0.215	0.319	0.162	0.297
RIF	0.444	0.046	0.294	0.071	0.410	0.038	0.697	0.663
RIFPS	0.004	0.047	0.101	0.765	0.048	0.059	0.081	0.054
CC	0.083	0.127	0.069	0.096	-0.083	0.037	-0.087	0.320
CCPS	0.047	0.232	0.090	0.407	-0.035	0.492	-0.046	0.099
ICF	0.389	0.137	0.799	0.264	0.333	0.037	0.478	0.570
ICFPS	0.270	0.318	0.426	0.063	0.246	-0.304	0.292	0.370
NETINT	-0.106	-0.147	0.102	0.048	-0.135	-0.069	-0.029	0.264

	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS
RIF	0.163						
RIFPS	-0.479	0.187					
CC	0.108	0.017	0.032				
CCPS	-0.069	-0.021	0.370	0.568			
ICF	0.194	0.456	0.072	-0.224	-0.151		
ICFPS	0.453	0.213	-0.114	-0.053	-0.393	0.558	
NETINT	0.042	0.664	0.231	0.117	0.028	0.129	0.051

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

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TABLE 5-12
MEAN CORRELATION MATRIX
FOR FIRMS LOCATED IN SECOND QUARTER
FOR THE PERIOD 92-94

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.577							
FCF	0.181	0.141						
FCFPS	0.061	0.202	0.779					
TCF	0.681	0.473	0.145	0.062				
TCFPS	0.200	0.358	0.022	0.107	0.446			
DIVID	0.674	0.405	0.169	0.054	0.705	0.183		
OCF	0.640	0.413	0.123	0.035	0.469	0.119	0.426	
OCFPS	0.206	0.345	0.042	0.025	0.123	0.340	0.040	0.472
RIF	0.362	0.256	0.112	0.102	0.352	0.129	0.593	0.540
RIFPS	-0.065	0.213	0.025	0.245	-0.040	0.480	-0.032	0.070
CC	0.035	0.013	0.338	0.165	-0.078	-0.103	-0.165	0.245
CCPS	0.006	-0.028	0.161	0.053	-0.110	-0.205	-0.118	0.153
ICF	0.457	0.309	0.626	0.524	0.330	0.101	0.345	0.517
ICFPS	0.246	0.377	0.549	0.692	0.187	0.357	0.143	0.335
NETINT	-0.146	-0.032	0.037	0.078	-0.210	-0.059	-0.127	0.275
	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS	
RIF	0.296							
RIFPS	0.528	0.377						
CC	0.124	-0.164	-0.099					
CCPS	0.479	-0.075	-0.103	0.608				
ICF	0.241	0.380	0.075	-0.223	-0.141			
ICFPS	0.422	0.292	0.420	-0.176	-0.180	0.791		
NETINT	0.251	0.685	0.405	-0.061	-0.010	0.177	0.213	

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

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TABLE 5-13
MEAN CORRELATION MATRIX
FOR FIRMS LOCATED IN THIRD QUARTER
FOR THE PERIOD 92-94

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.333							
FCF	-0.080	0.031						
FCFPS	-0.070	-0.264	0.489					
TCF	0.894	0.235	-0.073	-0.033				
TCFPS	0.194	0.357	0.036	0.389	0.284			
DIVID	0.851	0.183	-0.163	-0.084	0.861	0.140		
OCF	0.892	0.195	-0.195	-0.095	0.873	0.129	0.926	
OCFPS	0.264	0.609	-0.071	0.035	0.229	0.381	0.242	0.311
RIF	0.757	0.108	-0.227	-0.084	0.785	0.105	0.952	0.920
RIFPS	0.146	-0.040	-0.110	0.233	0.182	0.080	0.361	0.279
CC	-0.122	-0.006	0.263	0.138	-0.115	0.030	-0.237	-0.177
CCPS	-0.045	0.065	0.228	0.547	-0.032	0.348	-0.091	-0.059
ICF	0.422	0.143	0.270	0.130	0.347	0.026	0.371	0.403
ICFPS	0.192	0.262	0.435	0.357	0.140	0.109	0.127	0.160
NETINT	0.638	0.039	-0.274	-0.088	0.660	0.039	0.847	0.855
	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS	
RIF	0.238							
RIFPS	0.472	0.398						
CC	0.050	-0.261	-0.110					
CCPS	0.372	-0.139	-0.003	0.427				
ICF	0.100	0.318	0.080	-0.710	-0.236			
ICFPS	0.280	0.098	0.220	-0.217	-0.163	0.577		
NETINT	0.203	0.962	0.393	-0.265	-0.153	0.256	0.060	

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

The difference between 1977-1991 period and 1992-1994 period is this, the formal uses proxy cash flow data and the later uses real cash flow data.

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TABLE 5-14
MEAN CORRELATION MATRIX
FOR FIRMS LOCATED IN FOURTH QUARTER
FOR THE PERIOD 92-94

	EARN	EPS	FCF	FCFPS	TCF	TCFPS	DIVID	OCF
EPS	0.444							
FCF	-0.133	0.063						
FCFPS	-0.014	0.186	0.479					
TCF	0.950	0.377	-0.193	-0.022				
TCFPS	0.300	0.674	0.028	0.079	0.436			
DIVID	0.901	0.308	-0.130	-0.045	0.888	0.306		
OCF	0.905	0.360	-0.238	-0.025	0.956	0.371	0.873	
OCFPS	0.165	0.696	0.014	0.060	0.243	0.736	0.197	0.294
RIF	0.752	0.298	-0.277	-0.045	0.826	0.320	0.846	0.824
RIFPS	0.064	0.423	-0.004	-0.066	0.129	0.578	0.200	0.169
CC	-0.019	0.052	0.060	0.116	0.004	0.047	-0.054	-0.001
CCPS	-0.021	0.108	0.142	0.354	-0.013	-0.012	-0.037	0.010
ICF	0.600	0.300	0.232	0.149	0.598	0.282	0.532	0.625
ICFPS	0.086	0.476	0.250	0.533	0.104	0.401	0.084	0.127
NETINT	0.381	0.102	-0.385	-0.066	0.531	0.169	0.469	0.679

	OCFPS	RIF	RIFPS	CC	CCPS	ICF	ICFPS
RIF	0.241						
RIFPS	0.778	0.302					
CC	0.064	-0.085	0.021				
CCPS	0.047	-0.026	-0.041	0.471			
ICF	0.234	0.478	0.118	-0.585	-0.233		
ICFPS	0.590	0.070	0.320	-0.147	-0.293	0.366	
NETINT	0.203	0.645	0.247	-0.133	-0.040	0.386	0.042

The analysis that is presented in this table is the mean correlation coefficient over the years.

476 firms are used for years 1977-1986 and 428 firms for years 1987-1994.

The correlation coefficient is pearson product moment-correlation.

Firm sizes are classified according to the sales value in 1991.

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CHAPTER SIX

EMPIRICAL ANALYSIS: RESEARCH RESULTS

6.1 INTRODUCTION:

This chapter concentrates on the main analysis for this research, and is set out as follows: section two presents statistical descriptions for all the models by pooling all the firms over the years. The regression results for all the firms are presented in section three. The results for annual cross-sectional regression are given in section three. The regression results for different firm size categories are given in section four. Results of the information content tests are given in section five. The incremental information content tests are explained in section six, and the results presented in section seven. Discussion of the results is provided in section eight. Finally, the conclusion is provided in section nine.

6.2 STATISTICAL DESCRIPTION:

In table 6.1 statistical summaries for the pool of all the firms over the years for all [1]the models are presented. It is found that the means for aggregate and disaggregated

[1] The statistical description for each firm size are presented in Appendix (E).

cash flow variables as well as for earning variables are close to zero. The variables collect, OCF, OCFPS, CC, CCPS, ICF, ICFPS, FCFPS and Accruals 1, 2, and 3 have a high standard deviation owing to the presence of extreme observations that can be confirmed from the Min and Max columns. Also, the standard deviation of per share variables is higher than that of aggregate variables because per share variables are not deflated by market value. The mode for finance cash flow components stock and debt are found to be zero and indicate that the firms in this study do not frequently issue stock or debt for cash.

The correlation between cash flow and earnings components with cumulative abnormal returns reveals the followings: earnings, EPS, net interest and return on investment and services of finance exhibit the most significant association with security returns and with signs that are consistent with prior expectations. On the other hand, the least significant correlation exists in finance cash flow components and dividends. The comparison between aggregate cash flow and cash flow per share variables based on their correlation with CAR reveals the following: the correlation was increased for RIF when switched from aggregate to per share basis. However, for other variables the correlation coefficient declined after that switch.

TABLE 6.1
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	-
	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
	ACCRUALS 1	0.017	0.015	0.304	-1.41	1.50	0.064
M2	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
	ACCRUALS 2	0.024	0.014	0.391	-2.863	2.99	0.045
M3	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
	ACCRUALS 3	2.42	0.790	35.18	-190.5	194.9	-0.006
M4	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

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991 for M2 to M5 but for M1 it is from year 1981-1991. The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, Collect is collection from customers, PMT is payments to supplies, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 and 2 is earnings minus net cash flows in model 1 and 2 respectively. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity. The other variables are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, Accruals 3, and EPS is basic earnings per share. All per share variables are in first difference form only.

6.3 REGRESSION RESULTS:

The regression results for all models are given in this section and the analysis is conducted for all the firms regardless of their size. However, the regression results for different firm sizes are presented in the next section. The dependent variable in this analysis is CAR while the independent variables are cash flows and earnings measures. The CAR is based on four months lag and the results for other lags (five and six) are presented in Appendix (A), also the results of all lags are generally the same. The cash flows and earnings measures are in unexpected form after being deflated by market value, however, cash flow per share and EPS variables are in unexpected form only.

6.3.1 DISAGGREGATE CASH FLOW COMPONENTS REGRESSION RESULTS:

The test for the information content of disaggregated cash flow components is based on the association between them and CAR. This analysis is performed by the following: pooled and annual cross-sectional regression for total firms. In sections 6.3.1.1 and 6.3.1.3, the result for the hypotheses of individual coefficients will be described and interpreted and section 6.3.1.2 will focus on testing the hypotheses about groups of regression coefficients.

6.3.1.1 Pooled Data Regression Results:

Disaggregated cash flow components are pooled for an eleven year period from 1981 to 1991 and the regression results are presented in table 6.2. These suggest the following: collect is significant at .001 level which indicates disaggregated operating cash flow components are strongly associated with security returns and have the expected sign. This finding is consistent with theory and with previous empirical research.

In contrast to FASB 95 in U.S., FRS 1 in U.K. requires that return on investment and services of finance (RIF) and tax payment must be presented under two separate headings while in the U.S. these items are included in operating cash flows. RIF consists of net interest and dividend, and it is reported in table 6.2 that net interest is significant at .001 level which indicates net interest is strongly associated with security returns and has a negative sign, which means the market reacts strongly against interest payments. This result is consistent with Livnat and Zarowin 1990 and supports FRS 1's position of presenting net interest as well as dividends under a separate heading. On the other hand, this result is inconsistent with O'Bryan (1992), because he reported insignificant net interest. The dividend coefficient is insignificant. This results is inconsistent with theory and previous empirical research such as Livnat and Zarowin (1990) and by Abeyratna, Lonie, Power, and Sinclair (1993). The theory and previous research suggest that positive market reaction is associated with dividend payment, because the increase in dividend payment is an indication of an increase in future cash flow. After comprehensive investigation into this negative result, the following is found: dividend item number 434, which is used in this research represents the actual cash payment for ordinary and preferred shares during the period. On the other hand, dividend item number 187 represents the dividend amounts that relate to a specific year including dividend announcements for that particular year. When CAR is regressed on dividends item 187 a positive and significant coefficient is found for most years. Therefore, it can be concluded from this investigation that actual dividend payments as reported in FRS 1 did not have any information content and that the information content of dividends is associated with surprise in dividend announcements. Further evidence is given in figure 6.1, this figure presents the result of the following equation:

$$CAR_{it} = \alpha + \beta \text{ Dividend (item No. 434)}_{it+1} + e_{it}$$

FIGURE 6.1
REGRESSION RESULT FOR CAR IN YEAR T ON DIVIDENDS ITEM NO. 434 IN YEAR T+1

Years		$CAR_{it} = \alpha + \beta$ Dividend (item No. 434)$_{it+1}$ $+e_{it}$		
For CAR	For Dividends	T-Ratio	Significant	Adj (R^2)
1981	1982	4.56	***	12.10%
1982	1983	6.83	***	23.50%
1983	1984	2.18	***	2.50%
1984	1985	5.16	***	16.70%
1985	1986	2.42	**	3.20%
1986	1987	2.51	**	3.40%
1987	1988	2.26	**	2.90%
1988	1989	1.16	NS	0.20%
1989	1990	0.83	NS	0.00%
1990	1991	1.16	NS	0.20%

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level and NS Not Significant

This result indicates dividends in year t+1 are significantly associated with abnormal returns in year t which further supports the fact that the cash flow statement suffers from severe timing and matching problems.

Cash tax payments are also insignificant. The reason for this is either that information is irrelevant for the investors and financial report users or the investors can easily generate the tax payment's figures from other accounting numbers. This result is consistent with Livnat and Zarowin (1990) and O'Bryan (1992).

In investing cash flow components two variables are examined: sales of fixed assets and purchase of investment (which includes a cash issue for acquisition). The results in this research exhibit insignificant coefficients for both sale of fixed assets and purchase of investment. This finding is consistent with Mcconnell and Muscarella (1985) and Livnat and Zarowin (1990) and may result from capital investment cash flows being anticipated by investors.

Turning to finance cash flow components, the results show that all the variables are insignificant. This result is inconsistent with theory because Miller and Rock (1985) suggest a negative market reaction is associated with debt issuance. Once again the question of the timing of information flows may be influential.

The accrual variable has a positive coefficient and is significant at 0.001 level which means strong market reaction associated with accruals. This result is consistent with theory and previous empirical research such as Wilson (1986, 1987), Rayburn (1986), and Livnat and Zarowin (1990). The model significance is presented in table 6.2

where Adj R^2 = 5.3% and the F statistic equals 10.16 which is significant at 0.001 level.

TABLE 6.2
ASSOCIATION BETWEEN CAR AND DISAGGREGATE CASH FLOW
SUMMARY OF POOLED REGRESSION RESULTS, 1981-1991

Variables	Estimated Coefficients	T-Ratio	P-Value	R^2	(Adj) R^2	F-Ratio	P-value
Intercept	1.9495	240.32	0.000	5.8%	5.3%	10.16	0.000
COLLECT	0.071	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				
Accrual1	0.10558	3.24	0.001				

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1981-1991.

The variables definitions are: Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 is earnings minus net cash flows in model 1. All the previous variables are in first difference form after being deflated by the beginning-of-the-fiscal year market value of equity.

The Model can be written as

CAR= a_0+a_1 *Collections* + b_2 *Net Interest*+b_2 *Dividends Pmt.* +c_1 Taxes + d_1 *P.Investment* + d_2 *Sale Fixed* + e_1 *Debt* +e_2 *Stock* + f_1 *Accruals1* +e......(M1)

6.3.1.2 Test Of Hypotheses About Groups Of Coefficients:

The test of hypotheses about groups of coefficients is performed by using SHAZAM econometric software which can solve the joint coefficient test in three forms: the T statistic, the F statistic, and the Wald Chi-square statistic, but only F statistic results are reported in table 6.3. The reason for excluding the other tests is that all three tests provide the same conclusions. The test is conducted in a pooled regression for all the firms over an eleven-year period. Table 6.3 reports the hypotheses test, the restriction on the coefficient they imply, the F statistic, and their associated significance levels.

The test of H_1 suggests that the components of financing cash flow have the same association with security returns. This result is not comparable with any previous research because the element of finance cash flow components is unique under FRS1, and because, as explained before, FCF under FASB 95 contains dividend which makes the comparison between this result with any previous study in U.S. invalid.

Turning to the hypothesis of investing cash flow in H_2 we find that the coefficients of investing cash flow components have the same association with security returns and we are unable to reject the null hypotheses.

TABLE 6.3
RESULT OF HYPOTHESES' TEST

Hypotheses	Description of Null Hypotheses	Test	F Statistic	P Value
H_1	Financing cash flow components have identical association with security returns	$e_1 = e_2$	0.3228	0.570
H_2	Investing cash flow components have identical association with security returns	$d_1 = -d_2$	0.0299	0.863
H_3	Return on investment and services of finance components have identical association with security returns	$b_1 = -b_2$	22.317	0.000
H_4	Collect and accruals have identical association with security returns	$a_1 = -f_1$	21.319	0.000

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1981-1991.

The variables definitions are: Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 is earnings minus net cash flows in model 1. All the previous variables are in first difference form after being deflated by the beginning-of-the-fiscal year market value of equity.

The Model can be written as

$$CAR = a_0 + a_1\,\textit{Collections} + b_2\,\textit{Net Interest} + b_2\,\textit{Dividends Pmt.} + c_1\,\text{Taxes} + d_1\,\textit{P.Investment} + d_2\,\textit{Sale Fixed} + e_1\,\textit{Debt} + e_2\,\textit{Stock} + f_1\,\textit{Accruals1} + e \quad\text{......(M1)}$$

Return on investment and services of finance components in H_3 have different associations with security returns and we reject the null hypotheses at .001 level.

Turning to operating cash flow components it is found that it is easy to reject the null hypotheses at .001 level and conclude that collection and accruals have different associations with security returns. This result is consistent with Rayburn (1986), Wilson (1986, 1987) and Bowen et (1987) but it is inconsistent with Livnat and Zarowin (1990).

6.3.1.3 Annual Cross sectional Regression Results:

This part of the analysis is concerned with the investigation of annual cross sectional regression for disaggregated cash flow components. Eleven annual regressions are performed and the results are presented in table B.1 in Appendix (B).

Net interest is significant for nine years at different significance levels with negative signs for all the years. This result is consistent with the findings in the pooled regression results and the same interpretation is applicable.

On the other hand, collect coefficient is significant for only three out of eleven years, but does have a positive sign for most years. The dividend coefficient is insignificant for all but three years. Debt has a significant coefficient for three years with a positive sign. Sales of fixed assets has significant coefficient for four years with mixed signs.

Accruals coefficient is significant for one out of eleven years and has positive signs for most of the years which is consistent with prior expectation. For other disaggregated cash flow variables (tax payment, purchase of investment, and stock) coefficients are insignificant for most of the years and have mixed signs.

The model significance for annual cross sectional regression is presented in table B.1.

It reveals that in 1984 Adj R^2 reached its highest value 20.3%, and F statistic equalled 4.78 which is significant at .01 level. The F statistic is significant at .01 for five years and at .05 level for two years.

These annual results are disappointing. They indicate that there is considerable instability in the cross sectional model and only cash payments on net interest appears to be consistently related to abnormal security returns.

6.3.2 AGGREGATE CASH FLOW AND EARNING REGRESSION RESULTS:

In this part of the analysis the focus is on two models, M2 and M4. The investigation concentrated on the information content of cash flow and earnings variables based on the association between them and security returns.

6.3.2.1 Pooled Regression Results:

Table 6.4 exhibits the following: operating cash flow coefficient is significant at .001 level and has positive sign. This finding is consistent with theory which suggests positive market reaction is associated with operating cash flow. Also, this result is consistent with Rayburn (1986), Wilson (1986, 1987), Bowen, Burgstahler and Daley (1987), Livnat and Zarowin (1990) and Clubb (1993). On the other hand, it is inconsistent with Casey and Bartizak (1984), Board, Day and Walker (1989), Board, Day and Napier (1993) and Ali and Pope (1994).

Return on investment and services of finance (RIF) is significant at .01 level. Thus the net interest payments appear to dominate cash dividend payments when combined into this RIF variable. This is consistent with the timing relevance issue as cash dividend payments are known in advance from dividend announcements whilst cash interest payments are likely to contain new information to investors.

Investing cash flow (ICF) coefficient is significant at .01 level and has a negative sign, which suggests negative market reaction associated with the announcement of new investment. One might expect this if managers engage in negative net present value acquisition to diversify their firms and, indirectly, their own portfolio (Amihud and Lev, 1981). Assiri (1993) found a strong positive relationship between capital expenditure announcements and stock market abnormal returns. Again the issue of timing relevance of cash flow numbers becomes relevant.

The coefficient for finance cash flow is insignificant. This result is consistent with Livnat and Zarowin (1990). The tax payment coefficient is insignificant. Investors can seemingly generate tax payment figures based on the information of other accounting numbers. Therefore, at tax payment information release date, no new information is provided to investors.

The examination of the coefficient of total change in cash reveals a positive sign and it is statistically significant at .001 level. This result is inconsistent with Arnold, Clubb and Wearing (1991).

The accruals coefficient is significant at .001 level with a positive sign. This result is consistent with M1 result and the same interpretation is applied.

The model for cash flow variables is significant at .001 level because the F statistic equals 15.52 and Adj R^2 equals 4.8%.

Turning to earnings in M4 (table 6.5) it is found that, the earning coefficient is positive and significant at .001 level. This result is consistent with theory and with previous empirical research such as that of Livnat and Zarowin (1990), Strong and Walker (1991), Easton (1992) Kothari and Sloan (1992) and others. Therefore, this finding confirms the previous research that earnings have information content. The model is significant at 0.001 level because the F statistic equals 285.49 and Adj R^2 equals 11.2%.

TABLE 6.4
ASSOCIATION BETWEEN CAR AND CASH FLOW DATA
SUMMARY OF POOLED REGRESSION RESULTS, 1978-1991

Variables	Estimated Coefficients	T-Ratio	P-Value	R^2	(Adj) R^2	F-Ratio	P-value
α	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	0.16596	3.93	0.000				
Accruals 2	0.228	6.71	0.000				

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991.

The variables definitions are: OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, Accruals 2. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = g_0 + g_1 OCF + g_2 RIF + g_3 TCF + g_4 ICF + g_5 FCF + g_6 CC + h_7 Accruals\ 2 + e$...(M2)

TABLE 6.5
ASSOCIATION BETWEEN CAR AND EARNING DATA
SUMMARY OF POOLED REGRESSION RESULTS, 1978-1991

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

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991.

EARN is net income before extraordinary items and discontinuing of the operation, and it is in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR=I_0+I_1EARN+e$ ....(M4)

6.3.2.2 Annual Cross sectional Regression Results:

This section is an extension of the previous section and it presents the association between aggregate cash flows and earnings with security returns on yearly regression for all firms. The results are reported in table B.5 in Appendix (B).

Consistent with the pooled regression results OCF is significant for ten out of fourteen years with a positive sign. Previous empirical research found contradictory results about the information content of operating cash flow. The result of this research confirms that operating cash flow has an information content based on its association with security returns.

The coefficient for return on investment and services of finance is significant for eleven out of fourteen years with negative signs for all the years, and that confirms the pooled regression results.

There is a significant difference over time for investing cash flow. The coefficient is found significant for ten years but for other years it is insignificant and has mixed signs for most of the years. This is consistent with the significance of the pooled regression results.

The finance cash flow coefficient is significant for ten out of the fourteen years. The coefficients are positive over the years. The pooled regression result for FCF indicates an insignificant coefficient while in yearly regressions it is significant for most of the years. The accruals coefficient is positive and statistically significant for eleven years. This result confirms the pooled regression result.

The tax payment coefficient is generally insignificant and supports the pooled regression results. On the other hand change in total cash coefficient is insignificant for most of the years as found by Arnold *et.al* (1991) but contrary to the pooled regression results. Turning to model significance as reported in table B.5, it is found that Adj R^2 reaches its maximum value 29.4% in 1984 and the F statistic is significant at .01 level for twelve out of fourteen years.

The examination of the earnings in table B.13 in Appendix (B), indicates that it has a positive coefficient and is statistically significant at .001 level for all but two of the years. This finding is consistent with theory and previous empirical research. The model is significant at .001 level for most of the years and Adj R^2 reached its highest value 34.6% in 1984.

6.3.3 CASH FLOW PER SHARE AND EARNING PER SHARE:

This section will examine the association between cash flow per share and EPS variables with security returns.

6.3.3.1 Pooled Regression Results:

The results of cash flow per share variables are not significantly different from those of aggregate cash flow variables. RIFPS, ICFPS and accruals 3 are all significant as are RIF, ICF and accruals 2. Equally FCFPS and TCFPS are insignificant as are FCF and TCF. However, on a per share basis both OCF and CC lose their significance.

The F statistic equals 12.81 which is significant at .001 level and Adj R^2 equals 4.0% (table 6.6).

Turning to EPS in model 5 the results in table 6.7, show that the EPS coefficient is significant at .01 level and has a positive sign. This is consistent with theory and previous empirical research such as that of Steven and Rice (1978), Belkaoui (1983), Foster (1973) , and Kothari and Zimmerman (1993).

TABLE 6.6
ASSOCIATION BETWEEN CAR AND CASH FLOW PER SHARE DATA
SUMMARY OF POOLED REGRESSION RESULTS, 1978-1991

Variables	Estimated Coefficients	T-Ratio	P-Value	R^2	(Adj) R^2	F-Ratio (P-value)	Cash Flow Results		
							Var	Coef	P-Value
α	0.987	155.47	0.000	4.3%	4.0%	12.81 (0.000)	α	2.33	0.000
OCFPS	0.00044	1.03	0.302				OCF	0.170	0.000
RIFPS	-0.0188	-8.92	0.000				RIF	-1.286	0.000
ICFPS	-0.00062	-2.75	0.006				ICF	-0.109	0.000
FCFPS	0.0000869	0.25	0.803				FCF	0.0313	0.499
TCFPS	0.001675	1.01	0.313				TCF	-0.0727	0.638
CCPS	0.000643	1.60	0.109				CC	0.166	0.000
Accruals 3	0.00061	2.26	0.024				Accruals 2	0.228	0.000

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions are: OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, and Accruals 2 is earnings minus net cash flows in model 2 respectively. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity. The other variables are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and Accruals 3. All per share variables are in first difference form only.

The model can be written as:

$CAR = g_0 + g_1 OCF + g_2 RIF + g_3 TCF + g_4 ICF + g_5 FCF + g_6 CC + g_7$ Accruals 2 + e...(M2)

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

TABLE 6.7
ASSOCIATION BETWEEN CAR AND EPS DATA
SUMMARY OF POOLED REGRESSION RESULTS, 1978-1991

Variables	Estimated Coefficients	T-Ratio	P-Value	R^2	(Adj) R^2	F-Ratio	P-Value
Intercept	2.18116	310.09	0.000	5.3%	5.2%	114.68	0.000
EPS	0.01531	10.71	0.000				

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991.

EPS is earnings per share in unexpected form only.

The model can be written as:
$CAR = j_0+j_1EPS+e$ ....(M5)

6.3.2.2 Annual Cross Sectional Regression:

Once again the annual regressions indicate a significant amount of instability (see table B.9 in Appendix (B)). The pooled regression results are largely confirmed for RIFPS, ICFPS, CCPS and accruals whilst OCFPS is significant for nine out of the fourteen years and FCFPS is statistically significant for ten out of fourteen years with a positive sign for most of the years. TCFPS exhibits a significant coefficient for eight out of the fourteen years but with mixed signs.

Turning to EPS in Model 5 (table B.17 in Appendix (B)): it has a significant coefficient for most of the years at .01 level, and has a positive coefficient for all the years. Adj R^2 reached its maximum value 20.9% in 1991.

6.4 REGRESSION RESULTS FOR DIFFERENT FIRM SIZES:

The analyses carried out in the earlier section is now repeated for three different size grouping. These were achieved by splitting the sample into three sized groups based on 1991 sales levels producing the three sub groups of small, medium and large firms. The sales cut off are the following: the sales values are from 23,336,000 to 204,694,000 for small firms, from 211,250,000 to 899,500,000 for medium firms and [1] from 1,912,000,000 to 41,267,000,000 for large firms.

The assessment of different returns windows is given in section 4.4.1 and it is found that for cash flow models four month lag is relevant for large firms, five month lag is suitable for medium firms and six month lag is relevant for small firms. Thus, based on this the results reported in this section are in that order and each size category has a different lag for cash flow models whilst earnings models are according to a four month lag.

The pooled regression results are presented in tables 6.8 to 6.12, and the annual cross-sectional regression results for different firm sizes are presented in Appendix (B).

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[1] There are 22 firms which is excluded from the sample that located between medium and large firms and their sales values are extended from 949,900,000 to 1,785,000,000. The reason for excluding these firms is because they exhibit the same result as in medium firms and if they included in large firms they effect the large firm result.

6.4.1 DISAGGREGATE CASH FLOW COMPONENTS REGRESSION RESULTS:

6.4.1.1 Pooled Regression Results:

The pooled regression results for different firm sizes are presented in table 6.8, and reveal little difference between the size groups except that collect has a positive and statistically significant coefficient for medium and large firms at .05 and .01 levels respectively and accruals is only significant for medium sized firms.

6.4.1.2 Annual Cross-Sectional Regression Results:

From table B.2 in Appendix (B) in small firms, it is found that the pooled regression results are largely confirmed by the annual results. The same is largely true for medium firms also. However, the collect variable is consistently insignificant in the annual regressions whilst it is significant in the pooled results and a similar pattern emerges for accruals 1. For the large firms a similar pattern emerges for collect and net interest whilst the insignificance of accruals 1 is confirmed by the annual regressions. The limited number of observations for each size might explain the instability of the results as compares to pooled regression results. There are 52 firms each year for small and medium firms whilst there are 30 firms for large firms. These divisions are necessary to detect the relevant firm size group.

TABLE 6.8
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 1

Variables	Small firms		Medium firms		Large Firms		All Firms	
	Coef. (T-Ratio)	Significant	Coef. (T-Ratio)	Significant	Coef. (T-Ratio)	Significant	Coef (T-Ratio)	Significant
Collect	0.02827 (0.69)	NS	0.08044 (2.17)	**	0.1169 (3.32)	***	0.071 (4.65)	***
Net interest	-1.476 (-2.00)	**	-4.4021 (-5.67)	***	-2.364 (-3.29)	***	-2.6103 (-8.39)	***
Dividends	-1.474 (-1.04))	NS	0.355 (1.469)	NS	-1.014 (-0.66)	NS	-0.7473 (-1.25)	NS
TCF	0.3864 (1.17)	NS	-0.2691 (-0.58)	NS	-0.153 (-0.35)	NS	-0.0561 (-0.36)	NS
S.FIXED	0.2949 (1.13)	NS	-0.0888 (-0.27)	NS	-0.0564 (-0.13)	NS	0.0289 (0.24)	NS
P.Invest	-0.1060 (-0.84)	NS	-0.0492 (-0.35)	NS	0.0559 (0.43)	NS	-0.00744 (-0.14)	NS
Stock	0.1638 (0.72)	NS	-0.0491 (-0.26)	NS	-0.1421 (-0.59)	NS	0.0044 (0.05)	NS
Debt	-0.1209 (-0.92)	NS	-0.0531 (-0.43)	NS	0.0355 (0.30)	NS	0.05515 (1.14)	NS
Accruals	0.0892 (1.03)	NS	0.11248 (1.59)	*	-0.0178 (-0.17)	NS	0.10558 (3.24)	***
F- Statis	1.56	NS	4.52	***	2.01	*	10.16	***
Adj R^2	1.0%		6.3%		3.0%		5.3%	

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms for large and all firms regression. For medium firms, it is from June to May for and for small firms it is from July to June. The sample consists of 156 firms covering the period from 1981-1991. The number of the firm-year observations for each group are 728, 728 and 420 for small, medium and large firms respectively.

The variables definitions are: Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 is earnings minus net cash flows in model 1. All the previous variables are in first difference form after being deflated by the beginning-of-the-fiscal year market value of equity.

The firm sizes classification is according to sales value in 1991.

The Model can be written as

$$CAR= a_0+a_1\ \textit{Collections} + b_2\ \textit{Net Interest}+b_2\ \textit{Dividends Pmt.}+c_1\ \text{Taxes} + d_1\ \textit{P.Investment} + d_2\ \textit{Sale Fixed} + e_1\ \textit{Debt} +e_2\ \textit{Stock} + f_1\ \textit{Accruals1} +e \text{......(M1)}$$

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level and NS Not Significant

6.4.2 AGGREGATE CASH FLOW AND EARNING REGRESSION RESULTS:

6.4.2.1 Pooled Regression Results:

The pooled regression results for different firm sizes are presented in table 6.9 and 6.10 for M2 and M4 respectively. For M2, differences arise in RIF where significance for small and medium companies is lost for large firms; ICF and CC where the coefficients are insignificant for small firms and FCF where the coefficient is only significant for small firms. OCF is confirmed as containing information content for the security market for all firm sizes. Turning to M4, it is significant at .01 level for all firm sizes, and Adj (R^2) equals 11.9%, 15.4% and 4.2% for small, medium and large firms respectively.

6.4.2.2 Annual Cross-Sectional Regression Results:

The results of the annual cross-sectional regression are presented in table B6-B8 and B14-B16 (in Appendix (B)) for M2 and M4 respectively.

Instability is, once again, the main feature of the cash flow models. Whilst OCF is significant for the pooled regression results for all three size categories only in the minority of years is this variable significant. TCF is insignificant for pooled size categories and the vast majority of individual years.

TABLE 6.9
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 2

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	Coef. (T-Ratio)	Sig[a]	Coef. (T-Ratio)	Sig	Coef. (T-Ratio)	Sig	Coef. (T-ratio)	Sig
OCF	0.123 (2.46)	**	0.13288 (2.39)	**	0.229 (1.81)	*	0.170 (3.63)	***
RIF	-0.586 (-2.25)	**	-1.1944 (-4.36)	***	-0.458 (-1.18)	NS	-1.286 (-6.21)	***
ICF	-0.0239 (-0.71)	NS	-0.08016 (-2.04)	**	-0.152 (-1.97)	**	-0.1088 (-3.60)	***
FCF	0.118 (2.00)	**	-0.01915 (-0.32)	NS	0.182 (1.62)	NS	0.0313 (0.68)	NS
CC	0.054 (1.31)	NS	0.1166 (2.05)	**	0.252 (2.09)	**	0.166 (3.93)	***
TCF	0.145 (0.96)	NS	-0.2398 (-1.06)	NS	-0.201 (-0.59)	NS	-0.0727 (-0.47)	NS
Accruals 2	0.133 (3.76)	***	0.141 (3.16)	***	0.227 (2.38)	**	0.228 (6.71)	***
F-Statis	4.09	***	6.13	***	2.18	**	15.52	***
Adj R^2	3.2%		5.1%		2.1%		4.80%	

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms except for small firms it is from July to June window and medium firms it is from June to May.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. The number of the firm-year observations for each group are 728, 728 and 420 for small, medium and large firms respectively.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, Accruals 2. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR= g_0+g_1OCF+g_2RIF+g_3TCF+g_4ICF+g_5FCF+g_6CC+h_7Accruals\ 2 + e$...(M2)

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level, NS Not Significant and a Significant

TABLE 6.10
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 4

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	(T-Ratio)	Sig	(T-Ratio)	Sig	(T-Ratio)	Sig	(T-Ratio)	Sig
EARN	9.58	***	11.18	***	4.31	***	308.5	***
F-Statis	91.86	***	124.99	***	18.55	***	258.5	***
Adj R^2	11.9%		15.4%		4.2%		11.20%	

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. The number of the firm-year observations for each group are 728, 728 and 420 for small, medium and large firms respectively.

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

EARN is net income before extraordinary items and discontinuing of the operation, and it is in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = I_0 + I_1 EARN + e$ ....(M4)

* Significant at .10 level
** Significant at .05 level
*** Significant at .01 level
NS Not Significant

6.4.3 CASH FLOW PER SHARE AND EARNING PER SHARE:

6.4.3.1 Pooled Regression Results:

Pooled regression analysis was performed for model 3 for each of the 3 groups of firm size and the results are presented in table 6.11. It is found that OCFPS and FCFPS coefficients are insignificant for all firm sizes in agreement with the pooled results. The coefficient for RIFPS is negative and statistically significant at .01 level for all sizes. ICFPS has a negative coefficient which is statistically significant at .10 level for small and medium firms. TCFPS and accruals have significant coefficients with positive signs for small firms. Also, CCPS coefficient is positive and statistically significant at .05 level for large firms. For model 5, it is found that pooled regression results for each size reveals a positive coefficient which is statistically significant at .01 level for EPS.

6.4.3.2 Annual Regression Results:

The instability is, once again, the main feature of cash flow per share models. It is found that the coefficient for OCFPS in pooled results for all three size categories is insignificant whilst annual cross-sectional regression for medium firms reveals significant coefficients for eight years (table B.11).

TABLE 6.11
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 3

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	Coef. (T-Ratio)	Sig[a]	Coef. (T-Ratio)	Sig	Coef. (T-Ratio)	Sig	Coef. (T-Ratio)	Sig
OCFPS	0.0011 (1.45)	NS	0.0004 (0.64)	NS	-0.0007 (-0.84)	NS	0.00044 (1.03)	NS
RIFPS	-0.0133 (-3.50)	***	-0.0212 (-6.38)	***	-0.0077 (-2.04)	**	-0.0188 (-8.92)	***
ICFPS	-0.00079 (-1.76)	*	-0.0007 (-2.05)	**	-0.00001 (-0.02)	NS	-0.0006 (-2.75)	***
FCFPS	0.00085 (1.32)	NS	0.0003 (0.51)	NS	-0.0009 (-1.43)	NS	0.000087 (0.25)	NS
CCPS	0.00022 (0.32)	NS	-0.00028 (-0.43)	NS	0.0016 (2.15)	**	0.00643 (1.60)	NS
TCFPS	0.0052 (2.09)	**	-0.0027 (-0.94)	NS	0.002 (0.64)	NS	0.001675 (1.01)	NS
Accruals 3	0.0011 (2.05)	**	-0.00003 (0.07)	NS	-0.0002 (-0.44)	NS	0.00061 (2.26)	**
F-Statis	3.22	***	6.97	***	1.93	*	12.81	***
Adj R^2	2.3%		6.0%		1.6%		4.0%	

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms except for small firms it is from July to June window and for medium firms it is from June to May.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. The number of the firm-year observations for each group are 728, 728 and 420 for small, medium and large firms respectively.

The variables definitions are: OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and Accruals 3. All the variables are in first difference form only.

The model can be written as:

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

* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level,
NS Not Significant
a Significant

TABLE 6.12
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 5

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	Coef. (T-Ratio)	Sig[a]	Coef. (T-Ratio)	Sig	Coef. (T-Ratio)	Sig	Coef. (T-Ratio)	Sig
EPS	0.024 (7.63)	***	0.0158 (6.47)	***	0.0117 (5.06)	***	0.0153 (10.71)	***
F-Statis	58.15	***	41.83	***	25.64	***	114.7	***
Adj R^2	7.7%		5.6%		4.0%		5.2%	

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. The number of the firm-year observations for each group are 728, 728 and 420 for small, medium and large firms respectively.

EPS is earnings per share in unexpected form only.

The model can be written as:
$CAR = j_0 + j_1 EPS + e$ ....(M5)
* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level
NS Not Significant
a Significant

6.4.4 COMPARISON AMONG THE MODELS FOR DIFFERENT FIRM SIZES:

The comparison among the models for different firm sizes gives more insight about the importance of accounting information. This importance can be perceived from the explanatory power of the models for each group as presented in table 6.13.

TABLE 6.13
THE EXPLANATORY POWER OF
MODELS 1, 2, 3, 4 and 5

Regression Form	Adj R^2				
	M1	M 2	M 3	M 4	M 5
Pooled Regression	5.30%	4.80%	4.00%	11.20%	5.20%
Mean of Annual Cross Sectional Regression (Total Firms)	7.18%	12.07%	8.65%	11.88%	8.33%
Mean of Annual Cross Sectional Regression (Small Firms)	6.04%	12.51%	11.74%	12.51%	11.98%
Mean of Annual Cross Sectional Regression (Medium Firms)	11.04%	14.01%	11.09%	14.89%	10.10%
Mean of Annual Cross Sectional Regression (Large Firms)	12.38%	10.06%	8.82%	12.22%	8.60%

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991.

The models can be written as:

CAR= $a_0 + a_1$ *Collections* $+ b_1$ *Net Interest* $+ b_2$ *Dividends Pmt.* $+ c_1$ *Taxes* $+ d_1$ *P.Investment* $+ d_2$ *Sale Fixed* $+ e_1$ *Debt* $+ e_2$ *Stock* $+ f_1$ *Accruals1* + e..(M1)

CAR= $g_0+g_1OCF+g_2RIF+g_3TCF+g_4ICF+g_5FCF+g_6CC+g_7$ Accruals 2 + e..(M2)

CAR = $I_0+I_1EARN+e$ ....(M4)

CAR= $h_0+h_1OCFPS+h_2RIFPS+h_3TCFPS+h_4ICFPS+h_5FCFPS+$ $h_6CCPS+h_7$ Accruals 3 + e..(M3)

CAR = j_0+j_1EPS+e ....(M5)

The comparison between small and large firms in table 6.13 reveals the following: the association between security returns and cash flows and earnings is higher for medium and small firms than for large firms (except M1 result). These findings support the argument that investors in small firms depend heavily on the financial report as a source of information more than investors in large firms. This confirms that cash flow data have more potential information value for medium and small firms than for large firms. These results are consistent with the prior finding by Lee (1992). He reported a stronger volume reaction for small firms than for large firms on earnings' announcement day. Pope and Inyangete (1992) reported sharp increases in stock return variability for small firms but it was less for large firms at earnings' announcement day. Therefore, the investors in large firms might have alternative sources of information, because at the time of release of the financial reports, some of their information is already in the market.

6.5 SUMMARY FOR INFORMATION CONTENT RESULTS:

The previous sections examine the association between cash flow and earnings variables with abnormal returns. The analysis is conducted in pooled data as well as in annual cross sectional regression for different firm size. The summary is presented in table 6.14

First, for disaggregate cash flow components it is found that collect, net interest and accruals have a significant coefficients for pooled regression for total firm group. On the other hand, yearly regressions for small firms suggest that net interest coefficient is significant for three years while other disaggregate cash flow components are insignificant for most of the years. Also, medium firms have similar results to those of small firms except that debt is more important because it has a significant coefficient for two years. Turning to large firms, it is found that the net interest coefficient is insignificant for most of the years but with a negative sign. This result contradicts the findings in small and medium firms. However, the interpretation for that phenomenon is that the investors in large firms have another source of information besides the annual reports. Therefore, no market surprise is expected with respect to net interest information release. On the other hand, the investors in small and medium firms are heavily dependent on financial reports as

TABLE 6.14: SUMMARY FOR THE INFORMATION CONTENT REGRESSION RESULTS

Model	Var	Annual Cross-sectional Regression for all Firms														Pooled Regression for Different Firm Sizes			Pooled Regression for all Firms
		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	Small	Medium	Large	
M1	COLLECT	NA	NA	NA	•	NS	•	•••	NS	NS	NS	NS	NS	NS	NS	NS	••	•••	•••
	NETINT	NA	NA	NA	•••	••	••	•••	•	NS	•	NS	•••	•••	••	•••	•••	•••	•••
	DIVID	NA	NA	NA	NS	NS	NS	••	NS	NS	•	NS	NS	••	NS	NS•	NS	NS	NS
	TCF	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	S.FIXED	NA	NA	NA	NS	••	NS	•	NS	NS	•	NS	NS	NS	•	NS	NS	NS	NS
	P.INVS	NA	NA	NA	NS	NS	NS	NS	NS•	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	STOCK	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	DEBT	NA	NA	NA	NS	NS	NS	•	NS	NS	NS	••	NS	NS	•	NS	NS	NS	NS
	ACCRUALS	NA	NA	NA	NS	NS	NS	NS	NS	NS	••	NS	NS	•••	NS	NS	••	NS	•••
M2	OCF	•••	NS	••	•••	•••	•••	•••	•••	•••	NS	NS	•••	NS	•••	••	••	•	•••
	RIF	••	•	•••	•••	NS	•••	NS	NS	••	•••	•	•••	••	•••	•••	•••	NS	•••
	ICF	•••	NS	NS	••••	••	•••	•••	••	••	••	NS	••	NS	•••	NS	••	••	•••
	FCF	•••	NS	••	•••	••	•••	•••	••	••	NS	NS	••	NS	•••	••	NS	NS	NS
	TCF	NS	NS	NS	•	•	NS	NS	NS	NS	NS	NS	NS	NS	•••	NS	NS	NS	NS
	CC	NS	NS	•••	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	••	••	•••
	ACCRUALS 2	•••	•	•••	•••	•••	•••	•••	•••	••	NS	NS	•••	NS	•••	•••	•••	••	•••
M3	OCFPS	•••	•••	NS	•••	•••	••	•••	NS	NS	NS	•	••	NA	•••	NS	NS	NS	NS
	RIFPS	•••	•••	•••	•••	••	••	•••	NS	NS	••	•	•••	•••	•••	•••	•••	••	•••
	ICFPS	NS	NS	NS	•••	•••	•••	••	NS	NS	••	••	••	NS	•••	•	•	NS	•••
	FCFPS	•••	••	••	•••	•••	••	•••	NS	NS	NS	••	••	NS	•••	NS	NS	NS	NS
	TCFPS	NS	••	••	NS	•••	•	•••	NS	••	••	NS	•	NS	•••	••	NS	NS	NS
	CCPS	NS	•	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	••	NS
	ACCRUALS 3	•••	•••	••	•••	•••	•••	•••	NS	NS	NS	••	•••	NS	•••	••	NS	NS	••

Model	Var	Annual Cross-sectional Regression for all Firms														Pooled Regression for Different Firm Sizes			Pooled Regression for all Firms
		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	Small	Medium	Large	
M4	EARN	***	***	***	***	***	***	***	***	***	NS	***	***	*	***	***	***	***	***
M5	EPS	***	***	***	***	***	***	***	*	***	*	***	***	NS	***	***	***	***	***

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms except for small firms it is from July to June window for M2 and M3 only.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. The number of the firm-year observations for each group are 728, 728 and 420 for small, medium and large firms respectively.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 and 2 is earnings minus net cash flows in model 1 and 2 respectively. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity. The other variables are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, Accruals 3, and EPS is basic earnings per share. All per share variables are in first difference form only.

The models can be written as:

$CAR = a_0 + a_1$ *Collections* $+ b_1$ *Net Interest* $+ b_2$ *Dividends Pmt.* $+ c_1$ *Taxes* $+ d_1$ *P.Investment* $+ d_2$ *Sale Fixed* $+ e_1$ *Debt* $+ e_2$ *Stock* $+ f_1$ *Accruals1* $+ e$..(M1)

$CAR = g_0 + g_1 OCF + g_2 RIF + g_3 TCF + g_4 ICF + g_5 FCF + g_6 CC + g_7$ Accruals 2 $+ e$..(M2)

$CAR = I_0 + I_1 EARN + e$ ....(M4)

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

$CAR = j_0 + j_1 EPS + e$ ....(M5)

NA= Not Available, NS=Not Significant, ***Significant at .01 level, **Significant at .05 level, * significant at .1 level a source of information. In addition there might be another reason in that difference relates to risk matters and debt capacity, because small firms are more risky and have less debt capacity than large firms. Therefore the market reacts unfavourably to increasing net interest for small firms. However, large firms have a better debt capacity than small firms which might result in an insignificant coefficient for net interest. These interpretations are applicable for some years only in yearly regression for large firms. Also, there is another difference between large and small firms relating to stock issue. It is found that the stock issue coefficient is insignificant for small and medium firms whilst for large firms it is significant for three years with mixed signs.

The association between cash flows and earnings with abnormal returns reveals the following: pooled regression results suggest that the operating cash flow coefficient (OCF) is significant and has a positive sign. The coefficients for return on investment and services of finance (RIF) and investing cash flow (ICF) are significant and have negative signs. Tax payment (TCF) and financing cash flow (FCF) have insignificant coefficients. Change in cash (CC) and accruals 2 have positive-significant coefficients. Turning to earnings, it has a positive and significant coefficient.

Annual cross sectional regressions for cash flow variables reveal that, for total firms TCF and CC have insignificant coefficients for most of the years. On the other hand, the coefficients for OCF, FCF, RIF, ICF and accruals 2 are significant for most of the years. Next, the earnings coefficient is significant at .01 level for most of the years. In small firms, similar results were found as in total firms except that the number of significant coefficients is much lower. For medium firms, the OCF coefficient is significant with positive signs for four years, and ICF coefficient is significant for four years with mixed signs. Also, the FCF coefficient is significant for three years with positive signs. RIF has a significant coefficient for four years with a negative sign. Accruals 2 coefficient is significant for 5 years with a positive sign. Turning to earnings: it has a significant coefficient with positive signs for most of the years. For large firms, RIF coefficient is significant for three years and OCF coefficient is significant for three years while the other cash flow variables are insignificant for most of the years. FCF coefficient is significant for three years. Earnings has a significant coefficient for most of the years.

The examination of the association between cash flow per share and security returns indicates similar results as in cash flow variables for both pooled regression and yearly regressions. (Except for operating cash flow per share coefficient (OCFPS) and CCPS where they become insignificant with a positive sign in pooled regression only). Therefore, these results suggest that cash flow per share has information content similar to the information content in aggregate cash flow. Also, these results confirm that cash flow per share variables are not superior to cash flow variables in explaining the variation in security returns. EPS has a positive and significant coefficient in both pooled regression and in yearly regression.

Next, a joint hypotheses test for a group of coefficients is performed. The results from this test suggest financing cash flow components have identical associations with security returns. However, return on investment and services of finance components have different associations with security returns. On the other hand, the null hypotheses about investing cash flow components cannot be rejected, and the claim that investing cash flow components have identical associations with security returns is confirmed. Finally, collect and accruals have different associations with security returns.

6.6 THE INCREMENTAL INFORMATION CONTENT RESULTS:

The analysis in this part of the study will concentrate on the incremental information content of cash flow and cash flow per share beyond earnings and EPS. Also, it will investigate the incremental information content of cash flow per share over cash flow variables. This analysis is conducted in annual cross-sectional regression form for all of the firms. The results for this part of the analysis are based on testing null hypotheses H_5 to H_{12} and they are reported in table 6.15 to 6.22.

H_5: Cash flow per share variables have no incremental explanatory value over cash flow variables.

The results from table 6.15, suggest that cash flow per share variables do not contain any incremental information content beyond cash flow variables.

H_6: Cash flow variables have no incremental explanatory value over cash flow per share variables.

Table 6.16 reveals that, cash flow variables do not have any incremental information content over cash flow per share variables except in a few cases, such as in operating cash flow which is significant at .01, .05 and .05 levels for 1978, 1981 and pooled regression result respectively. Also, tax cash flow and change in cash are significant for 1984 and 1978 respectively. Therefore, the null hypothesis can be rejected for these cases only, while for other cases and most of the years it cannot be rejected. From the results of testing H_5 and H_6 it can be concluded that cash flow and cash flow per share have similar information content, and neither one can provide different information from the other.

H_7 : Cash flow variables have no incremental explanatory value over earnings.
The null hypothesis can be rejected at different significant levels in 1980 and 1986 for operating cash flow, in 1986 for investment cash flow, and in 1978, 1980, 1991 for change in cash (Table 6.17). However, in general and for the pooled results it can be concluded that cash flow variables have no incremental information value beyond earnings. This result is consistent with Board, Day and Walker (1989).

H_8 : Earnings has no incremental explanatory value over cash flow variables.
The results from table 6.18, suggest that the null hypothesis for all the variables over most of the fourteen years can be rejected at .01 level. Therefore, it is confirmed that earnings do indeed contain incremental explanatory value over cash flow variables either individually or taken together (table 6.22). This result is consistent with Bowen *et.al.*(1987) and Board, Day and Walker (1989).

H_9 : Cash flow per share variables have no incremental explanatory value over EPS.

The results of testing this hypothesis are reported in table 6.19, and suggest similar results to these for H_7, whilst some cash flow variables are significant in a few years the overwhelming evidence supports the conclusion that cash flow per share does not reveal any incremental information content beyond EPS.

H_{10} : EPS has no incremental explanatory value over cash flow per share variables.

The null hypothesis can be rejected for most of the cases and EPS does indeed have incremental information value over all cash flow variables for most of the years. EPS even has further explanatory power beyond the cash flow per share variables taken together (table 6.22).

H_{11} : Earnings has no incremental explanatory value over EPS.

The results of the test for this hypothesis are reported in table 6.21, and suggest that earnings contain incremental explanatory value beyond EPS for seven years out of fourteen and four of them at .01 level. The null hypothesis can be rejected in the pooled regression form.

H_{12} : EPS has no incremental explanatory value over earnings.

From table 6.21, the null hypothesis can be rejected for three years and for the pooled regression. Thus EPS has incremental explanatory value over earnings for a few years only. These results further supports the conclusion drawn from hypothesis 11.

6.7 SUMMARY FOR THE INCREMENTAL INFORMATION RESULTS:

The analysis in this part of the research investigates the incremental information content of cash flow and earnings in comparison with the incremental information content of cash flow per share and EPS.

The results of this investigation provide evidence about the superiority of earnings to both EPS and cash flow variables in explaining the variation in security returns. Also, EPS reveals incremental explanatory value beyond earnings for some years. On the other hand, cash flow per share does not reveal any incremental information content beyond that contained in cash flow variables. Also, cash flow variables do not exhibit any incremental information content beyond that contained in cash flow per share variables. This result confirmed that cash flow and cash flow per share variables convey similar information. Furthermore, earnings has incremental explanatory power beyond that contained in all cash flow variables, while cash flow variables do not reveal any incremental information content beyond that contained in earnings. This result is consistent with Bowen *et.al.* (1987) and Board, Day and Walker (1989).

As shown in table 6.22, cash flow variables taken together did not exhibit any incremental information content beyond that contained in earnings. Also, cash flow per share variables taken together did not reveal any incremental information content beyond that contained in EPS.

TABLE 6.15
TEST FOR THE INCREMENTAL INFORMATION CONTENT OF CASH FLOW PER SHARE OVER CASH FLOW VARIABLES
COEFFICIENT
(T-RATIO)

Year	OCFPS v OCF	RIFPS v RIF	ICFPS v ICF	FCFPS v FCF	TCFPS v TCF	CCPS v CC
1978	-0.002 (-0.53)	-0.022 (-1.15)	-0.0055 (-0.47)	0.0018 (0.26)	0.024 (1.53)	-0.0025 (-0.81)
1979	0.0068 (1.62)	-0.045 (-3.06)	-0.0125 (-0.93)	-0.00066 (-0.12)	-0.0033 (-0.26)	0.0058 (1.93)*
1980	-0.0001 (-0.03)	-0.021 (-1.82)	0.0018 (0.69)	-0.0028 (-0.83)	0.0226 (1.44)	0.0025 (0.82)
1981	-0.0017 (-0.76)	-0.019 (-1.26)	-0.00056 (-0.20)	-0.0045 (-1.63)	-0.0141 (-1.14)	0.0015 (0.73)
1982	0.002 (0.84)	0.0007 (0.04)	0.0013 (0.54)	0.0019 (0.52)	0.0204 (1.80)*	0.00588 (2.66)***
1983	0.00058 (0.20)	-0.0088 (-0.60)	-0.00021 (-0.08)	-0.0007 (-0.24)	-0.0050 (-0.44)	-0.0027 (-1.06)
1984	0.001 (0.38)	-0.042 (-2.29)	0.0039 (1.63)	0.0026 (1.03)	-0.007 (-0.54)	0.0017 (0.64)
1985	0.0013 (0.57)	-0.0157 (-1.09)	-0.00027 (-0.11)	-0.0004 (-0.20)	-0.0041 (-0.46)	0.00065 (0.28)
1986	-0.0001 (-0.06)	0.0085 (0.62)	0.0014 (1.10)	-0.002 (-1.02)	0.016 (1.71)*	-0.0043 (-2.45)
1987	-0.003 (-1.29)	-0.028 (-2.53)	-0.0024 (-1.99)	0.0001 (0.04)	0.0258 (1.95)*	-0.0012 (-0.68)
1988	-0.004 (-1.98)	-0.0045 (-0.34)	0.0002 (0.16)	-0.00188 (-0.75)	0.01 (0.97)	-0.0025 (-1.64)
1989	-0.0023 (-1.65)	-0.0168 (-1.80)	0.00068 (0.65)	-0.0015 (-1.14)	-0.0026 (-0.37)	-0.0032 (-2.33)
1990	0.002 (1.42)	-0.008 (-0.85)	-0.0002 (-0.22)	0.0022 (1.44)	-0.006 (-1.02)	0.00089 (0.75)
1991	0.0013 (0.88)	0.0006 (0.09)	0.0012 (1.08)	0.001 (0.57)	0.0025 (0.42)	0.001 (0.81)
Pooled Regression	-0.00105 (-1.86)	-0.0217 (-6.76)	0.007 (1.80)*	0.002 (0.40)	-0.0018 (-0.72)	-0.0001 (-0.20)

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, and CC is change in cash. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity. The other variables are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, and CCPS is change in cash per share. All per share variables are in first difference form only.

The T ratios and estimated coefficients (β) based on the results of the third equation as explained in chapter four. $U_{it}=\alpha+\beta e_{it}+\mu_{it}$

* Significant at 10 % level, ** Significant at 5 % level., and *** Significant at 1 % level.

TABLE 6.16
TEST FOR THE INCREMENTAL INFORMATION CONTENT OF CASH FLOW OVER CASH FLOW PER SHARE VARIABLES
COEFFICIENT
(T-RATIO)

Year	OCF v OCFPS	RIF v RIFPS	ICF v ICFPS	FCF v FCFPS	TCF v TCFPS	CC v CCPS
1978	0.215 (2.02)***	-0.29 (-0.63)	-0.08 (-0.26)	0.1667 (0.84)	-0.1477 (-0.51)	0.147 (2.18)**
1979	-0.16 (-0.95)	-0.58 (-0.86)	0.079 (0.15)	-0.09 (-0.33)	-0.393 (-0.98)	0.07 (0.68)
1980	0.26 (1.65)	-0.16 (-0.37)	-0.2765 (-2.05)	0.022 (0.13)	-0.268 (-0.41)	0.11 (0.74)
1981	0.185 (2.05)**	0.095 (0.12)	-0.06 (-0.51)	0.109 (0.65)	0.036 (0.08)	0.064 (0.85)
1982	-0.097 (-1.14)	0.398 (0.79)	-0.25 (-1.52)	-0.077 (-0.44)	-0.0117 (-0.03)	-0.234 (-2.67)
1983	-0.30 (-2.08)	-0.41 (-0.70)	0.135 (0.81)	-0.085 (-0.47)	0.684 (1.82)*	0.051 (0.62)
1984	0.0996 (0.85)	0.73 (0.83)	-0.51 (-3.01)	-0.052 (-0.36)	0.945 (1.72)*	0.198 (1.39)
1985	-0.069 (-0.52)	1.42 (1.63)	0.046 (0.32)	-0.122 (-0.84)	0.194 (0.43)	-0.134 (-0.87)
1986	0.0778 (0.77)	-0.698 (-0.89)	-0.0057 (-0.08)	-0.087 (-0.62)	0.086 (0.14)	0.0801 (0.59)
1987	-0.04 (-0.21)	0.5029 (1.00)	-0.014 (-0.13)	-0.087 (-0.36)	-0.806 (-0.66)	0.028 (0.28)
1988	-0.181 (-0.59)	-0.081 (-0.08)	0.0375 (0.22)	0.45 (1.51)	-0.319 (-0.29)	0.13 (1.15)
1989	0.15 (1.29)	-1.288 (-1.61)	-0.047 (-0.37)	0.158 (1.01)	-0.2025 (-0.37)	0.20 (1.53)
1990	-0.145 (-0.94)	-0.0228 (-0.03)	0.066 (0.46)	-0.244 (-1.02)	-0.014 (-0.03)	-0.042 (-0.40)
1991	-0.041 (-0.29)	-0.64 (-0.78)	-0.089 (-0.56)	0.1666 (0.52)	-0.423 (-0.79)	0.12 (0.78)
Pooled Regression	0.0699 (2.19)**	0.134 (0.84)	-0.0997 (-2.90)	-0.024 (-0.53)	0.07 (0.56)	0.0415 (1.53)

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, and CC is change in cash,. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity. The other variables are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, and CCPS is change in cash per share. All per share variables are in first difference form only.

The T ratios and estimated coefficients (β) based on the results of the third equation as explained in chapter four. $U_{it}=\alpha+\beta e_{it}+\mu_{it}$

* Significant at 10 % level, ** Significant at 5 % level., and *** Significant at 1 % level.

TABLE 6.17
TEST FOR THE INCREMENTAL INFORMATION CONTENT OF CASH FLOW OVER EARNING
COEFFICIENT
(T-RATIO)

Year	OCF v EARN	RIF v EARN	ICF v EARN	FCF v EARN	TCF v EARN	CC v EARN
1978	0.0999 (1.54)	-0.42 (-1.11)	-0.083 (-0.53)	0.147 (1.27)	0.073 (0.31)	0.115 (1.75)*
1979	0.033 (0.30)	-2.15 (-3.25)	-0.294 (-1.42)	-0.117 (-0.98)	-0.46 (-1.21)	0.257 (2.62)***
1980	0.26 (2.15)**	-0.787 (-1.47)	-0.36 (-2.68)	-0.1198 (-0.95)	-0.099 (-0.18)	0.2028 (1.95)*
1981	0.086 (1.48)	-0.74 (-1.51)	-0.059 (-0.66)	-0.102 (-0.93)	-0.66 (-1.73)	0.011 (0.19)
1982	-0.041 (-0.63)	0.055 (0.13)	-0.065 (-0.53)	-0.054 (-0.46)	0.445 (0.94)	-0.09 (-1.34)
1983	-0.182 (-2.10)	-0.58 (-1.19)	0.105 (1.35)	-0.091 (-0.90)	0.607 (1.10)	0.0465 (0.76)
1984	-0.11 (-1.30)	-0.58 (-0.83)	-0.29 (-3.16)	0.164 (1.56)	-0.49 (-1.33)	0.0168 (0.19)
1985	0.0396 (0.44)	0.503 (0.63)	0.11 (0.99)	-0.288 (-2.49)	0.496 (1.26)	-0.086 (-0.91)
1986	0.143 (1.97)**	-1.47 (-2.49)	0.116 (1.78)*	-0.257 (-3.00)	0.175 (0.43)	0.049 (0.53)
1987	-0.26 (-1.73)	-4.38 (-3.25)	-0.243 (-2.49)	-0.039 (-0.23)	0.6075 (0.62)	-0.177 (-1.32)
1988	-0.267 (-1.63)	-0.13 (-0.10)	0.0776 (0.86)	0.193 (1.28)	-0.056 (-0.06)	0.019 (0.15)
1989	0.053 (0.54)	-2.33 (-2.64)	0.088 (1.23)	0.031 (0.33)	-0.18 (-0.32)	-0.165 (-1.58)
1990	-0.061 (-0.51)	-0.71 (-0.83)	0.101 (1.37)	0.067 (0.49)	-0.363 (-0.78)	-0.0095 (-0.11)
1991	0.062 (0.51)	-0.299 (-0.44)	-0.096 (-1.17)	0.191 (1.08)	-1.52 (-2.31)	0.1387 (1.66)*
Pooled Regression	0.012 (0.50)	-0.689 (-4.11)	-0.062 (-2.55)	-0.052 (-1.56)	-0.144 (-1.15)	0.0174 (0.75)

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, and EARN is earnings. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The T ratios and estimated coefficients (β) based on the results of the third equation as explained in chapter four. $U_{it}=\alpha+\beta e_{it}+\mu_{it}$

* Significant at 10 % level, ** Significant at 5 % level., and *** Significant at 1 % level.

TABLE 6.18
TEST FOR THE INCREMENTAL INFORMATION CONTENT OF EARNING OVER CASH FLOW VARIABLES
COEFFICIENT
(T-RATIO)

Year	EARN v OCF	EARN v RIF	EARN v ICF	EARN v FCF	EARN v TCF	EARN v CC
1978	1.515 (4.45)***	1.62 (5.00)***	1.65 (5.06)***	1.64 (5.09)***	1.688 (5.31)***	1.577 (4.72)***
1979	2.60 (5.36)***	2.29 (4.89)***	2.43 (4.96)***	2.22 (4.47)***	2.6 (5.35)***	2.4855 (5.25)***
1980	1.48 (2.99)***	1.147 (2.30)**	1.566 (3.20)***	1.299 (2.62)***	1.263 (2.48)**	1.467 (2.96)***
1981	1.158 (3.00)***	0.933 (2.71)***	0.973 (2.86)***	0.954 (2.79)***	1.38 (3.65)***	1.107 (2.83)***
1982	1.57 (3.53)***	1.556 (3.51)***	1.4989 (3.44)***	1.388 (3.16)***	1.67 (3.79)***	1.558 (3.54)***
1983	1.45 (3.90)***	1.31 (3.53)***	1.426 (3.81)***	1.389 (3.69)***	1.70 (4.23)***	1.326 (3.57)***
1984	2.8 (7.75)***	2.83 (7.97)***	2.754 (8.10)***	2.77 (7.90)***	2.87 (7.76)***	2.687 (7.30)***
1985	1.43 (3.06)***	1.4 (3.00)***	1.379 (2.84)	1.55 (3.37)***	1.406 (2.95)***	1.38 (2.96)***
1986	0.5326 (0.90)	0.545 (0.94)	1.706 (2.61)***	1.5 (2.47)**	0.145 (0.24)	0.511 (0.83)
1987	0.82 (1.13)	0.41 (060)	0.786 (1.15)	0.059 (0.09)	0.215 (0.31)	0.5125 (0.73)
1988	-0.33 (-0.38)	0.389 (0.45)	-0.197 (-0.24)	-0.187 (-0.23)	0.0589 (0.07)	0.106 (0.12)
1989	2.68 (3.19)***	2.647 (3.26)***	2.68 (3.23)***	2.712 (3.24)***	2.7366 (3.29)***	3.25 (3.80)***
1990	1.545 (1.92)*	1.003 (1.23)	1.438 (1.79)*	1.512 (1.86)*	1.52 (1.92)*	1.58 (1.95)**
1991	3.24 (4.84)***	3.186 (4.94)***	3.41 (5.18)***	3.16 (4.91)***	4.30 (6.32)***	3.16 (4.98)***
Pooled Regression	1.53 (11.44)***	1.45 (11.13)***	1.587 (12.14)***	1.516 (11.55)***	1.585 (11.86)***	1.53 (11.53)***

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, and EARN is earnings. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The T ratios and estimated coefficients (β) based on the results of the third equation as explained in chapter four. $U_{it}=\alpha+\beta e_{it}+\mu_{it}$

* Significant at 10 % level, ** Significant at 5 % level., and *** Significant at 1 % level.

TABLE 6.19
TEST FOR THE INCREMENTAL INFORMATION CONTENT OF CASH FLOW PER SHARE OVER EPS
COEFFICIENT
(T-RATIO)

Year	OCFPS v EPS	RIFPS v EPS	ICFPS v EPS	FCFPS v EPS	TCFPS v EPS	CCPS v EPS
1978	0.00277 (0.118)	-0.025 (-2.41)	-0.0076 (-2.33)	0.0026 (1.63)	0.0089 (1.00)	0.0009 (0.55)
1979	0.0031 (1.36)	-0.031 (-3.03)	-0.0005 (0.944)	-0.002 (-1.14)	0.002 (0.25)	0.004 (1.90)*
1980	0.0028 (1.46)	-0.0184 (-1.92)	-0.0065 (-2.66)	-0.0023 (-1.15)	0.0099 (0.95)	0.002 (1.26)
1981	0.0016 (1.43)	-0.0055 (-0.74)	-0.004 (-2.52)	-0.0014 (-2.63)	-0.004 (-0.44)	0.002 (1.63)
1982	-0.001 (-0.78)	0.0055 (0.75)	0.00077 (0.57)	-0.0024 (-1.39)	0.0155 (2.12)**	-0.0009 (-0.82)
1983	-0.0035 (-2.19)	-0.012 (-1.46)	0.001 (1.04)	-0.0015 (-1.09)	0.006 (0.70)	-0.0026 (-1.61)
1984	-0.0006 (-0.42)	-0.029 (-2.50)	-0.0011 (-0.81)	0.001 (0.66)	0.0017 (0.24)	0.0032 (1.84)*
1985	0.0004 (0.38)	0.005 (0.48)	-0.0001 (-0.10)	-0.0006 (-0.46)	0.00057 (0.10)	-0.0004 (-0.34)
1986	0.0013 (1.43)	-0.0065 (-0.73)	0.0014 (1.86)*	-0.003 (-2.78)	0.0064 (1.20)	-0.0009 (-0.91)
1987	-0.003 (-2.16)	-0.02 (-2.45)	-0.0025 (-2.90)	0.0003 (0.22)	0.0115 (1.47)	-0.0007 (-0.59)
1988	-0.0015 (-1.25)	-0.0025 (-0.28)	-0.0002 (-0.33)	0.0012 (1.19)	-0.0058 (-0.89)	0.00007 (-0.07)
1989	-0.0013 (-1.44)	-0.019 (-2.89)	0.00035 (0.70)	-0.0001 (-0.13)	-0.0076 (-1.62)	-0.0012 (-1.35)
1990	0.0015 (1.70)*	-0.0148 (-2.10)	0.0004 (0.78)	0.0005 (0.68)	-0.003 (-0.72)	0.0004 (0.51)
1991	0.0001 (0.11)	-0.0043 (-0.87)	-0.0006 (-1.11)	0.00117 (1.58)	-0.0018 (-0.43)	0.0017 (2.39)**
Pooled Regression	-0.00024 (-0.70)	-0.0158 (-7.16)	-0.00064 (-2.84)	-0.0002 (-0.64)	-0.0025 (-1.40)	0.0004 (1.25)

CAR_i is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and EPS is basic earnings per share. All the previous variables are in first difference form only.

The T ratios and estimated coefficients (β) based on the results of the third equation as explained in chapter four. $U_i = \alpha + \beta e_i + \mu_i$.

* Significant at 10 % level, ** Significant at 5 % level., and *** Significant at 1 % level.

TABLE 6.20
TEST FOR THE INCREMENTAL INFORMATION CONTENT OF EPS OVER CASH FLOW PER SHARE VARIABLES
COEFFICIENT
(T-RATIO)

Year	EPS v OCFPS	EPS v RIFPS	EPS v ICFPS	EPS v FCFPS	EPS v TCFPS	EPS v CCPS
1978	0.0225 (3.56)***	0.0244 (4.03)***	0.026 (4.26)***	0.026 (4.22)***	0.024 (3.92)***	0.024 (3.87)***
1979	0.024 (3.41)***	0.022 (3.39)***	0.0257 (3.88)***	0.027 (4.03)***	0.027 (3.99)***	0.0228 (3.29)***
1980	0.015 (2.78)***	0.007 (1.21)	0.025 (3.79)***	0.014 (2.61)***	0.013 (2.37)**	0.013 (2.48)**
1981	0.027 (4.06)***	0.024 (3.43)***	0.033 (4.65)***	0.0289 (4.36)***	0.0256 (3.72)***	0.026 (3.90)***
1982	0.042 (4.60)***	0.041 (4.48)***	0.0423 (4.27)***	0.044 (4.62)***	0.04 (4.54)***	0.042 (4.58)***
1983	0.0156 (2.50)**	0.013 (2.31)**	0.0152 (2.57)**	0.0144 (2.44)**	0.014 (2.44)**	0.0144 (2.29)**
1984	0.026 (3.74)***	0.0097 (1.78)*	0.013 (2.41)**	0.016 (2.89)***	0.022 (3.18)***	0.0187 (3.42)***
1985	0.0188 (3.04)***	0.014 (2.40)**	0.0157 (2.80)***	0.0155 (2.86)***	0.015 (2.71)***	0.0147 (2.48)**
1986	0.0048 (0.92)	0.0062 (1.24)	0.006 (1.29)	0.007 (1.47)	0.006 (1.21)	0.0067 (1.37)
1987	0.0042 (0.77)	0.003 (0.51)	0.0087 (1.45)	0.003 (0.53)	-0.00001 (-0.00)	0.00157 (0.29)
1988	0.0117 (2.53)**	0.011 (2.44)**	0.0118 (2.51)**	0.0122 (2.57)**	0.0117 (2.41)**	0.0115 (2.41)**
1989	0.013 (2.82)***	0.011 (2.87)***	0.012 (2.66)***	0.0123 (3.05)***	0.014 (3.49)***	0.0125 (3.15)***
1990	0.0044 (1.59)	0.003 (1.17)	0.0031 (1.11)	0.0035 (1.21)	0.0042 (1.53)	0.004 (1.44)
1991	0.0142 (4.54)***	0.0158 (5.25)***	0.0158 (4.93)***	0.0152 (5.16)***	0.015 (4.96)***	0.01556 (5.19)***
Pooled Regression	0.0103 (7.92)***	0.0092 (7.41)***	0.011 (8.36)***	0.0105 (8.28)***	0.0106 (8.28)***	0.0102 (8.08)***

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and EPS is basic earnings per share. All the previous variables are in first difference form only.

The T ratios and estimated coefficients (β) based on the results of the third equation as explained in chapter four. $U_{it}=\alpha+\beta e_{it}+\mu_{it}$

* Significant at 10 % level, ** Significant at 5 % level., and *** Significant at 1 % level.

TABLE 6.21
TEST FOR THE INCREMENTAL INFORMATION CONTENT OF EARNING BEYOND EPS AND EPS BEYOND EARNING COEFFICIENT (T-RATIO)

Year	EARN v EPS	EPS v EARN
1978	1.22 (3.08)***	0.0065 (0.67)
1979	1.59 (2.81)***	0.0135 (1.34)
1980	0.995 (1.86)*	0.012 (1.62)
1981	0.3597 (0.92)	0.018 (1.77)*
1982	0.098 (0.22)	0.04 (3.16)***
1983	1.0498 (2.73)***	0.003 (0.43)
1984	2.48 (6.90)***	-0.0024 (-0.40)
1985	0.6228 (1.33)	0.0061 (0.80)
1986	0.902 (1.54)	0.0072 (1.10)
1987	-0.876 (-1.44)	0.0043 (0.73)
1988	-0.68 (-0.64)	0.0052 (0.88)
1989	1.955 (1.77)*	0.0079 (1.37)
1990	1.2 (0.96)	0.00007 (0.01)
1991	1.28 (1.83)*	0.0086 (1.91)*
Pooled Regression	1.122 (8.47)***	0.0032 (1.95)*

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991. EARN is earnings and it was in first difference form after being deflated by market value at the beginning of the year and EPS is earnings per share and it is in first difference form only.

The T ratios and estimated coefficients (β) based on the results of the third equation as explained in chapter four. $U_{it}=\alpha+\beta e_{it}+\mu_{it}$

* Significant at 10 % level, ** Significant at 5 % level., and *** Significant at 1 % level.

TABLE 6.22
TEST FOR THE INCREMENTAL INFORMATION CONTENT OF EARNING OVER ALL CASH FLOW VARIABLES(CFs) AND EPS OVER ALL CASH FLOW PER SHARE VARIABLES(CFPSs)
COEFFICIENT
(T-RATIO)

Year	EARN v CFs	EPS v CFPSs
1978	1.37 (3.79)***	0.0228 (3.72)***
1979	1.998 (4.23)***	0.021 (2.97)***
1980	1.91 (3.82)***	0.019 (2.48)**
1981	1.25 (3.20)***	0.03 (4.16)***
1982	1.396 (3.22)***	0.041 (4.16)***
1983	1.688 (3.89)***	0.016 (2.55)**
1984	2.594 (7.00)***	0.0206 (2.69)***
1985	1.30 (2.78)***	0.0175 (2.49)**
1986	1.59 (2.43)**	0.002355 (0.43)
1987	0.92 (1.29)	0.0099 (1.62)
1988	0.438 (0.48)	0.011 (2.24)**
1989	2.8 (3.29)***	0.0126 (2.74)***
1990	0.79 (0.97)	0.0022 (0.79)
1991	4.27 (6.05)***	0.018 (5.40)***
Pooled Regression	1.595 (11.79)***	0.0104 (7.72)***

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions CFs are OCF, RIF, ICF, FCF, TCF, and CC. EARN is earnings. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity. The other variables CFPSs are OCFPS, RIFPS, FCFPS, ICFPS, TCFPS, and CCPS. EPS is earnings per share. All the per share variables are in first difference form only.

The T ratios and estimated coefficients (β) based on the results of the third equation as explained in chapter four.
$U_{it}=\alpha+\beta e_{it}+\mu_{it}$

* Significant at 10 % level, ** Significant at 5 % level., and *** Significant at 1 % level.

6.8 DISCUSSION:

This section discusses the empirical results of the current research in the context of previous research in US and UK. The discussion will be divided into two parts. First, the findings that relate to the information content test will be discussed. Secondly, the results that relate to the incremental information test will be discussed.

6.8.1 Information Content Test:

Table 6.23 presents the comparison between the current research results and other related studies. The results from this study confirm the importance of OCF, ICF, collect, net interest and accruals as significant explanatory variables of abnormal returns. However, dividends and debt are found to be insignificant in this study. Whilst the result for accruals, net interest and OCF are confirmed for firms of all sizes this is not the case for all variables. Collect is only significant for medium and large firms also the signal for future performance from ICF is not homogenous across firm size.

Goh and Ederington (1993) examine the common stock reaction to bond rating changes, and they found that the downgrades of bond rating due to deterioration in the firm's earnings, cash flow and financial prospective is associated with negative abnormal returns. Their results are generally consistent with finding in the current research, because it is found that the increase in net interest payment is associated with negative abnormal returns

TABLE 6.23
COMPARISON BETWEEN THE RESEARCH RESULTS AND OTHER RELATED STUDIES

Independent Variables		Livnat and Zarowin (1990) (t-statistic)	O'Bryan (1992) (t-statistic)	Clubb (1995) No. of significant t statistic out of 48 firms	Current research results (t-statistic)
OCF		5.86***	3.664***	23	3.63***
RIF		NA	NA	NA	-6.21***
ICF		-2.40***	0.095	21	-3.60***
FCF		1.64	-0.755	22	0.68
TCF		-0.70	-1.04	NA	-0.47
CC		NA	NA	NA	3.93***
COLLECT		6.04***	2.02**	NA	4.65***
PAYMENT		-5.43***	-1.77*	NA	NA
NETINT		-3.67***	0.86	NA	-8.39***
DIVID		2.68***	2.35**	21	1.25
Investment in unconsolidated subsidiary		4.40***	0.58	NA	NA[@]
S.FIXED		1.39*	-1.11	NA	0.24
P.Investment		0.08	0.32	NA	-0.14
STOCK	Common	0.48	-0.27	NA	NA
	Preferred	-0.14	-0.58	NA	NA
	Both	NA	NA	NA	0.05
DEBT		2.51***	-1.09	NA	1.14
Accruals		3.24***	1.93*	NA	3.24***
Dependent Variable		CAR	Bond Return	Stock Return	CAR
Method of computing the variables		FASB 95 for US firms	FASB 95 for US firms	FASB 95 for UK firms	FRS 1 for UK firms

@ This variable is included in P.Investment.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.Investment is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 2 is earnings minus net cash flows . CAR is cumulative Abnormal return.

* Significant at 10% level.
** Significant at 5% level.
*** Significant at 1% level.

The comparison with US studies suggests that cash flow headings under FASB 95 and FRS 1 contain different messages. This may be explained by the difference between FASB 95 and FRS 1 definitions or it may simply be that the UK market suffers to a greater extent from timing and matching problems.

The results suggest that ASB has made some progress in solving the problems associated with funds flow statements and the US version of cash flow statement. These problems are the fund definition for funds statements and the treatment of dividend and net interest in the US version of cash flow statement. The fund definition no longer exists in the cash flow statement, and it is made clear that all elements of the new FRS 1 are on a cash basis. On the other hand, a cash flow basis has some limitations because it is presenting the realized cash inflow or outflow for a single period. These limitations have been confirmed in this study by identifying the difference between actual cash dividends that were reported in cash flow statements and dividends that related to any particular year including the accrual elements (see section 6.3.1.1). The market appears to react to the dividends' announcement and not to the cash payment of dividends as reported in cash flow statements. It can be learned from this that cash flow data suffers from severe timing and matching problems for the realized cash flow while accruals components play a major role in increasing the explanatory power of accounting earnings.

ASB made a step in the right direction when solving some of the problems associated with the US version of cash flow statements. These problems are the treatment of net interest and dividends and using the direct or indirect methods when presenting operating activities. ASB required presenting dividends and net interest under an additional standard heading "Return on Investment and Services of Finance (RIF)". ASB assumed that the cost of cash supply, which should be presented under RIF is the same either from shareholders or from creditors, while FASB required a more complicated process to present dividends and net interest. The results from this study suggest that RIF needs further disaggregation and should be replaced by two new standard headings net interest and net dividends. The reason for this is that net interest and dividends contain different information signals about future performance and that combining both items may result in losing the information content for one of them.

The previous results suggest that the FRS 1 classification should be amended to a more informative format. A cash flow statement would be more informative for investors if it was classified under the following standard headings: operating, investing, financing, dividends and net interest. The reasons for modifications to the previous classification are the following: dividends and net interest provide different signals about future performance. Also, tax payments have no information value for the investors, which leads to the suggestion that they be included in operating cash flow instead of being left under a separate standard heading.

The results from the present study support the ASB position on mandating the use of the direct method when presenting operating activities, because it is found that collection from customers contains information value as well as that contained in operating cash flow.

The financing cash flow coefficient is significant with a positive sign for small firms but is insignificant for large firms. This findings is consistent with Diamond (1991), Atiase (1985) and , Slovin, Johnson and Glascock (1992) . Diamond argues that fewer monitoring services are entailed in bank loans to large, high prestige firms who have less severe financial contracting problems and have better access to the securities markets. Further Atiase (1985) hypothesises that because less information is available about small firms, the expected percentage change in stock price in response to a public announcement is a decreasing function of firm size. Thus, if large capitalization firms are well monitored and have substantial good reputation, then a new bank loan does not have any comparative advantage as a source of external finance to public securities markets. Hence, share price responses to bank loan initiation should be greater for small capitalization firms than for large capitalization firms. Slovin, Johnson and Glascock (1992) report that share price effects of bank announcements are significantly positive only for small capitalization firms. This findings is consistent with the current research results and with Diamond (1991) who argues that small, less prestigious, firms gain greater advantage from screening and monitoring services, due to their firms facing severe moral hazard and adverse selection problems that make issuing capital market securities difficult.

The results from this study suggest that cash flow information is important for medium and small firms than for large firms. This result supports the idea that investors in large firms have alternative sources of information besides the annual reports while for small and medium firms, investors rely on the annual reports as the main as sole source of information. These results are in line with Alles and

Lundhom (1993). They show that uninformed traders will prefer public signals to eliminate their information disadvantage but only if they are in the minority. Alles and Lundhom (1993) assume that this occurs because, when the uninformed traders are in the majority, the loss-in risk- sharing chances that accompany the public signal out weight the benefit of informational parity. The current study shows that the investors behaviour to the release of the annual cash flow report is not homogenous across-firm sizes. For medium and small firms the investors react more to the public signal (annual reports) than for the investors in large firms. Thus, Alles and Lundholm (1993)'s conclusions might hold for small and medium firms only.

6.8.2 The Incremental Information Content Test:

The incremental information content test results that were presented in section 6.6 can be compared to Board, Day and Walker's (1989) results (BDW hereafter). The comparison between the findings from the current research and BDW's results is limited to the incremental information content of operating cash flow beyond earnings and the incremental information content of earnings beyond operating cash flow. BDW reported results that are consistent with the findings of the current research: that earnings contain incremental information content beyond operating cash flow, but operating cash flow does not reveal any incremental explanatory power beyond earnings.

There is no single study which addresses an incremental information content test for the remaining cash flow variables similar to that of the present study. As a result no further discussion is possible in this section.

6.9 CONCLUSION

Operating cash flow and operating cash flow per share (for yearly regression) reveal information content based on their association with security returns as does net interest. The coefficients for RIF, RIFPS, ICF, ICFPS and CC are significant according to the pooled regression results and FCF is found to have a significant coefficient in the annual cross-sectional regression.

From these results it might be suggested that: cash flow statement headings could be modified to the following: operating, net interest, net dividends, investing and financing activities. Tax payments are included in operating activities because they are neutral from an information perspective. This is consistent with FASB and IASC because they both require tax payments to be included in operating cash flow.

The results from the comparison between cash flow and cash flow per share suggest that cash flow and cash flow per share contain the same information content. Hence, presenting two figures in the cash flow statements will be superfluous. Thus, cash flow per share should not be reported in the financial statements, not because it is misleading, but because it has no additional information value beyond cash flow data. On the other hand, the results strongly support presenting both EPS and earnings in the annual reports because each one of them contains incremental information value beyond the other. Furthermore, the results support the ASB position in using the direct method when presenting operating cash flow components.

CHAPTER SEVEN

EMPIRICAL ANALYSIS: CHANGE VERSUS LEVEL VARIABLES AND VARYING PARAMETERS MODELS

7.1 INTRODUCTION:

In this chapter, some of the innovations in market based research methodologies are used to examine if they have any impact on the previous results. The new techniques in market based research are the use of both change and level variables, the varying parameter model and the non linear model. The change and level variables and the varying parameter model will be used in this chapter. Change and level variables have been used before in the earning-return models by Easton and Harris (1991), Strong and Walker (1991), Pope and Rees (1992), Strong (1992), Ohlson and Shroff (1992), Ali and Zarowin (1992), Ali (1994) and Ali and Pope (1994).

The traditional approach in market-based accounting research has centred on using change of earnings as an explanatory variable for returns. Easton and Harris (1991) found that earnings levels work no worse than change in earnings as an explanatory variable for returns. Earnings levels were introduced as an explanatory variable for return, based on the support by Ohlson and Shroff (1992)

"Earnings levels variable itself serves as the natural starting point in

> *explaining return. That is, if neither the returns variable nor the earnings levels variable is predictable, then the latter must be the maximum R^2 explanatory variable."* Ohlson and Shroff (1992).

Empirical evidence from Ali and Zarowin (1992) suggests that the permanent and transitory components of previous periods in earnings play a major role in determining the importance of earnings levels. They reported on firms with predominantly permanent earnings for the previous period; the incremental explanatory power of the model has a small increase after adding the earnings levels to the change earnings model. On the other hand, for firms with predominantly transitory earnings in the previous period, the incremental explanatory power is very high when adding the earnings level to the change in earnings model.

> *"These results are consistent with the view that earnings levels capture transitory components in earnings and suggest that measurement error in unexpected earnings has contributed to the low R^2 s and Earnings Response Coefficients (ERCs) in previous research."* Ali and Zarowin (1992).

Furthermore, Ali (1994) reported that cash flow from operation reveals a significant level of mean reversion for both groups[1] with negative mean serial correlation. These results suggest that change in OCF is transitory in its nature. Thus, based on the conclusion of earnings return models, cash flow levels should increase the explanatory power of change cash flow models as well.

The motivation for using the change and level variable in earnings models for

[1] Ali (1994) divided OCF into two groups: the first group is High Group (Transitory) and the second one is Low Group (Permanent) according to whether the absolute value of the change in OCF lies above or below the median.

previous research is to overcome the possible measurement error in the change in earnings variable. In the USA, Easton and Harris (1991) and Ali and Zarowin (1992) confirmed these assumptions by reporting higher R^2 for the level earnings model than for the change earnings model. In the UK however, Strong (1992) reports that the change in earnings model exhibits a higher explanatory power than does the level of earnings model.

As reported in chapter four, OLS tests were carried out and it was confirmed that all the change variables models are free from any misspecification problems. Therefore, the analysis in this chapter will concentrate on the effect of level variables after they are included in the previous change variable models. Level and change variables are introduced to investigate if they, individually or taken together, have any significant impact on the models. Furthermore, a varying parameters model is incorporated with change and level variables. Dummy variables are used to allow the intercept and slope to vary over time. Dummy variable $D_t = 1$ for year t, or 0 otherwise.

The analyses in this chapter are restricted to disaggregate, aggregated cash flows and earnings variables. The results for cash flow per share and EPS are reported in Appendix (C).

The chapter is organized as followings: development of the models is presented in section two; in section three, examination of the data and the model analysis; in section four, presentation of the regression results; discussion is presented in section five; finally, the chapter will close with a summary and conclusions in section six.

7.2 DEVELOPING THE MODELS:

The models that will be used in this analysis are presented in figures A1 to A3 in Appendix D. In figure A1, model 1 is presented and expanded in many forms: level variables models; change variables model; model with both change and level variables; model with change and level variables where intercept varies over time; model with change and level variables and slope varying over time; and model with change and level variables having both slope and intercept varying over time. Furthermore, the same modelling procedures are repeated for each individual variable as separate models. The same model-building procedures were employed in model 2 and 4 as they appear in figure A2 and A3 respectively. All the previous models will be used to test whether expanding the model using more recent innovations in research methods can increase the explanatory power or not.

7.3 EXAMINING THE DATA AND MODEL ANALYSIS:

Level variables computations are based on the previous sample which was used for change variables. All level variables are deflated by the market value at the beginning of the year. Cumulative Abnormal Return (CAR) is based on a four-month lag, this lag is used because it revels the highest explanatory power as explained in chapter four.

A statistical description will be provided, presenting permanent and transitory components of earnings and cash flow measures, and finally a model analysis will be presented.

7.3.1 Statistical Description:

Disaggregated cash flow variables are presented in table 7.1 for level variables in model 1, and this covered a 11 year-period from 1981 to 1991. The first three years are dropped due to non availability of some disaggregated cash flow components. 1716 observations are used for each variable including the eliminated extreme observations[2]. The extreme observations were omitted to avoid any problem associated with outliers.

The number of omitted extreme observations are presented in table 7.1a. The outlier results from either a mistake in the data or an extraneous effect and hence should be discarded. A major reason for omitting the outlier is suggested by Neter, Wasserman and Kutner (1989:121):

> *"Under the least square method, a fitted line may be pulled disproportionately toward an outlying observation because the sum of the squared deviations is minimized. This could cause a misleading fit if indeed the outlier observation resulted from a mistake or other extraneous cause."*

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[2] The method for eliminating the extreme observations is as follows: first present a histogram for each level variable, and then determine which observations are not fitting under the curve. These observations are considered as extreme observations and will be eliminated from that variable. For cash flow variables in M2, this method eliminated the observations that had an absolute value more than 3, and for earnings in M4 this method omitted the observations that had an absolute value more than 1. On the other hand, for disaggregate cash flow variables in M1, there are a large number of extreme observations for collect and that resulted in omitting any observations more than +40 and less than 0. For other disaggregate variables this method eliminated the observations that had an absolute value more than 2.

TABLE 7.1a
THE NUMBER OF OMITTED EXTREME OBSERVATIONS

Variables	Number of obs. before omitting the extreme obs.	Number of extreme obs.	% of extreme obs to all obs.
Collect	1716	19	1.11%
Net interest	1716	9	0.52%
Dividends	1716	37	2.16%
TCF	1716	25	1.46%
Sale Fixed	1716	21	1.22%
P. investment	1716	11	0.64%
Stock	1716	11	0.64%
Debt	1716	13	0.76%
Accruals 1	1716	15	0.87%
OCF	2184	51	2.34%
RIF	2184	24	1.10%
ICF	2184	7	0.32%
FCF	2184	40	1.83%
CC	2184	9	0.41%
EARN	2184	28	1.28%

The sample consists of 156 firms covering the period from 1977-1991 for M2 and M4 but for M1 it is from year 1981-1991.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 and 2 is earnings minus net cash flows in model 1 and 2 respectively. All the previous variables are in level form deflated by the beginning-of-the-fiscal year market value of equity.

From table 7.1 we find that collect has the highest standard deviation, which might be the result of the presence of the remaining extreme observations that can be confirmed from maximum column. For model 1, collect exhibited the highest correlation with CAR followed by net interest, dividends and sales fixed assets. This situation differs from the change variable models because it was found that net interest followed by accruals exhibits the highest correlation with CAR.

For aggregate cash flow and earnings variables, table 7.1 presents some descriptive statistics for 2184 firm-year observations[3] including the omitted observations owing to the extreme value in the variables. Earnings exhibited the highest correlation with CAR followed by OCF. In the previous chapter it was found that a change in OCF had a very low correlation with CAR but in level form it has almost as high a correlation with abnormal returns as earnings.

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[3] The number of observations are not the same for all models. For M1, there are 1716 observations while for other models there are 2184 observations. This is due to the dropping of the first three years for M1. This was necessary due to the lake of completed data set for some disaggregated cash flow components for these years.

TABLE 7.1
STATISTICAL DESCRIPTION FOR LEVEL VARIABLES IN ALL MODELS

Models	Var.	MIN	MAX	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN	Corr. with CAR
M1	CAR	1.035	3.072	1.974	1.982	1.973	0.272	0.007	-
	Collect	0.257	33.575	4.057	2.705	3.395	4.457	0.108	0.204
	NETINT	-0.373	0.562	0.038	0.019	0.030	0.080	0.002	0.174
	Dividends	0.000	0.270	0.050	0.045	0.048	0.027	0.001	0.140
	TCF	-0.377	0.725	0.063	0.052	0.058	0.060	0.001	0.024
	P.invs	-0.502	0.294	0.192	0.141	0.171	0.187	0.005	0.093
	S.fixed	0.000	0.471	0.043	0.021	0.032	0.064	0.002	0.102
	Debt	-0.602	0.707	0.022	0.000	0.017	0.123	0.003	-0.096
	Stock	-0.017	0.594	0.020	0.001	0.006	0.070	0.002	-0.012
	Accruals 1	-1.404	0.416	0.057	0.062	0.059	0.253	0.006	-0.008
M2	OCF	-0.677	1.58	0.31	0.247	0.292	0.259	0.0056	0.201
	RIF	-0.123	0.593	0.093	0.0714	0.084	0.089	0.0019	0.147
	ICF	-1.887	1.967	-0.02	0.0008	-0.02	0.289	0.0062	-0.16
	FCF	-0.599	0.7925	0.033	0.0014	0.026	0.134	0.0029	-0.07
	CC	-1.665	1.99	0.02	0.0053	0.012	0.237	0.0051	0.142
	Accruals 2	-2.89	2.55	0.029	0.032	0.0319	0.361	0.0078	-0.05
	TCF	-0.377	0.99	0.071	0.0558	0.063	0.076	0.0016	0.03
M4	EARN	-0.54	0.903	0.13	0.115	0.124	0.101	0.002	0.241

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991 for M2 and M4 but for M1 it is from year 1981-1991. The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, EARN is net income before extraordinary items and discontinuing of the operation, Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 and 2 is earnings minus net cash flows in model 1 and 2 respectively. All the previous variables are in level form deflated by the beginning-of-the-fiscal year market value of equity.

7.3.2 Permanent and Transitory Components of Earnings and Cash Flow Measures: Ali and Zarowin (1992) show that earnings coefficients for the transitory group are significantly different from zero with a negative sign, while for the permanent group they are insignificant with a positive sign. Ali (1994) reports similar results as in Ali and Zarowin (1992) about earnings and working capital from operations. On the other hand, he found that cash flow from operations reveals a significant coefficient with a negative sign for both groups. Ali assumes that,

> *"Since the persistence of earnings, working capital from operation and cash flows varies with the absolute value of changes in these variables, the marginal price response to the unexpected component of each of these variables is also expected to vary."* (Ali, 1994:67).

In this section, evidence is provided for the transitory and permanent components of earnings and cash flow measures. For this analysis the same procedures as those in Ali (1994) are followed. For each sample year the firms are classified into two groups depending on whether or not the absolute change in the variable X deflated by the market value at the beginning of the year $|\Delta X_t / MV_{t-1}|$ lies below or above the median. Reference is made to the group with the high absolute value of $|\Delta X_t / MV_{t-1}|$ as "high group" and to the one with the small change as "low group". The rationale of using this process is this: the firms located above the median have a high change in the unexpected components for that variable in the previous period; hence, they are called the transitory or high group. On the other hand, the firms located below the median have a low change in the unexpected components for the previous year; hence, they are called the permanent or low group. The analysis will be carried out using the following first order serial correlation equation:

$$(X_{it} - X_{it-1})/MV_{it-1} = B_{ot} + B_{1t}(X_{it-1} - X_{it-2})/MV_{it-2} + e_{it}$$

Where, X_{it} is any cash flow or earnings measure for firm i in year t and MV_{it-1} is the beginning of the period market value for firm i. Annual cross-sectional regression is performed for each year. The mean of the coefficients across firms is computed based on thirteen-year regressions[4], and the t-statistic is computed by dividing the mean of the yearly coefficients by its standard error. The closer $B_{1t} = 0$ the more permanent the variable, since $B_{1t}=0$ reveals that successive changes in that variable are independent. Consequently, in this case the random walk model is a good approximation for the time series process for that variable. Thus, when B_{1t} is close to zero it provides an indication that the absolute changes for that variable are small. On the other hand, the more the variable is transitory (i.e. mean-reverting) the more it is expected that B_{1t} will become negative.

Table 7.2 summarizes the results of the yearly cross-sectional estimates of the first order serial correlation for earnings and cash flow measures for both groups. For earnings, it is found that the mean coefficient for the low group is 0.01 (t=0.32)[5], and these findings are consistent with permanent innovation of the random walk model, because it represents an insignificant coefficient. These results are also consistent with recent findings in the US studies by Ali and Zarowin (1992) and Ali (1994). Also, for the high group, the mean coefficient for B_{it} is positive and it is

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[4] The year 1978 was lost owing to the lag requirement to determine the two groups.

[5] Ali (1994) reported for the low group $|\Delta E|$ mean=0.01 (t=.35) for earnings variable. Ali and Zarowin (1992) found for the permanent group mean=.07 (t=1.6) for E/P ratio. Both studies used US firms.

insignificant 0.119 (t=1.075). These findings in the high group contradict the previous research results in the USA[6]. This reveals that the high group is not significant and it has a positive coefficient which is consistent with a permanent innovation of the random walk. The insignificance of the mean of the earnings coefficient for the high group might explain the conflict between the US and the UK studies on the relative importance of the level and change of earnings. Also, there are ten out of thirteen years positive coefficient for each group which supports the previous findings that both groups exhibit permanent components for UK earnings.

This research provides evidence that UK earnings is more permanent than US earnings. On the other hand, previous research reported high transitory components for earnings using US firms. Thus, the differences[7] between US and UK GAAP might be the reasons for these conflicting results, which lead US earnings to have more transitory components than UK earnings. These differences eventually will have some consequences in the explanatory power in the level variable for both cash flow and earnings variables.

Turning to operating cash flow: the mean serial correlation coefficient of change in

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[6] Because Ali (1994) reported for the high group $|\Delta E|$ mean = -0.35 (t=-5.30), which was significant at .01 level. Ali and Zarowin (1992) reported mean = -0.29 (t=-3.8), which was significant at .01 level.

[7] An example of these differences is the different treatment in accounting for goodwill between US and UK GAAP. SSAP 22 states that goodwill should normally be written off immediately against reserve (This method is generally used by the UK firms.) or it may be amortize over its useful economic life through profit and loss account. However, the treatment for goodwill under US GAAP is stated by Accounting Principle Board 17 (ABP 17); it should be amortized by using either straight line or accelerated method over its estimated useful life not exceeding 40 years.

OCF for the low group is -0.0465 (t=-1.445), which is insignificant, and this result is consistent with the previous results by Ali (1994)[8]. On the other hand, high |ΔOCF| exhibits a significant coefficient of the mean = -0.461 (t=-4.54). These results suggest that the innovations of operating cash flow exhibit mean reversion for both groups but it was significant for the high |ΔOCF| only.

The examination of the mean serial correlation coefficient of change RIF reveals insignificant coefficient with positive signs for both groups. These findings are consistent with permanent innovation of the random walk model. The other cash flow measures, ICF, TCF, FCF and CC are significant for the high group with a negative mean of the coefficients. On the other hand, for the low group, ICF, FCF and TCF are not significantly different from zero. CC is significant at .05 level with a negative sign. Therefore, these results suggest that most of cash flow measures are a mean-reverted time series for both groups, because most of cash flow variables have negative signs for both groups except RIF. These results indicate that cash flow variables are more transitory than earnings, which might result in differences in the explanatory power of the level of earnings and cash flow measures.

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[8] Ali (1994) reported a significant coefficient for both low and high groups with a mean=-0.08(t=-3.70) and -0.43(t=-7.30) respectively.

TABLE 7.2
SERIAL CORRELATION COEFFICIENTS OF EARNINGS AND CASH FLOW MEASURES

Variables	Permanent (Low)Group Mean (B) (t-statistic (B)) No. of positive Coef. out of 13 years	Transitory (High) Group Mean (B) (t-statistic (B)) No. of positive Coef. out of 13 years
Earnings	0.01 (0.32) 10	0.119 (1.075) 10
OCF	-0.0465 (-1.445) 1	-0.461 (-4.54)** 0
RIF	0.00112 (0.040) 7	0.0716 (0.628) 8
ICF	-0.03 (-1.01) 3	-0.41 (-3.64)** 0
FCF	-0.03 (-1.32) 2	-0.41 (-4.03)** 0
TCF	-0.02 (-0.90) 4	-0.20 (-1.88)* 3
CC	-0.06 (-1.98)* 2	-0.46 (-4.43)** 1

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions are, OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, and EARN is net income before extraordinary items and discontinuing of the operation.

The classification method for high and low group is: for each sample year the firms are classified into two groups depending on whether or not the absolute change in the variable X deflated by the market value at the beginning of the year $|\Delta X_t / MV_{t-1}|$ lies below or above the median. Reference is made to the group with the high absolute value of $|\Delta X_t / MV_{t-1}|$ as "high group" and to the one with the small change as "low group".

The analysis is carried out using the following first order serial correlation equation:

$$(X_{it} - X_{it-1})/MV_{it-1} = B_{ot} + B_{1t}(X_{it-1} - X_{it-2})/MV_{it-2} + e_{it}$$

Where, X_{it} is any cash flow or earnings measures for firm i in year t and MV_{it-1} is the beginning of the period market value for firm i. Annual cross-sectional regression was performed for each year. The mean of the coefficients was computed based on thirteen-year regressions, and the t-statistic was computed by dividing the mean of the yearly coefficients by its standard error.

* Significant at .05 level, t=1.671.
** Significant at .01 level, t=2.390.

7.3.3 Model Analysis:

The analysis was performed for the three models 1, 2 and 4 after adding the level variables to the existing old models. The old models complied with all OLS assumptions, and the current analysis re-examined the existing models after adding level variables according to model M1a, M2a and M4a in figures A1, A2 and A3 respectively in Appendix D. For Model 1a, there is no departure from normality and multicollinearity assumptions. On the other hand, both the Ramsey and Glejser tests detected a heteroscedasticity problem in M1a in stock and TCF. Also, there is evidence for a misspecification error in M1a according to Ramsey 's RESET test.

Turning to Model 2a: there is a similar situation as in M1a; no normality and misspecification problems, but there is evidence for heteroscedasticity in TCF. Furthermore, there is a multicollinearity problem in M2a, because the correlation between change and level of CC is 74%. However, there is no evidence of any violations of OLS assumptions in model 4a (earnings model).

There was no misspecification error in the original change variable models as reported in a previous chapter, but after including the level variables there was a misspecification error. Hence, this misspecification error is the result of overfitting the model because of including unnecessary variables. If the model is overfitted, the problem causes less harm than if the model is underfitted. Therefore no action is taken with respect to the misspecification error. Turning to heteroscedasticity, the Box and Cox transformation has already been used in the old model, hence, White Heteroscedasticity Consistent Covariance Matrix is used to solve the problem in models M1a and M2a. This method is used to correct the estimates for any unknown form of heteroscedasticity. The level of CC is dropped to solve the multicollinearity problem in M2a.

7.4 REGRESSION RESULTS:

The regression results are organized as follows: first, disaggregated cash flow component models; second, aggregate cash flow variable models and third, earnings models. Finally, regression results are presented for transitory and permanent groups.

7.4.1 Disaggregated Cash Flow Models:

Table 7.3 presents the results for model 1 with both change and level variables. It reveals a significant increase, by 80.94%, in the explanatory power from the change variables model with (Adj) R^2 increasing from 5.3% to 9.59%. Furthermore in table 7.3, dividends are significant at .01 level for level variable. Sales of fixed assets and stock reveal significant coefficients at .05 and .01 level respectively.

By adding the coefficients of the change and the level variable to represent a proxy for unexpected components the data was tested for the incremental information content of disaggregated cash flow components. The test for the null hypothesis is presented in table 7.3 and it shows that collect, net interest, and stock are significant and have incremental information content.

The explanatory power of the model is increased by 79.87% when a shift is made from a model that has change and level variables without varying parameters to the same model with intercept varying over time, because, as is shown in table 7.4, Adj R^2 increases from 9.59% to 17.25%. Furthermore, when allowing the slope to vary over time whilst keeping the intercept constant Adj R^2 rises to 20.79%. On the other hand, when both intercept and slope varied over time and are incorporated with change and level variables, R^2 reaches its maximum level of 21.14%.

Table 7.5 reports the regression results for each individual disaggregated cash flow variable model. The general results confirm the model 1 results, the explanatory power is increased from the model with both change and level variables without varying parameters to the same model with both intercept and slope varying over time.

TABLE 7.3
REGRESSION RESULTS FOR CHANGE VERSUS LEVEL VARIABLES FOR MODEL 1
USING HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX

Variables	Estimated Coefficients	T- Ratio	null hypothesis test	F- Ratio	P- Value
Intercept	1.879	117.7***	$\beta_1 + \beta_{11} = 0$	12.563	0.000
ΔCOLLECT	0.0624	3.432***			
ΔNETINT	-2.6377	-6.926***	$\beta_2 + \beta_{12} = 0$	34.623	0.000
ΔDIVID	-1.473	-1.931**			
ΔTCF	-0.168	-0.8614	$\beta_3 + \beta_{13} = 0$	0.0411	0.839
ΔS.FIXED	0.234	1.377*			
ΔP.INVS	-0.1257	-1.857**	$\beta_4 + \beta_{14} = 0$	0.6555	0.418
ΔSTOCK	0.2499	2.029**			
ΔDEBT	0.176	2.368***	$\beta_5 + \beta_{15} = 0$	0.946	0.331
ΔAccruals1	0.195	4.346***			
COLLECT	-0.00052	-0.171	$\beta_6 + \beta_{16} = 0$	1.938	0.164
NETINT	0.426	3.312***			
DIVID	1.34	3.57***	$\beta_7 + \beta_{17} = 0$	4.334	0.038
TCF	0.0096	0.0502			
S.FIXED	-0.385	-1.999**	$\beta_8 + \beta_{18} = 0$	0.0592	0.808
P.INVS	0.214	2.69***			
STOCK	-0.449	-2.864***	$\beta_9 + \beta_{19} = 0$	0.765	0.382
DEBT	-0.194	-1.863**			
Accruals1	-0.156	-2.464***			
(Adj) R^2	9.59%				
F- Ratio (P-Value)	9.713 (0.000)				

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1981-1991 . The variables definitions are, Collect and ΔCollect are change and level of collection from customers, NETINT and ΔNETINT are change and level of net interest payment, DIVID and ΔDIVID are change and level of cash dividends, S.FIXED and ΔS.FIXED are change and level of sales of fixed assets, P.INVS and ΔP.INVS are change and level of purchase of investments, Stock and ΔStock are change and level of net cash inflow from issue ordinary and preferred stock, Debt and ΔDebt are change and level of net cash inflow from issuing loan capital and Accruals 1 and ΔAccruals 1 (earnings minus net cash flows in model 1) are change and level of Accruals.. All the previous variables are deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$$
\begin{aligned}
CAR_{it} = {} & \alpha + \beta_1 \Delta COLLECT_{it} + \beta_{11} COLLECT_{it} + \beta_2 \Delta NETINT_{it} + \beta_{12} NETINT_{it} \\
& + \beta_3 \Delta DIVID_{it} + \beta_{13} DIVID_{it} + \beta_4 \Delta TCF_{it} + \beta_{14} TCF_{it} + \beta_5 \Delta S.FIXED_{it} \\
& + \beta_{15} S.FIXED_{it} + \beta_6 \Delta P.INVS_{it} + \beta_{16} P.INVS_{it} + \beta_7 \Delta STOCK_{it} \\
& + \beta_{17} STOCK_{it} + \beta_8 \Delta DEBT_{it} + \beta_{18} DEBT_{it} + \beta_9 \Delta ACCRUALS1_{it} \\
& + \beta_{19} ACCRUALS1_{it} + u_{it} \ldots\ldots (M1a)
\end{aligned}
$$

White (1980) is used to estimate the OLS estimators and correct them from unknown form of heteroscedasticity by using "HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX"

* significant at .10 level t critical = 1.282
** significant at .05 level t critical = 1.645
*** significant at .01 level t critical = 2.326

TABLE 7.4
COMPARISON AMONG THE MODELS

	Adjusted R^2		
	M1	M2	M4
Change only variables	5.30%	4.08%	11.20%
Level only variables	5.40%	8.18%	5.77%
Both change and level variables	9.59%	10.00%	12.30%
Both change and level variables with intercept vary over time	17.25%	16.85%	20.26%
Both change and level variables with slope vary over time	20.79%	25.19%	20.03%
Both change and level variables with slope and intercept vary over time	21.14%	27.18%	21.37%

The models for both change and level variables are presented here and for more detailed about the other models please read Appendix (D) figure A1 to A3.

$$CAR_{it} = \alpha + \beta_1 \Delta COLLECT_{it} + \beta_{11} COLLECT_{it} + \beta_2 \Delta NETINT_{it} + \beta_{12} NETINT_{it} + \beta_3 \Delta DIVID_{it} + \beta_{13} DIVID_{it} + \beta_4 \Delta TCF_{it} + \beta_{14} TCF_{it} + \beta_5 \Delta S.FIXED_{it} + \beta_{15} S.FIXED_{it} + \beta_6 \Delta P.INVS_{it} + \beta_{16} P.INVS_{it} + \beta_7 \Delta STOCK_{it} + \beta_{17} STOCK_{it} + \beta_8 \Delta DEBT_{it} + \beta_{18} DEBT_{it} + \beta_9 \Delta ACCRUALS1_{it} + \beta_{19} ACCRUALS1_{it} + u_{it} \ldots\ldots (M1a)$$

$$CAR_{it} = \alpha + \beta_1 \Delta OCF_{it} + \beta_{11} OCF_{it} + \beta_2 \Delta RIF_{it} + \beta_{12} RIF_{it} + \beta_3 \Delta FCF_{it} + \beta_{13} FCF_{it} + \beta_4 \Delta ICF_{it} + \beta_{14} ICF_{it} + \beta_5 \Delta TCF_{it} + \beta_{15} TCF_{it} + \beta_6 \Delta CC_{it} + \beta_7 \Delta \text{ Accruals } 2_{it} + \beta_{17} \text{ Accruals } 2_{it} + u_{it} \ldots (M2a)$$

$$CAR_{it} = \alpha + \beta_1 \Delta EARN_{it} + \beta_2 EARN_{it} + u_{it} \ldots (M4a)$$

TABLE 7.5
REGRESSION RESULTS FOR DISAGGREGATE CASH FLOW VARIABLES
CHANGE VERSUS LEVEL WITH VARYING PARAMETERS
USING HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX

PANEL A

MODEL	INTERCEPT	Δ COLLECT	COLLECT	Adj R square
M11a	1.92***	-0.02887	0.0152***	3.33%
M11b				11.75%
M11c				12.05%
M11d				14.42%

M11A Model with both change and level variables.
M11b Model with both change and level variables and intercept varies over time.
M11c Model with both change and level variables and slope varies over time.
M11d Model with both change and level variables and both slope and intercept vary over time.

PANEL B

MODEL	INTERCEPT	Δ NETINT	NETINT	Adj R square
M12a	1.944***	-2.47***	0.784***	8.23%
M12b				15.72%
M12c				11.81%
M12d				17.30%

M12A Model with both change and level variables.
M12b Model with both change and level variables and intercept varies over time.
M12c Model with both change and level variables and slope varies over time.
M12d Model with both change and level variables and both slope and intercept vary over time.

PANEL C

MODEL	INTERCEPT	Δ DIVID	DIVID	Adj R square
M13a	1.888***	-1.77**	1.945***	2.67%
M13b				11.09%
M13c				12.94%
M13d				13.81%

M13A Model with both change and level variables.
M13b Model with both change and level variables and intercept varies over time.
M13c Model with both change and level variables and slope varies over time.
M13d Model with both change and level variables and both slope and intercept vary over time.

CONTINUE-TABLE 7.5
REGRESSION RESULTS FOR DISAGGREGATE CASH FLOW VARIABLES
CHANGE VERSUS LEVEL WITH VARYING PARAMETERS
USING HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX

PANEL D

MODEL	INTERCEPT	Δ TCF	TCF	Adj R square
M14a	1.96***	-0.291*	0.207*	0.16%
M14b				9.11%
M14c				5.23%
M14d				9.08%

M14A Model with both change and level variables.
M14b Model with both change and level variables and intercept varies over time.
M14c Model with both change and level variables and slope varies over time.
M14d Model with both change and level variables and both slope and intercept vary over time.

PANEL E

MODEL	INTERCEPT	Δ S.FIXED	S.FIXED	Adj R square
M15a	1.945***	-0.527***	0.657***	1.95%
M15b				10.74%
M15c				10.20%
M15d				13.33%

M15A Model with both change and level variables.
M15b Model with both change and level variables and intercept varies over time.
M15c Model with both change and level variables and slope varies over time.
M15d Model with both change and level variables and both slope and intercept vary over time.

PANEL F

MODEL	INTERCEPT	Δ P.INVS	P.INVS	Adj R square
M16a	1.94***	-0.059	0.18***	0.98%
M16b				10.15%
M16c				9.15%
M16d				10.90%

M16A Model with both change and level variables.
M16b Model with both change and level variables and intercept varies over time.
M16c Model with both change and level variables and slope varies over time.
M16d Model with both change and level variables and both slope and intercept vary over time.

CONTINUE- TABLE 7.5
REGRESSION RESULTS FOR DISAGGREGATE CASH FLOW VARIABLES CHANGE VERSUS LEVEL WITH VARYING PARAMETERS
USING HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX

PANEL G

MODEL	INTERCEPT	Δ STOCK	STOCK	Adj R square
M17a	1.975***	0.0828	-0.137*	-0.01%
M17b				9.42%
M17c				0.96%
M17d				9.10%

M17A Model with both change and level variables.
M17b Model with both change and level variables and intercept varies over time.
M17c Model with both change and level variables and slope varies over time.
M17d Model with both change and level variables and both slope and intercept vary over time.

PANEL H

MODEL	INTERCEPT	Δ DEBT	DEBT	Adj R square
M18a	1.98***	0.164***	-0.347**	1.20%
M18b				9.95%
M18c				1.89%
M18d				10.21%

M18A Model with both change and level variables.
M18b Model with both change and level variables and intercept varies over time.
M18c Model with both change and level variables and slope varies over time.
M18d Model with both change and level variables and both slope and intercept vary over time.

PANEL I

MODEL	INTERCEPT	Δ Accruals 1	Accruals 1	**Adj R2**
M19a	1.976***	0.1358***	-0.1351***	1.26%
M19b				10.52%
M19c				5.26%
M19d				11.79%

M19A Model with both change and level variables.
M19b Model with both change and level variables and intercept varies over time.
M19c Model with both change and level variables and slope varies over time.
M19d Model with both change and level variables and both slope and intercept vary over time.

CONTINUE- TABLE 7.5
REGRESSION RESULTS FOR DISAGGREGATE CASH FLOW VARIABLES CHANGE VERSUS LEVEL WITH VARYING PARAMETERS
USING HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX

CAR is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1981-1991 . The variables definitions are, Collect and ΔCollect are change and level of collection from customers, NETINT and ΔNETINT are change and level of net interest payment, DIVID and ΔDIVID are change and level of cash dividends, S.FIXED and ΔS.FIXED are change and level of sales of fixed assets, P.INVS and ΔP.INVS are change and level of purchase of investments, Stock and ΔStock are change and level of net cash inflow from issue ordinary and preferred stock, Debt and ΔDebt are change and level of net cash inflow from issuing loan capital and Accruals 1 and ΔAccruals 1 (earnings minus net cash flows in model 1) are change and level of Accruals.. All the previous variables are deflated by the beginning-of-the-fiscal year market value of equity.

White (1980) is used to estimate the OLS estimators and correct them from unknown form of heteroscedasticity by using "HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX"
* significant at .10 level t critical = 1.282
** significant at .05 level t critical = 1.645
*** significant at .01 level t critical = 2.326

7.4.2 Aggregate Cash Flow Models:

Table 7.6 reports the regression results for Model 2a for change and level variables without varying parameters using a White Heteroscedasticity-Consistent Covariance Matrix. OCF in level variables exhibits information content and it is significant at .01 level. Furthermore, the incremental information content for the sum of the coefficient OCF and ΔOCF which represents the unexpected components $\beta_1 + \beta_{11} = 0$, is significant, and confirms the previous findings in chapter six that operating cash flow has an information content for the investors in the security market.

RIF coefficient is significant at .01 level in both change and level variables and for the incremental information content the null hypothesis ($\beta_2 + \beta_{12}=0$) can be rejected and conclude that the unexpected components of RIF reveal an information value for the security market. The coefficient for ICF is significant in level variable alone and shows incremental information content.

Both change and level variables of FCF reveal significant coefficients whilst it is not possible to reject the null hypothesis ($\beta_3 + \beta_{13}=0$) for the incremental information test. Accruals 2 has a significant coefficient in change form and exhibits an incremental information content.

Table 7.4 presents the comparison among various forms of Model 2. The model with level variables have more explanatory power than models with change variables alone. The explanatory power is significantly increased, by 145.10% from the model with change variables only to the model with both change and level variables: R^2

increases from 4.08% to 10%. In addition, the explanatory power increases by 171.80% from the model including both change and level variables to the same model but with intercept and slope varying over time: R^2 increases from 10% to 27.18%.

Aggregate individual variables models are presented in table 7.7. The RIF model shows the highest explanatory power and $R^2 = 15.65\%$ in the model with both intercept and slope varying overtime as well as change and level variables. OCF reveals the second highest explanatory power and $R^2 = 15.17\%$ followed by Accruals2 and dividends.

Therefore, this evidence supports the information content of OCF in level form, and this finding is consistent with Ali and Pope (1994), who reported a significant coefficient for OCF in level form. The current study reports a high $R^2 = 15.17\%$ while Ali and Pope reported $R^2 = 3.95\%$ for the same model.

TABLE 7.6
REGRESSION RESULTS FOR CHANGE VERSUS LEVEL VARIABLES
FOR MODEL 2
USING HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX

Variables	Estimated Coefficients	T- Ratio	Null hypothesis test	F- Ratio for null hypothesis	P-Value for null hypothesis
Intercept	2.234	127.5***	$\beta_1 + \beta_{11} = 0$	19.696	0.000
ΔOCF	0.1144	1.714**	$\beta_2 + \beta_{12} = 0$	10.663	0.001
ΔRIF	-1.434	-4.802***	$\beta_3 + \beta_{13} = 0$	0.2318	0.630
ΔICF	0.04795	1.11	$\beta_4 + \beta_{14} = 0$	22.496	0.000
ΔFCF	0.177	2.336***	$\beta_5 + \beta_{15} = 0$	0.1505	0.902
ΔTCF	-0.142	-0.613	$\beta_7 + \beta_{17} = 0$	25.075	0.000
ΔCC	0.162	3.073***			
Δ Accruals 2	0.264	5.139***			
OCF	0.149	2.343***			
RIF	0.534	3.72***			
FCF	-0.211	-2.123**			
ICF	-0.228	-5.44***			
TCF	0.115	0.63			
Accruals 2	-0.0289	-0.565			
(Adj) R^2	10.00%				
F-Ratio (P-Value)	17.914 (0.000)				

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions are OCF and ΔOCF are the change and level of cash flows from operation, RIF and ΔRIF are the change and level of net cash flows from return on investment and servicing of finance, TCF and ΔTCF are the change and level of cash flows from taxation, ICF and ΔICF are the change and level of net cash flows from investment, FCF and ΔFCF are the change and level of net cash flows from finance, ΔCC are the change of change in cash, Accruals 2 and ΔAccruals 2 are the change and levels of Accruals (earnings minus net cash flows in mode2). All the previous variables are deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$$CAR_{it} = \alpha + \beta_1 \Delta OCF_{it} + \beta_{11} OCF_{it} + \beta_2 \Delta RIF_{it} + \beta_{12} RIF_{it} + \beta_3 \Delta FCF_{it} + \beta_{13} FCF_{it} + \beta_4 \Delta ICF_{it} + \beta_{14} ICF_{it} + \beta_5 \Delta TCF_{it} + \beta_{15} TCF_{it} + \beta_6 \Delta CC_{it} + \beta_7 \Delta \text{ Accruals } 2_{it} + \beta_{17} \text{ Accruals } 2_{it} + u_{it} \quad \text{....(M2a)}$$

White (1980) is used to estimate the OLS estimators and correct them from unknown form of heteroscedasticity by using "HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX"

* significant at .10 level t critical = 1.282
** significant at .05 level t critical = 1.645
*** significant at .01 level t critical = 2.326

TABLE 7.7
REGRESSION RESULTS FOR AGGREGATE CASH FLOW VARIABLES CHANGE VERSUS LEVEL WITH VARYING PARAMETERS USING HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX

PANEL A

MODEL	INTERCEPT	Δ OCF	OCF	Adj R square
M21a	2.22***	-0.1206***	0.357***	4.43%
M21b				13.15%
M21c				11.16%
M21d				15.17%

M21A Model with both change and level variables.
M21b Model with both change and level variables and intercept varies over time.
M21c Model with both change and level variables and slope varies over time.
M21d Model with both change and level variables and both slope and intercept vary over time.

PANEL B

MODEL	INTERCEPT	Δ RIF	RIF	Adj R square
M22a	2.266***	-1.65***	0.867***	5.33%
M22b				13.82%
M22c				12.76%
M22d				15.65%

M22A Model with both change and level variables.
M22b Model with both change and level variables and intercept varies over time.
M22c Model with both change and level variables and slope varies over time.
M22d Model with both change and level variables and both slope and intercept vary over time.

PANEL C

MODEL	INTERCEPT	Δ ICF	ICF	Adj R square
M23a	2.33***	0.0282	-0.23***	2.50%
M23b				10.32%
M23c				6.51%
M23d				11.72%

M23A Model with both change and level variables.
M23b Model with both change and level variables and intercept varies over time.
M23c Model with both change and level variables and slope varies over time.
M23d Model with both change and level variables and both slope and intercept vary over time.

CONTINUE-TABLE 7.7
REGRESSION RESULTS FOR AGGREGATE CASH FLOW VARIABLES CHANGE VERSUS LEVEL WITH VARYING PARAMETERS USING HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX

PANEL D

MODEL	INTERCEPT	Δ FCF	FCF	Adj R square
M24a	2.34***	0.1156*	-0.292***	0.49%
M24b				10.53%
M24c				2.79%
M24d				11.47%

M24A Model with both change and level variables.
M24b Model with both change and level variables and intercept varies over time.
M24c Model with both change and level variables and slope varies over time.
M24d Model with both change and level variables and both slope and intercept vary over time.

PANEL E

MODEL	INTERCEPT	Δ TCF	TCF	Adj R square
M25a	2.31***	-0.378**	0.256**	0.26%
M25b				9.90%
M25c				5.38%
M25d				9.95%

M25a Model with both change and level variables.
M25b Model with both change and level variables and intercept varies over time.
M25c Model with both change and level variables and slope varies over time.
M25d Model with both change and level variables and both slope and intercept vary over time.

PANEL F

MODEL	INTERCEPT	Δ Accruals 2	Accruals 2	Adj R square
M27a	2.33***	0.137***	-0.1426***	1.45%
M27b				10.64%
M27c				4.68%
M27d				12.06%

M27a Model with both change and level variables.
M27b Model with both change and level variables and intercept varies over time.
M27c Model with both change and level variables and slope varies over time.
M27d Model with both change and level variables and both slope and intercept vary over time.

CONTINUE-TABLE 7.7
REGRESSION RESULTS FOR AGGREGATE CASH FLOW VARIABLES
CHANGE VERSUS LEVEL WITH VARYING PARAMETERS
USING HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions are OCF and ΔOCF are the change and level of cash flows from operation, RIF and ΔRIF are the change and level of net cash flows from return on investment and servicing of finance, TCF and ΔTCF are the change and level of cash flows from taxation, ICF and ΔICF are the change and level of net cash flows from investment, FCF and ΔFCF are the change and level of net cash flows from finance, Accruals 2 and ΔAccruals 2 are the change and levels of Accruals (earnings minus net cash flows in mode2). All the previous variables are deflated by the beginning-of-the-fiscal year market value of equity.

The models are presented in figure A.1 in Appendix (D)

White (1980) is used to estimate the OLS estimators and correct them from unknown form of heteroscedasticity by using "HETEROSCEDASTICITY-CONSISTENT COVARIANCE MATRIX"

* significant at .10 level t critical = 1.282
** significant at .05 level t critical = 1.645
*** significant at .01 level t critical = 2.326

7.4.3 Earnings Models:

Earnings level and change both reveal significant coefficients at .01 level as is reported in table 7.8. The comparison between the change variable model and the level variable model suggests that the earnings change model has a higher explanatory power than level variable model because R^2 is equal 11.20% and 5.77% respectively (table 7.4). The explanatory power of the earnings model increases by 9.82% from the model with change variable to the model including both change and level variables: R^2 increases from 11.20% to 12.30%. These results are consistent with Ali and Pope (1994). They reported R^2=15.23% for the same model. On the other hand, the explanatory power rises significantly, by 113.17% (R^2=12.30% versus 5.77%) from level variables model to the model including both change and level variables. Furthermore, the explanatory power for earnings variables is increased by 73.74% from the model with change and level variables to the same model but with intercept and slope varying over time, R^2 increases from 12.30% to 21.37%.

TABLE 7.8
REGRESSION RESULTS FOR CHANGE VERSUS LEVEL VARIABLES AND VARYING PARAMETER MODEL FOR MODEL4

MODEL	INTERCEPT	Δ EARN	EARN	Adj R square
M4a	2.106***	1.65***	0.2296***	12.30%
M4b				20.26%
M4c				20.03%
M4d				21.37%

M4a Model with both change and level variables.
M4b Model with both change and level variables and intercept varies over time.
M4c Model with both change and level variables and slope varies over time.
M4d Model with both change and level variables and both slope and intercept vary over time.

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions are EARN and ΔEARN are the change and level of earnings.

The model can be written as:
$CAR_{it} = \alpha + \beta_1 \Delta EARN_{it} + \beta_2 EARN_{it} + u_{it}$...(M4a)

* significant at .10 level t critical = 1.282
** significant at .05 level t critical = 1.645
*** significant at .01 level t critical = 2.326

7.4.4 Regression Results for Transitory and Permanent Groups:

As with previous research, the yearly regression for each aggregate cash flow and earnings variable is estimated. The mean of the yearly regression coefficients and the adjusted R^2 are reported in table 7.9. The reported statistics are computed by dividing the mean of the coefficients by the standard error of the mean. Table 7.9 reports the estimation of cash flow and earnings variables. The dependent variable is CAR (Cumulative Abnormal Return) for both groups. The groups are according to section 7.3.2 procedures, and the following regression equations are estimated for each cash flow and earnings measure:

$CAR_{it} = a_{ot} + a_{1t}(X_{it} - X_{it-1})/MV_{it-1} + a_{2t}X_{it}/MV_{it-1} + u_{it}$ ....Ma

$CAR_{it} = b_{ot} + b_{1t}(X_{it} - X_{it-1})/MV_{it-1} + e_{it}$ ....Mb

$CAR_{it} = c_{ot} + c_{1t}\, X_{it}/MV_{it-1} + \mu_{it}$ ....Mc

Where,

CAR_{it} = Cumulative Abnormal Return for firm i in period t.

$a_{ot} - c_{1t}$ = The intercepts and slopes for the regression equations.

$(X_{it} - X_{it-1})$ = The changes for any cash flow or earnings variables.

X_{it-1} = The levels for any cash flow or earnings variables.

MV_{it-1} = Market value at the beginning of the year for firm i.

u_{it}, e_{it}, and μ_{it} = error terms for firm i at period t.

The previous equations are Ma for the model including both change and level variables, Mb for the model with change variable only and Mc for the model with level variable only.

7.4.4.1 Earnings:

The comparison of the regression results for the two groups reveals that for the low group, the R^2 increases by 70.17% (4.19% versus 7.13%) when the earnings level variable is included in the change earnings model. The comparison of the current results with previous findings by Ali and Zarowin (1992)[9] for the low (Permanent) group are:

Kind of Variable	Current Study Results (T-Ratio)' R^2	Ali and Zarowin Results (T-Ratio)' R^2
Change only	(1.59) 4.19%	(6.0) 17.5%
Level only	(0.63) 3.61%	(8.1) 16.2%
Both Change and Level	(1.48) (0.26) 7.13%	(2.8) (1.9) 19.3%
% increased in the R^2 after including the level variables	70.17%	10%

The previous comparison reveals that for the permanent group, the earnings variable that is calculated according to the U.S. GAAP, reveals more explanatory power than earnings according to U.K. GAAP.

For the high group (Transitory) there is a small increase in the R^2 when including the level variables-by 15.92% (13.32% versus 15.44%). The comparison of these findings with Ali and Zarowin's (1992) results for the transitory (High) group are:

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[9] Ali and Zarowin (1992) used different method for classifying the permanent and transitory group. Their method is the following: They rank firms into ten groups each year by their beginning-of-year earnings-price ratios. Then, they divide all firms with positive earnings into the first nine groups with almost equal number of firms per group. All firms with negative earnings are located in group ten. They classify firms in the middle six groups as predominantly permanent and firms in the bottom and top groups are predominantly transitory.

Kind of Variable	Current Study Results (T-Ratio)' R^2	Ali and Zarowin Results (T-Ratio)' R^2
Change only	(2.93) 13.32%	(6.4) 8.8%
Level only	(1.74) 6.87%	(4.9) 11.6%
Both Change and Level	(2.38) (-0.038) 15.44%	(3.9) (5.5) 15.30%
% increased in the R^2 after including the level variables	15.92%	74%

The comparison between the results of the current study and those of Ali and Zarowin reveals higher R^2 for the transitory group. This may well reflect the more permanent nature of the UK earnings compared to US earnings.

Thus, previous research concludes that the presence of the explanatory power in the earnings level is due to the transitory components in earnings levels. The current research results are unable to support this conclusion, because for the high group the increase in the explanatory power after including the level of earnings, is 15.92%, which is very low compared to that of the permanent group.

7.4.4.2 Cash Flow Measures:

For the low group, OCF shows low R^2 in both change and level: 0.46% and 3.04% respectively. However, for the high group, level OCF is significant and R^2 increases by 263.89% (1.80% versus 6.55%) when OCF level is included to OCF change model. These results support the expectation of the presence of high transitory components in the OCF variable.

For RIF: it is found that a change in RIF reveals $R^2 = 3.80\%$ for the high group and 0.86% for the low group. On the other hand, level RIF indicates $R^2 = 4.14\%$ for the low group and 2.50% for the high group. ICF, FCF and TCF all generate results with insignificant coefficients and very low R^2 for change and level for both groups.

TABLE 7.9
REGRESSION RESULTS FOR HIGH AND LOW GROUPS

VARIABLES			Earnings		OCF		RIF		ICF		FCF		TCF		CC	
			Low Group	High Group	Low Group	High Group	Low Group	High Group	Low Group	High Group	Low Group	High Group	Low Group	High Group	Low Group	High Group
Change only	Coef. (T-ratio)		4.34 (1.59)*	1.48 (2.93)***	0.175 (0.21)	0.023 (0.23)	-4.34 (-0.72)	-1.11 (-1.5)*	0.80 (0.67)	-0.12 (-1.00)	-0.63 (-0.37)	-0.02 (-0.11)	-2.0 (-0.42)	-0.12 (-0.23)	0.52 (0.71)	0.08 (0.78)
	R^2		4.19%	13.32%	0.46%	1.80%	0.86%	3.80%	0.47%	3.08%	1.94%	1.34%	1.01%	0.26%	0.76%	1.69%
Level only	Coef. (T-ratio)		0.45 (0.63)	0.668 (1.74)*	0.397 (1.32)*	0.198 (1.27)	0.78 (0.99)	0.39 (0.71)	-0.05 (-0.11)	0.01 (0.05)	0.16 (0.18)	-0.20 (-0.86)	0.89 (0.63)	0.29 (0.50)	0.50 (1.06)	0.22 (1.54)*
	R^2		3.61%	6.87%	3.04%	3.50%	4.14%	2.50%	0.42%	0.72%	0.98%	1.41%	1.26%	0.21%	1.46%	4.08%
Both change and level	Change	Coef. (T-ratio)	4.12 (1.48)*	1.59 (2.38)***	0.034 (0.042)	-0.15 (-0.91)	-4.39 (-0.74)	-1.79 (-1.88)**	0.81 (0.64)	-0.1 (-0.51)	0.77 (0.42)	0.12 (0.54)	-2.30 (-0.47)	-0.43 (-0.55)	0.31 (0.40)	-0.12 (-0.70)
	Level	Coef. (T-ratio)	0.19 (0.26)	-0.019 (-0.038)	0.388 (1.27)	0.305 (1.64)*	0.85 (1.06)	0.77 (1.46)*	-0.06 (-0.12)	0.05 (0.20)	-0.01 (-0.01)	-0.31 (-0.91)	0.99 (0.72)	0.53 (0.72)	0.46 (0.90)	0.35 (1.39)*
	R^2		7.13%	15.44%	3.00%	6.55%	4.50%	6.94%	0.61%	3.86%	2.81%	2.74%	1.76%	0.47%	1.52%	4.74%

The sample consists of 156 firms covering the period from 1977-1991. The variables definitions are, OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, and EARN is net income before extraordinary items and discontinuing of the operation.

The classification method for high and low group is: for each sample year the firms are classified into two groups depending on whether or not the absolute change in the variable X deflated by the market value at the beginning of the year $|\Delta X_t / MV_{t-1}|$ lies below or above the median. Reference is made to the group with the high absolute value of $|\Delta X_t / MV_{t-1}|$ as "high group" and to the one with the small change as "low group".

Annual cross-sectional regression was performed for each year. The mean of the coefficients was computed based on thirteen-year regressions, and the t-statistic was computed by dividing the mean of the yearly coefficients by its standard error.

Significant level at .10 t=1.282
Significant level at .05 t=1.645
Significant level at .01 t=2.326

7.5 DISCUSSION:

In this section, the applications of recent innovations in accounting market-based research methods in USA and UK are discussed in the context of the methodology that has been used in the previous sections. Change and level variables are incorporated with varying parameter models to test if they had any significant impact on the models and our resultant conclusions. Cash flow variables in both aggregate and disaggregate form as well as earnings are used.

Earnings:

Strong and Walker (1991) addressed the issue of change and level earnings as well as the varying parameter model in the UK. They report a significant increase in the explanatory power of R^2 when using change and level for earnings variables incorporated with varying parameter models. Their results are consistent with the findings of the current research.

Easton and Harris (1991) investigate the explanatory power of earnings using change or level earnings or both as explanatory variables for returns, and they find that level earnings show a higher R^2 than change earnings but that both were significant. Their results are inconsistent with the findings of recent research in the UK as well as with those of the current research. In the UK, Strong (1992) finds change earnings reveal a higher explanatory power than levels earnings and this is consistent with the findings of the current research. It can be concluded from this that US earnings have more transitory components, which result in higher explanatory power for return-earnings level models, while UK earnings are more permanent which leads to low explanatory power for return-earnings level models. Figure 7.1 presents some of the differences on accounting treatments between UK and US GAAP and their impact on earnings figures.

FIGURE 7.1
COMPARISON AMONG DIFFERENT ACCOUNTING TREATMENTS UNDER US AND UK GAAP AND THEIR IMPACT ON EARNINGS FIGURES

Status	The Treatment under		It is Impact on Earnings under US and UK GAAP		Its potential impact on the transitory and permanent components of earnings	
	US GAAP	UK GAAP	UK Earnings > US Earnings	UK Earnings < US Earnings	Under UK GAAP	Under US GAAP
Goodwill	Amortize up to 40 years.	Write-off-against reserve.	X		No effect	This causes the earnings to be more permanent
Deferred taxation	Using liability method, full provision.	Using liability method, partial provision.	X		This makes UK earnings more transitory than US earnings	
Valuation of the assets and depreciation charges	Using historical cost method only	-No preferred treatment, either historical cost or valuation (current cost) can be used. -Depreciation on revalued assets is based on their carry in amount which means that in general there is a large charge for depreciation in profit and loss account.		X	This causes UK earnings to be more transitory.	This causes US earnings to be more permanent.
Business combination	purchase method for acquisition, pooling of interest method for uniting of interest.	acquisition (purchase) and merger (pooling) accounting are not necessarily mutually exclusive. The application of the purchase method is different for each country. For instance, costs which are capitalized under UK GAAP but expended under the US GAAP. Also, the timing of the recognition of a gain on disposal of subsidiary is different for each GAAP regime.		X	This causes UK earnings to be more permanent.	This causes US earnings to be more transitory.
Borrowing costs	Capitalization is compulsory for certain assets.	No preferred treatment, either capitalize or write-off immediately can be used.	X		This causes UK earnings to be more transitory.	This causes US earnings to be more permanent.

Status	The Treatment under		It is Impact on Earnings under US and UK GAAP		Its potential impact on the transitory and permanent components of earnings	
	US GAAP	UK GAAP	UK Earnings > US Earnings	UK Earnings < US Earnings	Under UK GAAP	Under US GAAP
Research and Development	immediate Write-off-.	permitted to be recognize as assets when certain criteria are met, but choice of write-off also allowed.		X	This causes UK earnings to be more permanent.	No effect
Recognition of profit and revenue on long-term contracts.	Using percentage-of-completion and completed contract methods.	using percentage-of-completed methods only.			This causes UK earnings to be more permanent.	

Ali and Pope (1994) found results consistent with the findings of the current research, as did Strong (1992) with respect to both change and level of earnings model. Donnelly and Walker (1995) reported "in the context of prices anticipating earnings in the UK" that

> *"...the first difference variable, D2, works just as well as the level variable, L2, for firms with persistence earnings streams. Real improvements from using the levels variable only arise in the context of firms with transient earnings streams."*

The current research results as presented in table 7.9 support their findings for the permanent group, while for the transitory group their findings are not confirmed. In contrast, it is found that change earnings have more explanatory power for returns than do level earnings in both groups.

Cash Flow from Operations:

Ali and Pope (1994) investigate the use of both change and level of operating cash flow incorporated with varying parameter models for UK firms. They report that level OCF exhibits a significant coefficient while change OCF is insignificant for the linear model. Their results are consistent with the findings of the current research regarding level of OCF, but the current research exhibits higher R^2 for OCF when using varying parameter model: it increases from 4.43% to 15.17%, while Ali and Pope report 4.06% to 3.95% when moving from the model without time varying parameter to the varying parameter model. The current study provides evidence that the presence of the transitory components in cash flow variables is the reason for the increase in explanatory power after including the levels of cash flow variables in the change cash flow model.

In the current research, it is found that for the levels variable, the cash flow model shows a higher R^2 than does the earnings model. On the other hand, the change earnings model reveals a higher explanatory power than does the cash flow model. This further confirms the more transitory nature of cash flows as compared to earnings.

7.6 SUMMARY AND CONCLUSION:

This chapter re-examines the incremental information content of disaggregated cash flow data, aggregate cash flow and earnings variables, by employing some of the recent innovations in research methodology in market-based research. The results suggest that explanatory power is significantly increased for all the models when using both change and level variables as well as varying parameter models. Operating cash flow exhibits information content in both change and level form based on its association with cumulative abnormal returns. Also, OCF and RIF models report the highest R^2 in cash flow variables models. Disaggregate cash flow components reveal information content similar to what was found before in the previous chapter.

The overall results suggest that using level variables for cash flow models increases the explanatory power of the model significantly more than using change variables models alone does. However, using change variables for the earnings models increases the explanatory power significantly more than does using the level variable models. On the other hand, using a model containing both change and level variables as well as varying parameters, significantly increases the explanatory power for both cash flow and earnings models. These findings are consistent with Ali and Pope (1994) for earnings and operating cash flow models and with Strong and Walker (1991), Easton and Harris (1991), and Strong (1992) for earnings models.

The conclusions that were presented in the previous chapter hold for both earnings and cash flow models. OCF is significant in change variable, and it is significant in level variable too. Thus, these findings confirm that OCF has information content for the security market. Furthermore, all the remaining cash flow variables are significant in level form except TCF suggesting that tax payments can be calculated by using other accounting numbers before the release of TCF information.

CHAPTER EIGHT

SUMMARY AND CONCLUSIONS

8.1 INTRODUCTION:

There are numerous studies that investigate the usefulness of cash flow data in the USA. Nevertheless there is only a limited number which deal with this issue in the UK. The current research provides a comprehensive investigation into the usefulness of cash flow data as required under FRS 1 in aggregate, disaggregate and per share basis. Furthermore, some of the recent innovations in market-based research methodologies are used to investigate if they have any significant impact on the cash flow models.

The chapter is divided into the following: a summary of the results presented in section two; then, the implications of the results in section three; finally, extension and future research in section four.

8.2 SUMMARY OF THE RESULTS:

The correlation coefficients among cash flows and earnings are relatively low for most of the variables, except for EARN, RIF. This is due to the high correlation between earnings and dividends which is one of the items that is included in RIF. Furthermore, there is a high correlation between TCF and EARN, which is to be expected because the more one earns the more tax one has to pay.

The correlation coefficient between cash dividends and OCF is low for small firms. However, the managers in medium and large firms are more concerned with earnings and operating cash flow when making their dividend decisions than the managers in small firms. It can be concluded from this that small firms are more concerned with accrual earnings measure when making dividend decisions than with cash basis measures, while for medium and large firms, both cash and accruals basis are important when making dividends decisions.

The conclusions from the correlation analysis are these: small firms depend more heavily on external finance to finance their investment activities than on internal finance. On the other hand, large firms are less dependent on external finance to finance their investment activities but more dependent on their internal finance. The low correlation coefficient among the cash flow and earnings measures might be an indication of the separate information content of each measure.

The general results from the disaggregated cash flow components model suggest that collect, net interest and accruals are significant while other cash flow components are not significant. The pooled regression results for different firm sizes reveal little difference between the size groups except that collect has a positive and statistically significant coefficient for medium and large firms and accruals is only significant for medium firms. The results for disaggregated cash flow components are largely confirmed after employing change and level variables. The incremental information content of change and level of unexpected components of disaggregated cash flow is significant for collect, net interest and stock.

The comparison between aggregate and disaggregate cash flow results suggest that OCF and RIF have an information content as well as their disaggregated cash flow components. However, ICF and FCF have information value for the security markets whilst their disaggregated cash flow components are generally insignificant.

The information content test of the cash flow model and the cash flow per share model reveals similar results. It is found that OCF and OCFPS (OCFPS results according to yearly regression for total firms) are both significant with positive signs. Also, FCF, FCFPS, ICF, ICFPS, RIF, and RIFPS are significant. The incremental information content test suggests that cash flow per share variables do not have any incremental information content beyond cash flow variables. Similarly cash flow variables are unable to provide any incremental information value beyond cash flow per share variables.

Change and level cash flow variables are used and it is found that most level cash flow variables are significant, which suggests that level cash flow variables are associated with security returns. The explanatory power is higher for the levels cash flow model than for the change cash flow model. The reason for this is that level cash flow measures have more transitory components, which result in increasing the explanatory power of the model and which suggests that using levels cash flow measures for modelling cash flow response models is better than using changes in cash flows. When using the varying parameter model, it is found that the explanatory power is significantly increased.

Earnings and earnings per share both reveal information content for all firm sizes, small and medium firms have a higher R^2 than do large firms. The incremental information test suggests that earnings contain more incremental information beyond EPS and EPS has incremental information content beyond earnings for some years. Furthermore, cash flow variables do not contain any incremental information beyond earnings, while earnings reveals incremental explanatory power beyond cash flow variables, either individually or taken together. Cash flow per share variables do not have information value beyond EPS. However, EPS exhibits explanatory power beyond cash flow per share variables either individually or when taken together.

Change and level of earnings contain incremental information content. The explanatory power of earnings is increased when including both change and level at once. This result is consistent with the recent findings in the USA and the UK studies. The change earnings model reveals more explanatory power than does level earnings and this is consistent with Strong (1992) for the UK but inconsistent with

Easton and Harris (1991) for the USA. The explanatory power is significantly increased when using the varying parameter for earnings model.

8.3 IMPLICATIONS OF THE RESULTS:

8.3.1 Implications of the Results on FRS 1:

The current study provides evidence of the importance of cash flow statements under the FRS 1 classifications. Collect from customer and net interest are important components of cash flow statements and the results indicate a significant relationship with security returns. Furthermore, operating cash flow, return on investment and services of finance, investing, and financing cash flows also have information content. However, other disaggregated investing and financing cash flow components and dividends are less important owing to the timing and matching problem for the realized cash inflow and outflow. Thus, there is a problem in presenting cash flow statements for some items, since they reflect decisions taken in previous periods.

Tax payments did not contain any value for the security market, which raises the question of why it has been presented under a separate heading.

In contrast, net interest payment is important and able to provide a signal about a firm's performance. However, dividends could provide different signals about future performance. Combining both items under a single standard heading could result in losing the information value for one of them.

Cash flow per share did not contain any information value more than that contained in aggregate cash flow, so presenting two figures would be unnecessary.

From this study, it appears necessary to modify the current cash flow statements using the following standard headings: operating, net interest, dividends, financing, and investing cash flow. Tax cash flow will be included in cash flow from operation activities, because it is more related to operating activities and consistent with FASB and IASC.

8.3.2 Implications of the Results on Market Based Research:

Market based research has concentrated on using change variable as an explanatory variable for return in the context of earnings and cash flow models. Most of the studies in that area are limited to US firms. This study provides further evidence that UK and US markets are different in terms of the information content of some cash flow variables. Change of cash flow model reveals low explanatory power. However, the levels of cash flow model exhibits higher explanatory power. This is a result of the presence of high transitory components in cash flow levels (see section 7.3.2). UK earnings are more permanent than US earnings. Thus, earnings levels according to US GAAP capture high transitory components and lead to more explanatory power, while due to more permanent nature of UK earnings levels models result in low explanatory power. These findings are supported by Strong (1992) in the UK market.

The overall results from using recent innovations in market-based research suggest that change and level of the variable when incorporated in a varying parameter model should increase the explanatory power substantially.

8.4 EXTENSION AND FUTURE RESEARCH:

This section suggests some related areas where future research might be fruitful. First, using cash flow ratios as required by FRS 1 to determine failed or non- failed firms is a useful area for future study.

A second extension would the development of the directional hypotheses that were used for the current study, but from the perspective of corporate bond holders instead of from that of the stock holders. These disaggregated cash flow components might have an information content for bond holders as well as for stock holders.

Future research might consider the econometric development and take advantage of the new models that have been invented by many econometricians in time series type data. Also, they might consider the internal and the external validity of the model before relying on it.

The results from using some of the innovations of market-based research methods suggest that change and level variables incorporated with varying parameter models exhibit high explanatory power for earnings and cash flow models. Thus, future studies in this area are encouraged to use these methods.

The results of annual cross-sectional regression show fluctuations in the coefficient sign over the years for FCF and ICF and their related disaggregated components. The investigation of these fluctuations is an empirical issue and it is beyond the scope of the current research. Therefore, future research might consider expanding these issues much further by using time series data for each individual firm and studying these issues in conjunction with economic and environmental factors while running a comparison among industry groups.

Also, some of the limitations of the current research were related to the variable calculation, because a proxy variable had to be generated for cash flow data owing to the unavailability of real cash flow statements, and this process led to some errors beyond the author's control. In future, when actual cash flow statements become available further research will provide a good opportunity to confirm previous research results by using actual cash flow data.

Further tests, by introducing new models which combine both earnings and cash flows are essential to determine the market response to such models and to identify the explanatory power of cash flows and earnings taken together.

APPENDIX (A)
REGRESSION RESULTS FOR DIFFERENT LAGS

1-FOUR MONTH LAG:

TABLE A.1
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 1

Variables	Small firms		Medium firms		Large Firms		All Firms	
	Coef. (T-Ratio)	Significant	Coef. (T-Ratio)	Significant	Coef. (T-Ratio)	Significant	Coef (T-Ratio)	Significan t
Collect	0.047 (1.55)	NS	0.0644 (2.48)	**	0.1169 (3.32)	***	0.071 (4.65)	***
Net interest	-2.0155 (-3.72)	***	-3.224 (-5.68)	***	-2.364 (-3.29)	***	-2.6103 (-8.39)	***
Dividends	0.258 (0.25)	NS	0.347 (0.34)	NS	-1.014 (-0.66)	NS	-0.7473 (-1.25)	NS
TCF	0.284 (1.16)	NS	0.0119 (0.04)	NS	-0.153 (-0.35)	NS	-0.0561 (-0.36)	NS
S.FIXED	0.2668 (1.39)	NS	0.0439 (0.19)	NS	-0.0564 (-0.13)	NS	0.0289 (0.24)	NS
P.Invest	-0.0859 (-0.92)	NS	0.1026 (1.04)	NS	0.0559 (0.43)	NS	-0.00744 (-0.14)	NS
Stock	-0.0211 (-0.13)	NS	-0.0289 (-0.21)	NS	-0.1421 (-0.59)	NS	0.0044 (0.05)	NS
Debt	0.06042 (0.66)	NS	0.0469 (0.54)	NS	0.0355 (0.30)	NS	0.05515 (1.14)	NS
Accruals	0.04604 (0.73)	NS	0.1118 (2.25)	**	-0.0178 (-0.17)	NS	0.10558 (3.24)	***
F- Statis	2.32	**	5.27	***	2.01	*	10.16	***
Adj R^2	2.3%		7.4%		3.0%		5.3%	

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1981-1991.

The variables definitions are: Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 is earnings minus net cash flows in model 1. All the previous variables are in first difference form after being deflated by the beginning-of-the-fiscal year market value of equity.

The firm sizes classification is according to sales value in 1991. There are 572 firm-year observations for each small and meduim firms while for larg firms there are 330 firm-year observations.

The Model can be written as
CAR= $a_0 + a_1$ *Collections* + b_2 *Net Interest* + b_2 *Dividends Pmt.* + c_1 Taxes + d_1 *P.Investment* + d_2 *Sale Fixed* + e_1 *Debt* + e_2 *Stock* + f_1 *Accruals1* +e......(M1)
* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 levei and NS Not Significant

TABLE A.2
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 2

Variables	Small Firms		Medium Firms		Large Firms		All firms	
	Coef. (T-Ratio)	Sig[a]	Coef. (T-Ratio)	Sig	Coef. (T-Ratio)	Sig	Coef. (T-ratio)	Sig
OCF	0.232 (2.47)	**	0.155 (2.29)	**	0.229 (1.81)	*	0.170 (3.63)	***
RIF	-1.261 (-2.72)	***	-1.66 (-4.88)	***	-0.458 (-1.18)	NS	-1.286 (-6.21)	***
ICF	-0.0156 (-0.26)	NS	-0.123 (-2.53)	**	-0.152 (-1.97)	**	-0.1088 (-3.60)	***
FCF	0.1366 (1.36)	NS	-0.00014 (-0.00)	NS	0.182 (1.62)	NS	0.0313 (0.68)	NS
CC	0.108 (1.53)	NS	0.138 (1.99)	**	0.252 (2.09)	**	0.166 (3.93)	***
TCF	0.426 (1.58)	NS	-0.327 (-1.24)	NS	-0.201 (-0.59)	NS	-0.0727 (-0.47)	NS
Accruals 2	0.183 (2.79)	***	0.211 (3.88)	***	0.227 (2.38)	**	0.228 (6.71)	***
F-Statis	3.47	***	7.37	***	2.18	**	15.52	***
Adj R^2	2.5%		6.2%		2.1%		4.80%	

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. There are 728 firm-year observations for each small and meduim firms while for larg firms there are 420 firm-year observations.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, Accruals 2. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = g_0 + g_1 OCF + g_2 RIF + g_3 TCF + g_4 ICF + g_5 FCF + g_6 CC + h_7 Accruals\ 2 + e$...(M2)

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level, NS Not Significant and a Significant

TABLE A.3
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 4

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	(T-Ratio)	Sig	(T-Ratio)	Sig	(T-Ratio)	Sig	(T-Ratio)	Sig
EARN	9.58	***	11.18	***	4.31	***	308.5	***
F-Statis	91.86	***	124.99	***	18.55	***	258.5	***
Adj R^2	11.9%		15.4%		4.2%		11.20%	

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. There are 728 firm-year observations for each small and meduim firms while for larg firms there are 420 firm-year observations.

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

EARN is net income before extraordinary items and discontinuing of the operation, and it is in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = I_0 + I_1 EARN + e$ ....(M4)

* Significant at .10 level
** Significant at .05 level
*** Significant at .01 level
NS Not Significant

TABLE A.4
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 3

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	Coef. (T-Ratio)	Sig[a]	Coef. (T-Ratio)	Sig	Coef. (T-Ratio)	Sig	Coef. (T-Ratio)	Sig
OCFPS	0.00117 (1.33)	NS	0.0005 (0.72)	NS	-0.0007 (-0.84)	NS	0.00044 (1.03)	NS
RIFPS	-0.0178 (-4.12)	***	-0.026 (-7.14)	***	-0.0077 (-2.04)	**	-0.0188 (-8.92)	***
ICFPS	-0.000286 (-0.55)	NS	-0.0007 (-1.88)	*	-0.00001 (-0.02)	NS	-0.0006 (-2.75)	***
FCFPS	0.00045 (0.59)	NS	0.0002 (0.32)	NS	-0.0009 (-1.43)	NS	0.000087 (0.25)	NS
CCPS	0.00029 (0.36)	NS	-0.00006 (-0.09)	NS	0.0016 (2.15)	**	0.00643 (1.60)	NS
TCFPS	0.00313 (1.06)	NS	0.0002 (0.07)	NS	0.002 (0.64)	NS	0.001675 (1.01)	NS
Accruals 3	0.00717 (1.17)	NS	0.00036 (0.79)	NS	-0.0002 (-0.44)	NS	0.00061 (2.26)	**
F-Statis	3.10	***	7.82	***	1.93	*	12.81	***
Adj R^2	2.1%		6.7%		1.6%		4.0%	

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. There are 728 firm-year observations for each small and meduim firms while for larg firms there are 420 firm-year observations.

The variables definitions are: OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and Accruals 3. All the previous variables are in first difference form only.

The model can be written as:

$CAR = b_0 + b_1 OCFPS + b_2 RIFPS + b_3 TCFPS + b_4 ICFPS + b_5 FCFPS + b_6 CCPS + b_7$ Accruals 3+ e...(M3)

* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level,
NS Not Significant
a Significant

TABLE A.5
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES
FOR MODEL 5

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	Coef. (T-Ratio)	Sig[a]	Coef. (T-Ratio)	Sig	Coef. (T-Ratio)	Sig	Coef. (T-Ratio)	Sig
EPS	0.024 (7.63)	***	0.0158 (6.47)	***	0.0117 (5.06)	***	0.0153 (10.71)	***
F-Statis	58.15	***	41.83	***	25.64	***	114.7	***
Adj R^2	7.7%		5.6%		4.0%		5.2%	

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. There are 728 firm-year observations for each small and meduim firms while for larg firms there are 420 firm-year observations.

EPS is earnings per share in unexpected form only.

The model can be written as:
$CAR = j_0 + j_1 EPS + e$ ....(M5)
* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level
NS Not Significant
a Significant

2-FIVE MONTHS LAG:

TABLE A.6
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 1

Variables	Small firms		Medium firms		Large Firms		All Firms	
	Coef.	Significant	Coef.	Significant	Coef.	Significant	Coef	Significant
Collect	0.047	NS	0.08044	**	0.15346	***	0.0894	***
Net interest	-2.213	***	-4.402	***	-2.678	***	-3.342	***
Dividends	-0.676	NS	0.355	NS	-5.214	**	-1.75	**
TCF	0.362	NS	-0.2691	NS	-0.5962	NS	-0.2	NS
S.FIXED	0.3309	NS	-0.0888	NS	0.3075	NS	0.1857	NS
P.Invest	-0.1053	NS	-0.0492	NS	-0.2268	NS	-0.1456	*
Stock	0.0899	NS	-0.0491	NS	-0.1377	NS	0.064	NS
Debt	-0.0254	NS	-0.0531	NS	0.0265	NS	0.0286	NS
Accruals	0.06197	NS	0.11248	**	0.1359	NS	0.1663	***
F- Statis	1.35	NS	4.52	***	2.40	**	8.38	***
Adj R^2	0.6%		6.3%		4.1%		4.3%	

CAR_{it} is the Cumulative Abnormal Return for firm i from June of year t to May of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1981-1991.

The variables definitions are Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 is earnings minus net cash flows in model 1. All the previous variables are in first difference form after being deflated by the beginning-of-the-fiscal year market value of equity.

The firm sizes classification is according to sales value in 1991. There are 572 firm-year observations for each small and meduim firms while for larg firms there are 330 firm-year observations.

The Model can be written as

CAR= a_0+a_1 *Collections* + b_2 *Net Interest*+b_2 *Dividends Pmt.*+c_1 Taxes + d_1 *P.Investment* + d_2 *Sale Fixed* + e_1 *Debt* +e_2 *Stock* + f_1 *Accruals1* +e......(M1)

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level and NS Not Significant

TABLE A.7
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES
FOR MODEL 2

Variables	Small Firms		Medium Firms		Large Firms		All firms	
	Coef.	Sig[a]	Coef.	Sig	Coef.	Sig	Coef.	Sig
OCF	0.17667	**	0.133	**	0.039	NS	0.111	***
RIF	-0.77	**	-1.194	***	-0.4667	NS	-0.9718	***
ICF	-0.0867	*	-0.0802	**	-0.1605	**	-0.10989	***
FCF	0.12	NS	-0.019	NS	0.0117	NS	0.01489	NS
CC	0.0496	NS	0.1166	**	0.202	**	0.0943	***
TCF	0.3149	NS	-0.24	NS	-0.351	NS	-0.0715	NS
Accruals 2	0.116	**	0.141	***	0.121	NS	0.12477	***
F-Statis	3.55	***	6.13	***	2.20	**	13.48	***
Adj R^2	2.6%		5.1%		2.1%		4.20%	

CAR_{it} is the Cumulative Abnormal Return for firm i from Jun of year t to May of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. There are 728 firm-year observations for each small and meduim firms while for larg firms there are 420 firm-year observations.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, Accruals 2. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = g_0 + g_1 OCF + g_2 RIF + g_3 TCF + g_4 ICF + g_5 FCF + g_6 CC + h_7 Accruals\ 2 + e$...(M2)

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level, NS Not Significant and a Significant

TABLE A.8
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES
FOR MODEL 4

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	Coef.	Sig	Coef.	Sig	Coef.	Sig	Coef.	Sig
EARN	1.5476	***	1.413	***	1.1205	***	1.44	***
F-Statis	70.43	***	105.60	***	20.26	***	233.54	***
Adj R^2	9.30%		13.40%		4.60%		10.20%	

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. There are 728 firm-year observations for each small and meduim firms while for larg firms there are 420 firm-year observations.

CAR_{it} is the Cumulative Abnormal Return for firm i from June of year t to May of year t+1 for December year-end firms.

EARN is net income before extraordinary items and discontinuing of the operation, and it is in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = I_0 + I_1 EARN + e$ ....(M4)

* Significant at .10 level
** Significant at .05 level
*** Significant at .01 level
NS Not Significant

TABLE A.9
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 3

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	Coef.	Sig[a]	Coef.	Sig	Coef.	Sig	Coef.	Sig
OCFPS	0.001	NS	0.0004	NS	-0.00087	NS	0.0002	NS
RIFPS	-0.015	***	-0.0212	***	-0.0073	**	-0.0168	***
ICFPS	-0.001	*	-0.0007	**	-0.0004	NS	-0.00079	***
FCFPS	0.0009	NS	0.0003	NS	-0.0006	NS	0.00025	NS
CCPS	-0.0002	NS	-0.00028	NS	0.0013	*	0.00021	NS
TCFPS	0.0032	NS	-0.0027	NS	0.0003	NS	-0.00009	NS
Accruals 3	0.0003	NS	-0.00003	NS	-0.00007	NS	0.00026	NS
F-Statis	2.82	***	6.97	***	2.30	**	13.79	***
Adj R^2	1.90%		6.0%		2.3%		4.3%	

CAR_{it} is the Cumulative Abnormal Return for firm i from June of year t to May of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. There are 728 firm-year observations for each small and meduim firms while for larg firms there are 420 firm-year observations.

The variables definitions are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and Accruals 3. All per share variables are in first difference form only.

The model can be written as:

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

* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level,
NS Not Significant
a Significant

TABLE A.10
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 5

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	Coef.	Sig[a]	Coef.	Sig	Coef.	Sig	Coef.	Sig
EPS	0.01786	***	0.0118	***	0.0091	***	0.0117	***
F-Statis	47.98	***	37.89	***	25.19	***	108.6	***
Adj R^2	6.4%		5.1%		3.9%		5.0%	

CAR_{it} is the Cumulative Abnormal Return for firm i from June of year t to May of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. There are 728 firm-year observations for each small and meduim firms while for larg firms there are 420 firm-year observations.

EPS is earnings per share in unexpected form only.

The model can be written as:
$CAR = j_0+j_1EPS+e$ ....(M5)
* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level
NS Not Significant
a Significant

3- SIX MONTHS LAG:

TABLE A. 11
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 1

Variables	Small firms		Medium firms		Large Firms		All Firms	
	Coef.	Significant	Coef.	Significant	Coef.	Significant	Coef	Significant
Collect	0.0283	NS	0.0752	**	0.1457	***	0.0682	***
Net interest	-1.476	**	-4.0248	***	-2.501	**	-2.87	***
Dividends	-1.474	NS	-1.029	NS	-2.912	NS	-2.054	**
TCF	0.3864	NS	-0.1433	NS	-0.7426	NS	-0.151	NS
S.FIXED	0.295	NS	-0.092	NS	1.056	*	0.117	NS
P.Invest	-0.106	NS	-0.0359	NS	-0.3126	*	-0.1322	*
Stock	-0.121	NS	0.0365	NS	0.1106	NS	0.0873	NS
Debt	0.164	NS	-0.1956	NS	-0.0075	NS	-0.06878	NS
Accruals	0.0892	NS	0.1303	*	0.1106	NS	0.15068	***
F- Statis	1.56	NS	4.48	***	2.24	**	7.79	***
Adj R^2	1.0%		6.2%		3.7%		4.0%	

CAR_{it} is the Cumulative Abnormal Return for firm i from July of year t to June of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1981-1991.

The variables definitions are Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 is earnings minus net cash flows in model 1. All the previous variables are in first difference form after being deflated by the beginning-of-the-fiscal year market value of equity.

The firm sizes classification is according to sales value in 1991. There are 572 firm-year observations for each small and meduim firms while for larg firms there are 330 firm-year observations.

The Model can be written as

CAR= a_0+a_1 *Collections* + b_2 *Net Interest*+b_2 *Dividends Pmt.*+c_1 Taxes + d_1 *P.Investment* + d_2 *Sale Fixed* + e_1 *Debt* +e_2 *Stock* + f_1 *Accruals1* +e......(M1)

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level and NS Not Significant

TABLE A.12
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 2

Variables	Small Firms		Medium Firms		Large Firms		All firms	
	Coef.	Sig[a]	Coef.	Sig	Coef.	Sig	Coef.	Sig
OCF	0.123	**	0.046	NS	0.0313	NS	0.053	**
RIF	-0.586	**	-0.8595	***	-0.1586	NS	-0.683	***
ICF	-0.0239	NS	-0.0422	NS	-0.12857	***	-0.0688	***
FCF	0.118	**	-0.016	NS	-0.006	NS	0.00113	NS
CC	0.054	NS	0.10359	***	0.104	NS	0.0769	***
TCF	0.145	NS	-0.235	NS	-0.272	NS	-0.1397	NS
Accruals 2	0.133	***	0.0675	**	0.0636	NS	0.0844	***
F-Statis	4.09	***	6.01	***	2.05	**	12.86	***
Adj R^2	3.2%		5.0%		1.9%		4.00%	

CAR_{it} is the Cumulative Abnormal Return for firm i from July of year t to June of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. There are 728 firm-year observations for each small and meduim firms while for larg firms there are 420 firm-year observations.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, Accruals 2. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = g_0 + g_1 OCF + g_2 RIF + g_3 TCF + g_4 ICF + g_5 FCF + g_6 CC + h_7 Accruals\ 2 + e$...(M2)

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level, NS Not Significant and a Significant

TABLE A.13
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 4

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	Coef.	Sig	Coef.	Sig	Coef.	Sig	Coef.	Sig
EARN	1.272	***	1.213	***	1.403	***	1.245	***
F-Statis	56.17	***	89.78	***	28.42	***	196.76	***
Adj R^2	7.6%		11.60%		6.5%		8.80%	

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991.

CAR_{it} is the Cumulative Abnormal Return for firm i from July of year t to June of year t+1 for December year-end firms. There are 728 firm-year observations for each small and meduim firms while for larg firms there are 420 firm-year observations.

EARN is net income before extraordinary items and discontinuing of the operation, and it is in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = I_0 + I_1 EARN + e$ ....(M4)

* Significant at .10 level
** Significant at .05 level
*** Significant at .01 level
NS Not Significant

TABLE A.14
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 3

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	Coef.	Sig[a]	Coef.	Sig	Coef.	Sig	Coef.	Sig
OCFPS	0.0011	NS	0.0004	NS	-0.001	NS	0.00034	NS
RIFPS	-0.0133	***	-0.017	***	-0.0064	*	-0.015	***
ICFPS	-0.00079	*	-0.0009	***	-0.0003	NS	-0.00084	***
FCFPS	0.00085	NS	0.0002	NS	-0.00094	*	0.00006	NS
CCPS	0.00022	NS	0.00015	NS	0.0012	*	0.00037	NS
TCFPS	0.0052	**	-0.00045	NS	-0.0002	NS	0.0013	NS
Accruals 3	0.0011	**	0.000118	NS	-0.0002	NS	0.00047	**
F-Statis	3.22	***	5.57	***	2.30	*	12.58	***
Adj R^2	2.3%		4.6%		2.3%		3.9%	

CAR_{it} is the Cumulative Abnormal Return for firm i from July of year t to June of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. There are 728 firm-year observations for each small and meduim firms while for larg firms there are 420 firm-year observations.

The variables definitions are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and Accruals 3. All per share variables are in first difference form only.

The model can be written as:

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

* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level,
NS Not Significant
a Significant

TABLE A.15
POOLED REGRESSION RESULTS FOR DIFFERENT FIRM SIZES FOR MODEL 5

Variables	Small Firms		Medium Firms		Large Firms		All Firms	
	Coef.	Sig[a]	Coef.	Sig	Coef.	Sig	Coef.	Sig
EPS	0.0141	***	0.0095	***	0.0075	***	0.0096	***
F-Statis	46.19	***	38.48	***	26.45	***	111.64	***
Adj R^2	6.2%		5.2%		4.2%		5.1%	

CAR_{it} is the Cumulative Abnormal Return for firm i from July of year t to June of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. There are 728 firm-year observations for each small and meduim firms while for larg firms there are 420 firm-year observations.

EPS is earnings per share in unexpected form only.

The model can be written as:
$CAR = j_0 + j_1 EPS + e$ ....(M5)
* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level
NS Not Significant
a Significant

APPENDIX (B)

THE RESULTS OF ANNUAL CROSS-SECTIONAL REGRESSION FOR:

SMALL, MEDIUM, LARGE AND ALL FIRMS

FOR ALL THE MODELS

TABLE B.1
ASSOCIATION BETWEEN CAR AND DISAGGREGATE CASH FLOW
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR TOTAL FIRMS, 1981-1991
TEST THE VARIABLE AND MODEL SIGNIFICANCE

Years	Collect		Netint		Divid		TCF		P.invs		S.fixed		Debt		Stock		Accruals 1		Adj (R^2)	F-Value	Sig
	Coef	Sig^a	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef.	Sig	Coef.	Sig	Coef.	Sig			
1981	0.066	*	-2.6	***	-0.69	NS	-0.77	NS	0.26	NS	-0.01	NS	-0.14	NS	-0.37	NS	-0.08	NS	9.8%	2.55	***
1982	0.074	NS	-1.44	**	1.85	NS	0.32	NS	-0.02	NS	-0.73	**	0.003	NS	-0.28	NS	0.08	NS	10.2%	2.58	***
1983	0.079	*	-2.04	**	-1.6	NS	0.28	NS	-0.18	NS	0.132	NS	-0.037	NS	-0.29	NS	0.05	NS	2.3%	1.34	NS
1984	0.25	***	-2.93	***	-4.77	**	0.21	NS	-0.03	NS	-0.89	*	0.28	*	0.05	NS	0.15	NS	20.3%	4.78	***
1985	0.056	NS	-2.14	*	1.83	NS	0.02	NS	0.05	NS	0.30	NS	0.06	NS	-0.11	NS	0.13	NS	1.3%	1.19	NS
1986	0.051	NS	-1.35	NS	-0.68	NS	0.41	NS	0.16	NS	-0.25	NS	-0.22	NS	-0.27	NS	-0.002	NS	0.0%	0.85	NS
1987	0.040	NS	-3.12	*	-5.61	*	1.11	NS	-0.25	NS	0.888	*	0.040	NS	0.028	NS	0.277	**	7.0%	2.08	**
1988	-0.01	NS	-1.09	NS	-2.03	NS	0.24	NS	-0.20	NS	0.27	NS	0.49	**	0.20	NS	0.26	NS	0.0%	0.70	NS
1989	0.057	NS	-5.30	***	-2.48	NS	0.02	NS	0.24	NS	0.32	NS	-0.069	NS	-0.47	**	0.075	NS	10.8%	2.90	***
1990	0.091	NS	-4.75	***	-5.29	**	-0.01	NS	0.007	NS	-0.18	NS	0.113	NS	0.27	NS	0.05	NS	7.1%	2.22	**
1991	0.105	NS	-3.71	**	5.48	NS	-0.50	NS	-0.15	NS	1.15	*	0.47	*	0.20	NS	0.165	NS	10.2%	2.74	***
Pool Regression	0.071	***	-2.10	***	-0.75	NS	-0.06	NS	-0.01	NS	0.03	NS	0.056	NS	0.004	NS	0.106	***	5.3%	10.16	***

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1981-1991.

The variables definitions are Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 is earnings minus net cash flows in model 1. All the previous variables are in first difference form after being deflated by the beginning-of-the-fiscal year market value of equity.

The firm sizes classification is according to sales value in 1991.

The Model can be written as

$$CAR = a_0 + a_1\ \textit{Collections} + b_2\ \textit{Net Interest} + b_2\ \textit{Dividends Pmt.} + c_1\ \text{Taxes} + d_1\ \textit{P.Investment} + d_2\ \textit{Sale Fixed} + e_1\ \textit{Debt} + e_2\ \textit{Stock} + f_1\ \textit{Accruals1} + e \ldots\ldots (M1)$$

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level and NS Not Significant

TABLE B.2
ASSOCIATION BETWEEN CAR AND DISAGGREGATE CASH FLOW
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR SMALL FIRMS, 1981-1991
TEST THE VARIABLE AND THE MODEL SIGNIFICANCE

Years	Collect		Netint		Divid		TCF		P.invs		S.fixed		Debt		Stock		Accruals 1		Adj (R^2)	F-Value	Sig
	Coef	Sig[a]	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef.	Sig	Coef.	Sig	Coef.	Sig			
1981	0.22	NS	-6.09	***	-4.09	NS	-1.49	NS	0.451	NS	-1.12	NS	0.16	NS	-0.93	NS	-0.36	NS	17.3%	1.97	*
1982	0.09	NS	-1.52	NS	5.81	NS	-0.02	NS	-0.32	NS	-0.71	NS	-0.62	NS	-1.74	NS	-0.11	NS	3.6%	1.18	NS
1983	-0.05	NS	0.226	NS	0.59	NS	176	NS	0.041	NS	0.799	NS	-0.54	NS	-0.59	NS	0.11	NS	6.7%	1.36	NS
1984	0.196	NS	-0.09	NS	-6.07	NS	0.757	NS	0.55	NS	-0.95	NS	-0.306	NS	-0.73	NS	-0.13	NS	7.7%	1.42	NS
1985	0.158	NS	-1.18	NS	10.1	NS	-0.69	NS	-0.02	NS	1.24	NS	-0.40	NS	1.168	NS	0.38	NS	0.0%	0.77	NS
1986	.0.172	NS	-3.2	NS	-7.47	NS	-0.43	NS	-0.31	NS	-0.95	NS	0.293	NS	0.854	NS	0.61	*	0.0%	0.62	NS
1987	-0.11	NS	-4.74	NS	-4.89	NS	0.87	NS	0.81	NS	0.55	NS	-0.96	*	-0.61	NS	-0.46	NS	1.4%	1.07	NS
1988	-0.10	NS	0.156	NS	-4.56	NS	3.188	NS	-0.21	NS	0.697	NS	0.779	NS	-0.64	NS	-0.03	NS	0.0%	0.43	NS
1989	0.20	NS	-7.93	**	-10.8	*	-0.51	NS	0.19	NS	1.3	NS	-0.18	NS	-0.74	NS	0.20	NS	6.1%	1.33	NS
1990	0.028	NS	-6.87	**	-16.8	*	0.494	NS	0.492	NS	-0.54	NS	0.59	NS	-0.12	NS	-0.25	NS	9.7%	1.55	NS
1991	0.566	**	1.354	NS	19.5	*	0.387	NS	0.53	NS	1.98	*	0.058	NS	-0.25	NS	-0.13	NS	13.9%	1.86	*
Pool Regression	0.028	NS	-1.48	**	-1.47	NS	0.386	NS	-0.11	NS	0.295	NS	0.121	NS	0.164	NS	0.089	NS	1.0%	1.56	NS

Appendix (B)

CAR_{it} is the Cumulative Abnormal Return for firm i from July of year t to June of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1981-1991. There are 52 observations for each year that used in this analysis.

The variables definitions are Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 is earnings minus net cash flows in model 1. All the previous variables are in first difference form after being deflated by the beginning-of-the-fiscal year market value of equity.

The firm sizes classification is according to sales value in 1991.

The Model can be written as

$$CAR = a_0 + a_1\ \mathit{Collections} + b_2\ \mathit{Net\ Interest} + b_2\ \mathit{Dividends\ Pmt.} + c_1\ \text{Taxes} + d_1\ \mathit{P.Investment} + d_2\ \mathit{Sale\ Fixed} + e_1\ \mathit{Debt} + e_2\ \mathit{Stock} + f_1\ \mathit{Accruals1} + e \ldots\ldots (M1)$$

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level and NS Not Significant

TABLE B.3
ASSOCIATION BETWEEN CAR AND DISAGGREGATE CASH FLOW

ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR MEDIUM FIRMS, 1981-1991
TEST THE VARIABLE COEFFICIENT AND THE MODEL SIGNIFICANCE

Years	Collect		Netint		Divid		TCF		P.invs		S.fixed		Debt		Stock		Accruals 1		Adj (R^2)	F-Value	Sig
	Coef	Sig[a]	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef.	Sig	Coef.	Sig	Coef	Sig			
1981	-0.02	NS	-0.99	NS	-4.07	NS	-0.35	NS	0.205	NS	-1.95	NS	0.279	NS	0.201	NS	-0.01	NS	1.3%	1.06	NS
1982	-.001	NS	-2.56	NS	2.26	NS	-2.3	NS	-0.05	NS	0.318	NS	-0.24	NS	-1.05	NS	-0.10	NS	0.0%	0.76	NS
1983	0.106	NS	-6.67	**	-11	*	-0.35	NS	-0.34	NS	-0.02	NS	-0.56	NS	1.25	NS	0.36	NS	19.2%	2.09	*
1984	0.165	NS	-2.57	NS	2.05	NS	0.92	NS	-0.18	NS	-2.07	NS	0.13	NS	0.05	NS	0.36	NS	27.8%	2.63	**
1985	0.26	NS	-1.22	NS	-0.71	NS	-1.40	NS	0.68	NS	-1.65	NS	-0.96	**	-1.22	NS	-0.06	NS	5.6%	1.27	NS
1986	-0.17	NS	-0.01	NS	3.16	NS	1.34	NS	-0.15	NS	0.263	NS	-0.38	NS	-0.03	NS	0.13	NS	3.1%	1.15	NS
1987	0.02	NS	-13.8	***	-7.16	NS	5.78	NS	-1.7	*	2.6	NS	-0.16	NS	-0.55	NS	0.01	NS	8.9%	1.42	NS
1988	-0.09	NS	0.449	NS	3.3	NS	-2.70	NS	0.55	NS	-0.21	NS	-0.06	NS	0.302	NS	0.15	NS	0.0%	0.41	NS
1989	0.13	NS	-5.6	*	-6.87	NS	2.82	NS	0.05	NS	0.471	NS	0.66	NS	-0.18	NS	-0.06	NS	1.2%	1.06	NS
1990	0.114	NS	-5.40	NS	-3.9	NS	-1.05	NS	0.76	NS	2.58	*	-0.61	NS	-0.94	NS	-0.41	NS	3.7%	1.21	NS
1991	0.28	NS	-6.86	**	12.1	NS	-3.84	*	-0.93	NS	2.3	NS	2.09	***	0.13	NS	0.99	***	50.6%	6.11	***
Pool Regression	0.08	**	-4.4	***	0.36	NS	-0.27	NS	0.049	NS	-0.89	NS	-0.531	NS	-0.05	NS	0.11	*	6.3%	4.52	***

Appendix (B)

CAR_{it} is the Cumulative Abnormal Return for firm i from June of year t to May of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1981-1991. There are 52 observations that used in this analysis each year.

The variables definitions are Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 is earnings minus net cash flows in model 1. All the previous variables are in first difference form after being deflated by the beginning-of-the-fiscal year market value of equity.

The firm sizes classification is according to sales value in 1991.

The Model can be written as

$$CAR = a_0 + a_1\ \textit{Collections} + b_2\ \textit{Net Interest} + b_2\ \textit{Dividends Pmt.} + c_1\ \text{Taxes} + d_1\ \textit{P.Investment} + d_2\ \textit{Sale Fixed} + e_1\ \textit{Debt} + e_2\ \textit{Stock} + f_1\ \textit{Accruals1} + e \ldots\ldots (M1)$$

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level and NS Not Significant

TABLE B.4
ASSOCIATION BETWEEN CAR AND DISAGGREGATE CASH FLOW

ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR LARGE FIRMS, 1981-1991
TEST THE VARIABLE COEFFICIENT AND THE MODEL SIGNIFICANCE

Years	Collect		Netint		Divid		TCF		P.invs		S.fixed		Debt		Stock		Accruals 1		Adj (R^2)	F-Value	Sig
	Coef	Sig[a]	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef.	Sig	Coef.	Sig	Coef.	Sig			
1981	0.108	NS	-0.79	NS	9.67	*	-2.23	*	-0.16	NS	0.59	NS	-0.081	NS	1.64	*	0.20	NS	4.4%	1.13	NS
1982	0.26	NS	-3.3	NS	-1.43	NS	-0.93	NS	-1.15	NS	-0.01	NS	0.815	NS	2.34	NS	0.34	NS	0.0%	0.76	NS
1983	0.193	NS	2.8	NS	-0.97	NS	2.8	NS	0.62	NS	-1.2	NS	-0.42	NS	-0.01	NS	-0.86	*	14.6%	1.47	NS
1984	0.37	**	-7.40	***	3.97	NS	-0.23	NS	-0.59	NS	-1.69	NS	0.81	NS	1.89	NS	0.26	NS	31.1%	2.31	*
1985	0.31	NS	0.87	NS	-4.05	NS	1.61	NS	-0.12	NS	5.176	**	-0.51	NS	-0.96	NS	-0.31	NS	12.6%	1.43	NS
1986	0.076	NS	-1.58	NS	-2.74	NS	-3.45	*	0.09	NS	1.5	NS	-0.70	NS	-0.60	NS	-0.64	NS	9.3%	1.30	NS
1987	0.52	NS	-11.9	NS	-15.5	NS	-4.4	NS	0.462	NS	-2.66	NS	-1.07	NS	-4.73	**	-1.14	NS	0.0%	0.98	NS
1988	0.11	NS	-6.07	NS	-6.47	NS	2.05	NS	0.793	NS	-5.17	NS	-0.209	NS	-1.52	NS	0.1	NS	0.0%	0.84	NS
1989	-0.21	NS	6.056	NS	-3.91	NS	-5.7	*	1.059	**	-4.62	**	-0.85	*	-2.63	***	-1.21	***	36.6%	2.73	**
1990	0.38	*	1.89	NS	-8.3	NS	-0.75	NS	0.30	NS	-3.5	***	-0.506	NS	-0.13	NS	-0.22	NS	27.6%	2.19	*
1991	0.25	NS	-10.4	NS	7.7	NS	-0.2	NS	-1.2	NS	1.42	NS	0.99	NS	1.58	NS	0.91	NS	0.0%	0.69	NS
Pool Regression	0.12	***	-2.4	***	-1.01	NS	-0.15	NS	0.056	NS	-0.06	NS	0.036	NS	-0.14	NS	-0.018	NS	3.0%	2.01	**

Appendix (B)

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms. The sample consists of 156 firms covering the period from 1981-1991. There are 30 observations for each year.

The variables definitions are Collect is collection from customers, NETINT is net interest payment, DIVID is cash dividends, S.FIXED is sales of fixed assets, P.INVS is purchase of investments, Stock is net cash inflow from issue ordinary and preferred stock, Debt is net cash inflow from issuing loan capital and Accruals 1 is earnings minus net cash flows in model 1. All the previous variables are in first difference form after being deflated by the beginning-of-the-fiscal year market value of equity.

The firm sizes classification is according to sales value in 1991.

The Model can be written as

$CAR = a_0 + a_1\ \textit{Collections} + b_2\ \textit{Net Interest} + b_2\ \textit{Dividends Pmt.} + c_1\ \text{Taxes} + d_1\ \textit{P.Investment} + d_2\ \textit{Sale Fixed} + e_1\ \textit{Debt} + e_2\ \textit{Stock} + f_1\ \textit{Accruals1} + e$......(M1)

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level and NS Not Significant

TABLE B.5
ASSOCIATION BETWEEN CAR AND CASH FLOW DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR TOTAL FIRMS, 1978-1991
TEST THE VARIABLE COEFFICIENT AND THE MODEL SIGNIFICANCE

Years	OCF		RIF		ICF		FCF		CC		TCF		Accruals 2		Adj (R^2)	F-Value	Sig
	Coef	Sig[a]	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef.	Sig			
1978	1.29	***	-1.4	**	1.08	***	1.35	***	0.06	NS	-0.05	NS	1.14	***	14.6%	4.37	***
1979	0.56	NS	-2.15	*	0.76	NS	0.50	NS	0.17	NS	0.21	NS	0.68	*	5.7%	2.26	**
1980	0.85	**	-2.11	***	0.44	NS	0.84	**	0.55	***	0.09	NS	1.07	***	15.2%	4.76	***
1981	1.46	***	-2.12	***	1.14	***	1.19	***	0.04	NS	-1.09	*	1.37	***	15.5%	4.84	***
1982	1.37	***	-1.11	NS	1.04	**	1.26	**	-0.01	NS	0.89	*	1.4	***	7.7%	2.71	**
1983	1.4	***	-2.15	***	1.75	***	1.5	***	0.15	NS	0.82	NS	1.73	***	11.4%	3.66	***
1984	1.99	***	-0.31	NS	1.34	***	1.84	***	-0.1	NS	0.05	NS	1.7	***	29.4%	9.39	***
1985	1.33	***	-1.56	NS	1.0	**	0.83	**	0.02	NS	-0.07	NS	1.3	***	8.3%	2.82	***
1986	1.89	***	-2.33	**	1.77	**	1.46	**	-0.24	NS	-0.7	NS	1.7	**	10.4%	3.28	***
1987	-0.17	NS	-6.06	***	-0.28	**	0.08	NS	0.23	NS	1.4	NS	0.15	NS	11.4%	3.52	***
1988	0.40	NS	-4.2	*	-0.46	NS	0.79	NS	0.05	NS	-0.5	NS	0.46	NS	0.3%	1.06	NS
1989	1.67	***	-7.96	***	-1.72	**	1.50	**	0.14	NS	-1.2	NS	2.06	***	14.2%	4.52	***
1990	-0.58	NS	-3.44	**	0.52	NS	-0.33	NS	0.26	NS	0.84	NS	-0.35	NS	3.4%	1.73	NS
1991	4.22	***	-5.86	***	-4.32	***	4.53	***	0.07	NS	-6.77	***	4.28	***	21.6%	6.74	***
Pool Regression	0.17	***	-1.29	***	-0.11	***	0.03	NS	0.166	***	-0.07	NS	0.23	***	4.8%	15.52	***

Appendix (B)

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, Accruals 2. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = g_0 + g_1 OCF + g_2 RIF + g_3 TCF + g_4 ICF + g_5 FCF + g_6 CC + h_7 Accruals\ 2 + e$...(M2)

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level, NS Not Significant and a Significant

TABLE B.6
ASSOCIATION BETWEEN CAR AND CASH FLOW DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR SMALL FIRMS, 1978-1991
TEST THE VARIABLE COEFFICIENT AND THE MODEL SIGNIFICANCE

Years	OCF		RIF		ICF		FCF		CC		TCF		Accruals 2		Adj (R^2)	F-Value	Sig
	Coef	Sig[a]	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef.	Sig			
1978	2.18	***	-3.93	***	2.5	***	2.56	***	-0.11	NS	-0.27	NS	4.40	***	27.7%	3.30	***
1979	-0.08	NS	-0.23	NS	-0.4	NS	-0.22	NS	0.21	NS	0.41	NS	-0.16	NS	0.0%	0.83	NS
1980	-0.49	NS	0.44	NS	-0.71	NS	-0.18	NS	0.62	NS	0.83	***	0.055	NS	30.9%	3.93	***
1981	0.876	**	-01.79	**	0.36	NS	0.86	*	-0.198	NS	-0.79	NS	0.47	NS	32.1%	4.17	***
1982	0.50	NS	0.32	NS	0.22	NS	0.15	NS	0.20	NS	1.46	***	0.56	NS	17.6%	2.38	**
1983	-0.78	NS	-1.5	NS	-0.48	NS	-0.6	NS	-0.13	NS	-0.80	**	-0.43	NS	15%	2.15	*
1984	1.61	***	1.80'	NS	1.11	**	1.056	**	-0.08	NS	0.04	NS	1.3	***	28.4%	3.72	***
1985	0.59	NS	1.3	NS	0.44	NS	0.34	NS	-0.13	NS	0.16	NS	0.61	*	2.0%	1.13	NS
1986	-0.25	NS	-0.07	NS	-0.106	NS	-0016	NS	0.12	NS	-060	NS	0.04	NS	0.0%	0.71	NS
1987	0.19	NS	-2.17	NS	0.065	NS	0.097	NS	-0.11	NS	-0.33	NS	-0.21	NS	0.0%	0.95	NS
1988	0.19	NS	-2.24	NS	-0.26	NS	0.50	NS	-0.11	NS	0.28	NS	0.25	NS	0.0%	0.35	NS
1989	1.65	*	-4.81	***	-1.49	NS	1.54	NS	-0.026	NS	-1.50	NS	1.57	*	10.3%	1.78	NS
1990	1.94	NS	-3.6	**	-1.93	NS	2.28	NS	0.035	NS	-1.23	NS	2.01	NS	6.7%	1.48	NS
1991	1.96	**	-2.9	NS	-2.01	**	1.86	*	0.31	NS	-2.7	**	2.2	**	4.4%	1.33	NS
Pool Regression	0.12	**	-0.59	**	-0.024	NS	0.118	**	0.054	NS	0.145	NS	0.133	***	3.2%	4.09	***

Appendix (B)

CAR_{it} is the Cumulative Abnormal Return for firm i from July of year t to June of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. 52 observations are used each year in this analysis for small firms.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, Accruals 2. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = g_0 + g_1OCF + g_2RIF + g_3TCF + g_4ICF + g_5FCF + g_6CC + h_7Accruals\ 2\ +\ e$...(M2)

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level, NS Not Significant and a Significant

TABLE B.7
ASSOCIATION BETWEEN CAR AND CASH FLOW DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR MEDIUM FIRMS, 1978-1991
TEST THE VARIABLE COEFFICIENT AND THE MODEL SIGNIFICANCE

Years	OCF		RIF		ICF		FCF		CC		TCF		Accruals 2		Adj (R^2)	F-Value	Sig
	Coef	Sig[a]	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef.	Sig			
1978	1.13	***	-2.13	**	0.81	NS	1.067	**	-0.01	NS	-0.35	NS	1.304	**	23.1%	3.02	**
1979	1.02	**	-5.46	***	1.33	*	0.81	NS	-0.29	NS	-0.89	*	1.03	**	35.1%	4.48	***
1980	0.14	NS	-0.57	NS	-0.09	NS	0.39	NS	0.054	NS	-0.17	NS	0.122	NS	0.0%	0.43	NS
1981	0.65	NS	-1.22	NS	0.61	NS	0.70	NS	0.23	NS	0.49	NS	0.80	*	4.2%	1.31	NS
1982	0.82	NS	0.22	NS	0.40	NS	0.447	NS	-0.29	NS	-0.31	NS	0.52	NS	5.5%	1.38	NS
1983	0.69	NS	-3.11	**	0.75	NS	0.655	NS	0.07	NS	-0.33	NS	0.82	NS	11.0%	1.83	NS
1984	1.62	***	-0.53	NS	1.27	***	1.75	***	-0.05	NS	0.31	NS	1.57	***	33.3%	4.14	***
1985	0.93	NS	-0.78	NS	0.29	NS	0.22	NS	0.27	NS	-0.07	NS	0.91	NS	10.9%	1.84	NS
1986	1.37	NS	-0.82	NS	1.15	NS	0.98	NS	-0.19	NS	0.833	NS	1.20	NS	7.8%	1.56	NS
1987	-0.34	NS	-4.8	**	-0.32	**	-0.13	NS	0.46	NS	3.3	NS	0.32	NS	25.9%	3.25	***
1988	1.45	NS	-3.73	NS	-1.2	NS	1.61	NS	-0.30	NS	-4.15	*	1.24	NS	0.0%	0.74	NS
1989	0.558	NS	-1.85	NS	-0.07	NS	-0.12	NS	0.22	NS	-1.03	NS	0.07	NS	0.0%	0.73	NS
1990	0.13	NS	-1.25	NS	0.48	NS	-0.19	NS	-0.26	NS	-0.37	NS	-0.54	NS	0.0%	0.48	NS
1991	3.41	***	0.471	NS	-3.61	***	3.635	***	-0.25	NS	-8.06	***	3.42	***	39.3%	5.34	***
Pool Regression	0.133	**	-1.19	***	-0.08	**	-0.019	NS	0.117	**	-0.24	NS	0.14	***	5.1%	6.13	***

Appendix (B)

CAR_{it} is the Cumulative Abnormal Return for firm i from June of year t to May of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. 52 observations are used each year in this analysis for medium firms.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, Accruals 2. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:
$CAR= g_0+g_1OCF+g_2RIF+g_3TCF+g_4ICF+g_5FCF+g_6CC+h_7Accruals\ 2\ +\ e$...(M2)
* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level, NS Not Significant and a Significant

TABLE B.8
ASSOCIATION BETWEEN CAR AND CASH FLOW DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR LARGE FIRMS, 1978-1991
TEST THE VARIABLE COEFFICIENT AND THE MODEL SIGNIFICANCE

Years	OCF		RIF		ICF		FCF		CC		TCF		Accruals 2		Adj (R^2)	F-Value	Sig
	Coef	Sig[a]	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef.	Sig			
1978	4.2	**	-3.66	*	2.4	NS	3.45	*	0.51	NS	-0.55	NS	3.65	*	25.1%	2.25	*
1979	1.64	NS	-5.0	NS	0.20	NS	1.7	NS	0.70	NS	-0.96	NS	1.89	NS	2.2%	1.09	NS
1980	-0.32	NS	-0.27	NS	-0.26	NS	0.14	NS	1.4	*	-0.42	NS	0.36	NS	7.4%	1.31	NS
1981	1.7	NS	-1.09	NS	1.29	NS	1.77	NS	-0.28	NS	-1.0	NS	1.5	NS	0.0%	0.27	NS
1982	-3.4	NS	2.05	NS	-1.74	NS	-2.8	NS	1.22	*	-0.44	NS	-1.95	NS	8.2%	1.36	NS
1983	0.21	NS	0.24	NS	-0.92	NS	-0.18	NS	0.38	NS	0.27	NS	-0.35	NS	0.0%	0.64	NS
1984	8.14	**	-9.8	**	6.95	**	7.7	**	-0.30	NS	-1.16	NS	7.33	**	18.3%	1.80	NS
1985	2.7	NS	-5.6	NS	2.4	NS	1.32	NS	0.05	NS	2.06	NS	1.7	NS	18.7%	1.86	NS
1986	-0.85	NS	3.5	NS	-0.69	NS	-1.59	NS	-0.47	NS	-6.1	**	-1.67	NS	25.1%	2.15	*
1987	0.42	NS	-15.8	NS	-0.13	NS	0.07	NS	2.06	NS	1.5	NS	1.51	NS	0.0%	0.71	NS
1988	1.83	NS	-9.25	NS	-2.84	NS	2.74	NS	1.5	NS	-3.4	NS	2.85	NS	0.0%	0.39	NS
1989	-3.71	NS	-12.6	NS	3.96	NS	-4.8	NS	0.11	NS	7.9	NS	-3.37	NS	0.3%	1.01	NS
1990	0.699	NS	-7.3	NS	-0.40	NS	-0.68	NS	-0.12	NS	-2.6	NS	0.41	NS	0.0%	0.52	NS
1991	11.12	***	-10.7	**	-10.8	***	-10.9	***	-0.38	NS	-13.7	****	10.9	***	35.6%	3.29	**
Pool Regression	0.229	*	-0.46	NS	-0.15	**	0.18	NS	0.25	**	-0.2	NS	0.22	**	2.1%	2.18	**

Appendix (B)

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991. 30 observations are used in the analysis each year.

The variables definitions are OCF is cash flows from operation, RIF is net cash flows from return on investment and servicing of finance, TCF is cash flows from taxation, ICF is net cash flows from investment, FCF is net cash flows from finance, CC is change in cash, Accruals 2. All the previous variables are in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = g_0 + g_1 OCF + g_2 RIF + g_3 TCF + g_4 ICF + g_5 FCF + g_6 CC + h_7 \text{Accruals } 2 + e$...(M2)

* Significant at .10 level, ** Significant at .05 level, *** Significant at .01 level, NS Not Significant and a Significant

TABLE B.9
ASSOCIATION BETWEEN CAR AND CASH FLOW PER SHARE DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR TOTAL FIRMS, 1978-1991
TEST THE VARIABLE COEFFICIENT AND THE MODEL SIGNIFICANCE

Years	OCFPS		RIFPS		ICFPS		FCFPS		CCPS		TCFPS		Accruals 3		Adj (R^2)	F-Value	Sig
	Coef	Sig[a]	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef.	Sig			
1978	0.017	***	-0.03	***	0.005	NS	0.016	***	-0.001	NS	0.014	NS	0.013	***	11.3%	3.65	***
1979	0.018	***	-0.05	***	0.009	NS	0.017	**	0.004	*	0.022	**	0.02	***	17.2%	5.39	***
1980	0.01	NS	-0.03	***	0.007	NS	0.01	**	0.003	NS	0.023	**	0.012	**	9.7%	3.27	***
1981	0.02	***	-0.03	***	0.016	***	0.015	***	-0.001	NS	0.013	NS	0.018	***	13.7%	4.32	***
1982	0.026	***	-0.02	**	0.026	***	0.026	***	0.001	NS	0.04	***	0.028	***	7.6%	2.70	**
1983	0.012	**	-0.02	**	0.015	***	0.014	**	0.001	NS	0.02	*	0.015	***	3.4%	1.71	NS
1984	0.02	***	-0.03	***	0.016	**	0.019	***	0.002	NS	0.025	***	0.018	***	11.9%	3.64	***
1985	0.006	NS	-0.005	NS	0.006	NS	0.003	NS	-0.0005	NS	0.003	NS	0.006	NS	0.0%	0.87	NS
1986	0.004	NS	-0.012	NS	0.003	NS	0.001	NS	-0.002	*	0.001	NS	0.0017	NS	6.2%	2.35	**
1987	-0.001	NS	-0.017	**	-0.002	**	-0.00001	NS	0.0003	NS	0.015	**	0.0005	NS	7.3%	2.52	**
1988	0.009	*	-0.012	*	-0.012	**	0.012	**	0.0002	NS	0.011	NS	0.011	**	2.5%	1.51	NS
1989	0.009	**	-0.027	***	-0.01	**	0.009	**	-0.0006	NS	-0.012	*	0.010	***	7.4%	2.63	***
1990	0.001	NS	-0.019	***	-0.0002	NS	0.0009	NS	0.0012	NS	-0.002	NS	0.001	NS	4.3%	1.89	*
1991	0.017	***	-0.028	***	-0.02	***	0.02	***	0.0017	NS	-0.016	***	0.018	***	18.6%	5.51	***
Pool Regression	0.0004	NS	-0.02	***	-0.0006	***	0.00009	NS	0.0017	NS	0.0006	NS	0.0006	**	4.0%	12.81	***

Appendix (B)

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it was divided into three sub-samples small, medium and large according to sales value in 1991.

The variables definitions are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and Accruals 3. All the variables are in first difference form only.

The model can be written as:

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

* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level,
NS Not Significant
a Significant

TABLE B.10
ASSOCIATION BETWEEN CAR AND CASH FLOW PER SHARE DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR SMALL FIRMS, 1978-1991
TEST THE VARIABLE COEFFICIENT AND THE MODEL SIGNIFICANCE

Years	OCFPS		RIFPS		ICFPS		FCFPS		CCPS		TCFPS		Accruals 3		Adj (R^2)	F-Value	Sig
	Coef	Sig[a]	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef.	Sig			
1978	0.044	***	-0.099	***	0.044	**	0.06	***	-0.006	NS	0.040	NS	0.043	***	18.9%	2.53	**
1979	0.056	**	-0.056	**	0.048	*	0.054	**	.0011	NS	0.037	NS	0.055	**	26%	3.56	***
1980	-0.01	NS	0.014	NS	-0.025	NS	-0.002	NS	0.008	**	0.083	NS	-0.0045	NS	27.3%	3.42	***
1981	0.016	**	-0.05	**	0.0175	NS	0.01	NS	-0.006	*	0.007	NS	0.007	NS	19.8%	2.66	**
1982	0.008	NS	0.008	NS	0.0027	NS	-0.0016	NS	0.0021	NS	0.028	**	0.0064	NS	22%	2.97	**
1983	-0.002	NS	-0.028	**	0.0034	NS	0.005	NS	-0.0012	NS	-0.02	NS	0.003	NS	17.6%	2.44	*
1984	0.0014	NS	-0.014	NS	-0.0008	NS	-0.0047	NS	0.0061	*	0.031	**	0.0066	NS	13%	1.99	*
1985	0.0039	NS	0.012	NS	0.0035	NS	0.0063	NS	-0.0044	NS	-0.0027	NS	0.002	NS	0.0%	0.53	NS
1986	0.007	NS	-0.03	NS	0.007	NS	0.012	NS	-0.0023	NS	0.018	*	0.008	NS	0.0%	0.81	NS
1987	0.0011	NS	-0.021	NS	-0.0028	NS	-0.0008	NS	-0.0005	NS	-0.01	NS	-0.0023	NS	0.3%	1.02	NS
1988	0.005	NS	-0.007	NS	-0.0056	NS	0.0077	NS	-0.004	NS	0.007	NS	0.0024	NS	0.0%	0.75	NS
1989	0.001	NS	-0.016	NS	-0.0091	NS	0.009	NS	0.0002	NS	-0.0051	NS	0.01	NS	0.0%	.81	NS
1990	0.015	NS	-0.031	**	-0.015	NS	0.013	NS	0.004	NS	-0.0079	NS	0.017	*	14%	2.07	*
1991	0.013	*	-0.013	NS	-0.013	**	0.013	**	0.0018	NS	-0.005	NS	0.013	**	5.4%	1.39	NS
Pool Regression	0.0011	NS	-0.013	***	-0.0008	*	0.0008	NS	0.002	NS	0.00 51	**	0.0011	**	2.3%	3.22	***

Appendix (B)

CAR_{it} is the Cumulative Abnormal Return for firm i from July of year t to June of year t+1 for December year-end firms.

The sample is consisted of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. 52 observations are used in the analysis each year.

The variables definitions are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and Accruals 3. All the variables are in first difference form only.

The model can be written as:

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

* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level,
NS Not Significant
a Significant

TABLE B.11
ASSOCIATION BETWEEN CAR AND CASH FLOW PER SHARE DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR MEDIUM FIRMS, 1978-1986
TEST THE VARIABLE COEFFICIENT AND MODEL SIGNIFICANCE

Years	OCFPS		RIFPS		ICFPS		FCFPS		CCPS		TCFPS		Accruals 3		Adj (R^2)	F-Value	Sig
	Coef	Sig[a]	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef.	Sig			
1978	0.024	***	-0.057	*	0.012	NS	0.020	**	-0.001	NS	0.007	NS	0.020	**	14.2%	2.13	*
1979	0.007	NS	-0.054	***	0.0032	NS	0.004	NS	0.0013	NS	-0.008	NS	0.014	*	45.6%	6.51	***
1980	-0.0076	NS	-0.03	***	-0.004	NS	0.0012	NS	0.004	NS	0.002	NS	-0.005	NS	10.8%	1.80	NS
1981	0.01	NS	-0.029	*	0.007	NS	0.007	NS	-0.001	NS	-0.004	NS	0.0088	NS	0.0%	0.90	NS
1982	0.03	**	0.005	NS	0.035	**	0.034	**	0.0017	NS	0.037	NS	0.035	**	0.0%	0.93	NS
1983	0.022	*	-0.072	**	0.023	*	0.024	*	-0.0024	NS	-0.005	NS	0.023	NS	11.4%	1.84	NS
1984	0.0277	*	-0.0227	NS	0.026	*	0.032	**	0.0014	NS	0.045	**	0.027	**	9.6%	1.65	NS
1985	0.015	NS	-0.022	NS	0.007	NS	0.0074	NS	0.0006	NS	-0.002	NS	0.013	NS	6.5%	1.46	NS
1986	0.005	NS	-0.0005	NS	0.004	NS	0.004	NS	-0.003	NS	0.011	NS	0.002	NS	4.2%	1.31	NS
1987	-0.003	NS	-0.013	NS	-0.003	NS	0.0015	NS	-0.0003	NS	0.014	NS	0.0012	NS	17.0%	2.26	*
1988	0.0078	NS	-0.009	NS	-0.009	NS	0.010	NS	0.0006	NS	-0.021	NS	0.009	NS	0.0%	0.80	NS
1989	-0.0015	NS	-0.012	NS	0.0007	NS	0.0006	NS	0.002	NS	0.005	NS	-0.0000	NS	0.0%	0.87	NS
1990	0.0015	NS	-0.012	NS	-0.0006	NS	0.0003	NS	0.0005	NS	-0.0026	NS	-0.0001	NS	0.2%	1.01	NS
1991	0.022	***	-0.015	NS	-0.026	***	0.0258	***	0.0039	**	-0.028	***	0.025	***	35.7%	4.65	***
Pool Regression	0.0004	NS	-0.021	***	-0.0007	**	0.0003	NS	-0.0002	NS	-0.0027	NS	-.00003	NS	6.0%	6.97	***

Appendix (B)

CAR_{it} is the Cumulative Abnormal Return for firm i from June of year t to May of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. 52 observations are used in the analysis each year.

The variables definitions are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and Accruals 3. All the variables are in first difference form only.

The model can be written as:

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

* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level,
NS Not Significant
a Significant

TABLE B.12
ASSOCIATION BETWEEN CAR AND CASH FLOW PER SHARE DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR LARGE FIRMS, 1978-1991
TEST THE VARIABLE COEFFICIENT AND THE MODEL SIGNIFICANCE

Years	OCFPS		RIFPS		ICFPS		FCFPS		CCPS		TCFPS		Accruals 3		Adj (R^2)	F-Value	Sig
	Coef	Sig[a]	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef.	Sig			
1978	0.02	NS	-0.03	NS	-0.005	NS	0.012	NS	-0.002	NS	0.00001	NS	0.009	NS	11%	1.49	NS
1979	0.026	NS	-0.17	***	0.04	NS	0.031	NS	0.024	***	0.075	**	0.05	**	17.2%	1.83	NS
1980	0.030	NS	-0.004	NS	0.024	NS	0.024	NS	0.002	NS	0.022	NS	0.027	NS	3.9%	1.16	NS
1981	0.01	NS	-0.005	NS	0.01	NS	0.007	NS	-0.003	NS	0.015	NS	0.009	NS	0.0%	0.27	NS
1982	-0.004	NS	0.0005	NS	-0.0009	NS	-0.004	NS	0.007	NS	0.009	NS	0.0002	NS	0.0%	0.71	NS
1983	-0.009	NS	0.0005	NS	-0.01	NS	-0.012	NS	0.0086	**	-0.0004	NS	-0.01	NS	4%	1.17	NS
1984	0.018	NS	-0.05	*	0.007	NS	0.012	NS	-0.0055	NS	0.013	NS	0.0049	NS	6.3%	1.26	NS
1985	0.003	NS	0.013	NS	0.0035	NS	0.001	NS	-0.0004	NS	0.009	NS	-0.0013	NS	0.0%	0.98	NS
1986	-0.028	***	0.037	**	-0.03	***	-0.035	***	0.001	NS	-0.057	***	-0.031	***	36.8%	3.25	**
1987	-0.003	NS	-0.029	NS	0.0003	NS	-0.0017	NS	0.0015	NS	0.0085	NS	-0.002	NS	0.0%	0.43	NS
1988	0.04	**	-0.058	NS	-0.045	***	0.043	**	0.006	NS	-0.03	NS	0.048	***	20.1%	1.90	NS
1989	0.015	NS	-0.04	NS	-0.018	NS	0.018	NS	-0.0002	NS	-0.037	NS	0.016	NS	6.3%	1.26	NS
1990	-0.002	NS	0.002	NS	0.004	NS	-0.005	NS	0.0001	NS	0.003	NS	-0.004	NS	0.0%	0.19	NS
1991	0.02	**	-0.03	NS	-0.020	**	0.02	**	0.0004	NS	-0.019	NS	0.019	**	17.9%	1.78	NS
Pool Regression	-0.0007	NS	-0.0077	**	-0.00001	NS	-0.0009	NS	0.0016	**	0.002	NS	-0.0002	NS	1.6%	1.93	*

Appendix (B)

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. 30 observations are used each year in the analysis.

The variables definitions are OCFPS is operating cash flow per share, RIFPS is return on investment and servicing of financing cash flow per share, TCFPS is taxation cash flows per share, ICFPS is investing cash flows per share, FCFPS is financing cash flows per share, CCPS is change in cash per share, and Accruals 3. All the variables are in first difference form only.

The model can be written as:

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

* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level,
NS Not Significant
a Significant

TABLE B.13
ASSOCIATION BETWEEN CAR AND EARNING DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR TOTAL FIRMS 1978-1991
TEST THE MODEL AND VARIABLE SIGNIFICANCE

YEARS	R^2	ADJ-R^2	Coefficient (T-ratio)	Significant for T-ratio	F-value	P-value for F-value
1978	17.50%	16.90%	1.47 (5.47)	***	29.87	0.000
1979	26.50%	26.00%	2.42 (7.23)	***	52.27	0.000
1980	7.60%	7.00%	1.45 (3.48)	***	12.09	0.000
1981	9.90%	9.30%	1.12 (4.0)	***	15.99	0.000
1982	14.10%	13.50%	2.019 (4.86)	***	23.59	0.000
1983	13.60%	13.00%	1.45 (4.79)	***	22.97	0.000
1984	35.00%	34.60%	2.58 (8.87)	***	78.75	0.000
1985	8.60%	7.90%	1.63 (3.66)	***	13.42	0.000
1986	5.30%	4.60%	1.47 (2.87)	***	8.21	0.005
1987	1.30%	0.60%	0.79 (1.37)	NS	1.88	0.172
1988	6.30%	5.60%	2.57 (3.01)	***	9.05	0.003
1989	8.00%	7.40%	2.4 (3.58)	***	12.82	0.000
1990	2.50%	1.80%	1.25 (1.94)	*	3.77	0.054
1991	18.60%	18.10%	3.24 (5.86)	***	34.36	0.000
Pool Regression	11.20%	11.20%	1.73 (16.08)	***	258.49	0.000

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991.

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

EARN is net income before extraordinary items and discontinuing of the operation,
and it is in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = I_0 + I_1 EARN + e$ ....(M4)

* Significant at .10 level
** Significant at .05 level
*** Significant at .01 level
NS Not Significant

TABLE B.14
ASSOCIATION BETWEEN CAR AND EARNING DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR SMALL FIRMS, 1978-1991
TEST THE MODEL AND VARIABLE SIGNIFICANCE

YEARS	R^2	ADJ-R^2	Coefficient (T-ratio)	Significant for T-ratio	F-value	P-value for F-value
1978	30.50%	28.90%	2.65 (4.30)	***	18.45	0.000
1979	23.70%	22.10%	3.81 (3.82)	***	14.62	0.000
1980	0.00%	0.00%	-0.11 (-0.09)	NS	0.01	0.925
1981	10.70%	8.80%	1.06 (2.35)	**	5.51	0.023
1982	19.40%	17.60%	2.31 (3.33)	***	11.07	0.002
1983	9.40%	7.40%	1.31 (2.18)	**	4.75	0.034
1984	39.10%	37.80%	3.012 (5.55)	***	30.76	0.000
1985	18.10%	16.30%	2.28 (3.19)	***	10.15	0.003
1986	6.30%	4.30%	1.78 (1.78)	*	3.16	0.082
1987	0.00%	0.00%	0.2145 (0.26)	NS	0.07	0.799
1988	7.80%	5.70%	2.37 (1.91)	*	3.66	0.062
1989	12.18%	10.30%	3.25 (2.55)	**	6.48	0.014
1990	10.70%	8.80%	3.9 (2.37)	**	5.61	0.022
1991	9.10%	7.20%	2.74 (2.19)	**	4.79	0.034
Pool Regression	12.00%	11.90%	1.98 (9.58)	***	91.86	0.000

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. 52 observations are used in the analysis each year.

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

EARN is net income before extraordinary items and discontinuing of the operation, and it is in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = I_0 + I_1 EARN + e$ ....(M4)

* Significant at .10 level
** Significant at .05 level
*** Significant at .01 level
NS Not Significant

TABLE B.15
ASSOCIATION BETWEEN CAR AND EARNING DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR MEDIUM FIRMS, 1978-1991
TEST THE MODEL AND VARIABLE SIGNIFICANCE

YEARS	R^2	ADJ-R^2	Coefficient (T-ratio)	Significant for T-ratio	F-value	P-value for F-value
1978	23.20%	21.60%	1.20 (3.81)	***	14.48	0.000
1979	34.50%	33.00%	2.35 (4.86)	***	23.66	0.000
1980	12.60%	10.70%	1.3 (2.60)	**	6.76	0.012
1981	16.60%	14.80%	1.5 (3.06)	***	9.36	0.004
1982	20.10%	18.30%	2.71 (3.43)	***	11.79	0.001
1983	22.60%	21.00%	1.73 (3.71)	***	13.75	0.001
1984	30.10%	28.60%	1.998 (4.50)	***	20.23	0.000
1985	5.10%	3.10%	1.24 (1.57)	NS	2.48	0.122
1986	18.40%	16.70%	2.22 (3.32)	***	11.03	0.002
1987	4.30%	2.10%	1.24 (1.41)	NS	2.00	0.164
1988	3.60%	1.40%	1.7 (1.28)	NS	1.63	0.209
1989	8.30%	6.40%	1.8 (2.08)	**	4.34	0.043
1990	5.60%	3.70%	1.52 (1.69)	*	2.86	0.097
1991	28.50%	27.00%	3.1 (4.41)	***	19.49	0.000
Pool Regression	15.50%	15.40%	1.75 (11.18)	***	124.99	0.000

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. 52 observations are used in the analysis each year.

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

EARN is net income before extraordinary items and discontinuing of the operation,
and it is in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = I_0 + I_1 EARN + e$ ....(M4)

* Significant at .10 level
** Significant at .05 level
*** Significant at .01 level
NS Not Significant

TABLE B.16
ASSOCIATION BETWEEN CAR AND EARNING DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR LARGE FIRMS 1978-1991
TEST THE MODEL AND VARIABLE COEFFICIENT SIGNIFICANCE

YEARS	R^2	ADJ-R^2	Coefficient (T-ratio)	Significant for T-ratio	F-value	P-value for F-value
1978	30.60%	27.90%	3.4 (3.38)	***	11.44	0.002
1979	27.10%	24.40%	2.07 (3.17)	***	10.06	0.004
1980	18.90%	15.70%	2.5 (2.46)	**	6.04	0.021
1981	0.10%	0.00%	-0.147 (-0.17)	NS	0.03	0.869
1982	0.10%	0.00%	0.12 (0.16)	NS	0.02	0.876
1983	0.70%	0.00%	-0.27 (-0.44)	NS	0.19	0.665
1984	26.90%	24.20%	5.40 (3.15)	***	9.94	0.004
1985	6.80%	3.40%	1.28 (1.42)	NS	2.03	0.165
1986	21.20%	18.20%	-3.31 (-2.69)	**	7.25	0.012
1987	1.80%	0.00%	-2.7 (0.71)	NS	0.50	0.484
1988	27.90%	25.00%	9.94 (3.11)	***	9.67	0.005
1989	0.30%	0.00%	-0.60 (-0.28)	NS	0.08	0.782
1990	3.20%	0.00%	-1.17 (-0.96)	NS	0.92	0.347
1991	34.60%	32.30%	5.27 (3.85)	***	14.85	0.001
Pool Regression	4.40%	4.20%	1.23 (4.31)	***	18.55	0.000

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. 30 observations are used in the analysis each year.

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

EARN is net income before extraordinary items and discontinuing of the operation,
and it is in first difference form deflated by the beginning-of-the-fiscal year market value of equity.

The model can be written as:

$CAR = I_0 + I_1 EARN + e$ ....(M4)

* Significant at .10 level
** Significant at .05 level
*** Significant at .01 level
NS Not Significant

TABLE B.17
ASSOCIATION BETWEEN CAR AND EPS DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR TOTAL FIRMS 1978-1991
TEST THE MODEL AND VARIABLE SIGNIFICANCE

YEARS	R^2	ADJ-R^2	Coefficient (T-ratio)	Significant for T-ratio	F-value	P-value for F-value
1978	10.50%	9.90%	0.03 (4.10)	***	16.85	0.000
1979	16.80%	16.20%	0.037 (5.46)	***	29.81	0.000
1980	6.30%	5.70%	0.02 (3.17)	***	10.08	0.002
1981	11.00%	10.40%	0.033 (4.27)	***	18.22	0.000
1982	17.60%	17.00%	0.057 (5.56)	***	30.95	0.000
1983	4.60%	3.90%	0.019 (2.65)	***	7.02	0.009
1984	8.20%	7.60%	0.0227 (3.62)	***	13.08	0.000
1985	7.60%	6.90%	0.0225 (3.42)	***	11.68	0.001
1986	6.10%	5.50%	0.02 (3.11)	***	9.68	0.002
1987	2.10%	1.30%	0.009 (1.70)	*	2.87	0.092
1988	5.10%	4.40%	0.013 (2.69)	***	7.25	0.008
1989	6.90%	6.30%	0.015 (3.31)	***	10.97	0.001
1990	1.80%	1.10%	0.005 (1.63)	NS	2.65	0.106
1991	20.90%	20.40%	0.021 (6.28)	***	39.4	0.000
Pool Regression	5.30%	5.20%	0.015 (10.71)	***	114.68	0.000

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. 156 observations are used in the analysis each year.

EPS is earnings per share in unexpected form only.

The model can be written as:
$CAR = j_0 + j_1 EPS + e$ ....(M5)
* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level
NS Not Significant
a Significant

TABLE B.18
ASSOCIATION BETWEEN CAR AND EPS DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR SMALL FIRMS 1978-1991
TEST THE MODEL AND VARIABLE SIGNIFICANCE

YEARS	R^2	ADJ-R^2	Coefficient (T-ratio)	Significant for T-ratio	F-value	P-value for F-value
1978	30.10%	28.50%	0.07 (4.26)	***	18.13	0.000
1979	26.40%	24.80%	0.086 (4.14)	***	17.18	0.000
1980	0.70%	0.00%	0.012 (0.57)	NS	0.32	0.575
1981	21.20%	19.50%	0.06 (3.52)	***	12.40	0.001
1982	27.70%	26.10%	0.067 (4.20)	***	17.62	0.000
1983	0.20%	0.00%	0.006 (0.33)	NS	0.11	0.740
1984	20.00%	18.30%	0.041 (3.42)	***	11.73	0.001
1985	6.70%	4.80%	0.023 (1.86)	*	3.46	0.069
1986	7.80%	5.90%	0.025 (2.02)	**	4.08	0.049
1987	1.85%	1.60%	0.01382 (1.34)	NS	1.8	0.186
1988	2.40%	0.30%	0.009 (1.06)	NS	1.13	0.294
1989	9.70%	7.80%	0.022 (2.25)	**	5.07	0.029
1990	18.00%	16.20%	0.03 (3.14)	***	9.88	0.003
1991	15.60%	13.90%	0.022 (3.01)	***	9.07	0.004
Pool Regression	7.90%	7.70%	0.024 (7.63)	***	58.15	0.000

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. 52 observations are used in the analysis each year.

EPS is earnings per share in unexpected form only.

The model can be written as:
$CAR = j_0 + j_1 EPS + e$ ....(M5)
* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level
NS Not Significant
a Significant

TABLE B.19
ASSOCIATION BETWEEN CAR AND EPS DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR MEDIUM FIRMS, 1978-1991
TEST THE MODEL AND VARIABLE SIGNIFICANCE

YEARS	R^2	ADJ-R^2	Coefficient (T-ratio)	Significant for T-ratio	F-value	P-value for F-value
1978	7.60%	5.70%	0.02 (1.99)	*	3.95	0.052
1979	21.20%	19.50%	0.040 (3.52)	***	12.37	0.001
1980	9.40%	7.50%	0.025 (2.23)	**	4.97	0.030
1981	22.90%	21.30%	0.055 (3.82)	***	14.57	0.000
1982	25.00%	23.50%	0.073 (4.01)	***	16.04	0.000
1983	10.20%	8.30%	0.035 (2.31)	**	5.33	0.025
1984	6.90%	5.00%	0.025 (1.89)	*	3.57	0.065
1985	7.70%	5.60%	0.02 (1.94)	*	3.75	0.059
1986	20.10%	18.50%	0.033 (3.51)	***	12.31	0.001
1987	0.00%	0.00%	0.0013 (0.11)	NS	0.01	0.913
1988	2.70%	0.40%	0.0086 (1.08)	NS	1.17	0.285
1989	4.30%	2.30%	0.0083 (1.47)	NS	2.15	0.149
1990	1.70%	0.00%	0.0040 (0.92)	NS	0.84	0.363
1991	25.40%	23.80%	0.023 (4.08)	***	16.65	0.000
Pool Regression	5.80%	5.60%	0.015 (6.47)	***	41.83	0.000

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. 52 observations are used in the analysis each year.

EPS is earnings per share in unexpected form only.

The model can be written as:
$CAR = j_0 + j_1 EPS + e$ ....(M5)
* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level
NS Not Significant
a Significant

TABLE B.20
ASSOCIATION BETWEEN CAR AND EPS DATA
ANNUAL CROSS-SECTIONAL REGRESSION RESULTS FOR LARGE FIRMS, 1978-1986
TEST THE MODEL AND VARIABLE SIGNIFICANCE

YEARS	R^2	ADJ-R^2	Coefficient (T-ratio)	Significant for T-ratio	F-value	P-value for F-value
1978	6.50%	4.60%	0.021 (1.85)	*	3.43	0.070
1979	12.50%	10.70%	0.027 (2.67)	***	7.13	0.010
1980	12.30%	10.50%	0.021 (2.64)	**	6.99	0.011
1981	0.10%	0.00%	0.0015 (0.17)	NS	0.03	0.864
1982	4.40%	2.40%	0.027 (1.47)	NS	2.16	0.148
1983	4.10%	21.00%	0.012 (1.44)	NS	2.07	0.156
1984	3.20%	1.10%	0.01 (1.24)	NS	1.54	0.221
1985	8.90%	6.90%	0.025 (2.12)	**	4.51	0.039
1986	0.30%	0.00%	0.0045 (0.40)	NS	0.16	0.693
1987	11.20%	7.80%	0.014 (1.81)	*	3.29	0.081
1988	25.30%	22.20%	0.034 (2.85)	***	8.13	0.009
1989	0.00%	0.00%	-0.001 (-0.07)	NS	0.01	0.943
1990	1.30%	0.00%	-0.004 (-0.61)	NS	0.37	0.549
1991	35.50%	33.20%	0.023 (3.93)	888	15.42	0.001
Pool Regression	4.10%	4.00%	0.117 (5.06)	***	25.64	0.000

CAR_{it} is the Cumulative Abnormal Return for firm i from May of year t to April of year t+1 for December year-end firms.

The sample consists of 156 firms covering the period from 1977-1991, and it is divided into three sub-samples small, medium and large according to sales value in 1991. 30 observations are used in the analysis each year.

EPS is earnings per share in unexpected form only.

The model can be written as:
$CAR = j_0 + j_1 EPS + e$ ....(M5)
* is Significant at .10 level, ** is Significant at .05 level, and *** is Significant at .01 level
NS Not Significant
a Significant

APPENDIX (C)

REGRESSION RESULTS FOR BOTH CHANGE AND LEVEL VARIABLES FOR M3 AND M5

MODEL 3:

Predictor	Coef	Stdev	t-ratio	p	VIF
Constant	0.99733	0.01009	98.84	0.000	
ΔOCFPS	0.0004729	0.0005147	0.92	0.358	2.6
ΔRIFPS	-0.014252	0.002558	-5.57	0.000	1.5
ΔICFPS	-0.0001824	0.0002837	-0.64	0.520	1.8
ΔFCFPS	0.0012472	0.0005088	2.45	0.014	2.5
ΔCCPS	-0.0005160	0.0005882	-0.88	0.381	4.0
ΔTCFPS	0.004165	0.001905	2.19	0.029	1.4
ΔAccruals	0.0006695	0.0003348	2.00	0.046	2.9
ocfps	-0.0000770	0.0005070	-0.15	0.879	4.2
rifps	0.002740	0.001133	2.42	0.016	2.3
icfps	-0.0009168	0.0003188	-2.88	0.004	2.3
fcfps	-0.0017222	0.0006524	-2.64	0.008	2.6
ccps	0.0020928	0.0007736	2.71	0.007	3.6
tcfps	-0.003938	0.001697	-2.32	0.021	2.6
accruals	-0.0001990	0.0003466	-0.57	0.566	2.6

s = 0.2697 R-sq = 6.8% R-sq(adj) = 6.2%

Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	14	10.44711	0.74622	10.26	0.000
Error	1962	142.67484	0.07272		
Total	1976	153.12195			

MODEL 5:

Predictor	Coef	Stdev	t-ratio	p
Constant	2.23774	0.01134	197.28	0.000
EPS	0.019823	0.001590	12.47	0.000
epsl-a	-0.0047924	0.0007591	-6.31	0.000

s = 0.3128 R-sq = 7.5% R-sq(adj) = 7.4%

Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	2	16.0933	8.0467	82.24	0.000
Error	2028	198.4379	0.0978		
Total	2030	214.5312			

APPENDIX (D)

FIGURE A1
REGRESSION MODELS FOR DISAGGREGATE VARIABLES

First: Full Model

M1: Model with level variables only:

$$CAR_{it}=\alpha+\beta_1 COLLECT_{it}+\beta_2 NETINT_{it}+\beta_3 DIVID_{it}+\beta_4 TCF_{it}+\beta_5 S.FIXED_{it}+\beta_6 P.INVS_{it}+\beta_7 STOCK_{it}+\beta_8 DEBT_{it}+\beta_9 ACCRUALS1_{it}+u_{it}\ldots(M1)$$

M1Δ:Model with change variable only:

$$CAR_{it}=\alpha+\beta_1\Delta COLLECT_{it}+\beta_2\Delta NETINT_{it}+\beta_3\Delta DIVID_{it}+\beta_4\Delta TCF_{it}+\beta_5\Delta S.FIXED_{it}+\beta_6\Delta P.INVS_{it}+\beta_7\Delta STOCK_{it}+\beta_8\Delta DEBT_{it}+\beta_9\Delta ACCRUALS1_{it}+u_{it}\ldots(M1\Delta)$$

M1a:Model with both change and level variables:

$$CAR_{it}=\alpha+\beta_1\Delta COLLECT_{it}+\beta_2\Delta NETINT_{it}+\beta_3\Delta DIVID_{it}+\beta_4\Delta TCF_{it}+\beta_5\Delta S.FIXED_{it}+\beta_6\Delta P.INVS_{it}+\beta_7\Delta STOCK_{it}+\beta_8\Delta DEBT_{it}+\beta_9\Delta ACCRUALS1_{it}+\beta_{11}COLLECT_{it}+\beta_{12}NETINT_{it}+\beta_{13}DIVID_{it}+\beta_{14}TCF_{it}+\beta_{15}S.FIXED_{it}+\beta_{16}P.INVS_{it}+\beta_{17}STOCK_{it}+\beta_{18}DEBT_{it}+\beta_{19}ACCRUALS1_{it}+u_{it}\ldots(M1A)$$

M1b:Model with both change and level variables and intercept vary over time:

$$CAR_{it}=\alpha+\sum_{t=2}^{11}\delta_t D_{it}+\beta_1\Delta COLLECT_{it}+\beta_2\Delta NETINT_{it}+\beta_3\Delta DIVID_{it}+\beta_4\Delta TCF_{it}+\beta_5\Delta S.FIXED_{it}+\beta SUB6\Delta P.INVS_{it}+\beta_7\Delta STOCK_{it}+\beta_8\Delta DEBT_{it}+\beta_9\Delta ACCRUALS1_{it}+\beta_{11}COLLECT_{it}+\beta_{12}NETINT_{it}+\beta_{13}DIVID_{it}+\beta_{14}TCF_{it}+\beta_{15}S.FIXED_{it}+\beta_{16}P.INVS_{it}+\beta_{17}STOCK_{it}+\beta_{18}DEBT_{it}+\beta_{19}ACCRUALS1_{it}+u_{it}\ldots\ldots\ldots(M1b)$$

M1c:Model with both change and level variables and slop vary over time:

$$
\begin{aligned}
CAR_{it} = \alpha &+ \sum_{t=1}^{11} (\beta_{1t} D_{it} \Delta COLLECT_{it} + \beta_{11t} D_{it} COLLECT_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{2t} D_{it} \Delta NETINT_{it} + \beta_{12t} D_{it} NETINT_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{3t} D_{it} \Delta DIVID_{it} + \beta_{13t} D_{it} DIVID_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{4t} D_{it} \Delta TCF_{it} + \beta_{14t} D_{it} TCF_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{5t} D_{it} \Delta S.FIXED_{it} + \beta_{15t} D_{it} S.FIXED_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{6t} D_{it} \Delta P.INVS_{it} + \beta_{16t} D_{it} P.INVS_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{7t} D_{it} \Delta STOCK_{it} + \beta_{17t} D_{it} STOCK_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{8t} D_{it} \Delta DEBT_{it} + \beta_{18t} D_{it} DEBT_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{9t} D_{it} \Delta ACCRUALS1_{it} + \beta_{19t} D_{it} ACCRUALS1_{it}) + u_{it} \ldots\ldots (M1c)
\end{aligned}
$$

M1d:Model with both change and level variables and both slop and intercept vary over time:

$$
\begin{aligned}
CAR_{it} = \alpha &+ \sum_{t=2}^{11} \delta_t D_{it} + \sum_{t=1}^{11} (\beta_{1t} D_{it} \Delta COLLECT_{it} + \beta_{11t} D_{it} COLLECT_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{2t} D_{it} \Delta NETINT_{it} + \beta_{12t} D_{it} NETINT_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{3t} D_{it} \Delta DIVID_{it} + \beta_{13t} D_{it} DIVID_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{4t} D_{it} \Delta TCF_{it} + \beta_{14t} D_{it} TCF_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{5t} D_{it} \Delta S.FIXED_{it} + \beta_{15t} D_{it} S.FIXED_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{6t} D_{it} \Delta P.INVS_{it} + \beta_{16t} D_{it} P.INVS_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{7t} D_{it} \Delta STOCK_{it} + \beta_{17t} D_{it} STOCK_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{8t} D_{it} \Delta DEBT_{it} + \beta_{18t} D_{it} DEBT_{it}) \\
&+ \sum_{t=1}^{11} (\beta_{9t} D_{it} \Delta ACCRUALS1_{it} + \beta_{19t} D_{it} ACCRUALS1_{it}) + u_{it} \ldots\ldots (M1d)
\end{aligned}
$$

CONTINUE- FIGURE A1
REGRESSION MODELS FOR DISAGGREGATE VARIABLES

Continue Individual variables Models

$$CAR_{it} = \alpha + \beta_1 \Delta COLLECT_{it} + \beta_2 COLLECT_{it} + u_{it} \; .\;.\;.\;. \; M11a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \beta_1 \Delta COLLECT_{it} + \beta_2 COLLECT_{it} + u_{it} \; .\;. \; M11b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{11} (\beta_{1t} D_{it} \; \Delta COLLECT_{it} + \beta_{2t} D_{it} \; COLLECT_{it}) + u_{it} \; .\;. \; M11C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \sum_{t=1}^{11} (\beta_{1t} D_{it} \; \Delta COLLECT_{it} + \beta_{2t} D_{it} \; COLLECT_{it}) + u_{it} \; .\;. \; M11d$$

$$CAR_{it} = \alpha + \beta_1 \Delta NETINT_{it} + \beta_2 NETINT_{it} + u_{it} \; .\;.\;.\;. \; M12a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \beta_1 \Delta NETINT_{it} + \beta_2 NETINT_{it} + u_{it} \; .\;. \; M12b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{11} (\beta_{1t} D_{it} \; \Delta NETINT_{it} + \beta_{2t} D_{it} \; NETINT_{it}) + u_{it} \; .\;. \; M12C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \sum_{t=1}^{11} (\beta_{1t} D_{it} \; \Delta NETINT_{it} + \beta_{2t} D_{it} \; NETINT_{it}) + u_{it} \; .\;. \; M12d$$

$$CAR_{it} = \alpha + \beta_1 \Delta DIVID_{it} + \beta_2 DIVID_{it} + u_{it} \; .\;.\;.\;. \; M13a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \beta_1 \Delta DIVID_{it} + \beta_2 DIVID_{it} + u_{it} \; .\;. \; M13b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{11} (\beta_{1t} D_{it} \ \Delta DIVID_{it} + \beta_{2t} D_{it} \ DIVID_{it}) + u_{it} \ . . M13C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \sum_{t=1}^{11} (\beta_{1t} D_{it} \ \Delta DIVID_{it} + \beta_{2t} D_{it} \ DIVID_{it}) + u_{it} \ . . M13d$$

$$CAR_{it} = \alpha + \beta_1 \Delta TCF_{it} + \beta_2 TCF_{it} + u_{it} \ . . . . M14a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \beta_1 \Delta TCF_{it} + \beta_2 TCF_{it} + u_{it} \ . . M14b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{11} (\beta_{1t} D_{it} \ \Delta TCF_{it} + \beta_{2t} D_{it} \ TCF_{it}) + u_{it} \ . . M14C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \sum_{t=1}^{11} (\beta_{1t} D_{it} \ \Delta TCF_{it} + \beta_{2t} D_{it} \ TCF_{it}) + u_{it} \ . . M14d$$

$$CAR_{it} = \alpha + \beta_1 \Delta S.\ FIXED_{it} + \beta_2 S.\ FIXED_{it} + u_{it} \ . . . . M15a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \beta_1 \Delta S.\ FIXED_{it} + \beta_2 S.\ FIXED_{it} + u_{it} \ . . M15b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{11} (\beta_{1t} D_{it} \ \Delta S.\ FIXED_{it} + \beta_{2t} D_{it} \ S.\ FIXED_{it}) + u_{it} \ . . M15C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \sum_{t=1}^{11} (\beta_{1t} D_{it} \ \Delta S.\ FIXED_{it} + \beta_{2t} D_{it} \ S.\ FIXED_{it}) + u_{it} \ . . M15d$$

$$CAR_{it} = \alpha + \beta_1 \Delta P.\ INVS_{it} + \beta_2 P.\ INVS_{it} + u_{it} \ . . . . M16a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \beta_1 \Delta P.\ INVS_{it} + \beta_2 P.\ INVS_{it} + u_{it} \ldots M16b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{11} (\beta_{1t} D_{it}\ \Delta P.\ INVS_{it} + \beta_{2t} D_{it}\ P.\ INVS_{it}) + u_{it} \ldots M16C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \sum_{t=1}^{11} (\beta_{1t} D_{it}\ \Delta P.\ INVS_{it} + \beta_{2t} D_{it}\ P.\ INVS_{it}) + u_{it} \ldots M16d$$

$$CAR_{it} = \alpha + \beta_1 \Delta STOCK_{it} + \beta_2 STOCK_{it} + u_{it} \ldots\ldots M17a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \beta_1 \Delta STOCK_{it} + \beta_2 STOCK_{it} + u_{it} \ldots M17b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{11} (\beta_{1t} D_{it}\ \Delta STOCK_{it} + \beta_{2t} D_{it}\ STOCK_{it}) + u_{it} \ldots M17C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \sum_{t=1}^{11} (\beta_{1t} D_{it}\ \Delta STOCK_{it} + \beta_{2t} D_{it}\ STOCK_{it}) + u_{it} \ldots M17d$$

$$CAR_{it} = \alpha + \beta_1 \Delta DEBT_{it} + \beta_2 DEBT_{it} + u_{it} \ldots\ M18a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \beta_1 \Delta DEBT_{it} + \beta_2 DEBT_{it} + u_{it} \ldots M18b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{11} (\beta_{1t} D_{it}\ \Delta DEBT_{it} + \beta_{2t} D_{it}\ DEBT_{it}) + u_{it} \ldots M18C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \sum_{t=1}^{9} (\beta_{1t} D_{it}\ \Delta DEBT_{it} + \beta_{2t} D_{it}\ DEBT_{it}) + u_{it} \ldots M18d$$

$$CAR_{it} = \alpha + \beta_1 \Delta Accruals1_{it} + \beta_2 Accruals1_{it} + u_{it} \ldots\ldots M19a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \beta_1 \Delta Accruals1_{it} + \beta_2 Acceuals1_{it} + u_{it} \; . \; . \; M19b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{11} (\beta_{1t} D_{it} \; \Delta Accruals1_{it} + \beta_{2t} D_{it} \; Accruals1_{it}) + u_{it} \; . \; . \; M19C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{11} \delta_t D_{it} + \sum_{t=1}^{9} (\beta_{1t} D_{it} \; \Delta Accruals1_{it} + \beta_{2t} D_{it} \; Accruals1_{it}) + u_{it} \; . \; M19d$$

FIGURE A2
REGRESSION MODELS FOR CASH FLOW VARIABLES

First: Full Model

M2: Model with level variables only:

$$CAR_{it}=\alpha+\beta_1 OCF_{it}+\beta_2 RIF_{it}+\beta_3 FCF_{it}+\beta_4 ICF_{it}+ \beta_5 TCF_{it}+\beta_6 CC_{it}+\beta_7 Accruals2_{it}+u_{it}\ldots\ldots M2$$

M2Δ:Model with change variable only:

$$CAR_{it}=\alpha+\beta_1 \Delta OCF_{it}+\beta_2 \Delta RIF_{it}+\beta_3 \Delta FCF_{it}+\beta_4 \Delta ICF_{it}+ \beta_5 \Delta TCF_{it}+\beta_6 \Delta CC_{it}+\beta_7 \Delta Accruals2_{it}+u_{it}\ldots M2\Delta$$

M2a:Model with both change and level variables:

$$CAR_{it}=\alpha+\beta_1 \Delta OCF_{it}+\beta_{11} OCF_{it}+\beta_2 \Delta RIF_{it}+\beta_{12} RIF_{it}+ \beta_3 \Delta FCF_{it}+\beta_{13} FCF_{it}+\beta_4 \Delta ICF_{it}+\beta_{14} ICF_{it}+\beta_5 \Delta TCF_{it}+ \beta_{15} TCF_{it}+\beta_6 \Delta Accruals2_{it}+\beta_{16} ACCruals2_{it} +\beta_7 \Delta CC_{it}+u_{it}\ldots\ldots M2a$$

M2b:Model with both change and level variables and intercept vary over time:

$$CAR_{it}=\alpha+\sum_{t=2}^{14}\delta_t D_{it}+\beta_1 \Delta OCF_{it}+\beta_{11} OCF_{it}+\beta_2 \Delta RIF_{it}+\beta_{12} RIF_{it}+ \beta_3 \Delta FCF_{it}+\beta_{13} FCF_{it}+\beta_4 \Delta ICF_{it}+\beta_{14} ICF_{it}+\beta_5 \Delta TCF_{it}+ \beta_{15} TCF_{it}+\beta_6 \Delta Accruals2_{it}+\beta_{16} Accruals2_{it}+ \beta_7 \Delta CC_{it}+u_{it}\ldots\ldots M2b$$

M2c:Model with both change and level variables and slop vary over time:

$$CAR_{it}=\alpha+\sum_{t=1}^{14}(\beta_{1t} D_{it}\Delta OCF_{it}+\beta_{11t} D_{it} OCF_{it})+\sum_{t=1}^{14}(\beta_{2t} D_{it}\Delta RIF_{it}+ \beta_{12t} D_{it} RIF_{it})+\sum_{t=1}^{14}(\beta_{3t} D_{it}\Delta FCF_{it}+\beta_{13t} D_{it} FCF_{it})+\sum_{t=1}^{14}(\beta_{4t} D_{it}\Delta ICF_{it}+ \beta_{14t} D_{it} ICF_{it})+\sum_{t=1}^{14}(\beta_{5t} D_{it}\Delta TCF_{it}+\beta_{15t} D_{it} TCF_{it})+ \sum_{t=1}^{14}(\beta_{6t} D_{it}\Delta Accruals2_{it}+\beta_{16t} D_{it} Accruals2_{it})+ \sum_{t=1}^{14}(\beta_{7t} D_{it}\Delta CC_{it})+u_{it}\ldots M2c$$

M2d:Model with both change and level variables and both intercept and slop vary over time:

$$CAR_{it} = \alpha + \sum_{t=2}^{14} \delta_t D_{it} + \sum_{t=1}^{14} (\beta_{1t} D_{it} \Delta OCF_{it} + \beta_{11t} D_{it} OCF_{it}) + \sum_{t=1}^{14} (\beta_{2t} D_{it} \Delta RIF_{it} + \beta_{12t} D_{it} RIF_{it}) + \sum_{t=1}^{14} (\beta_{3t} D_{it} \Delta FCF_{it} + \beta_{13t} D_{it} FCF_{it}) + \sum_{t=1}^{14} (\beta_{4t} D_{it} \Delta ICF_{it} + \beta_{14t} D_{it} ICF_{it}) + \sum_{t=1}^{14} (\beta_{5t} D_{it} \Delta TCF_{it} + \beta_{15t} D_{it} TCF_{it}) + \sum_{t=1}^{14} (\beta_{6t} D_{it} \Delta Accruals2_{it} + \beta_{16t} D_{it} Accruals2_{it}) + \sum_{t=1}^{14} (\beta_{7t} D_{it} \Delta CC_{it}) + u_{it} \ldots\ldots\ldots\ldots M2d$$

Individual variables Models

$$CAR_{it} = \alpha + \beta_1 \Delta OCF_{it} + \beta_2 OCF_{it} + u_{it} \ldots\ldots M21a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{14} \delta_t D_{it} + \beta_1 \Delta OCF_{it} + \beta_2 OCF_{it} + u_{it} \ldots M21b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{14} (\beta_{1t} D_{it} \Delta OCF_{it} + \beta_{2t} D_{it} OCF_{it}) + u_{it} \ldots M21C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{14} \delta_t D_{it} + \sum_{t=1}^{14} (\beta_{1t} D_{it} \Delta OCF_{it} + \beta_{2t} D_{it} OCF_{it}) + u_{it} \ldots M21d$$

$$CAR_{it} = \alpha + \beta_1 \Delta RIF_{it} + \beta_2 RIF_{it} + u_{it} \ldots\ldots M22a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{14} \delta_t D_{it} + \beta_1 \Delta RIF_{it} + \beta_2 RIF_{it} + u_{it} \ldots M22b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{14} (\beta_{1t} D_{it} \Delta RIF_{it} + \beta_{2t} D_{it} RIF_{it}) + u_{it} \ldots M22C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{14} \delta_t D_{it} + \sum_{t=1}^{14} (\beta_{1t} D_{it} \Delta RIF_{it} + \beta_{2t} D_{it} RIF_{it}) + u_{it} \ldots M22d$$

$$CAR_{it} = \alpha + \beta_1 \Delta ICF_{it} + \beta_2 ICF_{it} + u_{it} \ldots\ldots M23a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{14} \delta_t D_{it} + \beta_1 \Delta ICF_{it} + \beta_2 ICF_{it} + u_{it} \ldots M23b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{14} (\beta_{1t} D_{it} \Delta ICF_{it} + \beta_{2t} D_{it} ICF_{it}) + u_{it} \ldots M23C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{14} \delta_t D_{it} + \sum_{t=1}^{14} (\beta_{1t} D_{it} \Delta ICF_{it} + \beta_{2t} D_{it} ICF_{it}) + u_{it} \ldots M23d$$

$$CAR_{it} = \alpha + \beta_1 \Delta FCF_{it} + \beta_2 FCF_{it} + u_{it} \ldots . M24a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{14} \delta_t D_{it} + \beta_1 \Delta FCF_{it} + \beta_2 FCF_{it} + u_{it} \ldots M24b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{14} (\beta_{1t} D_{it} \Delta FCF_{it} + \beta_{2t} D_{it} FCF_{it}) + u_{it} \ldots M24C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{14} \delta_t D_{it} + \sum_{t=1}^{14} (\beta_{1t} D_{it} \Delta FCF_{it} + \beta_{2t} D_{it} FCF_{it}) + u_{it} \ldots M24d$$

$$CAR_{it} = \alpha + \beta_1 \Delta TCF_{it} + \beta_2 TCF_{it} + u_{it} \ldots . M25a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{14} \delta_t D_{it} + \beta_1 \Delta TCF_{it} + \beta_2 TCF_{it} + u_{it} \ldots M25b$$

$$CAR_{it} = \alpha + \sum_{t=1}^{14} (\beta_{1t} D_{it} \Delta TCF_{it} + \beta_{2t} D_{it} TCF_{it}) + u_{it} \ldots M25C$$

$$CAR_{it} = \alpha + \sum_{t=2}^{14} \delta_t D_{it} + \sum_{t=1}^{14} (\beta_{1t} D_{it} \Delta TCF_{it} + \beta_{2t} D_{it} TCF_{it}) + u_{it} \ldots M25d$$

$$CAR_{it} = \alpha + \beta_1 \Delta Accruals2_{it} + \beta_2 Accruals2_{it} + u_{it} \ldots . M26a$$

$$CAR_{it} = \alpha + \sum_{t=2}^{14} \delta_t D_{it} + \beta_1 \Delta Accruals2_{it} + \beta_2 Accruals2_{it} + u_{it} \ldots M26b$$

$$CAR_{it}=\alpha+\sum_{t=1}^{14}(\beta_{1t}D_{it}\Delta Accruals2_{it}+\beta_{2t}D_{it}Accruals2_{it})+u_{it}..M26C$$

$$AR_{it}=\alpha+\sum_{t=2}^{14}\delta_t D_{it}+\sum_{t=1}^{14}(\beta_{1t}D_{it}\Delta Accruals2_{it}+\beta_{2t}D_{it}Accruals2_{it})+u_{it}..M26$$

FIGURE A3
REGRESSION MODELS FOR EARNINGS VARIABLE

First: Full Model

$$CAR_{it}=\alpha+\beta_2 EARN_{it}+u_{it}...M4$$

$$CAR_{it}=\alpha+\beta_1\Delta EARN_{it}+u_{it}..M4\Delta$$

$$CAR_{it}=\alpha+\beta_1\Delta EARN_{it}+\beta_2 EARN_{it}+u_{it}....M4a$$

$$CAR_{it}=\alpha+\sum_{t=2}^{14}\delta_t D_{it}+\beta_1\Delta EARN_{it}+\beta_2 EARN_{it}+u_{it}..M4b$$

$$CAR_{it}=\alpha+\sum_{t=1}^{14}(\beta_{1t}D_{it}\Delta EARN_{it}+\beta_{2t}D_{it}EARN_{it})+u_{it}.M4C$$

$$CAR_{it}=\alpha+\sum_{t=2}^{14}\delta_t D_{it}+\sum_{t=1}^{14}(\beta_{1t}D_{it}\Delta EARN_{it}+\beta_{2t}D_{it}EARN_{it})+u_{it}..M4d$$

APPENDIX (E)
DESCRIPTIVE STATISTIC FOR CHANGE CASH FLOW MODELS FOR DIFFERENT FIRM SIZES

M1

SMALL FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	546	26	1.9697	1.9843	1.968	0.2748	0.0118
COLLECT	554	18	0.2157	0.1414	0.1964	0.4327	0.0184
PMT	553	19	0.1933	0.1187	0.1721	0.438	0.0186
NETINT	565	7	0.00018	0	-0.00012	0.02529	0.00106
DIVID	564	8	0.00701	0.00419	0.00594	0.01651	0.0007
TCF	567	5	0.00568	0.00515	0.00667	0.06405	0.00269
PINVS	566	6	0.02641	0.01461	0.0255	0.16395	0.00689
SFIXED	563	9	0.00462	0.00075	0.003	0.07096	0.00299
DEBT	568	4	0.00367	0	0.00415	0.16543	0.00694
STOCK	569	3	0.00205	0	0.00061	0.06834	0.00286
ACCRUAL1	559	13	0.0229	0.0168	0.018	0.2725	0.0115

	MIN	MAX	Q1	Q3
CAR	1.2205	3.0716	1.7883	2.163
COLLECT	-1.3602	2.1833	0.0432	0.3705
PMT	-1.328	2.4769	0.0228	0.3263
NETINT	-0.10481	0.10775	-0.00835	0.00877
DIVID	-0.04783	0.14626	0.00174	0.0087
TCF	-0.61493	0.37257	-0.00859	0.02162
PINVS	-0.94847	0.81222	-0.02266	0.06772
SFIXED	-0.30156	0.39746	-0.00589	0.01263
DEBT	-0.94772	0.77369	-0.01669	0.0311
STOCK	-0.45537	0.45432	0	0.00055
ACCRUAL1	-1.135	1.4766	-0.0787	0.118

MEDIUM FIRMS

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	550	22	1.9806	1.9811	1.9799	0.2875	0.0123
COLLECT	535	37	0.3178	0.2057	0.2894	0.571	0.0247
PMT	536	36	0.254	0.1653	0.2405	0.5424	0.0234
NETINT	562	10	0.00092	0.00106	0.00142	0.02677	0.00113
DIVID	554	18	0.00914	0.00601	0.00794	0.01723	0.00073
TCF	569	3	0.00837	0.00583	0.0072	0.04608	0.00193
PINVS	567	5	0.02937	0.01398	0.02383	0.16275	0.00683
SFIXED	560	12	0.00063	0.00077	0.00141	0.06183	0.00261
DEBT	568	4	0.00947	0.00071	0.00493	0.1845	0.00774
STOCK	558	14	0.00515	0	0.00274	0.09419	0.00399
ACCRUAL1	565	7	0.0183	0.0117	0.0137	0.3539	0.0149

	MIN	MAX	Q1	Q3
CAR	1.0351	3.0419	1.7833	2.1617
COLLECT	-1.493	2.4614	0.0304	0.5285
PMT	-1.4744	2.4888	0.008	0.472
NETINT	-0.11027	0.12598	-0.00878	0.0123
DIVID	-0.04425	0.14516	0.00269	0.01213
TCF	-0.21791	0.39282	-0.00879	0.02485
PINVS	-0.70438	0.95817	-0.03551	0.08042
SFIXED	-0.34781	0.35091	-0.01039	0.01283
DEBT	-0.78562	0.97006	-0.04136	0.05795
STOCK	-0.41625	0.44323	-0.00033	0.00142
ACCRUAL1	-1.2767	1.4448	-0.1239	0.1318

LARGE FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	323	7	1.9714	1.979	1.9761	0.2291	0.0127
COLLECT	320	10	0.3195	0.215	0.2895	0.4587	0.0256
PMT	318	12	0.2634	0.1731	0.2432	0.4469	0.0251
NETINT	323	7	0.00095	0	0.0011	0.01972	0.0011
DIVID	327	3	0.00922	0.00543	0.00694	0.01782	0.00099
TCF	328	2	0.00857	0.00463	0.00682	0.06761	0.00373
PINVS	329	1	0.03053	0.01763	0.02699	0.16403	0.00904
SFIXED	329	1	0.00614	0.00227	0.00415	0.0488	0.00269
DEBT	325	5	-0.00347	0.00023	0.00262	0.15223	0.00844
STOCK	329	1	0.00013	0.00005	0.00031	0.0728	0.00401
ACCRUAL1	328	2	0.0034	0.0161	0.0089	0.2738	0.0151

	MIN	MAX	Q1	Q3
CAR	1.3414	2.5973	1.8378	2.1238
COLLECT	-1.349	2.2765	0.0757	0.4847
PMT	-1.4538	2.2777	0.0316	0.4275
NETINT	-0.11257	0.08659	-0.00684	0.00846
DIVID	-0.04012	0.12788	0.00333	0.00917
TCF	-0.52011	0.52109	-0.00551	0.01961
PINVS	-0.82127	0.91906	-0.01343	0.07664
SFIXED	-0.18577	0.36978	-0.00558	0.0127
DEBT	-0.89801	0.74413	-0.05381	0.05217
STOCK	-0.40179	0.39152	-0.00044	0.00193
ACCRUAL1	-1.4072	1.2002	-0.1014	0.1217

M2

SMALL FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	689	39	2.326	2.3426	2.3255	0.3861	0.0147
OCF	719	9	0.03398	0.02609	0.03423	0.25233	0.00941
RIF	728	0	0.01074	0.00549	0.0086	0.04861	0.0018
ICF	726	2	-0.00119	-0.00095	0.00033	0.26378	0.00979
FCF	721	7	0.00955	0	0.00778	0.17191	0.0064
CC	723	5	0.0103	-0.0018	0.0037	0.3415	0.0127
TCF	722	6	0.00568	0.00412	0.00635	0.06472	0.00241
ACCRUALS2	720	8	0.0239	0.0074	0.0194	0.3566	0.0133

	MIN	MAX	Q1	Q3
CAR	1.4576	3.5575	2.0546	2.6103
OCF	-1.60983	1.36875	-0.05791	0.12159
RIF	-0.23508	0.448	-0.00306	0.02006
ICF	-2.1104	1.8785	-0.0643	0.05425
FCF	-0.93405	0.83182	-0.01551	0.03065
CC	-2.3892	2.3502	-0.0938	0.1109
TCF	-0.61493	0.37257	-0.01087	0.02312
ACCRUALS2	-2.8627	2.3935	-0.093	0.1248

MEDIUM FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	688	40	2.3318	2.3315	2.3292	0.389	0.0148
OCF	725	3	0.0389	0.0253	0.0361	0.3472	0.0129
RIF	728	0	0.01068	0.00975	0.01143	0.04673	0.00173
ICF	727	1	0.0032	-0.0001	-0.0053	0.3262	0.0121
FCF	720	8	0.01249	0.00012	0.00683	0.23756	0.00885
CC	726	2	0.0156	0	0.0058	0.348	0.0129
TCF	725	3	0.00593	0.00583	0.00659	0.0603	0.00224
ACCRUALS2	725	3	0.0284	0.0202	0.027	0.4421	0.0164

	MIN	MAX	Q1	Q3
CAR	1.3683	3.5096	2.0469	2.5886
OCF	-1.9317	1.9785	-0.0716	0.1297
RIF	-0.34176	0.29759	-0.00152	0.02517
ICF	-2.2584	2.128	-0.0891	0.0707
FCF	-1.14002	1.45471	-0.05532	0.06876
CC	-1.894	2.1629	-0.1042	0.1259
TCF	-0.66991	0.39282	-0.011	0.02538
ACCRUALS2	-2.6897	2.8683	-0.1214	0.167

LARGE FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	412	8	2.3436	2.3377	2.3472	0.3426	0.0169
OCF	415	5	0.0474	0.0319	0.0387	0.2128	0.0104
RIF	419	1	0.01325	0.00717	0.01164	0.05628	0.00275
ICF	420	0	-0.0036	-0.0101	-0.0057	0.268	0.0131
FCF	404	16	-0.00485	0.00017	0.00019	0.18206	0.00906
CC	420	0	0.0137	-0.0051	-0.0004	0.3141	0.0153
TCF	418	2	0.00802	0.00499	0.00754	0.07033	0.00344
ACCRUALS2	419	1	0.0148	0.0148	0.0238	0.3648	0.0178

	MIN	MAX	Q1	Q3
CAR	1.4393	3.2659	2.1373	2.5622
OCF	-1.0958	1.518	-0.0285	0.0967
RIF	-0.35196	0.44424	-0.00028	0.02084
ICF	-1.7182	1.7854	-0.0867	0.0674
FCF	-1.41186	0.77963	-0.06273	0.05968
CC	-2.7711	2.9484	-0.0828	0.0866
TCF	-0.54971	0.52109	-0.00552	0.02144
ACCRUALS2	-2.5066	2.0193	-0.0995	0.127

M3

SMALL FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	687	41	0.9719	0.9856	0.9731	0.285	0.0109
OCFPS	724	4	1.451	1.398	1.44	17.706	0.658
RIFPS	724	4	0.659	0.308	0.57	2.709	0.101
ICFPS	725	3	1.668	-0.02	1.207	25.01	0.929
FCFPS	726	2	0.573	0	0.623	18.172	0.674
CCPS	724	4	-0.519	-0.28	-0.563	20.784	0.772
TCFPS	718	10	0.332	0.243	0.342	3.972	0.148
ACCRUALS3	727	1	1.82	0.75	1.92	28.76	1.07

	MIN	MAX	Q1	Q3
CAR	0.3201	1.6676	0.7697	1.1859
OCFPS	-72.576	89.444	-4.368	7.47
RIFPS	-17.407	19.691	-0.292	1.42
ICFPS	-189.15	198.44	-4.705	5.085
FCFPS	-148.88	147.45	-0.97	2.38
CCPS	-98.86	87.41	-7.97	6.68
TCFPS	-19.753	18.829	-0.779	1.5
ACCRUALS3	-187.31	177.85	-5.84	10.12

MEDIUM FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	684	44	0.9709	0.975	0.9711	0.2864	0.011
OCFPS	715	13	1.013	0.935	0.956	22.449	0.84
RIFPS	724	4	0.658	0.446	0.666	3.273	0.122
ICFPS	720	8	0.52	-0.02	0.34	31.09	1.16
FCFPS	724	4	0.463	0.01	0.518	21.233	0.789
CCPS	712	16	-0.056	-0.12	0.018	23.395	0.877
TCFPS	724	4	0.307	0.227	0.317	3.805	0.141
ACCRUALS3	720	8	2.77	0.99	1.71	37.81	1.41

	MIN	MAX	Q1	Q3
CAR	0.2904	1.667	0.7613	1.1695
OCFPS	-93.374	92.745	-7.503	8.656
RIFPS	-19.935	19.792	-0.375	1.736
ICFPS	-193.73	194.34	-6.15	4.51
FCFPS	-131.58	116.88	-4.068	5.575
CCPS	-99.87	95.92	-8.663	8.038
TCFPS	-19.933	16.614	-1.001	1.552
ACCRUALS3	-145.18	194.56	-10	12.52

LARGE FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	412	8	0.9866	0.9817	0.9889	0.2554	0.0126
OCFPS	415	5	3.447	1.886	3.267	19.688	0.966
RIFPS	416	4	1.095	0.571	1.04	3.809	0.187
ICFPS	411	9	2.31	-0.25	1.17	38.58	1.9
FCFPS	417	3	0.35	0.02	0.46	24.42	1.2
CCPS	417	3	-0.14	-0.37	0.01	22.83	1.12
TCFPS	415	5	0.523	0.327	0.478	4.404	0.216
ACCRUALS3	414	6	3.86	1.08	2.84	41.41	2.04

	MIN	MAX	Q1	Q3
CAR	0.342	1.6695	0.831	1.1502
OCFPS	-59.218	74.999	-3.688	9.427
RIFPS	-18.634	18.596	-0.16	2.236
ICFPS	-156.28	193.01	-7.86	8.56
FCFPS	-141.78	104.89	-5.13	6.06
CCPS	-98.39	81.7	-8.45	9.87
TCFPS	-19.494	19.646	-0.873	1.688
ACCRUALS3	-190.49	194.89	-8.86	16.05

M4

SMALL FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	686	42	2.16	2.1731	2.1602	0.3265	0.0125
EARN	717	11	0.01366	0.01457	0.01472	0.06012	0.00225

	MIN	MAX	Q1	Q3
CAR	1.35	3.2299	1.9306	2.3979
EARN	-0.40949	0.34154	-0.00425	0.03545

MEDIUM FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	692	36	2.1737	2.1714	2.1693	0.3401	0.0129
EARN	720	8	0.02115	0.01727	0.01926	0.07666	0.00286

	MIN	MAX	Q1	Q3
CAR	1.3743	3.5153	1.9299	2.3882
EARN	-0.41441	0.3894	-0.0048	0.0414

LARGE FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	418	8	2.1849	2.181	2.1863	0.2972	0.0121
EARN	414	6	0.02315	0.01704	0.01981	0.05555	0.00225

	MIN	MAX	Q1	Q3
CAR	1.3069	3.2143	1.9904	2.3771
EARN	-0.20993	0.44982	0.00384	0.03531

M5

SMALL FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	684	44	2.1888	2.2031	2.1901	0.3288	0.0126
EPS	726	2	0.639	0.75	0.748	3.885	0.144

	MIN	MAX	Q1	Q3
CAR	1.4051	3.0203	1.9542	2.4349
EPS	-26.68	24.59	-0.42	2.125

MEDIUM FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	690	38	2.1869	2.1926	2.1885	0.3459	0.0132
EPS	725	3	0.593	0.8	0.767	5.089	0.189

	MIN	MAX	Q1	Q3
CAR	0.1437	3.0896	1.9427	2.4158
EPS	-31.81	28.94	-0.68	2.465

LARGE FIRMS:

	N	N*	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
CAR	410	10	2.2178	2.2115	2.2187	0.3027	0.0124
EPS	419	1	1.161	1.13	1.344	5.305	0.214

	MIN	MAX	Q1	Q3
CAR	1.3131	3.1832	2.0179	2.4137
EPS	-34.41	33.77	0.035	2.86

APPENDIX (F)

COMPANIES LIST

600 GROUP
AAH HOLDINGS
ABBEY
ADWEST GROUP
ALBERT FISHER
ALEXON GROUP
ALLIED COLLOIDS
ALLIED TEXTILE
ALVIS
AMBER DAY
ANDREWS SYKES
ANGLIA TV.GROUP
API GROUP
APPLEYARD GROUP
APV
ARMOUR TRUST
ASDA GROUP
ASH & LACY
ASSD.BRIT.FOODS
ASSD.FISHERIES
ASTEC (BSR)
AUSTIN REED GP.
AVON RUBBER
BAGGERIDGE BRICK
BAIRD,WILLIAM
BARR,A.G.
BARR & WALL.'A'
BARRATT DEV.
BARR&WALL.ARND.
BASS
BBA GROUP
BEATTIE,JAMES'A'
BECKMAN,A.
BELLWAY
BENTALLS
BERISFORD INTL.
BETT BROS.
BEVERLEY GROUP
BICC
BLACKS LEISURE
BLAGDEN INDS.
BLOCKLEYS
BLUE CIRCLE IND.
BM GROUP
BOC GROUP
BODDINGTON GP.
BOOKER
BOOSEY & HAWKES
BOOT,HENRY
BOOTS
BORTHWICKS
BOWATER
BOWTHORPE
BPB INDUSTRIES
BRAMMER
BREEDON
BRIDON
BRIDPORT-GUNDRY
BRITISH VITA
BRIT.BORNEO PTL.
BRIT.DREDGING
BRIT.MOHAIR
BRIT.PETROLEUM
BRIT.POLYTHENE
BROMSGROVE INDS.
BROOKE TOOL
BROWN,N.GP.
BROWN & JACKSON
BRYANT GROUP
BSG INTL.

BSS GROUP
BSTL.EVNG.POST
BTP
BUCKINGHAM INTL.
BUDGENS
BULGIN,A.F.
BULGIN,A.F.'A'
BULLOUGH
BULMER,H.P.
BUNZL
BURMAH CASTROL
BURNDENE INVS.
BURTON GROUP
BURTONWOOD BREW.
CADBURY SCHWEPPS
CAFFYNS
CAMPARI INTL.
CANNING,W.
CANTORS
CAPE
CARCLO ENGR. GP.
CARR'S MILLING
CELESTION INDS.
CHLORIDE GROUP
CHRYSALIS GROUP
CHURCH & CO.
CI GROUP
CITY CTR.REST.
CLAYHITHE
COATS VIYELLA
COHEN,A.
COHEN,A.'A'
CONCENTRIC
COOK,WILLIAM
COSTAIN GROUP
COUNTRYSIDE PR.
COURTAULDS
COURTS (FURN.)
COWIE,T.
CRAIG & ROSE
CRAY ELTN.HDG.
CREST NICHOLSON
CRH
CRODA INTL.
DAILY MAIL&GEN.
DAILY MAIL'A'
DALGETY
DAWSON INTL.
DELTA
DEVENISH,J.A.
DEWHIRST GROUP
DIPLOMA
DIXONS GP.
DOBSON PARK
DOWDING & MILLS
DRUMMOND GROUP
DUNHILL HDG.
DYSON,J.&J.
DYSON,J.&J.'A'
E R F HOLDINGS
EIS GROUP
ELECTROCOMPONENT
ELLIS & EVERARD
ELSWICK
ELYS (WIMBLEDON)
EMAP
ERITH
EUROPEAN COLOUR
EVERED BARDON
FARNELL ELTN.
FENNER
FERGUSON INTL.
FINE ART DEV.
FINLAY,JAMES
FIRTH,G.M.
FISONS
FITZWILTON UTS.
FOLKES GROUP
FOLKES GROUP NV.
FORTE
FR GROUP
FRIENDLY HOTELS
GALLIFORD
GEI INTL.
GENERAL ELEC.
GKN
GLAXO HDG.
GLEESON,M.J.

GLYNWED
GRAND MET.
GREENALLS GP.
GREENE, KING
GT.UNVL.STORES
GT.UNVL.STORES A
GUINNESS
HADEN MACLELLAN
HALL ENGINEERING
HALMA
HALSTEAD,JAMES
HARDYS&HANSONS
HENLYS GROUP
HEPWORTH
HEWDEN-STUART
HEYWOOD WILLIAMS
HICKSON INTL.
HIGGS & HILL
HIGHLAND DISTL.
HILL & SMITH
HOLLAS GROUP
HOLT,JOSEPH
HOPKINSONS GP.
HOUSE OF LEROSE
HOWDEN GROUP
HTV GROUP
HUNTING
IBSTOCK JOHNSEN
IMI
IMP.CHM.INDS.
JHNSN.&FTH.BROWN
JOHNSON, MATTHEY
JOHNSTON GROUP
JONES & SHIPMAN
KALAMAZOO
KALON GROUP
KLEENEZE
KWIK SAVE GP.
KWIK-FIT HDG.
LADBROKE GROUP
LAING,JOHN
LAING,JOHN'A'
LAIRD GROUP
LAPORTE
LASMO
LATHAM,JAMES
LEC REFRIG.
LEX SERVICE
LIBERTY
LIBERTY NV.
LINREAD
LISTER & CO.
LOCKER,THOMAS
LOCKER,THOMAS'A'
LONDON INTL.GP.
LOOKERS
LOVELL,Y.J.
LOW & BONAR
LOW (WM)
LUCAS INDUSTRIES
MACALLAN-GLVT.
MACDONALD MART.A
MACDONALD MART.B
MACFARLANE GROUP
MANGANESE BRONZE
MANSFIELD BREW.
MARKS & SPENCER
MARLEY
MARSHALLS
MARSTON,THOMPSON
MATTHEW CLARK
MATTHEWS,BERNARD
MCALPINE(ALFRED)
MEGGITT
MENZIES,JOHN
MERCHANT RETAIL
METALRAX GROUP
ML HOLDINGS
MNG.ALLD.SUPS.
MOLINS
MORE O'FERRALL
MORLAND
MORRISON,WM SPMK
MOSS BROS.GP.
MOWLEM,JOHN
MS INTERNATIONAL
NEWMAN-TONKS
NEXT

NICHOLS (VIMTO)
NURDIN & PEACOCK
OLIVER GROUP
OMI INTL.
PARKLAND TEXT.
PARKLAND TEXT. A
PATERSON ZOCH.
PATERSON ZOCH. A
PEARSON
PENTOS
PERRY GROUP
PEX
PHOENIX TIMBER
PIFCO HDG.
PIFCO HDG.'A'
PILKINGTON
PLYSU
PORTALS GP.
PORTS.SUND.NWSP.
POWERSCREEN
PREMIER CONS.OIL
PRESSAC HOLDINGS
RACAL ELECTRONIC
RAINE
RANK ORG.
RANSOMES
RATNERS GROUP
READICUT INTL.
RECKITT & COLMAN
REDLAND
REED INTL.
RENOLD
RICHARDS
RICHARDS GROUP
RICHDSNS.WSTGTH.
RMC GROUP
ROTORK
RUGBY GROUP
RUSSELL,ALEX.
SAINSBURY,J
SAVILLE GORDON
SAVOY HOTEL 'A'
SAVOY HOTEL 'B'
SCHOLES GP.
SCOTTISH T.V.
SCOT.& NEWCASTLE
SEARS
SENIOR ENGR.
SHARPE & FISHER
SHELL TRANSPORT
SIDLAW GROUP
SIEBE
SIMON ENGR.
SIRDAR
SMART,J.
SMITH,DAVID S.
SMITH,WH GP.'A'
SMITH,WH GP.'B'
SMITH & NEPHEW
SMITHS INDS.
SMURFIT,JEF.
SPIRAX-SARCO
STAKIS
STERLING INDS.
STIRLING GP.
STODDARD SEKERS
STYLO
SYLTONE
T & N
TARMAC
TATE & LYLE
TAYLOR WOODROW
TESCO
THORN EMI
TI GROUP
TILBURY DOUGLAS
TOMKINSONS
TRANSFER TECH.GP
TRINITY INTL.
TRIPLEX LLOYD
UNIGATE
UNILEVER
UNITECH
UNITED BISCUITS
UNITED NWSP.
VAUX GROUP
VIBROPLANT
VICKERS

VICTORIA CARPET
VINTEN GROUP
VIVAT HOLDINGS
VOLEX GROUP
WADDINGTON,J
WAGON IND.HDG.
WARD HOLDINGS
WATMOUGHS HDG.
WATSON & PHILIP
WEIR GROUP
WELLMAN
WESTLAND GP.
WHATMAN
WHESSOE
WHEWAY
WHITBREAD 'A'
WHITBREAD 'B'
WHOLESALE FTNGS.
WILSON,CONNOLLY
WIMPEY (GEORGE)
WOLSELEY
WOLSTENHLME RNK.
WOLV.&DUDLEY
WPP GROUP
YNG.&CO.BREW.NV.
YNG.&CO.BREW.'A'
YORKLYDE
YORKS.CHEMICAL
YULE CATTO
ZETTERS GROUP

ADDENDUM

AFRICAN LAKES
AMBER INDL.HDG.
ASSD.BRIT.ENGR.
ATTWOODS
AUTOMATED SCTY.
BAT INDS.
BAYNES,CHARLES
BEMROSE CORP.
BET
BIBBY,J.
BLACK ARROW GP.
BLACK,PETER
BODYCOTE INTL.
BOUSTEAD
BRITISH SYPHON
BRIT.FITTINGS
BROWN & TAWSE
BTR
BULLERS
CASKET
CHARTER CONS.
CHEMRING
CHRISTIES INTL.
COOKSON GROUP
CORNWELL PARK.
COSALT
CRADLEY GP.HDG.
CREAN,JAMES UTS
CRT GROUP
DAVIS SER.GP.
DE LA RUE
DELANEY GROUP
DINKIE HEEL
ELBIEF
ELECO HOLDINGS
ENG.CHINA CLAYS
EXCALIBUR GP.
EXPAMET INTL.
FERRY PICKERING
FII GROUP
FISHER,JAMES
GESTETNER
GIEVES GROUP
GLENCHEWTON
GRAIG SHIPPING
GRAMPIAN HDG.
HANSON
HARRISONS &CROS
HEADLAM GROUP
HEATH,SAMUEL
HEWITT GROUP
INCHCAPE
IOM.STEAM PACKE
JACOBS(JOHN I)
JOHNSON CLEANER

JOURDAN,THOMAS
KELSEY INDS.
LAMBERT HOWARTH
LEP GROUP
LIONHEART
LONRHO
MANC.SHIP CANAL
MARLING INDS.
MCKECHNIE
MITIE GROUP
MORGAN CRUCIBLE
MOSAIC INVS.
NORCROS
NOREX
NU-SWIFT
OCEAN GROUP
OFFICE & ELTN.
PEN.&ORNTL.DFD.
PHOTO-ME INTL.
PITTARD
PLATIGNUM
POWELL DUFFRYN
REA HOLDINGS
RELYON GROUP
RENTOKIL GROUP
RICARDO GP.
ROPNER
ROTHMANS INTL.'
SCAPA GROUP
SCOT.HERIT.TRUS
SECURICOR GP.
SECURITY SER.
SILENTNIGHT HDG
SKETCHLEY
SPEAR,J.W.
STAG FURNITURE
STRONG & FISHER
SWAN,JOHN
TEX HOLDINGS
TIME PRODUCTS
TOMKINS
TOYE
TRAFALGAR HOUSE
TRANSPORT DEV.
TT GROUP
USHER-WALKER
WACE GROUP
WALKER GREENBAN
WASSALL
WATTS,BLAKE,BEA
WHITECROFT
WILLIAMS HDG.
WILLS GROUP
WOOD,ARTHUR
WOOD,S.W.
WTF.WEDG.UTS
YOUNG(H)HDG.

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