THE CONTEMPORANEOUS MOVEMENT BETWEEN CASH FLOW AND ACCRUALS-BASED ACCOUNTING NUMBERS: THE NEW ZEALAND EVIDENCE

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ABSTRACT

Much attention has been focused on the *usefulness* of cash flow numbers as variables used in predicting the *future* cash flows of an entity. Paradoxically, little attention has been paid to how earnings move relative to cash flows over a sustained time period. This thesis addresses the issue and analyses the financial information from the annual reports of New Zealand listed companies for the 21 year period, 1971-1991. The evidence shows that there has been wide variation between earnings and the underlying cash flows during the 1980s. The two years following the 1987 stock market collapse appears to have had a reduced degree of variation between the earnings and cash flow variables. This suggests that post-crash the attention on financial reporting was influential in reducing the degree of variation between earnings and the underlying cash flows.

The study also examines the data scaled and with outliers removed. Scaling indicates that non-current accruals are more important for large companies while removal of outliers has little effect on the results.

Data on actual cash flows were analysed for the period 1989-1991. The results indicate that the variation between earnings and actual cash flows is quite high.

The contextual relationship between changes in each of the accounting variables (earnings and cash flows) and changes in macroeconomic indicators (gdp, money supply and inflation) was investigated. The evidence is that the association between changes in the macroeconomic indicators and changes in the accounting variables is not particularly strong and that changes in both money supply and inflation are of more importance than changes in gdp.

An industry by industry analysis provides evidence showing that for most industries there is little association between changes in the accounting variables and changes in economic indicators. There is evidence that some industries are more sensitive than others to macroeconomic changes. This evidence is enhanced when the data are partitioned in a way which allows low, medium and high changes in macroeconomic activity to be analyzed separately.

The conclusion of the study is that although the largest proportion of variation in accounting numbers is explained by factors other than changes in the economy there is sufficient evidence to suggest that for some industries the impact of changes in macroeconomic conditions is greater than for others.

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CHAPTER 1: OVERVIEW OF THE RESEARCH PROJECT

1.1 INTRODUCTION

The past twenty-five years have seen many research studies in accounting literature that examine various aspects of the relationship between accruals-based accounting numbers and cash flow numbers. These research studies have often emphasised the impact of the release of either accruals-based or cash flow numbers on stock prices. Implicitly in such studies the correlation between underlying cash flow numbers and the earnings numbers which are derived from them becomes important. This was explained by Manly (1986) when he suggested that a lack of correlation is a useful property " because it means that the variables are measuring 'different dimensions'" (p. 59). The implication is that if the correlation between the variables is high then the amount of incremental information conveyed by one number in relation to the other is low. There are several reasons why studies which attempt to understand the relationship between the two types of accounting numbers provide valuable contributions to the literature. First, evidence of the relationship is important because earnings are frequently used as a proxy for future cash flows in firm valuation models. Second, earnings are often used to assess solvency (solvency depends, however, on cash flows to meet debts as they fall due and, because of this, the relationship between earnings and cash flows becomes particularly important). Third, an understanding of the relationship between the two types of accounting numbers can be useful in providing support for including cash flow numbers in interpretation of financial information. For example, an examination of the contemporaneous movement between

cash flows and earnings demonstrates that the correlation between the variables is frequently low then a reason exists to consider inclusion of cash flow information as an input in fundamental analysis.

It is becoming clear from the research literature that cash flows, in particular operating cash flows and dividend cash flows, have a role in the analysis of financial accounts and in the area of corporate failure prediction. It follows then that users of financial reports may be interested in cash flow information.

That there is increased interest in the potential of cash flow numbers to convey information is now beyond dispute. Since the mid-1980s accounting regulators in various countries, including New Zealand, Canada, the USA, Australia and the United Kingdom, have mandated the provision of a statement of cash flows (SCF) as part of a company's annual financial statements. Harvey (1991) in support of the issuance of a cash flow statement in the UK criticised profit as a performance measure thus:

> Profit may be a reasonable measure of economic wellbeing, but it does not give the shareholder or creditor the complete picture needed to evaluate the likelihood of realisation. Some would argue, after recent corporate collapses, that *it is no more than what a financial PR man says it is* [italics added]. (p. 32)

Clearly, the *quality* and *completeness* of information in published accounts have been the subjects of criticism and, according to Harvey (1991), the Chartered Association of Certified Accountants (CACA) in their submission which endorsed ED 54 *Cash Flow Statements*, stated that in their view cash flow information would "significantly enhance the quality of published accounts" (p. 32). A theoretical basis for the

CACA's view that cash flow information enhances the quality of published accounts depends on the possibility that the correlation between cash flow and earnings numbers is low, thus providing the opportunity for it to measure 'different dimensions'. The foregoing theory of low correlation between cash flows and earnings opens up an interesting area for investigation.

1.2 AIM AND OBJECTIVES OF THE RESEARCH PROJECT

The main aim of this study is to examine and analyse the relationships between the earnings numbers and cash flow numbers of New Zealand listed companies taking account of the contextual specificity of such relationships.

To facilitate achievement of this aim the research has the following specific objectives:

(1) analyse the earnings numbers for New Zealand listed companies cross-sectionally over a period of years to allow the movement in earnings to be established, thus facilitating comparison with the contemporaneous cash flow numbers;

(2) derive and analyse cash flow surrogates for New Zealand listed companies for the study period in order that the movement in cash flows can be determined to facilitate comparison with the contemporaneous earnings numbers;

(3) determine the relationship between cash flow numbers and earnings numbers for the study period by identifying their pattern of change.

(4) examine the impact of macroeconomic variables on the relationship between earnings and cash flow numbers and extend the consideration of the contextual nature of the relationship between earnings and cash flow numbers by examining the possible influence of industry membership.

1.3 RESEARCH METHODOLOGY

The research is conducted in several phases as follows:

(1) a literature-based search to identify the issues associated with the relationship between cash flows and accruals based accounting numbers;

(2) an empirical study, based on New Zealand Annual Reports for the period 1971-1991, to determine the contemporaneous movement of earnings and cash flow numbers. For the purpose of the study derived cash flows are used as surrogates for actual cash flows for the entire period. In addition to the derived cash flows, *actual* cash flows are also examined for the period 1989-1991;

(3) tests to determine how changes in the New Zealand economy during the study period may have influenced changes in earnings and changes in cash flows. The purpose of this is to determine whether or not changes in the accounting variables are contextually specific.

1.3.1 Literature-based study

The literature on the association between earnings and cash flow numbers is reviewed. The area investigated includes studies on the usefulness of the variables as well as on the association between the variables. The literature on usefulness is relevant because the potential for cash flow information to be useful *derives* from the fact that cash flow numbers *are different* from earnings information. It is only because the cash flow information has the potential to be useful that interest in the association between the earnings and cash flow variables exists.

The literature is sourced from refereed journals, conference papers, professional journals, working and discussion papers, books and dissertations. The literature is identified from the following sources:

(1) on-line and CD-ROM database search

(2) manual search of accounting-based indices

(3) references cited in the accounting literature.

1.3.2 Empirical Research

The research process is conducted as follows:

(1) The relationship between earnings and cash flow numbers is analysed. The basis of this research is the published accounts of New Zealand listed companies for the period 1971-1991.

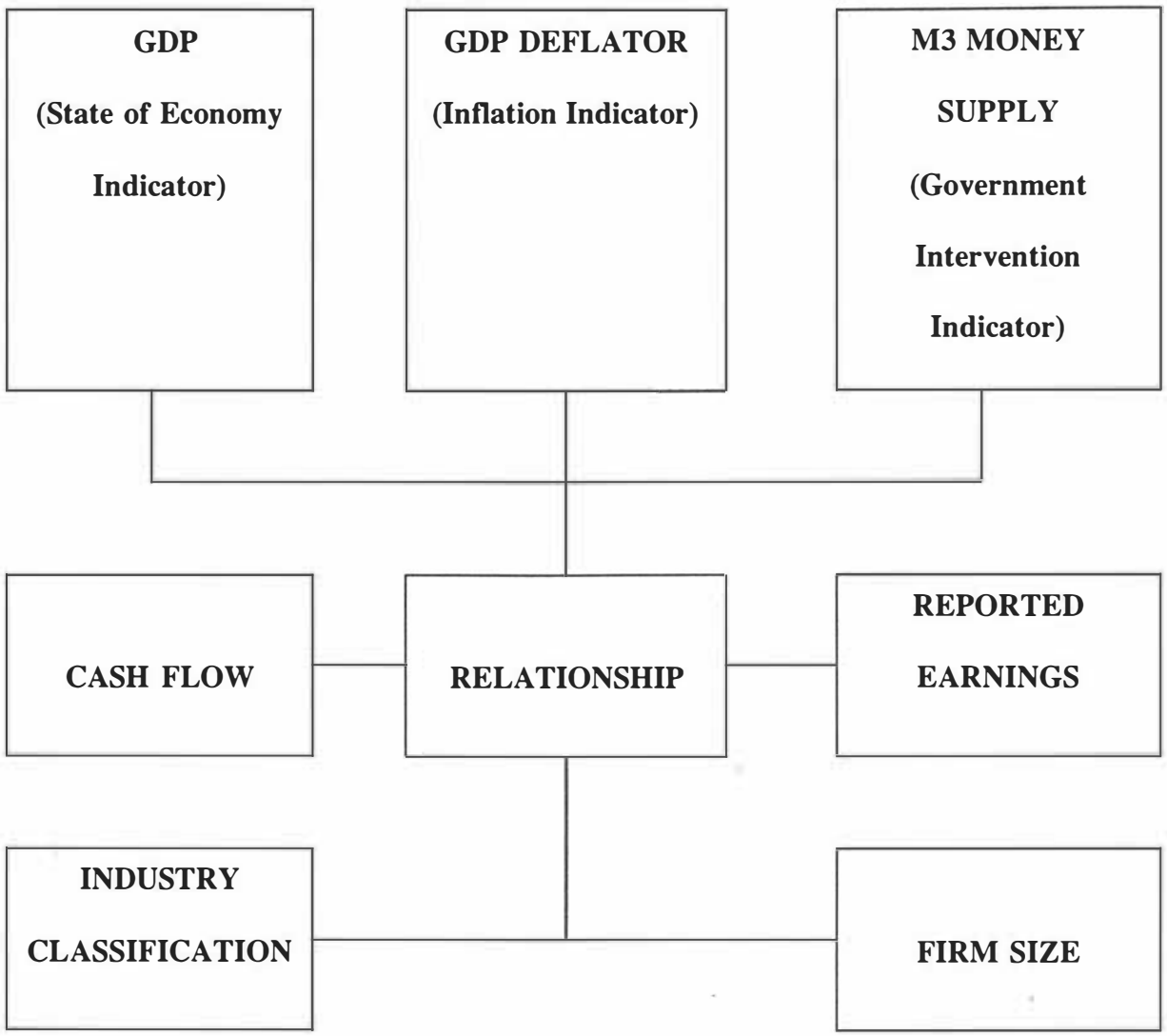
(2) The contextual nature of the relationship between earnings and cash flows is analysed. To do this, changes in GDP, M3 money supply and inflation as measured by the GDP deflator, are correlated with changes in earnings and cash flow numbers. Contextuality is also considered as a function of industrial classification and firm size.

Figure 1.1 is a schematic model of the relationships which are being examined in this thesis.

The model illustrates that the relationship between earnings and cash flows may be contextual in the sense that it is influenced by macroeconomic changes represented by the variables GDP, M3 Money supply and GDP Deflator (as the inflation measure). The relationship may also be influenced by the particular industry to which a firm belongs or it may be influenced by firm size.

FIGURE 1.1

The Contextual Influences on the Relationship between Earnings and Cash Flows.



1.4 PROJECT CONSTRAINTS

The scope of this project has several limiting features. First, the empirical analysis is confined to the accounts of companies reporting in New Zealand. It is not automatically assumed that there is anything systematically different about New Zealand which makes the findings of this study different from those which would

pertain if the study were to be conducted in a different domicile. On the other hand, differences may exist which *are* unique to New Zealand and where this is felt to be the case arguments to support it will be offered. Second, in order to complete the project within a reasonable time it is necessary to apply a guillotine to the time period of the study. Consequently, the dates chosen for the study period are 1971-1991. Finally, of the 4,300 rows in the database, each of which represented the annual results of an individual company there were found to be some values which were obviously extreme. These extreme values were invariably the result of an incorrect entry having an additional three zeros mistakenly added to the accounting numbers. The results were checked against the annual reports of the companies concerned and corrected. The size of the database made the checking of every entry impractical. Missing values were in the order of 2% of the entries and this along with the possibility of some input errors was accepted as a limitation of the database.

1.5 OUTLINE OF THESIS

The thesis is presented in 6 chapters as follows:

Chapter 1 **Overview of the research project.**

Chapter 2 **Review of the literature on the relationship between cash flows and earnings.**

There has been a considerable amount of literature on the subject of the information content of earnings numbers. Somewhat less has been written on the subject of the information content of cash flow numbers although the period since the mid-1980s has seen an increasing number of articles on this subject appear in the literature. This chapter considers the literature which examines the information content of cash flows and earnings numbers with a view to identifying the issues which need further investigation in order to enhance our understanding of that relationship.

Chapter 3 **An analysis of the association between earnings numbers and cash flow numbers for New Zealand listed companies.**

In the past much attention has been focused on the usefulness of cash flow numbers as a variable to predict the future cash flows of an entity. Paradoxically, little attention has been paid to how the earnings move relative to cash flows over a sustained time period. This chapter addresses the issue through an analysis of earnings numbers and cash flow numbers from the financial accounts of New Zealand listed companies. The cross-temporal association between earnings and cash flow numbers is measured using correlation tests. In order to conduct these tests surrogates are used for the entire study period. However, actual cash flows are examined in relation to earnings for the period 1989-1991.

Chapter 4 **Macroeconomic changes in New Zealand during the study period.**

This chapter provides a concise overview of the economic changes which have occurred since the 1950s with particular reference to changes during the 'Think Big' and 'Rogernomics' periods.

Chapter 5 **Contextuality of the relationship between earnings and underlying cash flows.**

Examining the contextual nature of the relationship between reported earnings and the underlying cash flows, this section of the thesis focuses on the effect of changes in macroeconomic variables on the accounting numbers. Motivation for the investigation of the effect of changes in economic conditions is derived from suggestions in the literature that the results of some previous studies might be specific to particular time periods.

Chapter 6 **Summary and conclusions.**

In this chapter the results of the various component parts of the study are combined and the findings are described in summary form. The findings are related to those of prior studies and areas of future research are identified.

1.6 SUMMARY

This chapter provides an overview of the research project. Commencing with an explanation of why an understanding of the relationship between earnings and cash flows is important the chapter proceeds to describe the aims and objectives of the thesis. The stated purpose of the project is to examine and analyse the relationships between the earnings and cash flow numbers of New Zealand listed companies taking account of the contextual specificity of such relationships. The research methodology described in this chapter includes both a literature-based and an empirical component. The chapter concludes with an overview of the thesis.

CHAPTER 2: SURVEY OF LITERATURE ON THE INFORMATION CONTENT OF CASH FLOWS AND EARNINGS

2.1 INTRODUCTION

In Chapter 1 reference was made to the mandating of cash flow statements by accounting regulatory bodies in several countries. These regulatory bodies, however, have not provided any compelling evidence as to why there is a need for such information. In recent years studies have suggested that cash flow information is important to allow users of financial information to assess company performance. Increasingly commentators are referring to the concept of the quality of earnings whereby the ratio of operating cash flows to operating profits is utilised to allow the strength of the financial performance of an entity to be ascertained. It is clear that the relationship between earnings and cash flows is fundamental to this subject. Consequently, this chapter considers the literature which examines the relationship between cash flow information and accruals-based earnings numbers.

The relationship between accruals-based accounting numbers and cash flow numbers has been discussed in accounting literature for a considerable time. Much of the controversy is concerned with the provision of the appropriate information to help in the assessment of future cash flows and the fundamental issue becomes the question of whether accruals-based earnings or cash flow numbers are the more useful in this context. The Statement of Concepts for General Purpose Financial Reporting issued

by the New Zealand Society of Accountants (1993) makes no specific comment that earnings are superior to cash flows but the statement is firm that in the absence of special circumstances the accruals basis should be applied since:

> financial reports prepared on the accrual basis inform users not only of past transactions involving the payment and receipt of cash, but also of obligations to pay cash in the future and of resources that represent cash to be received in the future. (p. 8)

It is implicit that the NZSA sees accruals-based information as being a better indicator than historic cash flows of future cash flows. In the USA the Financial Accounting Standards Board in Statement of Financial Accounting Concepts No.1 (SFAC No. 1) entitled "Objectives of Financial Reporting by Business Enterprises" (FASB, 1978) states that:

> financial reporting should provide information to help present and potential investors and creditors and others in assessing the amounts, timing and uncertainty of prospective cash flows from dividends or interest and the proceeds from the sale, redemption, or maturity of securities or loans. (para. 42)

The FASB (1978) makes it clear that the important factor in the foregoing is the enterprise's ability to generate cash and that earnings are of primary interest in estimating future cash flows. SFAC No.1 is unequivocal in stating that:

> Their [investors, creditors and others] interest in an enterprise's future cash flows and its ability to generate favorable cash flows leads primarily to an interest in information about its earnings rather than information directly about its cash flows. (para. 43)

Although the FASB (1978) is unequivocal that earnings have primacy over cash receipts and payments in terms of usefulness to investors, creditors and others it mandated the provision of a statement of cash flows in 1987 with the issue of Statement of Financial Accounting Standard No.95 (FASB, 1987). Presumably the FASB issued SFAS No.95 in response to demand from users of financial statements and in the belief that it would be, in some sense, useful. The FASB outlined how it felt that the information might be useful when it asserted that cash flow information would allow investors and other interested parties to assess:

(i) the enterprise's ability to generate positive future cash flows;

(ii) the enterprise's ability to meet its obligations, its ability to pay dividends, and its need for external financing;

(iii) the reasons for differences between net income and associated cash receipts and payments;

(iv) the effects on an enterprise's financial position of both its cash and noncash investing and of its financing transactions during a period.

Similarly, the New Zealand Statement of Standard Accounting Practice No.10, issued in 1987, states that:

> The information in a Statement of Cash Flows, *if used with information in the other financial statements* [italics added] should help, investors, creditors, and others to:

(a) estimate the entity's ability to generate positive future net cash flows;

(b) assess the entity's ability to meet its obligations and pay dividends and assess its needs for external financing; and

(c) note the difference between income and associated cash receipts and payments. (para. 4.1)

In the UK the approach by the Accounting Standards Board (ASB) was similar, with the FRS-1 "Cash Flow Statement" being viewed as providing, "assistance to users in assessing the liquidity, viability and financial adaptability of an enterprise" (cited in Wallace and Collier, 1991, p. 45).

Much of the research on this question has been conducted since the 1980s and the fact that it took until this period to stimulate interest in the subject has been noted by Lev and Ohlson (1982, p. 265) who observed that:

> Given strong beliefs, particularly among practitioners, that cash flows reflect better than accruals earnings the economic realities of a company's performance, it is surprising that *so little research has been devoted to this issue* (italics added).

This chapter surveys the literature on the information content of cash flows and earnings with a view to identifying the nature of the relationship between the two variables and the issues that need further investigation in order to enhance our understanding of that relationship.

2.2 THE USEFULNESS OF CASH FLOW NUMBERS

The literature in this area can be classified into three categories. First, there has been research which is capital markets-based and which considers the information content of cash flow numbers by investigating the effect of the release of cash flow information on share price. Second, researchers have considered the usefulness of cash flow information as an input into models of corporate failure and have examined the question of whether the inclusion of cash flow numbers improves the predictive ability of such models. Regardless of which type of enquiry is being considered the basic question remains the same, namely: 'is the information contained in the cash flow numbers useful'? Useful, of course, implies that it contains information not captured by the earnings number.

Appendix A, Table 1 outlines in chronological order the studies which examine the information content of cash flow numbers from a capital market perspective. Appendix A, Table 2 lists studies in the corporate failure literature.

Other studies which do not fall into either of the above categories but nevertheless make a significant contribution to the debate comprise the third category which is referred to as miscellaneous studies. This category includes studies such as Epstein and Pava (1992a) in which users were surveyed with respect to their perception of the usefulness of cash flow information, and the works of Lawson and Lee which are largely in the nature of *a priori* studies although Lee (1981a) has also examined users'

views on the use of cash flow information. These studies and others are discussed below.

2.2.1 Market-based studies

Appendix A, Table 1 commences with a seminal paper by Ball and Brown (1968). The prediction of the study was that unexpected increases in earnings are accompanied by positive abnormal rates of return[1] whilst unexpected decreases in earnings are accompanied by negative abnormal rates of return. The investigation was concerned with annual earnings announcements and the salient questions were: First, do annual earnings reflect information which affects stock prices; and second, do they convey information to the market?

The results of Ball and Brown's (1968) study confirmed that unexpected increases in earnings were accompanied by positive abnormal rates of return. A considerable proportion (85-95%) of the price adjustment to annual earnings changes occurs before the month of the earnings announcement and as a result of this they did not consider annual earnings to rate highly as a timely source of income. Ball and Brown, in the same study, computed results for the model substituting cash flows for earnings and concluded that the cash flow variable was less accurate than the accruals-based variable in explaining the sign of abnormal returns. Their study generated a continuing interest in the subject and established the basis of the methodology for

1 Using rates of return for each firm in the sample for prior periods and a market index they calculate parameters to predict the rate of return for each month of the year. The abnormal rate of return is the difference between the actual and the predicted rates of return.

many further studies. Ball and Brown were primarily interested in the information content of the earnings number with the information content of cash flow considered as an afterthought. Other researchers (e.g. Beaver and Dukes, 1972; Bowen, Burgstahler and Daley, 1987; and Bernard and Stober, 1989) have developed the investigation of the information content of the cash flow numbers.

The measure used by Ball and Brown (1968) to approximate cash flow was operating income as defined in the *Compustat Manual*. The variable was calculated by taking net sales less cost of sales and operating expenses before deducting depreciation and amortization. Beaver and Dukes (1972) used a similar measure with an adjustment for deferred taxation and found that unexpected earnings are more highly associated with abnormal rates of return than are unexpected cash flows. The implication of this finding is that earnings numbers are better conveyers of information than cash flow numbers. However, the problem with their approach was that each of the accounting variables was examined in isolation and no consideration was given to either the interrelationship between the two accounting variables or the possibility that although the earnings number had more information when considered independently the cash flow number might contain information which was *incremental* to the earnings number. If it was found that this was, in fact, the case it would provide evidence to support the argument that cash flow information is useful as an addition to the 'traditional' accounting performance measure of earnings. This, of course, has appeal in the sense that although the evidence to this point is that earnings are the important conveyers of information, demand for further information has led to the provision of a statement of cash flows.

Patell and Kaplan (1977) enquired into the question of whether cash flow numbers, as represented by operating cash flows, conveyed information which was *incremental* to the information conveyed by the earnings numbers. As a surrogate for the cash flow number they used the *Compustat* variable total funds from operations. This is defined as 'net income after extraordinary items *plus* deferred taxes and depreciation *minus* unremitted earnings of unconsolidated companies *plus* other adjustments'. The result of this study confirmed the findings of previous studies that earnings numbers are better predictors of future cash flows than are current cash flow numbers and furthermore the findings suggested that the cash flow numbers contained no incremental information beyond that contained in the earnings numbers.

The literature was advanced by Patell and Kaplan (1977) explicitly introducing the issue of the possible *incremental* information content of the cash flow numbers. However, the association between the earnings number and the cash flow number is such that it was difficult to remove from the enquiry the influence of earnings on the cash flow measure. Since the earnings number is derived from the underlying cash flow number the relation which exists between them, and how this relation changes particularly over a sustained time period, must be of some interest. Patell and Kaplan did not attempt to consider how the earnings and cash flow numbers were associated over time nor did they attempt to isolate the influence of the accruals adjustment through which the cash flows are converted into earnings.

The question of the influence of the accruals adjustment in the context of the explanatory power of the variables was examined by Rayburn (1986) who postulated

that if accruals are not associated with security returns then the value of the process through which cash flows are converted into earnings is brought into doubt. The focus of Rayburn's concern was that the ability of investors to assess the future cash flows of an enterprise may not be significantly improved by the process of adjusting cash flows via the accruals process. The findings of Rayburn's study support the association of both cash flows and total accruals with abnormal returns. The study provided evidence that cash flow numbers have information content, albeit in an incremental sense. Dechow (1994) suggested that while the results of Rayburn's study "are consistent with both components [accruals and cash flows] having incremental information...they do not directly assess whether reported earnings is a superior summary measure to realized cash flows" (p. 6). Dechow acknowledged that the evidence to date on this question is ambiguous. However, she concluded from the results of a study which examined the circumstances under which accruals are predicted to improve the ability of earnings to measure firm performance, that earnings are the superior measure. The finding of Rayburn that both earnings and cash flows have incremental information content is consistent with that of Wilson (1986) and neither are negated by Dechow's conclusion. Dechow's results were based on the question of which measure is superior "given the choice of one" (p. 6).

It is interesting to note that Dechow (1994) acknowledged the possibility of a contextual influence being present in the ability of accounting variables to reflect firm performance. Where a firm is "in steady state (i.e., firms with cash requirements for working capital, investments, and financing that are relatively stable), cash flows have few timing and matching problems and are a *relatively useful measure of firm*

performance" [italics added] (p. 7). Cash flow's ability to reflect firm performance, on the other hand, declines as the operating environment becomes more unstable. Dechow argued that the accruals process can reduce the timing and matching problems inherent in cash flows under volatile conditions. A further allusion to a contextual element being present in determining whether or not cash flow numbers are useful in assessing firm performance was made when Dechow suggested that in industries which are characterised by short operating cycles, cash flows and earnings are equally useful. However, in industries which are characterised by long operating cycles cash flows are less useful measures of performance than earnings.

Prior to Rayburn (1986) the only previous indication from a market-based study that there was incremental information content in the cash flow numbers was a weak finding by Beaver, Griffen and Landsman (1982) that net income adjusted for depreciation had incremental information content over earnings. Further evidence of the value of cash flow information appeared with studies by Bowen *et al.* (1987) and Wilson (1987).

Bowen *et al.* (1987) investigate whether "cash flow data adds anything to the information set impounded in the security prices" (p. 724). They also examined the question from the opposite perspective, i.e., they asked whether there was incremental information content in the earnings figure over and above that contained in the cash flow figure. The results of the study provide evidence that:

(a) cash flow numbers have information content beyond that contained in earnings. Furthermore, cash flow numbers also have information content beyond that contained in earnings and working capital from operations (WCFO), and;

(b) earnings and WCFO have information content over and above that contained in cash flow data.

Baydoun and Papasyriopolous (1992) examined the incremental information content of cash flows for a sample of 31 New Zealand companies over the time period 1987-1990. The stated reason for the study was that there was no empirical evidence to support the primacy of either cash flows or earnings and they claim that the study was an attempt to remedy the deficiency. The conclusion of the study was that cash flows, in particular cash flows from investments, have significant incremental information content only for 1987 and that accruals possess incremental information content for 1989 and 1990. Baydoun and Papasyriopolous suggested that this is what one would expect in view of investors' loss of confidence in the reliability of financial accounting information after the 1987 stock market crash. The authors claimed that in 1989 confidence in the reliability of financial accounting information improved but they provide no evidence to support this view.

In none of the above studies was there particularly strong evidence of incremental information content being associated with the cash flow numbers. However, the studies did lead to questions about whether the results were robust beyond the time period of the particular study and whether they were generalisable to other firms.

Rayburn's (1986) study provided little evidence of robustness and the author expressly warns that the results are not necessarily generalisable to other firms. Wilson (1987) expressed the view that his results might be dependent upon the "state of the economy" (p. 320) although he did not specifically test for this. He suggested that investors may, if the economy is moving into an expansionary period, " reward firms that anticipate ...demand by expanding their inventories and receivables and as a result reduce cash from operations" (p. 320). Firms faced with an economy entering recession might also be rewarded for reductions in inventories and receivables which help to generate cash flows. Thus, since firms may be adjusting to economic changes, the relationship between the accounting variables (both earnings and cash flows) and the stock returns may be related to these economic changes. It is possible, according to Wilson, that the association between the change in the sign of the correlation between stock returns and unexpected cash flows from operations may be systematic.

The question of whether factors such as the state of the economy may be influential in attempts to assess the implications for cash flow numbers as a variable in predicting the future cash flows of an enterprise has led to the question of 'contextuality'. Bernard and Stober (1989) were of the opinion that the contextual nature of the relation between company valuation and the components of earnings (cash flow and accruals) was so complex that models could only capture a small part of it. Contextuality was also an issue with Lev and Thiagarajan (1993) when they examined the effect of changes in economic variables on fundamental analysis. They conjectured, for example, that "a disproportionate (to sales) increase in receivables

conveys bad news. Yet for a given receivables increase 'the negative message is likely to be more pronounced as the rate of inflation increases'" (pp. 205-206).

Clearly Lev and Thiagarajan (1993) saw change in the economic indicator as being associated with change in the message conveyed by the accounting number. They developed their study by partitioning the data into three classes of high, medium and low changes in economic activity and found that the message conveyed by changes in accounting numbers was sensitive to the level of change in economic indicators.

The possibility of the relationship between the components of earnings and valuation being highly contextual raises the question of whether the association between cash flows and earnings is itself contextual. Little empirical work has been conducted in New Zealand on the association between cash flows and earnings or their information content. The current study seeks to address this issue by examining the relationship between earnings and cash flows and considering the influence of contextuality with respect to this relationship.

2.2.2 Corporate failure prediction models

The corporate failure prediction models as shown in Appendix A, Table 2 make use of the accounting numbers which are presented in annual financial reports. The usual approach has been to construct univariate or, more commonly, multivariate models which utilise the ratios calculated from the information provided in the Profit and Loss Account and Balance Sheet.

Beaver (1966) was one of the first researchers to find evidence of the usefulness of cash flow numbers in models of corporate failure prediction. He developed a univariate model using a matched pair classification method which included 79 failed and 79 non-failed firms. The basis of the model was the use of financial ratios, although the approach was somewhat crude insofar as it utilised only one ratio at a time to predict failure. It was quickly realised that, since different ratios "reflect different aspects of a firm's financial position, so better predictions can be obtained by using combinations of ratios instead of one ratio" (Watts and Zimmerman, 1986, p. 114). Nevertheless, Beaver's study found that overall the best predictor of failure was the ratio of cash flow to total assets. Because of the limitation of the univariate approach Beaver's model was quickly replaced by multivariate models, the best known of which is Altman's (1968). Altman's model took the following form:

$$Z= .012X_1 + .014X_2 + .033X_3 + .006X_4 + .999X_5$$

where:

X_1 = Working capital/Total assets

X_2 = Retained earnings/Total assets

X_3 = Earnings before interest and taxes/Total assets

X_4 = Market value of equity/Par value of debt

X_5 = Sales/Total assets

Z = Overall index

As can be seen from the above Altman (1968) did not include a cash flow variable in his model. However, that does not imply that cash flows do not have information content. Altman (1984) argued that the 'traditional' cash flow measure (net income and depreciation) was a good individual indicator but not as good as the 'classic' return-on-asset variable. He went on to state that "...there is some important information in OCF [operating cash flow] data" but cautions that the results need to be interpreted by an experienced analyst in order to be sure that the correct interpretation is being placed on the cash information. This is because the use of increasing operating cash flow information as an indicator can signal a healthy situation (increased receivables as a result of a relaxation in credit policy) or it can signal 'bad news' (increases in receivables as a result of a decline in the effectiveness of collection procedures).

Altman's (1984) view that operating cash flow has some important information was confirmed by later capital markets-based studies (Rayburn, 1986; Wilson 1986) that found that cash flow numbers had information which was incremental to the information contained in earnings numbers.

Largay and Stickney (1980), in a case study of the American retailer W.T. Grant, were convinced of the usefulness of cash flow numbers. Their study led them to the conclusion that cash from operations (CFO) provided an earlier warning of impending failure than the earnings numbers. However, their study was univariate and furthermore it was based on only one company so that it is difficult to support the view that the results may be generalisable to other firms, particularly if those firms

are in a different industry (this question of generalisability of results has been addressed by Bernard and Stober (1989) where they described the problem in terms of 'contextuality'). Charitou and Veneris (1990) in a study of Greek company failures also reported that cash flow information: " could have indicated liquidity and solvency problems for the bankrupt firms several years before bankruptcy" (p.113). Gahlon and Vigeland (1988) examined the situation for USA companies and found that "... cash flow variables and suggested ratios capture statistically significant differences between bankrupt and non-bankrupt firms, on average, as much as five years prior to bankruptcy" (p.13). Other significant contributions have been provided by the empirical work of Gombola and Ketz (1983), and Thode, Dtrina and Largay (1987).

The findings of Largay and Stickney (1980) were not supported by those of Casey and Bartczak (1984 and 1985) who found that CFO was not a good predictor either in a univariate model or a multivariate model. Over a five year period Casey and Bartczak could not distinguish between "the healthy enterprise and one which would fail" (p. 61). Furthermore, they found that operating cash flow was less accurate as a variable in predicting failure than conventional accruals-based measures. The cash flow measures used by Casey and Bartczak were:

(i) Operating cash flow

(ii) Operating cash flow \ Current liabilities

(iii) Operating cash flow \ Total liabilities

The accruals-based measures used were:

(i) Net income \ Total assets

(ii) Cash \ Total assets

(iii) Current assets \ Current liabilities

(iv) Net sales \ Current assets

(v) Current assets \ Total assets

(vi) Total liabilities \ Owners equity

The definition of CFO (or as Casey and Bartczak, 1984, expressed it OCF) is working capital from operations plus or minus changes in non-cash working capital. This measure is consistent with FASB's measure (and the measure used in the current study). Unadjusted however, it has the drawback of ignoring the consideration of business size and, from a business failure perspective, the existence of unused borrowing capacity. As a means of compensating for these deficiencies Casey and Bartczak (1984) divided the CFO through, in the first instance by current liabilities and, in the second instance by total liabilities. This, according to the authors, helped to: "offset this drawback by relating OCF to a company's level of short-term and long-term indebtedness, respectively" (p. 62). Although, the method used does compensate for indebtedness it is less clear why it should be suitable as a proxy for size. Presumably the assumption is that large companies carry more short-term and long-term debt than smaller companies. However, this may or may not be the case (a more usual proxy, and the one used in the current study, is to apply total assets as the

denominator on the more generalisable assumption that large companies have greater assets than small companies).

Casey and Bartczak (1984) were aware of the shortcomings of their cash flow measure and acknowledged that the way in which cash flow was measured might influence the classification of failed and non-failed firms. They suggested that broader definitions of cash flow might be better than narrow ones. Lee (1985) focused on this when he suggested that: " ...the Casey and Bartczak study may have been too simplistic in its cash flow approach and that a more detailed examination of the nature and composition of operating cash flow may have been appropriate" (p. 42).

Gentry, Newbold and Whitford (1985a) supported the view that the type of cash flow measure is important. For example, they found that CFO was not significant in models which attempted to classify failed and non-failed firms but that dividend cash flows were a significant variable. Using a cash flow-based funds flow approach which was based on a model designed by Helfert (1982) they conducted tests using MDA, Probit and Logit techniques. The model utilised the following 8 major components:

(i) Funds from operations

(ii) Working capital

(iii) Financial[2]

(iv) Fixed coverage expenses

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2 Gentry *et al* (1985a) provide no further description of this variable. Examination of Helfert's model indicates that it is equity finance.

(v) Capital expenditures

(vi) Dividends

(vii) Other asset and liability flows

(viii) Change in cash and marketable securities.

In order to obtain a sample of failed companies for their study Gentry *et al.* (1985a) examined the *Compustat Industrial File* and extracted 92 companies which had failed between 1970-1981. Of these 92 companies, complete information for years one, two and three prior to failure was only available for 33 companies. Using these 33 firms the authors applied the three techniques mentioned above in order to classify failed and non-failed companies. Only the results from the logit technique were reported in the study since the authors claim that this provided the best results. However, Gentry *et al.* (1985a) stated that "the MDA and probit models did not alter the results" (p. 150). With a correct classification of failure between 77% (3 years prior to failure) and 83% (1 year prior to failure) they concluded that cash flow-based funds flow components "offer a viable alternative for classifying failed and non-failed firms" (p. 160). Significantly, the results of this study provided evidence that CFO did not improve the classification of failed and non-failed firms, which concurs with the findings of Casey and Bartczak (1984). However, the finding that dividend funds flow was a significant variable in classification of failed and non-failed firms is an interesting addition to Casey and Bartczak's findings which has intuitive appeal.

Although agreeing with the findings of Gentry *et al.* (1985a) that dividend payments (or non payments) were an important indicator of impending corporate failure, Lau

and Lau (1988) argued that CFO *was* a useful variable in predicting dividend default or reduction.

Aziz and Lawson (1989) found that a model which used 5 cash flow components was powerful although not superior to Altman's (1968) model which did not contain cash flows. Using the *Compustat Industrial File* the authors took a sample of 49 firms which entered bankruptcy between 1973 and 1982. The failed companies were matched with 49 other non-failed companies. The approach taken was two-pronged in the sense that the authors first used a cash flow model which was based on Lawson's (1981) cash flow entity equation (see page 55). This cash flow based model is analogous to the Gentry *et al.* (1985a) funds flow type model in that: "they both originate in the cash funds flow statement" (p. 56). The second approach by Aziz and Lawson was to construct a mixed model which is analogous to that in Gentry, Newbold and Whitford (1985b) in that it contains both cash flow and accruals-based ratio data (Z variables). The cash flow variables in Lawson's model were:

(i) Operating cash flow

(ii) Net capital investment

(iii) Liquidity change

(iv) Taxes paid

(v) Lender cash flow

(vi) Shareholder cash flow.

For the purposes of their investigation Aziz and Lawson (1989) excluded shareholder cash flow "to avoid statistical over-identification" (p. 58). The second set of variables, i.e., the Z variables, were as follows:

(i) Working capital \ Total assets

(ii) Retained earnings \ Total assets

(iii) Earnings before interest and taxes \ Total assets

(iv) Market value of equity \ Book value of total debt

(v) Sales \ Total assets.

Aziz and Lawson (1989) used the above variables in a logit model to predict bankruptcy, arguing that the use of cash flows in such a model is empirically justified if they, i.e., cash flows, take on significantly different values between bankrupt and non-bankrupt firms. They found that operating cash flow and taxes paid are significantly different at a very high level from the fifth to the first year prior to bankruptcy. Lender cash flow was found to be significant in the fourth year prior to bankruptcy while net capital investment cash flow was significant in the first year prior to bankruptcy. Finally, for this set, liquidity change was found to be significant for the fifth year prior to bankruptcy. Thus the empirical evidence for formulating a model for bankruptcy prediction based on cash flows as measured by Lawson's (1981) cash flow identity appears to be sound. Looking at the cash flow-based model alone, it appears that taxes paid is the only variable which is significant for all of the five years. Each of the other four variables is significant for two of the five years.

For the Aziz and Lawson's (1989) mixed model taxes paid was significant for three of the five years, with none of the other variables being significant in more than two of the years. By combining the cash flow-based model and the Z variable model Aziz and Lawson claimed an improvement in chi-square values for the first and second year before bankruptcy. They demonstrated that operating cash flow, lender cash flow, net capital investment cash flow and taxation cash flow are important variables in models of bankruptcy prediction. Furthermore, the authors argued that Casey and Bartczak's (1984) suggestion that cash flow should be de-emphasised in tracking financial health would be a retrogressive step.

Lee (1985), one of the main British proponents of the use of cash flow information, conducted an examination of the accounts of 37 failed British companies and found evidence in favour of the use of operating cash flows as a means of predicting company failure. Lee used the information in the failed companies' published funds statements over a three year period to derive his cash flow data. The results of Lee's study indicated that the operating cash flows of the 37 failed companies were poor and declining over the three years of the study period. As would be expected this poor performance was particularly evident in the year prior to failure. A further observation was that the poor operating cash flow performance was accompanied by a corresponding increase in external financing: "with 75% of companies obtaining more than one third of cash inflow in the form of debt" (p. 45).

Laitinen (1994) in a study which analysed the behaviour of failing and non-failing companies concluded that the traditional cash flow measure is a more stable and

reliable predictor of business failure than operating cash flow. This provides evidence of the usefulness of the cash flow measure and at the same time provides a justification for the use of a derived cash flow surrogate rather than the actual operating cash flow in corporate failure prediction models.

The results of studies which have investigated the use of cash flow numbers within corporate failure models have tended to show that accruals-based multivariate discriminant models are more accurate as predictors of corporate failure than any single cash flow ratio (Casey and Bartczak, 1985, p. 385). However, as has been shown there is growing contrary evidence which supports the view that cash flow numbers have information content which is incremental to that conveyed by the earnings numbers. This suggests that cash flow numbers have a role to play in corporate failure prediction models. New Zealand based studies have tended to be variations of the multivariate discriminant model and have attempted to improve on the predictive power of existing models by modifying the number of variables in the model.

Tabb and Wong (1983) used an MDA approach which involved seven ratios:

X_1 = (Current assets-Current liabilities)/Total assets

X_2 = Retained earnings/Total assets

X_3 = Cash flow/Total assets

X_4 =Log (Total assets /1,000,000)[10]

X_5 = Earnings before tax / Shareholders funds

X_6 = Log (Total liabilities /Total assets)

X_7 = (Current assets -Current liabilities)/Total liabilities

These ratios were chosen on the basis that the most important indicators of potential failure are liquidity, age, productivity, volume of cash flow, size, profitability and gearing. Perhaps the most significant dissimilarity between Tabb and Wong's approach and Altman's approach is the inclusion of a cash flow based ratio within the model. The model was successful 80% of the time in predicting failure one year prior to the event.

Ferner and Hamilton (1987) also used MDA combining a set of 11 financial ratios as follows:

Working capital / Total assets

Retained earnings / Total assets

Earnings before interest and tax / Total assets

Market value of equity / Book value of total debt

Sales / Total assets

Profit before tax / Current liabilities

Current assets / Total liabilities

Current liabilities / Total assets

No credit interval(net current assets to annual cash expenditure)

Cash flow / Total debt

Cash flow / Interest paid

Ferner and Hamilton claimed a 95% accuracy level for classifications based on the last years results.

Bradbury (1985) also applied an MDA model to the results of 40 small businesses. Developing three models Bradbury claimed classification power of up to 87% but did not make any claim on the predictive ability of the models.

None of the above studies considers the fact that the usefulness of the cash flow variable might be dependent upon factors such as industry membership or the state of the economy and, by implication, the time period during which the study was conducted.

2.2.3 Miscellaneous Studies

Many studies since Ball and Brown (1968) have concluded that accruals-based numbers are superior to cash flow numbers in the sense that they have a greater information content. Although this view has had the support of no less a body than the Financial Accounting Standards Board in the USA, there has been, nevertheless, a continuing and increasing demand for more cash-based information. The result of this increased demand has been that in recent years accounting standards on cash flow accounting have been issued in a number of countries including Australia (AASB-1026 in 1991), New Zealand (SSAP-10 in 1987 revised in 1992), the USA (FASB-95 in 1987) and the UK (FRS-1 in 1991). The issuance of a statement of cash flows by most Anglo-American accounting bodies can be interpreted as a response to the demand for this type of information. Dowds and Blake (1992) argued that it could

be seen as a response to the "inadequacy of the Statement of Changes in Financial Position as a means of extracting information about cash flows" (p. 2). Edmonds, Rogow and Rezaee (1990) also saw the provision of cash flow statement as providing "...an excellent source of data. Because the data is more accessible and reliable than old sources [profit and loss account] it will make the appraisal process easier and more exact" (p. 9) .

In New Zealand the objective of the provision of a cash flow statement was stated in SSAP-10 (1987) to be: "to provide information about the...activities of an entity and the effect of those activities on cash resources" (para. 4.1).

A possible reason for the increased interest in cash flow numbers was given by Edmonds, Rogow and Rezaee (1990, p. 9) when they stated that:

> ...analysts and investors began to lose confidence in the real meaning of earnings as they were reported in financial statements. Over the years accountants utilized more and more arbitrary allocation devices to derive net income.

A further factor was, they suggested, the increase in leveraged buyouts (LBOs) which occurred during the 1980s. The leveraged buyout was defined by Keiso and Weygandt (1992) as "a procedure...where management or another employee group purchases the stock of the company and finances the purchase by using the assets of the company as collateral" (p. 766). In effect this means that the company has more debt and less equity. The reason that this activity increases the interest in cash flow is that the servicing of the debt requires cash. This argument should not be viewed as advocating the use of the statement of cash flow in preference to the accruals-based

financial reports. Clearly, the argument that the accruals-based income statement, on a 'stand-alone' basis, provides a better indication as to the possibility and magnitude of future cash flows still has favour with many commentators, including regulatory bodies such as the FASB. Rather, the increased demand for cash flow information should be seen as being a demand for *additional* information. Indeed the FASB in *Statement of Financial Accounting Standards No. 95*, makes it clear that the usefulness of the cash flow statement in helping users to assess a firm's ability to generate positive future cash flows depends on it being used with other financial statements.

Walker and Robinson (1994), in a study which was concerned with the conflicting agendas of competing regulatory agencies with respect to the development of a cash flow statement, are of the opinion that the corporate collapses which followed the stock market crashes focused attention on cash flow information. Arguing that at the time "the community at large began paying greater attention to cash flow reports" (p.134), they suggested that one of the consequences of the increasing importance of cash flow information was that "directors of leading corporations frequently reassured investors that their companies had strong cash flows" (p.134). The high number of corporate collapses which followed the stock market crash in Australia (and elsewhere) led to criticisms of accounting and auditing practices. The subjectivity of the traditional accruals-based financial statements created an environment for creative accounting practices to come under scrutiny. In Australia the joint accounting bodies "even went so far as to issue a news release urging members *not to succumb to the blandishments of management to engage in creative accounting* [italics added]" (Walker and Robinson, 1994, p. 131). Walker and Robinson made it clear that some

parties viewed the provision of cash flow information as an antidote which would help counteract the excesses of creative accounting. At the very least, it would allow financial analysts, through the process of comparison between accruals-based earnings and reported cash flows, to question the reported earnings.

Other commentators such as Lee (1978)[3] have raised the issue of the subjectivity of the adjustments through which cash flows are converted into earnings for the purposes of financial reports. Lee (1992) summarised the case as follows:

> [the cash flow statement] is devoid of the effects of periodic accounting accruals and cost allocations. It represents the observable effects of economic transactions, and can therefore be said to be a statement entirely of economic substance and free of legal form (p. 35).

Although this view has some merit it is not as clear cut as Lee (1992) would have us believe. Sharma and Robb (1991) in a review of the cash flow statements of companies in the finance industry identified a number of problems in the *allocation* of cash flows. To cite two examples:

(1) dividends paid to shareholders were treated as an operating item in one case, as a financing item in four cases, and did not arise in one case.

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3 Lee was of the opinion that "accrual accounting, largely because of its dependence on subjective judgements for allocation purposes, has created a stockpile of problems which has diverted accountants' attention away from the more fundamental problem of finding the most suitable financial information to meet the needs of a variety of users of financial reports" (p.64).

(2) increases or decreases in government securities were treated as an operating item in one case, as an investing item in two cases, as a financing item in one case, and as a change in the form in which cash balances were held in two cases.

Furthermore, in some cases companies showing different accounting treatment had the same auditors. Dowds and Blake (1992) argued that: "for leasing there is the potential for a greater range of treatment than in accruals based accounting" (p. 14). Using the simple example of a taxi driver who wishes to obtain the use of an asset (a taxi) Dowds and Blake considered three ways through which the taxi driver might acquire the use of the asset, each having the same pattern of cash flows.

(1) The asset may be purchased with finance from an instalment based loan. In the accruals-based accounts the asset (subject to depreciation) will appear in the Balance Sheet as will the outstanding liability. In the Profit and Loss account the depreciation charge and the finance cost will appear. The cash flow statement will show the asset as an investing outflow and the loan received as a financing inflow, while loan instalments net of interest are shown as a financing outflow and interest is shown as servicing of finance.

(2) A finance lease may be used, giving rise to a similar Balance Sheet and Profit and Loss treatment as for a purchase. In the cash flow statement the interest element appears as a servicing of finance and the instalments net of interest as a financing outflow. This is similar to the process of purchasing an asset with

an instalment loan, *except* that there is no recognition of the investing and financing implications of the inception of the lease contract in the cash flow statement.

(3) An operating lease may be used. Rentals are charged on a systematic basis against profit, and in the cash flow statement rentals, when paid, form part of operating cash flows.

Example 2.1 shows how each method might be used to achieve the same objective, provision of a business asset. Illustration 2.1 shows how each method, while leading to the same outcome as a cash increase and representing the same economic substance, produces a very different breakdown of reported cash flows.

From Example 2.1 it can be seen that while cash flow avoids some of the areas of judgement inherent in accruals accounting, cash flow reporting still involves some exercise of judgement and some conflict of 'substance versus form'.

EXAMPLE 2.1

A taxi driver has the following ways of obtaining a new taxi:

(1) To buy the taxi for $11,080, borrowing the entire sum on 1 January 1992 and repaying the loan by quarterly instalments of $1,080, payable in advance, for three years. The first year's finance charge is $1,055. The taxi is to be depreciated on a straight line basis over four years with no residual value.

(2) To enter a finance lease with a primary term of three years at $1,080 per quarter, payable in advance, and an option to continue the lease thereafter at $1 per year.

(3) To enter a lease on similar terms to (2) above, but with a clause on residual value risks that converts this into an operating lease.

In 1992 the taxi driver has fare income of $25,000 and expenses, all in cash, of $10,000.

ILLUSTRATION 2.1

A taxi driver
Cash Flow Statements for the Year to 31 December 1992

	(1) Loan Finance $	(2) Finance Lease $	(3) Operating Lease $
Operating Activities			
Cash from customers	25,000	25,000	25,000
Cash for supplies	(10,000)	(10,000)	(10,000)
Cash for rental			(4,320)
Loan interest/lease finance charge	(1,055)	(1,055)	
	13,945	13,945	10,680
Investing Activity			
Payment for taxi	(11,080)	-	-
	2,865	13,945	10,680
Financing			
Loan received	11,080	-	-
Loan repaid	(3,265)	(3,265)	-
Cash increase	$10,680	$10,680	$10,680

The leasing example is an extreme one, and standard setters tend to have tackled it by way of disclosure. Thus the Australian Standard identifies 'obtaining an asset by entering into a finance lease' as an example of an item requiring disclosure.

The New Zealand SSAP-10, *Statement of Cash Flows* stated that "users of financial statements are better informed as to liquidity and financial flexibility" (para. 4.2) while "actual cash flow information ...enables users to assess better the cash performance of the entity...and hence be in a position to make projections of future cash flows" (para. 4.3). In expressing an opinion on the usefulness of cash flow information SSAP-10 identified the fact that "inflows and outflows of cash are not influenced by the *subjective cost allocations which affect reported income*" (para 4.3). It is clear then that as far as the New Zealand Society of Accountants is concerned the provision of cash flow information is of benefit to users of financial statements and they argue that the benefit lies in the potential for cash flow information to improve the comparability between financial statements of different entities. Whiteman and Newby (1989), supporting this view were of the opinion that "the *overriding intention* [italics added] of SSAP-10 is to provide users with useful information" (p. 27). The benefit to users of financial reports of a statement of cash flows is that it is *less* subjective than the income statement but as evidenced by Sharma and Robb (1991) and Dowds and Blake (1992) it would be erroneous to claim that it is *free* of subjective judgements.

There is ample evidence in the literature to support the view that cash flow information is desired by users of financial statements. In many of these studies the main factors which are identified as being important are linked to operating cash

flows. Hovey (1986) was certain that "a firm's operating cash flows are its essence" (p. 64). Other authors who suggested that operating cash flows are extremely important include Lee (1985), Giacomino and Mielke (1988) and Gahlon and Vigeland (1988). In a New Zealand study, Carslaw and McNally (1990) examined a range of ratios and found operating cash flows or elements thereof to be significant in eleven out of thirteen cases.

Unfortunately, there does not appear to be a consensus on the most useful cash flow-based ratios although a common suggestion is that operating cash flows to operating profit may be useful. This ratio is sometimes referred to as "quality of earnings ". Emmanual (1988), an assistant vice-president of First Florida Bank was unequivocal in declaring that:

> The cash flow statement can and should be used to measure the quality of earnings. The analysis of earnings quality facilitates an understanding of the income statement by linking income and expense data to cash flows. By measuring the gap between accrual income and net cash flow from operations, the true operating strength of the entity can be ascertained (p. 24).

Some support for this point of view was provided in the UK when the Accounting Standards Board on issuing the cash flow statement FRS-1 referred to the quality of profit earned. The ASB at this time suggested with respect to the collapse of the UK company Polly Peck that "the company's difficulties ...would have been quite apparent in a cash flow statement" (reported in *Accountancy*, November,1991, p. 10). However, Singleton-Green (1991) pointed out that while analysis of Polly Peck would have shown negative operating cash flows, the other major collapse at that time, Brent Walker, was showing operating cash inflows of £171 million compared with operating

profit of £118 million, in other words, a high quality of earnings. Murphy (1991), arguing against the replacement of a statement of changes in financial position with a statement of cash flows suggested that analysts using simple criteria for assessing cash flow, and as a result emphasising companies with increasingly positive cash flows, are in danger of promoting a short-termist approach by management. This Murphy argued, is inconsistent with long term economic management. However, the same argument has long been made against management decisions based on traditional accounting information such as earnings per share. Murphy implicitly acknowledged this problem when he stated that: "the UK economy underinvests because it has adopted a short-term view..." (p. 26). Management focus on earnings-based indicators is often associated with management compensation being related to such short-term performance measures. The coupling of this problem (which existed without a cash flow statement) with a cautious approach on cash flow management could be economically disastrous, according to Murphy.

The quality of earnings argument was also raised in a market-based study by Bernard and Stober (1989) who explained the concept as meaning that "under the quality of earnings argument accruals have a smaller impact on [stock] prices than cash flows (or no impact at all) since accruals are *subject to manipulation* (italics added)" (p. 627). Bernard and Stober are of the opinion that the quality of earnings argument has appeal "at least with respect to the difference between cash flows and *non-current* accruals" (p. 628). Epstein and Pava (1992a) explained the significance of the Quality of Earnings explanation as follows:

> The essence of the Quality of Earnings Explanation is that through the accruals process, managers have an opportunity to "manipulate" the reported net income. By choosing among reporting alternatives available under Generally Accepted Accounting Principles (GAAP), management is able to conceal the true condition of the firm. Accordingly, cash flow information is useful to the extent that one can use it to *pierce through the accrual number* [italics added] and gain an unadulterated view of the firm. (p. 6)

Cash flow information is seen then by some commentators as being useful in assessing the income figure, in that it allows the user to gauge the quality of the earnings either in the sense of allowing interested parties to 'see through' the accruals process described by Epstein and Pava (1992a) or in the sense that it allows users to determine the source of the cash flows, e.g., operating, investing or financing. It is therefore, appropriate that accounting bodies such as the FASB and ASB have required that reported cash flow information in the annual statements of reporting entities be presented within different categories. Separating operating cash flows, investing cash flows and financing cash flows allows the user to determine the source of the cash flow and ultimately the quality of the profit earned. It is not surprising therefore to learn that cash flow information has become increasingly popular with users in recent years. It is however surprising that little evidence exists to indicate the usefulness of cash flow information from a user's perspective.

Epstein and Pava (1992a, p. 3) observed the lack of 'empirical evidence' with respect to the extent to which users of cash flow statements read, understand and react to the information which they contain. They further observed that the market-based studies had limited success in assessing the usefulness of the statement. A survey of investors in the USA led them to the following conclusions among others: First, the majority

of investors do not find the statement of cash flows difficult to understand; second, the majority of investors find the statement useful for the purpose of investing; third, more sophisticated investors *do not* find the cash flow statement more useful for investing purposes than less sophisticated investors. On the other hand, the income statement is found to be more useful to the sophisticated than the unsophisticated investor. This, of course, merely serves to emphasise the fact that to many potential users of accounting information the accruals process creates a document which is difficult to decipher. A substantial number of investors would like more cash flow explanation. Epstein and Pava compared the results of their study with those reported in an earlier study (Epstein, 1975) which reported the results of a survey conducted in 1973 and concluded that not only were the majority of investors finding the cash flow information useful but they were an *increasing* majority. Furthermore, they found that there had been a decrease in the percentage of investors who found the income statement useful.

Epstein and Pava (1992a) claimed that their approach had the following methodological advantages over previous capital market-based attempts to assess the usefulness of cash flow information:

> First, the market-based approach has had limited success in assessing the usefulness of the cash flow statement. Second, a survey approach provides a direct instrument for measuring usefulness from the individual investor's point of view, independent of any theoretical consideration involving cash flow. Third, the survey approach offers the opportunity to probe for answers to a larger set of questions than does the association methodology. (p. 3)

The advantages claimed by Epstein and Pava (1992a) have some merit. In the first case a consequence of the limited success of market-based studies in assessing the usefulness of the cash flow statement has resulted in researchers being reluctant to reach a firm conclusion. In the second case the use of the survey technique removes certain theoretical limitations. For example, Kinnunen and Niskanen (1993) pointed out that many studies which have examined the market reaction to unexpected cash flows have based their model on the theory of random walk. They found that this assumption was "likely to have understated the significance of market reactions to unexpected cash flows" (p.271). In other words, the theoretical assumption of the models was creating bias against finding a market reaction to the release of cash flow information. In the final case it is evident that the survey approach allows a wide range of questions to be put to the respondents, a facility which is not available with the association methodology.

There is little published research in New Zealand with which to compare these results. Dowds and Esslemont (1994) surveyed the membership of the New Zealand Society of Investment Analysts with respect to the perceived usefulness of financial statements. The emphasis of this study was on the perceived usefulness of the Statement of Cash Flows. The findings were that 65% of financial analysts found the Statement of Cash Flows very useful, with a further 30 % claiming to find it to be of moderate use. These findings provided evidence that the replacement of the Statement of Changes in Financial Position with the Statement of Cash Flows has been worthwhile. This conclusion was reinforced by and contrasted with the conclusion of a study by Bradbury and Newby (1989), in which they conducted an experiment using

thirty New Zealand financial analysts to assess the use of the previous third financial statement, the Statement of Changes in Financial Position, and concluded that the statement did not enhance financial analysis. This study, in the end, confirmed what many observers already knew, i.e., the Statement of Change in Financial Position was of little use since it did not provide any new information which was not available in the income statement and balance sheet. It provided empirical evidence to help assess the usefulness of the statement.

Even though capital market studies failed to provide much support for the usefulness of the Statement of Change in Financial Position the possibility remained that the statement might have been perceived as useful to users in order to assess creditworthiness (Eyes and Tabb, 1978). Certainly there is evidence that some users perceived the Statement of Change in Financial Position to be important (Rakes and Shenkir, 1972; Buzby, 1975; McNally, Eng and Hasseldine, 1982). However, as Bradbury and Newby (1989) pointed out, other commentators found the importance of the statement to be quite low (Pankoff and Virgil, 1970; Walker, 1984). The results of Bradbury and Newby's study support the view that the Statement of Change in Financial Position was not useful enough to justify its retention as the third financial statement.

It is interesting to observe that the British accounting regulatory bodies were among the last to require a cash flow statement as part of the published accounts of a company (September, 1991). The interest in this fact arises since Britain has been the base of two long time advocates of the benefits of cash flow accounting, Lawson and

Lee. The importance of these two researchers to cash flow accounting is such that Samuels (cited in Bromwich and Hopwood, 1981) was moved to say that they were "two *leading* researchers on cash flow accounting" (p. 101, italics added). Samuels argued that the work of these two researchers gave Britain a clear lead over the USA in this field.

It would be difficult to sustain this view since a substantial proportion of the significant research on the usefulness of cash flow information which has been conducted since the mid 1980s has been sourced from the USA. Nevertheless, it is probably fair to say that these two authors have been leading authorities in arguing for recognition of the possibilities of cash flow accounting as a system which offers an alternative to accruals-based accounting.

Lawson's work focuses on the inequities of the traditional accruals-based accounting system and its resulting effect on equity returns. For example, Lawson (1981) recasts the historic cost accounting performance of UK manufacturing companies for the period 1954-1976 in terms of cash flows, and this is reproduced in Table 2.1.

Lawson (1981) stated that his analysis clearly showed the following:

(i) effective interest covers were much lower than those perceived by lenders;

(ii) companies suffered enormous fiscal drag;

(iii) dividends were significantly uncovered; and,

(iv) the resultant debt-financing by lenders caused a substantial increase in debt levels, i.e., debt-equity substitution has taken place. (p. 85)

TABLE 2.1

U.K. Quoted Manufacturing Companies: Weighted Average Profits and weighted Average Cash Flows 1954 to 1976

	Historic Cost	Cash Flows	
Pre-tax profit	690	407	Entity earnings
less interest	97	97	less interest
Pre-tax profit	593	310	Pre-tax equity earnings
Tax @ 44%	260	260	Effective equity tax burden = 84% (260/310)
Post-tax profit	333	50	Post-tax equity earnings
Dividends (40%)	133	133	Dividends
		26	Liquidity change
Retained earnings	200	(109)	Debt-financed deficit

Lawson (1981) argued that Table 2.1 showed the substitution of debt for equity which as a consequence reduced the market value of the equity. He further suggested that the differences between the historic cost figures and the cash flow figures are so great as to lead to the conclusion that lenders, the Treasury and company directors have been fooled by the historic cost model. The purpose of Lawson's argument was to some extent political. This was clearly demonstrated when he suggested that:

> There is little point in examining the efficiency of the U.K. lending mechanism in seeking explanations for a low level of investment *in circumstances in which dividends are habitually debt financed because the returns to equity investment are confiscated by the tax system* [italics added]. (p. 100)

Lawson (1985) described his view of cash flow accounting (CFA) as: "essentially a system for measuring multiperiod (*ex post*) performance" (p. 99). It has the advantage over the traditional accruals-based accounting system that it highlights entity, lender and shareholder returns for all the periods within the multiperiod sequence. For any given year a total cash flow statement can be expressed by the equation:

$$(k_j-h_j)+/-B_j +/- N_j +/-M_j \equiv (A_j +R_j -Y_j)+F_j+t_j+D_j+/-H_j$$

where:

k_j-h_j = operating cash flow (cash from customers, k_j, - cash paid to suppliers, h_j);

B_j = new capital received from equity shareholders or repaid thereto;

N_j = new medium and/or long-term loans raised or repaid;

M_j = increase or decrease in bank overdrafts and/or short-term loans;

$A_j +R_j -Y_j$ = net cash capital outlays on capital investment comprising replacements,

A_j, = growth investment, R_j and displacements, Y_j;

F_j = interest payments;

t_j = corporate tax payment;

D_j = dividend paid to shareholders; and,

H_j = increase or decrease in liquidity.

Lawson (1981) described the above as the cash flow identity and in its simplest form as expressed above it means that total cash inflows ≡ total cash outflows. Any cash flow can then be represented by a variation in the cash flow identity.

Although the variables in the above identity can be specified in an objective manner, critics of CFA argue that classification of the items means that an element of subjectivity must always be present. Eggington(1984) for example argued that:

> CFA must entail classificatory allocations if the whole period's expenditure is to be partitioned into parts under different headings... [it] carries implications for time-period allocation, since investment flows must be judged to bring benefits in future time periods. (p. 101-102)

Lawson (1985), in replying to Eggington (1984), viewed the criticism that CFA did not avoid the problem of allocation as a 'complete red herring' (p. 107). The system which he proposed was completely allocation free and to criticise it on the basis of potential classification problems was merely, in his view, to play "semantic games". Since classification of accounting numbers is an important part of financial statement presentation in any form, the important task is to base it on clearly defined principles and thereby reduce the arbitrariness of the allocation process. Lawson's argument had some merit in that it is true that any form of presentation will require judgement on

the most appropriate classification for certain items. Nevertheless, Lawson provided insufficient defence to allow dismissal of Eggington's concerns, although it can be acknowledged that the timing difficulties to which Eggington alluded were less of a problem in Lawson's model since payments and receipts were "recorded at the points in time at which they are made and received respectively" (p. 107). Undoubtedly however, classification requires the allocation of cash flows to specific categories and the potential difficulties which are inherent in this process are evidenced by the fact that New Zealand has now produced its third version of the cash flow statement since 1987. Furthermore, research studies indicate that there is lack of agreement with respect to classification of cash flows (Sharma and Robb, 1991).

The use of CFA is, in Lawson's (1985) view, here to stay and is gaining an increasing number of supporters. Evidence of this is seen in the adoption of cash flow accounting standards by many regulatory bodies although none has recommended a fully fledged system of cash flow accounting in place of the existing accruals-based system.

At the same time that Lawson was developing his early ideas on CFA, another British researcher was independently developing similar ideas. Lee (1971) began to develop his thoughts on CFA in a paper on the treatment of goodwill. In this study Lee argued that the most important need for information came from the investor's need to continually assess the "desirability of investing in individual entities" (p. 27). This being the case there is a need to be able to assess the future performance of the entity and, according to Lee, the existing stewardship financial statements fell short of the

requirements since they "tend to support or contradict the *past* desirability of investing in a business" (p. 27). The use of profit forecasts based on existing figures was seen to be subject to the problems of subjectivity associated with the accruals process. Lee saw the provision of cash flow information as being the only type of information which *minimises* this problem. The publication of forecast cash flow information supported by past cash flow information was seen as the way forward. An important part of Lee's suggested system was that the cash flow statement would not be supplemental to the income statement and position statement but would replace them as the primary financial statements and they would become ancillary to it. In this supplementary role the income and position statements would still provide the information necessary for the purposes of stewardship.

Replacement of the accruals-based accounting statements had also been expounded by Lawson (cited in Lee, 1981b, p. 69) who suggested that cash flow figures for the previous 10 years should be provided. Although the choice of a 10 year period is undoubtedly an arbitrary one, the philosophy behind it is that such a sustained period should provide decision makers with more reliable information. Furthermore, it was felt that many of the problems associated with profitability accounting (e.g., the subjectivity of the accruals process and the effects of inflation) would be to a large extent eliminated.

Much of the argument in support of the change from an accruals-based system of accounting to one based on cash flow principles originates from the view that the former are largely irrelevant to non-accountants. Lee and Tweedie, (1975a, 1975b,

1976, 1977 and 1981) examined this contention and concluded that few investors made use of the existing statements. In addition, Tweedie (1977) provided some evidence that non-accounting users interpreted the existing accruals-based statements as if they *were* prepared on a cash flow basis.

Criticism of Lee's proposals on cash flow accounting have been based on the apparent lack of an income measure of performance and a financial position statement. Eggington (1984) argued such a case and, although he acknowledged that Lee in his writings had made "proposals of considerable significance...in this area" (p. 99), he appeared to have chosen to ignore the point of these proposals, since Lee (1981b) made clear his view that "CFA [cash flow accounting] is...conceived as a multipurpose reporting system, *compatible with the decision and accountability aims usually associated with conventional allocation-based reporting systems* [italics added]" (p.68).

The development of the idea of combining cash flow accounting (CFA) and net realisable value accounting (NRVA) can be found in Lee (1986). CFA has been explained earlier but it is important to realise that in terms of Lee's vision it is intended that it be presented in both *ex post* and *ex ante* forms (Lee, 1986, p. 126). NRVA uses sales values which assume an orderly liquidation of assets and, using both cash and non-cash resources, the financial position of an entity is reported as the aggregation of the total monies available for the entity to implement the decisions with regard to its future activities. By comparing NRV position statements a form of "surplus" can be ascertained which, combined with the other information in the

statement, provides users of the financial statements with both information on the financial position and information on periodic changes in financial position.

Lee (1986) saw the advantages of a combination of CFA and NRVA as being that they are both allocation-free systems which, in his opinion, improved the objectivity and therefore the quality of the data. However, Lee acknowledged that the use of NRVA will involve some subjectivity because preparers and auditors will have to estimate value.

A further important advantage claimed for this system of accounting is that NRVA emphasised the "survival attribute" of the business. Lee (1986) argued that the sales values of the enterprise's assets will reflect the "cover available for its commitments, as well as the base from which growth, development and change occur in its activities" (p. 127).

In effect Lee's (1986) belief in the use of a combined CFA and NRVA system was based on the argument that a company's most pressing need, in terms of survival, is availability of cash. Without cash, no enterprise can survive in the long-term. It does not matter how good the enterprise's output might be, nor does it matter, according to Lee, how good its management might be, if the company does not generate enough cash in sufficient quantities to pay its obligations and finance, its development it will not survive. This argument is, of course, largely true, although Lee ignores the fact that good financial management will endeavour to ensure that cash generation, particularly in the area of operating cash flows, is healthy.

The system of financial reporting advocated by Lee (1986) is much more than the provision of cash flow information. The use of net realizable values for the position statement in combination with cash flow information which utilises both past and future cash flows creates a radical departure from the allocation-based traditional accounting system. Much of Lee's argument in support of the use of a cash flow-based system of financial reporting was based on *a priori* reasoning. However, he attempted to balance this with some empirical support for cash flow information.

Lee (1981a) surveyed 448 members of the Institute of Chartered Accountants in Scotland. The survey concluded that there was support from 68% of respondents for the idea of reporting to external parties using cash flow information. In particular, there was support for past cash flow information. Less interest was shown to exist for projected cash flow information.

Lee (1983) admitted that the results of studies conducted by other researchers, as well as studies conducted by Lee and Tweedie (1975a, 1975b, 1977 and 1981), tended to show that users, both expert and non-expert, are more concerned with income data with liquidity either being ignored or being regarded as secondary material. It is argued that regarding the CFA information in this way leads even experts such as bankers to miss signals of corporate failure due to illiquidity.

In a study of failed companies which was a response to Casey and Bartczak's (1984) publication Lee (1985) found in favour of the use of operating cash flows as a means of predicting company failure.

Lee (1982) was critical of the banking fraternity in the UK for not being sufficiently concerned with cash flow and liquidity. It is argued that by ignoring these matters potential crises are only identified when it is too late. Using the 1982 collapse of Laker Airways as an example Lee claimed that the warning signs, in terms of a lack of operating cash flow, were "glaringly obvious in 1979, and ignored". (p. 116).

Continuing the theme of the importance of operating cash flows Lee (1992) argued that: "the financial analyst should be concerned to monitor the relationship over time between operating cash flows and financing cash flows (especially borrowing) to determine the relative dependence of the reporting entity on external funding" (p. 35). This is particularly important since the effect of borrowing is to create future interest payments which consume potential 'free' operating cash flows. It is this need to examine the relationship between cash flows and other variables over time that Lee saw as being important. In particular, it was seen as an important educational task for accounting academics but Lee pointed out that it was also a responsibility for professional bodies and other regulatory bodies.

2.3 STUDIES OF THE ASSOCIATION BETWEEN EARNINGS AND CASH FLOW NUMBERS

Section 2.2 stated that the literature which examined the usefulness of cash flow numbers could be classified into three categories: market-based studies, corporate failure studies and miscellaneous studies. The first category was comprised of studies

which examined the effect of the release of accounting information on stock prices. Usually the accounting information under consideration was earnings or some component of earnings such as cash flows. Although the analysis of the data was often conducted on a sample of companies (i.e. cross-sectionally) over a time period[4] few studies used the available information to examine how earnings numbers were associated with cash flow numbers over a long period. The association between earnings and cash flows generates interest for several reasons. First, there is a potential for either earnings or cash flows to be useful in assessing the future cash flows of an entity. Stewart (1989) argued that: "financial analysts assume that the market value of an entity or its common stock is the present value of all future MCFs (market cash flows) which the owner of the share will receive" (p. 157-158). Stewart concluded that the "MCF can be shown to entail more than a simple process (e.g., random walk)" (p.157). Although the cash flow measure does not directly compare with the derived cash flow measure used in this study the conclusion that more than a random walk process is involved is common to both studies.

Referring to dissimilarity in earnings behaviour Stewart indirectly alluded to the possibility of a contextual influence by stating that: "this dissimilarity in net earnings behaviour might be due in part to the difference in the data base period" (p.175). Second, it was shown that there is potential for the earnings and cash flow numbers to be useful in models of corporate failure prediction. There is growing evidence that both operating cash flows and dividend cash flows possess information which is useful in corporate failure studies. A third reason for interest in the relationship between

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4 Ball and Brown (1968) used the nine year period 1957-1965.

earnings and cash flows stems from the criticisms which see the earnings numbers as being smoothed versions of the underlying cash flows (see Whittington, 1974; Watts and Zimmerman, 1986). Associated with this criticism is the view of some commentators that traditional accounting information, as represented by the accruals-based system, is capable of being manipulated by unscrupulous managements with the acquiesence of the preparers of financial accounting information. Whether or not one agrees wholeheartedly with the latter view there can be little doubt that many writers in the accounting and finance area argue that managers have strong incentives to smooth income numbers to achieve earnings numbers which maximise their advantage (see, for example, Griffiths, 1986; Ronen and Sadan, 1981; Givoly and Ronen, 1981).

Watts and Zimmerman (1986, p. 136) pointed out that in developing the literature on the subject of income smoothing researchers have not, as a rule, attempted to develop a theory which explains why reported earnings follow a particular process. Significantly for this study they suggested that one way of developing a theory would be to explain first of all the cash flows of an entity and then to consider how choice of accounting procedures convert cash flows into reported earnings. In this case an understanding of the cash flows and the contemporaneous relationship which those cash flows have with earnings would be an important requirement for a successful study. Watts and Zimmerman argued that:

> Without theories of the firm's underlying cash flows and the choice of accounting procedures, it is difficult to address the issues that motivate researchers to investigate the time-series of earnings (p.136).

They went on to suggest that in testing valuation models the two things which are, in fact, being tested are:

(a) the valuation model itself; and,

(b) the extent to which earnings approximate cash flows.

Therefore, in tests of 'smoothing' researchers are examining the movement in the cash flows which underlie the earnings numbers. It is clear from this that investigations of the simultaneous movement between earnings and cash flows over a sustained time period have a contribution to make to this field of study.

The use of earnings figures adjusted to derive cash flows is clearly seen by the above commentators and others as a useful mechanism to assess company performance. The reason why such an analysis might be useful lies in the fact that earnings *are* different from the underlying cash flows. One succinct way of describing the significance of the difference between cash flows and earnings is expressed in the statement that "profit is an opinion, cash flow is a fact" (unknown author). Of course, over the life time of an enterprise the total net cash flows and the earnings will be the same. Storey (1960) was clear on the importance of this relationship when he made the following points with respect to the characteristics of the nature of periodic income determination:

> Over the life of a business, revenue is equal to the cash receipts from operations, and expense is equal to the cash disbursements from operations; the profit (positive or negative) is therefore equal to the difference between cash receipts and disbursements resulting from

> operations. *This relationship is the most vital one in income determination* [italics added].
>
> For any period less than the life of the enterprise, revenue is equal to the cash that will be received (past, present, or future) as a result of the operations of the period, and expense is equal to the cash that will be disbursed (past, present, or future) as a result of the operations of a period.
>
> Income and asset valuation depend on the expected amount and time distribution of cash movements which take place primarily in the future *and are therefore subjective in nature* [italics added] (p.154).

Clearly then, in the long-term, the earnings and cash flow numbers will equate. However, it remains a fact that the trading process is of a continuous nature while the need to report is periodic and this requires the use of the accruals-based method of accounting in order to break up the stream of trading activity into artificial segments. This separation of financial events into alternative time periods requires accountants to exercise the judgements which separate periodic income from the underlying cash flows. At the same time the subjective nature of these judgements create the potential for interest in the association between earnings and cash flows across time periods. This is so because the ability to recognise income in one period rather than another allows an entity to exercise some degree of control over the turnover figure upon which income is partially based. Similarly, expenses can be manipulated in the sense that an entity may decide to capitalise them and therefore remove them from the income statement. Other methods of *adjusting* expenses include deferring costs through closing stock adjustments, the effect of which is to carry the cost forward into the following accounting period. These and other methods of manipulating accounting information are described by Griffiths (1986) and they are all legitimate accounting procedures. It is clear that, legitimate or not, the temptation can arise to abuse such

adjustments. In the short term (i.e., perhaps one or two accounting periods) such procedures can help a company over a difficult period. In the longterm such activities can do little to help a company which is having persistent financial difficulties. However, since the mechanisms are in place to allow such manipulation of financial statements the relationship between cash flows and earnings numbers becomes important since knowledge of this relationship will allow comparison of cash flows with the earnings numbers which are presented in financial statements.

Bowen, Burgstahler and Daley (1986) in a study of the association between earnings and cash flows were concerned with three specific questions, which they described as follows:

> Q1. Are the traditional CF measures used in previous research highly correlated with alternative measures of cash flow that have been advocated by academics and practitioners?
>
> Q2. Are accrual accounting earnings and cash flow measures highly correlated?
>
> Q3. Does earnings or a CF variable best predict future cash flows? (p. 714)

The authors pointed out that the above questions are interrelated. The main objective of their paper was to determine by examining the properties of the variables which of them is the best predictor of future cash flows. Expressed another way the authors examined "the potential importance of the...CF to user decision models" (p. 714). Bowen *et al.* (1986) were mainly interested in the cash flow number from the point of view of the user. The results of their study showed that the observed correlations between the traditional cash flow measure (i.e., net income plus depreciation and

amortisation) and earnings are high, indicating that little additional information is contained in the cash flow number beyond that contained in the earnings number. Furthermore, the correlations between more refined measures of cash flow and earnings are low which signifies that the more refined measures (which include adjustments for changes in non-cash working capital) contain information beyond that contained in the earnings measure. Finally, they defined five measures of cash flow:

NIDPR	=	net income with depreciation and amortisation added back;
WCFO	=	NIDPR adjusted for 'other' elements not affecting working capital;
CFO	=	WCFO adjusted for changes in non-cash working capital;
CFAI	=	CFO adjusted for sale of property capital expenditures; and,
CC	=	CFAI plus net financing for period.

For four out of five of the above cash flow variables, random-walk models predict future cash flows as well as and often better than models based on other flow variables.

Percy and Stokes (1992) replicated Bowen *et al.* (1986) using Australian data. They claimed that their replication study provided external validation for BB&D's (1986) results and they also found:

(a) low correlations between traditional cash flow measures and the more refined measures;

(b) high correlation between traditional cash flow measures and earnings, and low correlation between refined cash flow measures and earnings; and,

(c) traditional cash flow measures are better predictors of future cash flows than earnings or more refined cash flow measures.

Percy and Stokes (1992) were aware of the possibility that their results might be subject to a contextual influence. They considered the question of whether or not the findings were generalisable across industries. In examining the effect of industry membership they only reported the results of companies in four industry groups, namely; Developers and Contractors, Building Materials, Heavy Engineering and Retail. Consequently, they cautioned that the results should be interpreted cautiously. They found that the correlation evidence was generalisable across industries but that the ability of traditional cash flow information to predict future cash flows varied across industries. A criticism of this analysis is that they only considered a small number of industries. This would not perhaps be too detrimental to the results if it were not compounded by the fact that:

(a) two of the four industry groups are in businesses which are characterised by long-term contracts (Developers and Contractors and Heavy Engineering) and which may have similar cash flow profiles; and,

(b) Developers and Contractors and Building Materials are associated industries which are similarly affected by changes in economic conditions.

Austin and Graydon (1991) examined the time-series properties of the accounting earnings and cash flows for a sample of 40 New Zealand companies over a fifteen year period. Using correlations and runs tests the authors concluded that successive changes in earnings and cash flows are independent and can be explained best by a random-walk model. This result partially confirmed the finding of an earlier study of New Zealand earnings by Caird and Emanuel (1981) which examined the time series properties of earnings and earnings per share. The study concluded that the movement in both variables approximated a random-walk process.

2.4 SUMMARY

Clearly the literature which examines cash flow numbers is diverse. Some studies use statistical and econometrical techniques to examine the effect of accounting information on capital markets or as components in models of corporate failure prediction. They also encompass surveys which seek to describe users' views on the usefulness of cash flow information and writings which challenge the subjective nature of accruals-based earnings figures.

The fundamental question raised in market-based studies is concerned with whether or not earnings or some component of earnings conveys information to the market. Studies of this type have as their origin the Ball and Brown (1968) study which established the methodology for inquiring into the influence which the release of earnings and cash flow numbers has on the market as represented by movement in share prices. Although Ball and Brown's findings indicated that earnings were more

accurate than cash flows in explaining abnormal returns, the study of this subject evolved to another stage when the question of the incremental information content of cash flow numbers was raised by Patell and Kaplan (1977). Failure by Patell and Kaplan to find incremental information content in cash flow numbers was counter-balanced by the findings of other researchers who found evidence of incremental information content in cash flow numbers. In particular, the work of Rayburn (1986) and Bowen, Burgstahler and Daley (1987) produced results which called into question the conclusion that cash flow numbers had little information to offer beyond that conveyed by earnings numbers.

Studies tended to concentrate on the usefulness of earnings and/or cash flows with little interest on how earnings and cash flows moved contemporaneously. Bowen, Burgstahler and Daley (1986) considered this question and concluded that the correlation between earnings numbers and traditional cash flow numbers was high, while the correlation between earnings numbers and more refined cash flow numbers was low. This led them to the conclusion that earnings and refined cash flow measures convey different signals.

The robustness of the results of many of the foregoing studies beyond the specific time period involved gave rise to the question of 'contextuality'. Rayburn (1986) was aware of one form of contextuality when she cautioned that the results of the study were not generalisable beyond the firms included in the analysis.

The possibility that the prevailing economic climate might be a factor which limits the generalisability of the results was raised by Wilson (1987) and tested by Bernard and Stober (1989). Bernard and Stober's suggestion that the association between earnings components (i.e cash flows and accruals) and company valuation was contextual in the extreme explicitly identified the possibility of contextuality being a problem in the use of company valuation models. Lev and Thiagarajan (1993) also considered that there was potential for changes in economic indicators to influence the message conveyed by accounting numbers.

The foregoing studies raised issues concerning the relationship between earnings and cash flows and the influence of contextuality when earnings components are used in models of company valuation. A natural development of these studies is to ask whether the relationship between earnings and cash flows is itself subject to contextual influences. The current study seeks to answer this question first by examining the association between earnings and cash flows with respect to the financial reports of New Zealand listed companies during the period 1971-1991, and then by examining how changes in macroeconomic indicators and industry membership might be associated with that relationship. By examining earnings and cash flows for a sustained period of twenty-one years this study proposes to provide substantial evidence of the association between cash flows and earnings and the possibility of contextual influences on that association within the context of New Zealand listed company financial reporting.

CHAPTER 3: AN ANALYSIS OF THE ASSOCIATION BETWEEN EARNINGS NUMBERS AND CASH FLOW NUMBERS FOR NEW ZEALAND LISTED COMPANIES.

3.1 INTRODUCTION

Previous research interest in the area of cash flows has tended to focus on the usefulness of cash flow numbers in comparison to the usefulness of earnings numbers. The methodology employed has been to estimate the effect of the unexpected component of the variable (earnings or cash flow) on the unexpected return on the security. Having observed the effects, conclusions are then drawn on the usefulness of the accounting numbers based on the magnitudes of the changes in the securities returns associated with the release of the information for each of the accounting variables. The objective of much of the previous research has been to determine whether the earnings number or the cash flow number is superior in forecasting the future cash flows of an entity. Unfortunately, the evidence which has been obtained from studies in this area has been inconclusive.

For example, Wilson (1987) found that the cash and total accruals components of earnings each have information content which is over and above that contained in the earnings number itself. On the other hand, Bernard and Stober (1989), in a replication of Wilson's study, were not able to conclude that the results were valid for their whole study period (1977-84). This last point was also made by Freeman and Gagne (1992)

who also drew attention to the fact that "Bernard and Stober also check for the effect of firm size and are unable to detect one" (p.142).

Although many previous studies have examined the relationship between the accounting numbers and stock prices, little prior research has concentrated on the contemporaneous movement of cash flow numbers and earnings. Notable exceptions have been by studies conducted by Bowen *et al.* (1986) and Percy and Stokes (1992). This later study largely replicated Bowen *et al.* but extended the inquiry to include an industry analysis.

Where such studies have occurred they have been based on the analysis of relatively small samples and/or across relatively short time periods. In New Zealand a study of this nature was undertaken by Austin and Graydon (1991), and in the UK some work has been conducted by Green and Stark (1989).

An understanding of the association between earnings and cash flows over time is important for several reasons. First, models of company valuation use forecast future cash flows in order to assess the current value of an entity. Percy and Stokes (1992) extended this argument by observing that assessments of company solvency also depend on estimates of future cash flows. Second, Bowen *et al.* (1986) suggested that by examining the properties of various accounting variables such as earnings and cash flows "we attempt to assess the potential importance of an additional accounting input without defining its context" (p.714). Third, in recent years many accounting regulatory bodies have mandated the provision of a statement of cash flows. An

appreciation of the usefulness of such a statement is likely to be enhanced by an understanding of the relationship between cash flows and earnings.

The purpose of this chapter is to examine the relationship between earnings numbers and the underlying cash flow numbers for New Zealand listed companies on a cross-temporal basis for the period 1971-1991. For the major part of the study period it has been necessary to create surrogates for the cash flow numbers since published reports did not provide actual cash flow figures until post 1987.[5]

For the purposes of this study, surrogates for cash flows were created by reinstating the depreciation charges and adjusting for changes in non-cash working capital. This is similar to the methods used by other researchers in the field.[6] Many of the previous studies are on the whole concerned with the predictive qualities of the variables whereas the current study is more concerned with the extent to which cash flows and earnings move together over time. The reasons for this emphasis are twofold. First, criticism of the 'traditional' accounting figures, i.e., the figures presented in the income statement, stems from the decline in the confidence of users in the veracity of the income statement as a representation of the historic performance of the reporting entity. Evidence of this is quite convincing, for example, Edmonds, Rogow and Rezaee (1990) argued that "... analysts and investors began to lose

5 Effectively, information on cash flows only became widely available in accounts from 1989.

6 The typical approach has been to 'de-accrue' the earnings figure by adding back to net profit both the current and the non-current accruals.

confidence in the real meaning of earnings as they were reported in financial statements" (p. 9). As far back as 1976 Ashton stated that "... in recent years, both businessmen and accountants have been dissatisfied with conventional historic cost accounting" (p.63). Second, little research effort in New Zealand has been directed towards a study of the actual contemporaneous movement of the cash flow and earnings figures. The paucity of New Zealand based research in the area of cash flows has been referred to by Baydoun and Papasyriopolous (1992) when they claim that:

> the argument of those resisting cash flow reporting is that accruals are clearly superior to cash flows in predicting future cash flows. They further argue that it is those who are asking for change that are pressed to provide objective evidence of the superiority of alternative approaches ...(p.1).

Baydoun and Papasyriopolous (1992) argued that there was *no empirical evidence* to support either argument. This lack of research is not confined to New Zealand. In a study of Irish companies it was argued by Green and Stark (1989) that "little research has investigated explicitly the relationship between profits and cash flow data on a detailed basis" (p. 1).

The current study adds to the small amount of existing New Zealand literature which has examined the properties of earnings and/or cash flows across companies for a sustained time period. It is not only concerned with the changes *between* periods but also with the relationship between the variables over time. Essentially the objective is to analyse the temporal movement of profit figures and cash flow figures. The objective of the study is to attempt, within the environment of New Zealand financial

reporting, to remedy the lack of empirical evidence on the cross-temporal association between earnings and cash flows.

3.2 DATA AND DEFINITIONS

The data were extracted from the database held at Otago University. It includes the majority of companies which were listed on the New Zealand Stock Exchange. The data were examined against annual reports on a random basis and s were printed to identify extreme results. The method of analysis used in this study differs from that used in previous studies such as Bowen *et al*, (1986) and Percy and Stokes (1992) in that by using all the companies on the database, without adjustment for exit or entry, the problem of reporting results affected by a survivorship bias is eliminated. The tests are conducted on one earnings variable, net profit before tax (NPBT) and several cash flow variables. The cash flow variables are initially surrogates created as follows: The first cash flow variable is net profit before tax plus depreciation (NPBTD - hereinafter CF1). The second cash flow variable is CF1 adjusted for changes in non-cash working capital (NPBTDW - hereinafter CF2). The adjustment to create CF2 is made by taking the non-cash working capital items (i.e., current liabilities and current assets not including cash) and adjusting CF1 accordingly. Actual cash flow figures are used for the period 1989-1991.

3.3 ANALYSIS AND RESULTS

Using the foregoing definitions, the earnings variables for the years 1971 -1991 were correlated with each of the cash flow variables. The analysis was performed cross-sectionally using all listed companies for each year of the study period. Where the data has been analysed across the years, such as in Table 3.1, it is described as 'pooled' since there were, in this event, elements of both cross-sectional and time-series data in the analysis (see Gujarati, 1988, p.21). Tests of correlation were conducted on the earnings and cash flow variables using the statistical package SPSSPC.

The tests of correlation were conducted initially on the earnings variable (NPBT) with each of the cash flow variables (CF1 and CF2) in an unmodified form. Subsequent tests were conducted on the variables with modification by scaling using total assets as the scalar. Tests of correlation using first differences were also conducted. In these tests the differences in the earnings variable between successive years were correlated with the differences in each of the cash flow variables for the same successive years.

The results of correlation tests (using Pearson's measure) for NPBT with CF1 (i.e., the 'traditional' cash flow measure) and for NPBT with CF2 (i.e., the 'refined' cash flow measure) are shown in Table 3.1.

TABLE 3.1

Pooled Correlations of NPBT and Cash Flows (CF1 and CF2)

	r	β
CF1	0.98	0.73
CF2	0.55	0.24

r = Pearson's coefficient of correlation
β = slope coefficient

3.3.1 Correlation of NPBT with CF1

Table 3.1 shows that Pearson's coefficient of correlation (r) is 0.98 with a slope coefficient of 0.73[7]. This traditional measure of cash flow can be seen to result in a very high degree of positive association between the cash flow and the associated profit figures. Focusing on the slope it can be seen that using the less refined cash flow surrogate results in a $0.73 change in earnings for every $1 change in cash. Implicit in the high correlation is the conclusion that this traditional measure of cash flow is a poor surrogate. This is confirmed in many studies, for example, Ball and Brown (1968), Beaver and Dukes (1972) and Percy and Stokes (1992). One of the problems with this measure is that it *is* unrefined and since Cash Flow = Profit + Depreciation, given a relatively fixed amount of depreciation from year to year,

7 Technically the slope is calculated as part of the regression equation and is of use in prediction models. It is included here because the rate of change between the variables provides a further insight into the relationship between them.

whenever profit increases cash flows will also increase - hence the high degree of positive correlation. Adjusting cash flow for the non-cash working capital as is the case with CF2 helps to correct for this, since the changes can be negative or positive.

Percy and Stokes (1992) stated that their results confirmed "that more traditional measures of cash flow *used in prior research* (emphasis added) are poor proxies for a more refined measure of cash flow incorporating additional adjustments" (p.32). Furthermore the high degree of correlation indicates that there is not a significant amount of additional information in the cash flow variable beyond that contained in the earnings variable. The next correlation test incorporates adjustments for changes in non-cash working capital.

3.3.2 Correlation of NPBT with CF2

Table 3.1 shows Pearson's coefficient of correlation (r) to be 0.55 with a slope coefficient of 0.24. As before the association between the variables is positive but because of the adjustment for changes in non-cash working capital, the strength of the association is lower.

There are several important implications associated with this result. First, the additional adjustment to the earnings figure produces a surrogate for the cash flow variable which provides different information from that provided by the earnings figure. This conclusion is supported by the findings of Bowen *et al.* (1986) where they stated that: "... these results suggest that the traditional CF measures used in previous research are relatively unlikely to provide users with different information

from that contained in the earnings numbers" (p.719). Second, the lower correlation between this measure of cash flow and earnings is to be found in different national domains as confirmed by Bowen *et al.* in the USA, and Percy and Stokes (1992) in Australia. Third, the lower correlation for the refined cash flow measure supports the view of Percy and Stokes that regulation should require more refined cash flow measures. However, Percy and Stokes stated that, "... the refined cash flow measure does not perform better ... than the other measures in predicting future cash flows" (p.40).

The tests carried out to this point have been based on the association between cash flows and earnings over a twenty-one year time period and are only capable of giving a broad view of the association between the variables. In order to examine further the variation in the relationship over time, correlation tests were conducted for each year of the study period, 1971-1991. The results for the correlations of NPBT with CF1 and NPBT with CF2 are shown in Table 3.2. Predictably, the association between earnings, NPBT, and the less refined cash flow measure, CF1, is high for each year. The correlation coefficient for the association between the variables using the refined measure of cash flow, CF2, has considerable variation between years but is lower than the alternative measure. These results are consistent with the findings of Percy and Stokes (1992) which in turn were consistent with those of Bowen *et al.* (1986).

These findings indicate that for the period of the study, CF1 was comparable to earnings, while the refined cash flow measure (CF2) was divergent from earnings for most of the firms listed on the New Zealand Stock Exchange.

TABLE 3.2
Year by Year Correlations of Earnings and Cash Flows

	NPBT WITH CF1		NPBT WITH CF2	
	r	β	r	β
1971	.99	.78	-.27	-.004
1972	.98	.75	.30	.08
1973	.99	.76	.74	.50
1974	.99	.78	.65	.46
1975	.99	.72	.47	.41
1976	.99	.74	.80	.46
1977	.99	.75	.58	.44
1978	.98	.68	.57	.30
1979	.98	.73	.62	.28
1980	.99	.71	.55	.23
1981	.99	.78	.01	.01
1982	.99	.73	.69	.35
1983	.89	.68	.46	.04
1984	.99	.88	.55	.20
1985	.99	.70	.49	.20
1986	.98	.77	.79	.45
1987	.99	.80	.77	.38
1988	.99	.75	.83	.40
1989	.99	.76	.14	.09
1990	.99	.86	.64	.40
1991	.99	.55	.88	.28
Mean	.98	.75	.54	.28
Median	.99	.75	.58	.30

r = Pearson's coefficient of correlation

β = slope coefficient

The smaller correlation coefficient between earnings (NPBT) and the second cash flow measure (CF2) suggests that this more refined measure has the potential to provide different information from that provided by the less refined cash flow measure (CF1). With the exception of 1971, the coefficients are positive, although there does not

appear to be any pattern to the magnitude of the coefficient. The period 1986-1988 produced a run of three years when the correlation coefficients were relatively high (0.79, 0.77 and 0.83 respectively). This period encompasses the 1987 stock market crash which some observers consider produced unusual results. Baydoun and Papasyriopolous (1992) suggested that 1987, for example, was a period when users had lost confidence in earnings figures. This confidence in earnings, according to Baydoun and Papasyriopolous, returned in 1989.

The results of the current study suggest that around the period of the stock-market crash the association between earnings and the underlying cash flows was relatively high, with the post-crash year (1988) showing a coefficient of correlation of 0.83. The following year (1989) produced a coefficient of correlation of 0.14 which is interesting when viewed in the context of Baydoun and Papasyriopolous's argument that confidence in earnings figures returned in 1989. They felt that users of financial accounting reports were experiencing an increase in confidence in the earnings figures, while the dramatic reduction in the coefficient of correlation suggests that preparers of financial statements were behaving in a less constrained way. From this perspective a reduction in the coefficient of correlation between earnings and cash flows suggests that preparers may be making more adjustments through the accruals process than they were when the coefficient of correlation was greater. A further explanation of the high correlations between earnings and cash flows for the period 1986-1988 is that the first cash flow statement, SSAP-10, was introduced during this time (October 1987). Coinciding with the problems on the stock market, this may have had an influence on preparers of financial reports. The fact that the coefficient of correlation between

NPBT and CF2 for 1991, when a new version of the statement of cash flows was introduced, was 0.88 provides additional evidence that regulation may have an influence on the degree of association between earnings and cash flows.

The above tests were based on the population of listed companies without any adjustment for company size. The possibility exists that large companies are exerting an undue influence and, in effect, driving the regression results. There is evidence to suggest that firm size is of some importance. The demand for differential disclosure from users and regulatory bodies such as FASB is based, in part, on firm size. Freeman and Gagne (1992) argued that size is important because: "large firms' securities are priced using earnings but small firms' securities are not" (p. 144). To exclude the possibility that firm size was affecting the results, further tests were conducted. First, the variables were scaled by dividing through by total assets. This is a frequently used method of controlling for size. Wilson (1986) suggested that the method is useful "to control for swings in flow variables from capital expansion during the fiscal year under consideration" (p.178). This suggests that the adjustment may also be useful as a proxy for life cycle changes, on the basis that capital expansion/reduction is positively correlated with a company's life cycle. He further argued that the scaling "may reduce cross-sectional variation ... and bias against detecting information content" (p.178). The method has also been used in Australian and New Zealand studies (see Taylor and Tress, 1988; Austin and Graydon, 1991). Second, outliers were removed thereby controlling for the effects of extreme observations in the analysis. An outlier is defined as "an observation whose value exceeds the values of other observations in the sample by a large amount, perhaps

three or four standard deviations away from the mean value of all the observations" (Gujarati, 1988, p. 393). A large outlier can be the result of a mistake in inputting the data. Outliers can exert influence on the data and consideration of the outliers may cause a model to be modified (Wittink, 1988). Consequently, after correction for incorrect data input, outliers which were more than three standard deviations away from the mean value of the observations were removed and further tests of correlation were conducted. This technique was also used by Wilson (1986).

3.3.3 Correlation of NPBT with CF1 scaled by total assets

In Table 3.3 the results show that when adjustment is made to control for variation in the size of an entity by dividing through by total assets the correlation coefficients remain high. The interesting observation is that examination of the betas shows that in 86% of the cases scaling has the effect of increasing the slope. This is significant in that it indicates that a $1 change in cash flow results in a higher change in earnings than was found in the unscaled test. The implication is that the non-current accruals adjustment has more impact in the accounts of larger companies. This is to be expected since the larger companies have a greater asset base on which to charge depreciation. The final two columns of Table 3.3 show that these results are significant for both scaled and unscaled observations for each year.

TABLE 3.3

Comparison of Statistical Results between Unscaled and Scaled Observations for Variables NPBT and CF1

YEAR	r Unscaled	r Scaled	β Unscaled	β Scaled	Signif. Unscaled (P <)	Signif. Scaled (P <)
1971	.99	.96	.78	.89	.001	.001
1972	.98	.93	.75	.80	.001	.001
1973	.99	.95	.76	.83	.001	.001
1974	.99	.96	.78	.88	.001	.001
1975	.99	.97	.72	.90	.001	.001
1976	.99	.98	.74	.93	.001	.001
1977	.99	.97	.75	.88	.001	.001
1978	.98	.96	.68	.65	.001	.001
1979	.98	.99	.73	.87	.001	.001
1980	.99	.99	.71	1.00	.001	.001
1981	.99	.99	.78	.96	.001	.001
1982	.99	.99	.73	.93	.001	.001
1983	.89	.99	.68	.53	.001	.001
1984	.99	1.00	.88	.94	.001	.001
1985	.99	.95	.70	1.02	.001	.001
1986	.98	.99	.77	.97	.001	.001
1987	.99	.99	.80	1.02	.001	.001
1988	.99	.99	.75	.99	.001	.001
1989	.99	.99	.76	.97	.001	.001
1990	.99	.99	.86	.99	.001	.001
1991	.99	.99	.55	.98	.001	.001
Mean	.98	.98	.74	.90		
Median	.99	.99	.75	.93		

r = Pearson's coefficient of correlation
β = Slope coefficient
P = Significance level

NOTE: In this case the use of the words *scaled* and *unscaled* indicates whether or not the variables were adjusted by dividing through by total assets. The use of the words *scaled* and *unscaled* does not imply a change in the correlation technique.

3.3.4 Correlation of NPBT with CF2 scaled by total assets

As demonstrated in Table 3.4, Pearson's coefficient of correlation for the scaled observations is still very much lower than that for the test of unscaled NPBT and CF1.

In 52% of the cases scaling has the effect of increasing the r above that of the unscaled observations. Examination of the betas shows that in 52% of the cases the slope is less for the scaled observations. This result indicates that scaling for size has the effect of increasing the association between the cash flows and the associated profits. Of particular interest are the results for the period 1986-1991 which have the greatest frequency of very small or, indeed negative, slopes (this period again encompasses the stock market crash). Statistically, however, the significance tests show too low a level of significance for three of the years. Overall the results of the scaled test are significant in 15 of the 21 years.

TABLE 3.4

Comparison of Statistical Results between Unscaled and Scaled Observations for Variables NPBT and CF2

YEAR	r Unscaled	r Scaled	β Unscaled	β Scaled	signif. Unscaled (P<)	Signif. Scaled (P<)
1971	-.27	.02	-.004	.001	.001	.79
1972	.30	.42	.08	.17	.001	.001
1973	.74	.36	.50	.18	.001	.001
1974	.65	.35	.46	.18	.001	.001
1975	.47	.53	.41	.43	.001	.001
1976	.80	.71	.46	.71	.001	.001
1977	.58	-.05	.44	.0002	.001	.41
1978	.57	.76	.30	.21	.001	.001
1979	.62	.98	.28	.33	.001	.001
1980	.55	.99	.23	.23	.001	.001
1981	.01	.51	.01	.33	.86	.001
1982	.69	.99	.35	.53	.001	.001
1983	.46	.99	.04	.54	.001	.001
1984	.55	.99	.20	.94	.001	.001
1985	.49	.50	.20	.58	.001	.001
1986	.79	.008	.45	.0002	.001	.90
1987	.77	.23	.38	.16	.001	.001
1988	.83	.06	.40	-.0009	.001	.41
1989	.14	.01	.09	.001	.10	.90
1990	.64	.93	.40	.16	.001	.001
1991	.88	-.04	.28	-.0001	.001	.76
Mean	.54	.49	.28	.27		
Median	.58	.50	.30	.18		

r = Pearson's coefficient of correlation
β = Slope coefficient
P = Significance level

In most of the foregoing tests (scaled and unscaled) there appears to be little evidence of autocorrelation with Durbin-Watson statistics ranging from 1.98 to 2.05[8]. In the case of CF2 (unscaled) the Durbin-Watson statistic is 1.18 which, although not indicating strong autocorrelation, should be more cautiously interpreted. Scaling this variable by total assets has the effect of improving the Durbin-Watson statistic which increases to 1.99 again suggesting no autocorrelation. This could offer some support to the results of Austin and Graydon (1991) when they concluded from a sample of New Zealand companies that: "successive changes in the reported average earnings and derivative average cash flows of the sample companies are essentially independent" (p.191).

Testing the correlation coefficients of NPBT with CF1 and NPBT with CF2 with the outliers removed (see Appendix C, Table 1) does little to change the overall results reported above. In the case of the former there is almost no difference in the coefficients while in the latter case removal of the outliers increases the coefficients in 85.7% of the years with the remaining three years showing decreases.

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8 Stewart (1976) stated that for the Durbin-Watson statistic values of "between 0 and 1 will generally indicate positive serial correlation [autocorrelation] and a value of between 3 and 4 will indicate negative serial correlation. A value between 1 and 3, can somewhat cautiously, be interpreted as being consistent with independence of the disturbances: the closer the value is to 2 the more confidence one would have in drawing this conclusion.... for larger values of *n*, the range of values should be more like 1.5-2.5.

3.3.5 Correlation of Changes in NPBT with Changes in CF1 and CF2

The justification for examining the association between changes in the earnings variable and changes in the cash flow variable is at least two-fold. First, it is of interest to consider how changes in cash flows are reflected in changes in earnings. Second, statistically it has been usual in studies of this type to measure changes between the years (known as first differences and represented by the equation $X_t - X_{t-1}$ where the subscripts refer to consecutive time periods) as a means of controlling for problems of non-stationarity[9].

The correlation coefficients between each of the years presented in Table 3.5 show a similar pattern to that which exists when the correlations between the variables for each year are examined, namely high correlation between δNPBT and δCF1 and lower correlation between δNPBT and δCF2. The tendency is for the variation in the correlation coefficient between δNPBT and δCF2 to be very small and the variation in the correlation coefficients between δNPBT and δCF2 to have a high degree of variability in the size of the coefficient. The coefficient also varies between positive and negative signs.

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9 Where data which may contain a trend are being analysed taking successive differences removes the effects of the trend without affecting other patterns (see Wheelwright and Makridakis, 1985).

TABLE 3.5

Year by Year Correlations of Changes in Earnings with Changes in Cash Flows

	δNPBT WITH δCF1		δNPBT WITH δCF2	
YEAR	r	β	r	β
1971-72	.92	.90	-.21	-.001
1972-73	.96	.93	.39	.06
1973-74	.99	.88	.45	.19
1974-75	.98	.97	.16	.06
1975-76	.93	.76	.64	.18
1976-77	.92	.79	-.13	-.03
1977-78	.98	.97	.08	.02
1978-79	.99	.93	.42	.09
1979-80	.99	.86	.27	.06
1980-81	.91	.81	.09	.02
1981-82	.95	.85	-.46	-.07
1982-83	.98	1.19	.89	.07
1983-84	.99	.93	.44	.09
1984-85	.99	.92	.27	.11
1985-86	.98	.86	.78	.31
1986-87	.99	.86	.41	.11
1987-88	.98	.85	.59	.16
1988-89	.99	.97	-.38	-.10
1989-90	.65	.33	-.004	-.001
1990-91	-.001	-.001	-.35	-.06
Mean	.90	.83	.22	.06
Median	.98	.87	.27	.06

r = Pearson's coefficient of correlation

β = slope coefficient

The implication of the above is that changes in the current accruals adjustments fluctuate widely between years. This supports the view of Whittington (1974) that a rationale for the use of accruals is that it is a smoothed version of the underlying cash flows. The income smoothing literature leads to the expectation that earnings will be a smoothed version of cash flows and the fluctuation in the association between the refined measure of cash flow represented by the variable CF2 confirms this. Accounting techniques, in particular the accruals process, can be seen as being managerial choices through which management produces performance numbers (earnings) for presentation to interested parties. A legitimate objective of the accruals process is to present the performance of an entity's on-going activity within the artificial constraints of periodic reporting. However, concern has been expressed by Gordon (1964) that the process may be a means to "fool" the stock-market and to decrease the variance of earnings thus creating a steady trend in earnings. The correlations shown above support the view that cash flows are smoothed to create the reported earnings numbers.

3.3.6 Correlation of NPBT with Pooled Cash Flow

The foregoing tests have been conducted using surrogates for cash flow figures. The emergence in 1987 of SSAP-10: Statement of Cash Flows provides an opportunity for examining actual cash flow numbers. Although the statement was issued in October 1987 actual cash flow figures are not available in sufficient numbers until the accounts of 1989. The following tests provide evidence of the relationship between earnings and cash flows based on the limited data available for the years 1989-1991.

The pooled coefficient of correlation (r) for the period 1989-1991, as shown in Table 3.6 is 0.20 with a slope (β) of 0.72. It is clear from the pooled correlation coefficient that the association between earnings and *actual* cash flows is low providing support for the argument that cash flows contain information which is different from the information contained in earnings numbers.

TABLE 3.6

Relationship between Earnings and Actual Cash Flows 1989-1991

YEAR	r1	r2	r3	β1	β2	β3
1989-1991 POOLED	.20			0.72		
1989	.60	.99	.14	1.98	.76	.09
1990	-.52	.99	.64	-2.02	.86	.40
1991	.45	.99	.88	.80	0.55	.28

r = Pearson's coefficient of correlation
β = slope coefficient
Columns r1 and β1 = NPBT with actual cash flows
Columns r2 and β2 = NPBT with CF1
Columns r3 and β3 = NPBT with CF2

Analysis of the relationship between cash flows and earnings on a year by year basis produces the following results. For the year 1989 the coefficient of correlation is 0.6 and a slope of 1.98. This indicates that for this year a change in cash flow of $1 would result in a change in earnings of $1.98. The association between the variables in 1990 was improved with a coefficient of correlation of -0.52 and a slope of -2.02. The test for 1991 produced a correlation coefficient of 0.45 and a slope of 0.80. Columns r2 and r3 of Table 3.6 show the comparative correlation coefficients for the

traditional and refined cash flow proxies which were previously reported in Table 3.2 (the associated slopes are shown in columns 2 and 3). The correlation coefficients of earnings with actual cash flows for the years 1989-1991 are smaller than the coefficients calculated when the traditional cash flow measure, CF1 is correlated with earnings. This calculation most frequently results in a correlation coefficient of r = 0.99. It would seem to be the case therefore that actual cash flows are better proxied by the refined cash flow which, in most cases, also finds the correlation coefficient to be much smaller than 0.99 (See Table 3.2). The implication of this finding is that many of the early market-based studies (e.g., Ball and Brown, 1968; Beaver and Dukes, 1972) that used the traditional cash flow surrogate and found little support for cash flow numbers having information content were flawed because the cash flow variable was misspecified.

The above results are based on an examination of the variables without any adjustment for size. The results with the variables adjusted for size by dividing through by total assets are shown in Table 3.7. To allow comparison with the correlation coefficients reported in Tables 3.3 and 3.4 which utilised the traditional and refined cash flow measures respectively, columns r2, r3, $\beta 2$ and $\beta 3$ are provided in Table 3.7.

TABLE 3.7

Relationship between Earnings and Actual Cash Flows Scaled by Total Assets

YEAR	r1	r2	r3	β1	β2	β3
Pooled 1989-1991	.003	-	-	.14	-	-
1989	.02	.99	.01	.02	.97	.001
1990	.01	.99	.93	.09	.99	.16
1991	.23	.99	-.04	.39	.98	-.0001

r = Pearson's coefficient of correlation
β = slope coefficient
Columns r1 and β1 = NPBT with actual cash flows
Columns r2 and β2 = NPBT with CF1
Columns r3 and β3 = NPBT with CF2

Scaling by total assets reduces the degree of explained variation between the earnings and cash flow variables. The reduction in the beta coefficients indicates less change in the earnings per $1 change in the cash flows. This implies that company size has a significant influence on the variation between cash flows and earnings.

3.4 SUMMARY

This chapter has analysed the cross-temporal association between the earnings number and two measures of cash flow for New Zealand listed companies for the period 1971-1991. Furthermore, the chapter has provided evidence on the association between earnings and actual cash flows for the period 1989-1991.

Tests of correlation were conducted on earnings and cash flow variables both unadjusted and with each of the variables adjusted by dividing through by total assets in order to compensate for the possibility of large companies affecting the results. Similar tests were performed to assess the association between *changes* in earnings and *changes* in each of the cash flow measures.

The results of this study are that less refined cash flow measures have a high correlation with earnings and are a poor surrogate for actual cash flows. Additional refinement by adjusting for changes in non-cash working capital significantly reduces the coefficient of correlation and provides additional information over and above that provided by the earnings number. These findings validate the results of Bowen *et al.* (1986) and Percy and Stokes (1992).

Year by year analysis demonstrates that there was wide variation in the correlation coefficients during the 1980s. It would seem that the stock market collapse had the effect of increasing the correlation coefficients in 1988 and 1989. A possible explanation for this is that the post-crash attention which was being focused on financial reporting had an influence on the results for these two years. A similar effect was found by Baydoun and Papasyriopolous (1992) although they concluded that 1987 was the unusual year.

When the results for NPBT and CF1 are scaled by total assets the beta coefficients increase thus leading to the conclusion that non-current accruals are more significant for large companies. Scaling the more refined measure of cash flow (CF2) in the

majority of cases reduces the beta coefficient which leads to the conclusion that there is a reduced association between cash flows and earnings. The results for 1988-89 show small slopes which imply that there is little variation between the cash flows and earnings variables for this post-crash period. Removal of the outliers has little effect on the results. When the relationship between the variables is tested using actual cash flows the coefficients of correlation indicate that CF2 is a better approximation of actual cash flows than CF1.

The variations in the relationship between earnings and cash flow variables suggest that the association between the variables may be influenced by contextual factors that exist at times, e.g., macroeconomic factors. The next chapter describes the important changes that took place in the economy of New Zealand at the macro level during the period of this study.

CHAPTER 4: MACROECONOMIC CHANGES IN NEW ZEALAND DURING THE STUDY PERIOD

4.1 INTRODUCTION

Wilson (1987) conjectured that the results of his study on the incremental information content of earnings components might be specific to the time period of the study. This was based on his belief that firms respond to economic downturns by "reducing inventories and receivables thus increasing cash flows" (p.320). The reverse of course applies when firms are faced with an upswing in the economy. Bernard and Stober (1989) were unable to find "evidence of any significant variation over time in the relative impacts of cash flows and accruals [upon stock price movements]. On the other hand, Lev and Thiagarajan (1993) were clear that their findings did indicate evidence of variation due to changes in economic conditions. Because of the conflicting evidence which exists in this area it was felt that an examination of how changes in earnings, changes in cash flows and changes in the relationship between them are associated with different economic conditions would be useful. As a precursor to this an explanation of how the New Zealand economy changed during the study period is provided.

The following section provides a condensed view of New Zealand's economic history since the 1950s and describes how the changes which took place affected the accounting numbers. The study period includes two quite major occurrences which

shaped the course of the New Zealand economy at the time and the reverberations of which still impact upon the economy. These occurrences were the National Government's "Think Big" programme and the Labour Government's economic restructuring programme based on monetarist economic policies. In an unstable state of affairs, both policies helped to intensify the instability. The result has been that the New Zealand economy has undergone traumatic economic change during the period covered by this study.

4.2 SALIENT FEATURES OF THE NEW ZEALAND ECONOMY

Gould (1982, p. 20) suggested that New Zealand during the 1950s and 60s was popularly thought to have the highest standard of living in the world. He argued that whilst the standard of living was relatively high, New Zealand was never, in the post war years, the leading nation in terms of per capita gross domestic product. Appendix B, Table 1 shows the ranking of various countries which performed as well as or better than New Zealand for a selection of years up to 1989. From a ranking of joint third in 1953, New Zealand has slipped back to 24th place in terms of GDP per capita in 1989. During the early to mid-1960s the New Zealand economy was performing well with economic indicators such as inflation, gross domestic product and unemployment all at comfortable levels[10]. The country's terms of trade were

10 In the first half of the 1960s economic growth measured in real terms was around 5% with unemployment at 1% of the labour force. The rate of price inflation ranged between 1.2% and 2.2% up until 1965.

favourable[11] and although the Balance of Payments was running at a deficit for much of the period it was kept within manageable limits.[12]

Dalziel and Lattimore (1991) argued that the beginning of the decline of this 'golden age' was the collapse in wool prices. By the beginning of the 1970s the real price of wool had fallen by almost 50% of its 1966 value and intervention measures were taken to assist farmers. The economic climate was strained and inflation rates increased not only in New Zealand but throughout the world. The collapse of the Bretton Woods agreement in 1971 saw the world monetary system move from one of relatively fixed exchange rates between the major world economies to one where floating exchange rates were the order of the day. As a consequence the upward trend in inflation rates continued and governments were faced with having to take actions to curb the rise in inflation.

In New Zealand, among other measures, the government introduced wage and price controls and increased its farming subsidies. Unfortunately New Zealand and the rest of the world were about to experience the power of the OPEC countries as they began, in 1973, to control the price of oil through restrictions in supply. The impact of the

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11 The terms of trade is calculated by taking the average price of exports and dividing it by the average price of imports. If the terms of trade rise it indicates that export prices have increased at a faster rate than import prices. Rising terms of trade is therefore an indicator of improved prosperity.

12 The 1960s began with a Balance of Payments Current Account surplus of 3.11% of GDP. Between 1961 and 1965 it was in deficit with a range of between -0.89% to -3.91% of GDP.

oil cartels accord was to cause New Zealand's Fuel Price Index to double in the June quarter of 1974 (Dalziel and Lattimore 1991, p.45).

The oil price shock had a dramatic effect on the countries whose economies depended on the continued supply of the commodity at the prevailing price levels and the effect of the oil crisis was to push those economies into recession. Dalziel and Lattimore (1991) argued that the effect of this was to reduce demand for New Zealand exports abroad.

Britain, up until the 1970s, had been seen by New Zealand, for reasons which are rooted in history, as the main outlet for its agricultural produce. However, a bad situation was made worse by Britain's entry in 1973 into what is now the European Union (then the European Economic Community). The result of these changes was to drive New Zealand's Balance of Payment on Current Account into a deficit of 14% of GDP in 1975. The predictable response of the New Zealand government was to borrow heavily overseas to finance the deficit. In 1977 difficulty in sustaining the Balance of Payments deficit forced the government to lift controls on interest rates and remove subsidies. Real growth in the economy fell to zero and for the year 1976/77 inflation rose to over 20%.[13]

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13 Consumer price inflation for the year ended March 1976 was at 16.8%. Producer price inflation was 22.8% for the same period. Real growth moved from a 1974 high of 7.18 % to a negative -2.74% in 1978 with a small improvement to a positive 0.21 % in 1979. Since then the highest real growth achieved occurred in 1985 with 4.99% but this was not sustained and negative real growth of 1.38% was recorded in 1989.

4.2.1 The "Think Big" Era (1978-84)

Up until 1980 the registered unemployment level was always below 2%. Since then unemployment has continued to grow until it reached over 10% in the early 1990s. To combat this the 1980s saw several major attempts by government to improve economic performance. The National Government devised the "Think Big" energy projects in an attempt to reduce dependency on imported oil. The objective was to relieve the strain on the Balance of Payments and to increase employment levels as New Zealand benefited from the relaxation of the constraints which were imposed by the Balance of Payments deficit. Prices and Incomes freezes were introduced although the nominal money supply continued to grow and thereby continued to fuel the inflationary pressures within the economy. The result was that none of the above initiatives was successful in improving the overall economic performance of the country. Table 4.1 provides some of the salient economic statistics for this period.

TABLE 4.1

ECONOMIC STATISTICS FOR PERIOD 1971-1990

Year	Registered Unemployment Rate %	NZ Real Growth %	Total Public Debt (%GDP)	Real Net Exports ($m)
1971	0.13	3.70	52.6	-358
1972	0.42	2.54	47.2	86
1973	0.22	4.43	45.1	390
1974	0.06	7.18	41.5	-10
1975	0.26	4.03	43.0	-1946
1976	0.40	1.69	50.7	-1078
1977	0.33	0.15	47.3	-484
1978	1.74	-2.74	50.3	-253
1979	1.95	0.21	52.3	35
1980	2.23	2.55	52.6	-202
1981	3.71	1.07	50.6	-181
1982	3.51	4.85	51.8	-537
1983	5.61	0.37	60.2	-568
1984	6.69	2.90	63.6	-309
1985	4.65	4.99	72.9	-740
1986	3.75	1.18	71.7	-654
1987	5.15	2.46	78.8	-108
1988	6.28	0.55	65.4	122
1989	9.02	-1.38	61.2	435
1990	10.15	1.14	61.7	-307

Source: Dalziel and Lattimore (1991, pp. 53-61)

Many observers consider that the failure of the "Think Big" policies stems from the Government's reliance on economic assumptions which proved to be inaccurate. Birks (1992) claimed that there were two major erroneous presumptions which contributed to the failure of the policies. First, the view that oil prices, following the oil-price shocks of the 1970s, would continue to be a problem proved to be flawed when the price of oil slumped in the 1980s. Second, this was coupled with a belief that there was an over-supply of cheap hydro-electric power. These assumptions had major implications for the generation of electrical power in New Zealand. Excess capacity began to appear in the generation of electricity and the Marsden Point oil-fired generating station, a major project, was "mothballed" before it was commissioned. The flaw in the "Think-Big" philosophy was that oil prices would have needed to rise more sharply and for a more sustained period than they did to make the projects cost effective.

Gould (1982), at an early stage of the "Think Big" era, was encouraging caution when he described the phrase as "largely an electioneering slogan, rather than a shorthand summary of a coherent economic plan" (p.222). He went on to describe some of the components of the policies as 'dubious propositions' (p.223). Regardless of the reasons for the failure of the National Government's economic recovery attempts, the economic situation as New Zealand faced a change in government in 1984 was not stable. Pent-up demand created inflationary pressure as the government's prices and incomes freeze came to an end.

4.2.2 The "Rogernomics" Era (1984-1990)

The new Labour Government which came into office in July 1984 inherited an economy which was severely weakened by protectionism, extensive government intervention and suppressed inflation (OECD, 1989, p.11). Macroeconomic imbalances were severe and attempts to deal with unemployment by stimulating demand within the economy were undertaken. The approach was to adopt expansionary monetary and fiscal policies which had the effect of temporarily stimulating demand. Unfortunately, the amount of government debt increased from 51 per cent of GDP at the end of the 1980/81 fiscal year to 73 per cent of GDP at the end of the fiscal year 1984/85. The servicing of this debt was to consume 20 per cent of government revenue. Table 4.1 provides some of the salient economic statistics of this period.

The period from 1984 saw a serious attempt to restructure the economy and the Labour Government undertook what Walker (1989) described as "the most comprehensive and far-reaching revisions of economic policy that New Zealand has ever experienced" (p. vi). The objective was to reduce inflation by imposing tighter monetary controls and to improve New Zealand's economic position through the deregulation of financial markets. A decision was made on 4 March 1985 to float the currency and the devaluation which occurred had a small but unsustainable positive effect on unemployment. Initially the devaluation of the currency gave a boost to New Zealand's international trading competitiveness. This, combined with the freeze on prices and wages, created an increase in profitability which stimulated some growth in employment. However, inflation remained a problem and the introduction of a goods and services tax (GST) in 1987 had a downward effect on profitability. The

combination of these events and the reverberations of the stockmarket crash pushed the economy into further recession and unemployment continued its upward trend. The economic processes which were taking place during this period were named after the then Minister of Finance Roger (now Sir Roger) Douglas and became popularly known as "Rogernomics". A synopsis of the change in economic policies since this time is shown in Appendix B, Table 2.

However, the BOP deficit on Current Account for 1985 and 1986 was over 9.25 % of GDP and as the 1980s came to a close New Zealand was moving further into recession. Nominal interest rates were high at just under 20% in 1988 and the real rate of interest for the same period was 9.36 % (at the same time the real rate of interest in the UK was 4.7%).

Up until 1987 the money supply continued to grow and the percentage growth in M3[14] (the most comprehensive measure) for 1986 was 23.26%. One of the

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14 M3 is the most inclusive measure of money supply and using the figures as at 30th September 1990 is defined as follows:

		$ million
	Notes and coin held by public	1,049
plus	Transaction account balances in registered banks	8,387
less	Adjustments	(256)
plus	Other call funds as follows:	
	Registered banks	17,125
	Other financial institutions	1,841
less	Adjustment	(2,454)
plus	Other funds as follows:	
	Registered banks	(28,226)
	Other financial institutions	3,618
less	Adjustment	(6,334)
	M3	51,202

Source: Reserve Bank Bulletin 1991, Vol.7, No.1, p.88.

consequences of having this additional money released into the economy was to fuel stock market investment and the Sharemarket Index rose dramatically only to come crashing down in October 1987.

4.2.3 The Stock Market Crash and New Zealand's Slow Recovery

The 1987 Stock Market crash saw some of the largest declines ever recorded, with the Dow Jones Industrial Index falling by 22% in the USA during October 19th and 20th. The market fell in Australia by 25% and in New Zealand by 36% during October (NZSE, 1988, p.1). The New Zealand Barclay's Index fell from over 3600 at the date of the crash to under 1500 in August 1991. According to Wheeler and Nash (1989) the feature which distinguished New Zealand from the rest of the world was that while other economies rallied, albeit gradually, New Zealand stock prices remained down.

Wheeler and Nash (1989) suggested that the performance of the New Zealand Stock Market has three possible explanations:

(i) Volatility

(ii) Liberalisation, and

(iii) Regulation.

The volatility explanation hinges on the proposition that economic diversification can reduce the amount of stockmarket volatility. Small nations, such as New Zealand, are not sufficiently diversified and are therefore dependent on a few sectors (See Tower, 1991; Wheeler and Nash, 1989). This limited degree of diversification contributes

both to the volatility and the magnitude of the reaction to events such as the Stock Market crash.

Economic liberalisation as an explanation of the Stock Market crash hypothesises that the liberalisation which occurred since July 1984 led to a restructuring which increased the demand for equity capital. Wheeler and Nash (1989) argue that a consequence of this was to stimulate the growth of investment companies which had as their main activity the acquisition of other companies. The financing of these mergers was carried out to a large degree by equity trading. When a major shock hits the Stock Market, companies which are so structured are more vulnerable to the impact of the shock waves. Companies which are involved, to a significant extent, in mergers and acquisitions would be expected to be relatively high risk companies. This is particularly so if the companies are dependent upon leveraged finance.

The lack of regulation in the New Zealand Market coupled with poor disclosure requirements and enforcement is also seen as a reason for New Zealand's poor performance since the 1987 crash (Wheeler and Nash,1989). However, the findings of the *Sharemarket Inquiry Unit* (1989, p.4) support the view that the Stock Exchange is not sufficiently well monitored and the quality of corporate reporting was criticised by the Ministerial Committee of Inquiry into the Sharemarket (the Russell Committee) (1989) which stated that:

> One of the major disclosure deficiencies identified by the Committee was the level of non-compliance with New Zealand Society of Accountants SSAPs. Despite a requirement in the listing requirements for companies to comply with SSAPs, it is apparent to the Committee

that these standards are not adhered to by all listed companies (Report of Ministerial Committee of Inquiry into the Sharemarket, 1989, P.57).

4.3 SUMMARY

The economic history of New Zealand over the past 40 years has been characterised by a decline in economic performance, as measured by GDP per capita, relative to other OECD countries. As a consequence the country has undergone several traumatic changes in economic policy and management since the latter part of the 1960s. The collapse of wool prices heralded the commencement of what would eventually be seen as being quite draconian measures to reverse the economic decline. Measures such as devaluation of the currency and wage and price freezes were attempts to improve New Zealand's competitive position and thereby improve the returns to business. Because of the Balance of Payments problem, in particular, it was hoped that these measures would improve the profitability of exporters.

Rising unemployment levels combined with other economic problems created the impetus for major governmental efforts to combat the situation. The objectives of these "Think Big" projects were commendable in that they were designed to reduce dependency on imported fuels, relax Balance of Payments constraints and improve the employment situation. Unfortunately, flawed assumptions such as expectations about oil prices and hydro-electric power supplies were to prove the downfall of the projects. Further economic changes occurred subsequent to the Labour Government taking office in 1984. The implementation of "Rogernomics" brought changes which, among

other things, saw a significant growth in the money supply. This increasing money supply encouraged vigorous stockmarket investment which came to an abrupt end with the crash of 1987. This crash, and New Zealand's slow recovery from it, led to adverse criticism of financial reporting in New Zealand: in particular, disclosure requirements and the enforcement of accounting standards.

Lack of confidence in financial statements and the accompanying criticism of financial reporting led to demands for better information. A significant improvement in financial reporting has been the mandating of cash flow statements. This is important because one of the mechanisms through which accounting information can deviate from the underlying cash flows is the accruals process. The question then arises as to how the earnings numbers and the cash flow numbers are associated. This leads to the further question of whether the association between earnings and cash flows is influenced by the economic climate which prevails at a particular time.

CHAPTER 5 CONTEXTUALITY OF THE RELATIONSHIP BETWEEN EARNINGS AND UNDERLYING CASH FLOWS

5.1 INTRODUCTION

The suggestion that contextuality may be of concern has been raised by Wilson (1987), Bernard and Stober (1989) and Lev and Thiagarajan (1993). Wilson suggested that his results might extend only to periods of economic downturn (in the case of his study, 1981-1982). Similarly, Bernard and Stober put forward an argument which 'maintains that differences in the valuation implications of cash flows and the various accruals accounts are more contextual [than the models examined in the study]' (p.648). Lev and Thiagarajan provided evidence that the relationship between stock returns and financial variables is strengthened when "it is conditional on macroeconomic variables" (p.190). It is clear that Lev and Thiagarajan were in no doubt that changes in exogenous macroeconomic activity have an effect on the association between financial variables such as earnings and stock returns.

A possible reason why prevailing economic conditions might be relevant was given by Wilson (1987) when he suggested that investors who believe that demand is going to expand may reward companies that are expanding inventories and receivables and are, as a consequence, reducing cash flows from operations. Similarly, if companies are faced with a recessionary situation and, as a result, are reducing inventories and receivables and are thereby increasing cash flows, they may also be rewarded by

investors. Wilson argued that the foregoing scenario suggests that "a similar study covering an extended time period might find a systematic change in the sign of the correlation between [stock] returns and unexpected cash from operations..." (p.320). Bernard and Stober (1989) failed to find any such systematic change across time, which led them to conclude that "further attempts to document time-varying coefficients are not likely to be fruitful" (p.641). Nevertheless, Bernard and Stober were specifically examining the relationship between unexpected cash from operations and unexpected changes in the economy. Their failure to find a significant association does not imply that the association between the cash flow numbers and the earnings numbers is not influenced by the state of the economy. Certainly it might be expected that an increase in an economic indicator such as GDP sends a positive signal to the business community. This in turn stimulates business confidence and results in expansions of inventories and the extension of credit. These two factors initially create negative cash flows which can be 'smoothed' as far as the earnings effect is concerned. Similarly, increasing GDP can stimulate investment in buildings, plant and other fixed assets which, through the process of depreciation, can impact on non-current accruals. Such items being in the nature of non-cash items can and do increase the variation between earnings and cash flows.

Expansions or contractions in the money supply can similarly send signals which stimulate or depress investment. In the long run, government policy is normally aimed at controlling the growth in money supply so that the rate of growth of the monetary aggregate is in line with the real rate of growth in the economy. If

successful this would have the effect of increasing business confidence because of the inherent stability of the policy.

In a situation where investment is stimulated by an increase in the money supply the effect would be similar to that described for changes in GDP. In fact there is convincing evidence that changes in the money supply *initiate* changes in GDP. Schwartz (1992) states that:

> (1) Short-run changes in the growth rate of the money tend to be followed by changes in the same direction in real output after a lag of six to nine months.
>
> (2) Substantial contractions in the growth rate of money over short periods have been a major factor in producing severe economic contractions (p.13).

Davis (1971) was of the view that although the role of the money supply is crucial in determining the course of business activity, the influence of a lag may be less than expected. When the rate of change in the money supply is tracked against the rate of change in GDP the time lag can be as short as three months. The question of whether the time-lag between changes in particular economic indicators and other economic activities is significant is of relevance to this study as it impinges upon the issue of whether changes in macroeconomic conditions have an effect on accounting numbers.

It is possible that the association between the variables is not only dependent on the economic conditions which prevail but is also linked to the industry to which a company belongs. Percy and Stokes (1992) provided evidence that industry classification may be important. It follows that studies which are concerned with the

association between earnings and cash flows should be cognizant of the possibility of an influence being exerted by the economic climate and/or the industry classification to which a company under consideration may belong. The approach in this study is two-pronged in that initially macro-economic influences are examined, followed by a consideration of industry specific-effects.

5.2 CONTEXTUALITY

Griffiths (1986) declared that "Cash is King" and went on to argue that balance sheet and profit and loss accounts are only granted their opportunities for creativity because of a lack of a firm relationship between them and actual cash payments (p.138). The propensity for a company's profit to deviate from cash flow is based largely on its accruals adjustments and the extent of this deviation may conceivably be associated with the prevailing economic conditions. Typically, adjustments to depreciation schedules affect the non-current element of the accruals adjustment and it is conceivable that changes in the economic climate can stimulate companies to accelerate depreciation and amortization charges. In the case of non-current accruals adjustments, the possibility exists that economic changes affect the amount and treatment of accounts receivable and inventory. Furthermore, profit may be adjusted by recognising sales at an earlier time than would otherwise be the case and the company ends up in a situation which was described by O'Glove (1987) as "borrowing sales from the future" (p. 107).

It is of interest therefore to consider changes in the major economic indicators in the context of how such changes may be associated with changes in accounting variables. It is intuitively appealing to associate a reduction in economic activity with a reduction in cash flows, the reverse being true for an upswing in economic activity. For the purposes of this study three macroeconomic indicators are utilised: GDP, money supply and GDP deflator. These indicators are chosen for the following reasons: GDP is one of the main indicators of a country's economic activity; money supply captures a 'political policy' input in the sense that increases or decreases in the money supply are under the control of the Reserve Bank; and GDP deflator is, according to Dalziel and Lattimore (1991), 'the best measure of inflation from a macroeconomic viewpoint...' (p. 5).

Bernard and Stober (1989), on the basis of Wilson's (1987) conjecture, predicted that when growth in GNP[15] is unexpectedly low the market would respond favourably to firms which were liquidating working capital accounts and thus generating more operating cash flow, the reverse being the case in times of higher unexpected GNP growth. They were unable to confirm that Wilson's results would extend beyond his test period. However, Bernard and Stober suggested that one of the problems with their tests lay with the assumption that financial information release dates represent

15 Some countries use the concept of Gross National Product (GNP) instead of Gross Domestic Product (GDP). Both terms are measures of aggregate output but differ in that while GDP represents the output produced in New Zealand, GNP is the gross output produced by New Zealand residents and therefore does not include the part of GDP which is produced by foreign-owned factors of production. GNP also includes production carried on overseas by New Zealand owned factors of production. The New Zealand economy is characterised by a high level of overseas ownership, the result of which is that GDP is higher than GNP.

important information in terms of how the market values a firm's stock. This assumption is flawed in that much of the essential information reaches the market prior to the official release, through less formal channels. Nevertheless, if Bernard and Stober are correct in their suggestion that the association between company valuation, cash flows and earnings variables may be highly contextual, then the question arises of the relationship between changes in the accounting variables (both cash flows and earnings) and changes in the macroeconomic indicators. The following section examines the relationship between changes in macroeconomic activity and changes in the accounting variables.

5.3 CHANGES IN MACROECONOMIC VARIABLES AND CHANGES IN ACCOUNTING NUMBERS: THE COMPREHENSIVE PERSPECTIVE

The overriding impression conveyed by the previous chapter is that the economy has undergone quite traumatic change during the period of the study. There has been a shift from the philosophy of having a highly regulated economy governed by the principles of neo-Keynesianism to one where the approach has been more *laissez faire*. Lane and Lane (cited in Alexander and Palmer, 1993) suggested that the objective has been to reduce and control the level of inflation. This has been achieved with annual inflation currently sitting at around 1 to 2 per cent.

The period of this study, 1971-1991, has seen New Zealand business move from a period of expansion, with its consequent growth in the number of companies listing

on the New Zealand Stock Exchange, to a contraction during which companies were failing and the number listed on the Stock Exchange fell dramatically. The association between changes in key macroeconomic variables and company performance has been tested to an extent by several authors who have examined the relationship between the business failure rate (BFR) and the prevailing macroeconomic conditions. In a comparative study of the United Kingdom and Japan, Cumming and Saini (1981) suggested that restrictive government economic policies might be a primary cause of corporate collapse. Rose, Andrews and Giroux (1982) found strong links between the rate of business failures and macroeconomic variables. In New Zealand Alexander and Palmer (1993) found "that the BFR is a function of the **spill over** effect,...positive lagged changes in M3, and some evidence of the existence of the effect of a political business cycle" (p. 32).

This chapter takes a different approach, in that it inquires into the association between changes in accounting numbers, both profit and non-profit, and changes in macroeconomic variables. Specifically, it inquires into the relationship between changes in the accounting variables (i.e., net profit before tax [NPBT], net profit before tax plus depreciation [CF1] and net profit before tax plus depreciation plus or minus changes in non-cash working capital [CF2]) and changes in the macroeconomic variables (i.e., gross domestic product [GDP], money supply [M3] and inflation [I]). The latter two accounting variables are described as CF1 and CF2 respectively as they are both measures of cash flow. Inflation (I) is measured by the GDP deflator which is a more comprehensive measure of the general price level than the Consumer Price Index because it takes into account all goods and services produced in New Zealand.

The Consumer Price Index which is the more frequently quoted measure of inflation is less useful in this case as it includes only expenditures by households (Wooding, 1992, p.54).

5.3.1 Sources of the macroeconomic variables

The macroeconomic variables were derived from the Department of Statistics through the PCINFOS database, the New Zealand Official Yearbook 1992 and from Tables contained in "A Briefing on the New Zealand Economy" by Dalziel and Lattimore (1991). For GDP the statistical series was extracted from PCINFOS series SNBA.SZ999. Money Supply (M3) for the period 1971-1987 was derived from the tables on page 61 of Dalziel and Lattimore. For the period 1988-1991 the information was obtained from PCINFOS series FINM.SAGB. The figures for inflation were obtained from the tables in Dalziel and Lattimore (p.54) with the exception of the figure for 1991 which was calculated from the GDP figures provided in the New Zealand Official Yearbook 1992.

5.3.2 Measurement of the variables

Changes in the macroeconomic variables for a particular year were taken as being the difference between the value of variable in the earlier year (y-1) minus the value of the variable in the year which follows (y). So that the difference in GDP between years 1971 and 1972 was calculated as the value of GDP_{y-1} minus the value of GDP_y where *y-1* represents the year 1971 and *y* represents the year 1972. Similar calculations were performed for differences in the GDP deflator inflation and M3 Money supply.

Changes in the three accounting variables (Net Profit before Tax, Net Profit before Tax+Depreciation and Net Profit before Tax+Depreciation adjusted for changes in non-cash working capital, referred to as NPBT, CF1 and CF2 respectively) were calculated by subtracting the accounting values for each company for a particular year from the accounting value for each company for the preceding year. In order to calculate the change in profit for Company A between 1971 and 1972, for example, the profit figure for 1972 was subtracted from the profit figure for 1971. To determine the average change in profit for the period, the differences for all companies were summed and divided by the number of companies. This method of calculating the average difference in profit between consecutive years is described by Equation 5.1.

EQUATION 5.1

$$\frac{\sum (x_{i_1})}{N_1} - \frac{\sum (x_{i_2})}{N_2} = \textit{average change in profit per year.}$$

Where $x_{i,1}$ represents profit for company *i* in year *1*, $x_{i,2}$ represents profit for company *i* in time period *2* and N_1 and N_2 represents the number of companies for which calculations have been made in year *1* and year *2* respectively. In order to perform this calculation it was necessary to include for each year only companies which provided a result in the previous year. In other words, if a company appeared in 1972 but did not appear in 1971 then it was not included in the analysis for the difference between 1971 and 1972. However, if the company which appeared in 1972 also appeared in 1973 then it was included in the difference between the years 1972 and 1973.

5.4 THE TESTS

Changes in each of the three macroeconomic variables (GDP, GDP deflator and the M3 Money supply) were correlated against changes in each of the three accounting variables (NPBT, CF1 and CF2). The tests used the average change in profit per year as shown in Equation 5.1. The initial tests were based on the first differences between the accounting variables and the corresponding first differences for the macroeconomic variables. Subsequent tests were conducted where a one period time lag was introduced between the change in macroeconomic indicator and the change in the accounting variables. The correlation tests in these cases were performed on the change between the macroeconomic variables in one period and the change between the accounting variables in the succeeding period.

Further tests of correlation were conducted with the data partitioned on the basis of high, medium and low changes in macroeconomic variables. In the final tests the changes in the relationship between the earnings and cash flow variables were correlated against the changes in the macroeconomic variables.

5.5 THE RESULTS

Appendix B, Table 3 shows the Pearson's correlation coefficients for the relationship between the macroeconomic variables GDP, GDP deflator inflation and money supply and the accounting variables NPBT, CF1 and CF2. The association between the

change in GDP and the change in NPBT is negative although very low at -0.013 indicating that the strength of the association is weak. The traditional cash flow measure (i.e., NPBT+depreciation) is represented in the table as CF1 and here the degree of association between this cash flow measure and the change in GDP is also very weak although positive, with a correlation coefficient of 0.001. Changes in the more refined measure of cash flow, CF2 which includes an adjustment for changes in non-cash working capital, when correlated with changes in GDP again produces a low correlation coefficient of 0.01. It would seem then that examination of the pooled data indicates that the influence of changes in GDP upon the accounting variables, earnings and both cash flow variables, is not strong.

A similar finding results from an examination of the relationship between changes in the accounting variables and changes in inflation as measured by the GDP deflator. In this case the correlation coefficients for NPBT, CF1 and CF2 against the GDP deflator are very low (0.003, -0.001 and 0.01 respectively).

Examination of the correlations between changes in the accounting variables and changes in money supply produces results which are again similar to the results found for changes in the other macroeconomic indicators. In this case the correlation coefficients are consistently negative (-0.04, -0.03 and -0.02 respectively). As the measure of cash flow becomes more refined, the correlation coefficients become a little stronger but the difference is too small to have any impact on the conclusion that changes in accounting variables do not have a strong association with changes in macroeconomic variables.

The income smoothing literature suggests that companies smooth their reported earnings in order to prevent wide fluctuations from having adverse effects on their stock prices. If this is the case, then the finding that changes in macroeconomic indicators do not have strong association with changes in earnings is not entirely surprising. The finding that changes in cash flow variables do not have a significant association with changes in macroeconomic indicators is more surprising. However, these results are based on pooled data, and the question arises as to whether or not the findings would be similar if the data were to be analysed using industry classifications allowing for the possibility of influence depending on the type of industry to which firms belong. In order to examine this possibility the next section of this chapter partitions the data by industry.

5.6 AN INDUSTRY ANALYSIS OF CHANGES IN MACROECONOMIC VARIABLES AND ACCOUNTING NUMBERS

The possibility exists that the relationship between cash flows and accruals may be 'contextual' in the sense that it is industry specific. Percy and Stokes (1992) in a study of Australian companies concluded that the correlations between earnings and more refined cash flow measures were low. Conversely, the correlations between traditional cash flow measures and earnings were high. These results were found to be generalisable across industries. On the other hand, a tendency was found for traditional cash flow measures to be better predictors of future cash flows than either

earnings or more refined cash flow measures. This result was found to differ across industries.

It seems then that the previous research discussed above fails to find a contextual influence related to the time factor but did provide some evidence of an industry-based contextuality. This study extends the process by partitioning the data on the basis of industrial classification and considering the potential for changes in the accounting numbers (both accruals-based and cash-based) to be associated with changes in the economy.

Having partitioned the data by industrial classification, a further partitioning is effected by ranking the economic variables into three groups based on the magnitude of the changes in the variables. Thus, for example, "group one" includes the seven years with the lowest changes in GDP growth, with "group two" having seven years of medium changes in GDP growth and finally "group three" having six years of high changes in GDP growth. The same partitioning is then performed for the other economic indicators. This technique is similar to that used by Lev and Thiagarajan (1993).

5.6.1 Changes in earnings and changes in macroeconomic indicators.

Examination of the first column of Table 4 in Appendix B shows that in general the association between the average changes in earnings and changes in GDP is very low. Nevertheless, the coefficients of correlation between changes in the accounting variables and changes in GDP do have some variability when partitioned on the basis

of industry classification. The highest Pearson's coefficient occurs for the printing industry with an r of -0.40 at a level of significance P = 0.08. Followed by the wholesale commerce industry with an r of 0.35 and a level of significance of 0.13. The conclusion drawn from this evidence is that it does not support the view that for the period 1971-1991 changes in earnings were particularly associated with changes in GDP. On the whole, for the other industry classifications the correlation coefficients were too low to be taken to indicate any association between changes in earnings and changes in GDP.

The possibility of a contextual influence being present in the association between changes in reported earnings and changes in money supply is examined in columns 3 and 4 of Table 4 in Appendix B. In this case there appears to be a moderate degree of association in several cases. The transport industry has a correlation coefficient of -0.44 with a degree of significance P = 0.05. This is followed by the forestry industry which has a coefficient of correlation of almost 0.43 with a significance level P = 0.06. The meat and by-products industry has a coefficient of correlation of 0.40 with a significance level P = 0.08. For the other industrial classifications the correlation coefficients do not indicate any strong association between changes in the accounting number and changes in the money supply.

The existence of a contextual influence in the association between changes in earnings and changes in inflation is tested by measuring the degree of correlation between changes in earnings and changes in the GDP deflator. The results of the correlation tests are shown in columns 5 and 6 of Table 4, Appendix B. As was the case with

the previous two economic indicators, the correlation coefficients are mainly quite low. The highest correlations occur in the unclassified textile industry with an r of -0.33 and P = 0.15. The mineral exploration industry, with an r = 0.32 and a significance level P = 0.16, produces the next highest correlation with industrial textiles and the miscellaneous category being the only other industries to produce a correlation coefficient of at least 0.30 (r = 0.30, P = 0.19 and r = 0.30, P= 0.18 respectively).

5.6.2 Changes in cash flows (CF1) and changes in macroeconomic indicators

The influence of changes in GDP on changes in average cash flows during the study period, 1971-1991 was examined, and the results are displayed in the first two columns of Table 5 in Appendix B, . In this case the correlation coefficients between changes in average cash flows and changes in GDP are too low in almost all cases to indicate any meaningful degree of association between the accounting and macroeconomic variables. There are, however, a few exceptions. The printing industry with a coefficient of correlation of -0.44 at a significance level P = 0.05, followed by wholesale commerce with a coefficient of correlation of 0.36 at a significance level P = 0.12, are the only two classifications which have any marked degree of association between changes in macroeconomic variables and changes in the accounting variables. This is similar to the situation when changes in earnings are correlated with changes in macroeconomic variables and is not unusual. The difference between the earnings number and this cash flow measure, being basically an adjustment for depreciation, is relatively unsophisticated. This can be seen as providing evidence that early studies which found little useful additional information

in cash flows over and above that contained in the earnings number were not using a cash flow surrogate which was sufficiently different from earnings to be able to capture any differences.

Column 3 of Table 5, Appendix B shows the results of the correlations between changes in average cash flows and changes in the money supply. The coefficients of correlation are again, on the whole, small, indicating a low level of association. There are a greater number of cases where there appears to be a moderate degree of association between changes in the accounting numbers and changes in the macroeconomic variable. The cases where the coefficients are showing signs of some association are led by the transport and tourism industry with an r = -0.52 and P = 0.02, followed by the Liquor industry with an r = -0.42 and P = 0.07. The meat and by-products industry with an r = 0.42 and P = 0.06 is the only industry which has a coefficient of correlation of at least 0.40.

The degree of association between changes in inflation and changes in cash flows (CF1) was tested and the results are presented in the last two columns of Table 5, Appendix B. The coefficients of correlation are all relatively low and in no case is there a coefficient of 0.40. The highest coefficient of correlation is found in the electrical industry with an r = -0.33 and P = 0.16.

5.6.3 Changes in cash flows (CF2) and changes in macroeconomic indicators

In this case the measure of cash flow has been refined to include changes in working capital. The correlation coefficients shown in the first two columns of Table 6, Appendix B confirm that there is, in the majority of cases, a low association between changes in average cash flows and changes in GDP. The highest degree of association occurred in the unclassified textile industry which produced an r = 0.31 and P = 0.18.

When changes in cash flows are correlated with changes in money supply the majority of correlation coefficients, as shown in Column 3 of Table 6, Appendix B, are low, which indicates that changes in money supply are not usually accompanied by changes in cash flows. In this case, however, there are a greater number of occasions where there is an association between changes in the variables than pertain when changes in cash flows are correlated with either of the other two macroeconomic variables. The transport and tourism industry produces the highest coefficient of correlation with an r = -0.51 and P = 0.02. The automotive industry with r = -0.49 and P = 0.02 shows a moderate degree of association between changes in money supply and changes in cash flow. The printing industry and the industrial textile industry also show a moderate degree of association between changes in the two variables with r = -0.41, P = 0.07 and r = -0.40, P = 0.08 respectively.

When changes in cash flows (CF2) are correlated with changes in inflation the results indicate that only the transport and tourism industry with an r = 0.48 , P = 0.03, and the chemical industry with r = 0.40 , P = 0.08, have coefficients which are at least moderately high.

It is clear from the above analysis that neither changes in earnings nor changes in either measure of cash flow are associated with changes in macroeconomic indicators. The exceptions which do exist suggest that when association is present changes in cash flows have a greater degree of association with macroeconomic changes than is the case when earnings are the accounting variable. The fact that some industries show a small degree of association between changes in the macroeconomic and cash flow variables suggests that caution should be exercised when considering the significance of changes in cash flows. It could be the case that the association between earnings and cash flows is greater in some industries because earnings are smoothed in response to trading conditions for that particular industry. This, of course, is a speculative suggestion for why some industries show a greater degree of association between changes in cash flows and changes in macroeconomic indicators than occurs when changes in earnings are correlated with changes in macroeconomic indicators.

5.7 THE LAGGED RELATIONSHIP BETWEEN CHANGES IN MACROECONOMIC VARIABLES AND CHANGES IN ACCOUNTING NUMBERS BY INDUSTRY

The foregoing section examined the relationship between changes in the macroeconomic indicators and changes in the accounting variables by comparing each year's change in the economic indicator with the equivalent year's change in the accounting variable. In other words if the change in an economic indicator between

years 1971 and 1972 is defined as $\partial \mathbf{Et_0}$, and if the change in an accounting variable between years 1971 and 1972 is defined as $\partial \mathbf{At_0}$, and if each subsequent year is numbered *1 to n* then to determine the degree of association between the variables a correlation coefficient is calculated comparing $\partial Et_{0...n}$ and $\partial At_{0...n}$.

The above approach ignores the possibility of the relationship between changes in economic indicators and changes in accounting variables being lagged. To test for this the correlations between changes in the economic indicators and changes in the accounting variables were calculated using a one period time lag. This means that the change in the economic indicator between 1971 and 1972 was compared to the change in the accounting variable between 1972-1973. In other words, using the terminology developed above, ∂Et_0 was compared to ∂At_1, ∂Et_1 was compared to ∂At_2 and so on until the end of the series. The results of the correlation coefficients for the lagged variables are as follows:

5.7.1 Changes in macroeconomic indicators correlated with lagged changes in earnings

Appendix B, Table 7, column 1 shows that the correlations between changes in GDP and lagged changes in average earnings are low for most industries. The precious metal industry is the only case which has a high coefficient of correlation, with r = -0.98.

When changes in money supply are correlated with lagged changes in earnings, as shown in Column 2 of Table 7, Appendix B, it can be seen that the majority of

correlations are still low. There are, however, a greater number of industries with a moderately high coefficient than occurred in the previous case. The precious metal industry produces the highest correlation coefficient with an r = -0.87, followed by the industrial textile industry with an r = - 0.54. In this latter case the significance level is high at 0.001. Other industries which have moderately high coefficients of correlation are the manufacturing industry with an r = -0.52. and the rural services industry with an r = -0.39. Again, in the latter case, the significance level P is high at 0.001.

Substituting changes in inflation as the macroeconomic variable and correlating it with changes in earnings, as shown in Appendix B, Table 7, Column 3, it is clear that in almost all cases there is little association between the variables. The highest correlation coefficients occur in manufacturing industry with an r = -0.39, and the precious metal industry with r = -0.30.

5.7.2 Changes in macroeconomic indicators correlated with lagged changes in cash flows (CF1)

In this case, Appendix B, Table 8, column 1 demonstrates that the precious metal industry produced a correlation coefficient of r = -0.96. All other industries produced correlation coefficients which were low.

When changes in money supply are correlated with lagged changes in cash flows (CF1), as shown in Appendix B, Table 8, Column 3, it can be seen that a larger number of industries produce correlation coefficients greater than r = 0.35 than was

the case when the macroeconomic indicator was GDP. The precious metal industry produced an r = -0.83, and this was followed by the industrial textiles industry with an r = 0.54. The correlation coefficient for the manufacturing industry was r = -0.46, the medical industry was r = 0.45 and the rural services industry produced an r = -0.41.

The correlation coefficients which resulted from changes in inflation being correlated with lagged changes in cash flows (CF1) were, in every case, low. The highest of these correlation coefficients occurred with the manufacturing industry which produced an r = -0.37. Apart from this all other industries produced coefficients which were less than 0.30.

5.7.3 Changes in macroeconomic indicators correlated with lagged changes in cash flows (CF2)

The results given in Appendix B, Table 9, column 1 show that only the precious metal industry produced a high coefficient of correlation between changes in GDP and lagged changes in cash flows (CF2) with r = -0.99. In all other cases the coefficients were very low.

When money supply was used as the macroeconomic indicator it can be seen from Appendix B, Table 9, column 3 that the precious metal industry with a coefficient of correlation of -0.96, had the greatest degree of association between changes in the accounting and macroeconomic variables. All the other coefficients were below (+/-) 0.34 and as such show little association between the changes in the variables.

The degree of association between changes in inflation and lagged changes in cash flow (CF2) is shown in Appendix B, Table 9, column 5. The table shows that only the precious metal industry, with an r = -0.52, produced a coefficient of correlation which indicated any meaningful degree of association between the variables. In no other case was the correlation coefficient above 0.20.

5.8 THE SEGREGATION OF THE DATA INTO LOW, MEDIUM AND HIGH CHANGES IN MACROECONOMIC INDICATORS

Lev and Thiagarajan (1993) in their study of value-relevant fundamentals (such as earnings) on the value of corporate securities observed that "previous research on the value relevance of earnings and other fundamentals was generally conducted in an unconditioned (noncontextual) mode" (p.205). In order to test the impact of different economic conditions over a fifteen-year period they segregated their three economic variables (change in GNP, change in inflation and change in the level of business inventories) into three groups. For example, for inflation "group one" constituted the five years with the lowest inflation rates for the study period 1974-88. This was followed by "group two" and "group three" which had five years of medium and high inflation respectively. The results of this segregation, according to Lev and Thiagarajan, demonstrated different response coefficients for different economic regimes. As a consequence of Lev and Thiagarajan's findings it was felt that it would be of interest to segregate the data on the basis of low, medium and high change in economic activity. As the study was conducted over a twenty-one year period, which

creates twenty changes between the years, the results were segregated into two periods of seven changes and one period of six changes. The correlation coefficients for this analysis are contained in Appendix B, Tables 10-18. The following section describes the results.

5.8.1 The association between changes in earnings with changes in macroeconomic indicators partitioned by magnitude of macroeconomic change

The association between changes in earnings and changes in macroeconomic indicators where the macroeconomic changes are classified as high is shown in Appendix B, Table 10. Considering first the association between changes in earnings and changes in GDP as shown in Column 1 of the table it is clear that for most industries there is little association between the variables. However, there are a few industries which do show some degree of correlation. In particular, for the manufacturing industry classification 'other manufacturing' there is a coefficient of correlation of 0.84. Financial institutions also show a moderate degree of correlation with an r = -0.44.

High changes in money supply show a greater number of industries having an association between changes in the accounting variable and changes in the macroeconomic variable. This is particularly obvious in the cases of the metals and machinery industry and the automobile industry, with coefficients of correlation of -0.92 and -0.85 respectively. Other industries with high coefficients are unclassified textiles, other manufacturing, industrial textiles electrical machinery, food and construction with coefficients in the range +/- 0.77 to 0.67. In all, 11 of the 20

industry categories have a coefficient of correlation of 0.40 or more. Inflationary changes frequently have a moderate to high degree of association with changes in earnings. The industry classification 'other manufacturing', in this case, has a coefficient of correlation of -0.75, followed by the rural services industry with a coefficient of -0.73. A similarly high coefficient of correlation is found in the industrial textile industry with a coefficient of correlation of 0.73. The electrical machinery, unclassified textiles, chemicals, metals and machinery, and meat and by-products industries each have coefficients of correlation in the range +/-0.68 to 0.51.

When the change in GDP is defined as medium, 8 of the 26 industry groups have a coefficient of correlation of +/- 0.50 or more. For the chemical industry and the food industry the coefficient of correlation is -0.76, with the wholesale commerce industry returning a similarly high correlation coefficient of 0.70. Other industries with notable degrees of association between the variables are meat and by-products, non-metallic minerals, unclassified textiles, industrial textiles and the automotive industry, each having a coefficient of correlation in the range +/- 0.69 to 0.51.

When changes in money supply are classified as medium it is clear that there is a greater frequency of moderate to high correlation between changes in earnings and changes in money supply than is the case when medium changes of either GDP or inflation is correlated with the accounting variable. In this case 12 of the 26 industry categories display correlation coefficients of 0.50 or more, with five more having coefficients of over 0.40. The highest correlation coefficient is found with the industrial textile industry with an r = -0.79. This is followed by the meat and by-

products industry with a coefficient of 0.68. Other industries for which changes in earnings are moderately associated with changes in money supply when the change in the macroeconomic variable is of a medium magnitude are the chemical industry, miscellaneous industries, transport and tourism, non-metallic industries, with correlation coefficients in the range +/- 0.67 and 0.60. Correlating medium changes in inflation with changes in earnings produces a smaller number of cases in which the coefficient is high to moderate than is the case when the macroeconomic indicator is either GDP or money supply. In this case only the food and drink industry and the manufacturing industry have correlation coefficients in excess of 0.50.

Under conditions which are characterised by low changes in the economic indicators, changes in GDP produce correlation coefficients of greater than 0.50 on only two occasions: The non-metallic industry category has an $r = 0.55$ and the financial institutions industry produces an $r = 0.54$. Low changes in money supply are more frequently associated with changes in earnings than is the case when GDP is the macroeconomic variable. The mineral exploration industry with an $r = 0.90$ and a significance level $P = 0.01$ is closely followed by the financial institutions industry with an $r = -0.89$ at a significance level $P = 0.02$. Other industries which record high to moderate coefficients of correlation are rural services, agriculture and manufacturing each within the range +/-0.72 to 0.54. Low inflation results in a number of industries which have moderate to high coefficients of correlation. These industries are metals and machinery, construction, retail commerce, transport and tourism, electrical machinery and rural services, each with a coefficient of correlation in the range +/-

0.71 to 0.61. Several other industries have correlation coefficients in excess of 0.50.

5.8.2 The association between changes in cash flows (CF1) and changes in macroeconomic indicators partitioned by magnitude of change in macroeconomic indicator

Appendix B, Table 13, Column 1 shows that when changes in GDP are in the high category only one industry produces a high correlation between changes in cash flows and changes in the macroeconomic variable. The other manufacturing industry with an r = -0.83 stands out on its own, with the next highest correlation coefficient being found in the financial institutions industry with an r = -0.45. Twenty-one of the remaining industry categories produce correlation coefficients of less than 0.30 and in 19 cases the correlation coefficients are less than 0.20. For high changes in money supply, the association with changes in cash flow more frequently produces high to moderate coefficients of correlation. Both the metals and machinery industry and the automotive industry produce correlation coefficients of -0.86, while the construction industry produces a coefficient of 0.83. Other industries with high to moderate coefficients are manufacturing, industrial textiles, unclassified textiles, electrical machinery, rural services and retail commerce, which produced coefficients in the range +/- 0.77 to 0.61. Several other industries have correlation coefficients of between 0.44 and 0.54. High changes in inflation also produce quite high coefficients of correlation. Most notably, the manufacturing industry with an r = -0.76. Rural services, industrial textiles, electrical machinery, automotive industry and the unclassified textile industry produce coefficients in the range +/- 0.76 to 0.64 with several other industries having coefficients of between -0.43 and -0.54.

When the changes in macroeconomic indicators are classified as being of a medium magnitude, changes in GDP produce several coefficients of correlation of over 0.70. The chemicals industry with r = -0.77 and the wholesale commerce industry with r = 0.71 are the highest in this category. The meat and by-products industry and the non-metallic minerals industry produce correlation coefficients of -0.69 and -0.64 respectively. As has been the case previously, money supply has a greater frequency of high to moderate correlation coefficients than either of the other two categories. The industrial textiles industry produces an r = -0.77. This was followed by the meat and by-products industry with an r = 0.70. Other industries with correlation coefficients in the range +/- 0.65 to 0.63 are non-metallic minerals, chemicals transport and tourism, food and miscellaneous. An additional number of industries have correlation coefficients in the range +/- 0.57 to 0.54. These industries are financial institutions, mineral exploration, manufacturing, precious metal industry, agriculture and property investors. Medium changes in inflation have no particularly high coefficients of correlation. The highest occurs in the food industry which has an r = 0.57. Manufacturing produces a correlation coefficient of 0.55 and the chemical industry has a coefficient of 0.50.

Tests of the association between changes in cash flows and changes in GDP when changes in GDP are low, produced no high coefficients of correlation. The financial institutions industry with an r = 0.55 has the highest coefficient, and the only other one of note is the non-metallic minerals industry with a correlation coefficient of 0.51. In total 13 out of 26 industries have correlation coefficients of less than 0.40. Changes in money supply provide one of the highest coefficients of correlation in this

category, with an r = 0.90. In this case the significance level P was high at 0.01. Similarly, financial institutions have a coefficient with an r = -0.90 with a significance level P = 0.01. Rural services have the next highest correlation coefficient with an r = 0.71. Low inflationary changes display fewer high correlation coefficients than low changes in money supply, but more than occurs when the independent variable is low changes in GDP. For example, the following industries all have coefficients of correlation of between +/- 0.68 and 0.61: construction, metals and machinery, commerce-retail and rural services.

5.8.3 The association between changes in cash flows (CF2) and changes in macroeconomic indicators partitioned by magnitude of change in macroeconomic indicator

In the case of high changes in GDP no industry has a high correlation coefficient. The manufacturing industry produces the highest coefficient of correlation with an r = -0.39, with the retail commerce industry next highest with an r = -0.38.

High changes in money supply appear to have a greater effect on cash flow, with 13 of the 20 industry classifications having a coefficient of correlation of 0.50 or greater. In particular the media and communication industry with an r = 0.81 displays a high degree of association between changes in cash flows and high changes in GDP. Other industries which have a high to moderate degree of association are transport and tourism, forestry, industrial textiles, chemicals, construction, property investors liquor, non-metallic minerals and rural services, each of which has a correlation coefficient

in the range +/- 0.79 to 0.60. Several other industries have coefficients of correlation between +/- 0.50 and 0.59.

Changes in inflation in the high category produce only a slightly smaller number of cases where the coefficients of correlation are relatively large than was the case for money supply. For this classification there are 11 of the 26 cases with a coefficient of correlation of 0.50 or more. The construction and industrial textile industries produce the highest coefficients, with -0.74 and 0.72 respectively. Property investors and transport and tourism, each with coefficients of +/- 0.69, followed by the non-metallic metals industry with a coefficient of correlation of 0.68, also display moderate degrees of association between changes in cash flow and high changes in inflation. There are six cases for which the correlation coefficient is in the range +/- 0.50 to 0.60.

Medium changes in macroeconomic activity produce no particularly high coefficients when correlated with CF2. The metals and machinery industry with a coefficient of -0.69 produces the highest degree of association between changes in cash flow and medium changes in GDP. Other industries which have moderate degrees of association are rural services and meat and by-products, with coefficients of -0.68 and -0.61 respectively. Wholesale commerce was the only other case of note, with a coefficient of correlation of 0.59. Medium changes in money supply are again more frequently associated with changes in cash flows. In this case 17 of the 26 categories record a coefficient of correlation greater than 0.50. None however are particularly high, with forestry and non-metallic minerals recording the highest coefficients, at -

0.69 and 0.69 respectively. The construction, financial institution, industrial textiles, miscellaneous and automotive industries, with coefficients in the range +/- 0.68 to 0.61, complete the list of industries with correlation coefficients of +/- 0.60 or greater. A further seven industries have coefficients which are in the range +/- 0.50 -0.59.

Changes of this magnitude in inflation appear to have little association with changes in cash flows. The food industry, with a coefficient of 0.71, is the only case with a high degree of correlation. The property investors industry, with a correlation coefficient of -0.50, has the next highest degree of association between the variables.

When changes in GDP are low the effect on changes in cash flows is, on the whole, slight. Only the wholesale commerce industry, with a coefficient of correlation of -0.71, has a coefficient which is particularly noteworthy. The automotive, electrical machinery, forestry, liquor and non-metallic minerals industries have coefficients of correlation which are in the range +/- 0.50 to 0.53. A greater degree of association is found in the case of changes in money supply, with non-metallic minerals having a coefficient of correlation of -0.90. The transport and tourism industry and the chemicals industry, with coefficients of -0.77 and 0.74 respectively, also display a high degree of association between changes in cash flows and changes in money supply. Other industries with moderately high association between the variables are electrical machinery and other manufacturing, with coefficients of -0.65 and 0.60 respectively. There are several industries with coefficients of correlation in the range +/- 0.50 to 0.59. Low changes in inflation demonstrate a high to moderate degree of association with changes in cash flow. The mineral exploration industry, with a

coefficient of correlation of -0.94, has the highest degree of association between the variables. The food industry and the gas industry are also high, with correlation coefficients of 0.90 and 0.86 respectively. Unclassified textiles, other manufacturing and construction, with coefficients in the range +/- 0.76 to 0.65, also display a moderate to high degree of association. The non-metallic minerals industry and the miscellaneous industry category have correlation coefficients of 0.56 and 0.55 respectively.

5.9 THE RELATIONSHIP BETWEEN EARNINGS AND CASH FLOWS AND ITS ASSOCIATION WITH CHANGES IN MACROECONOMIC INDICATORS.

To this point this chapter has considered how changes in *each* of the accounting variables, earnings and cash flow, have been associated with changes in macroeconomic indicators. However, bearing in mind that chapter 3 examined the relationship between earnings and cash flows, it is pertinent to inquire how that relationship is associated with changes that occur within the economy. To that end, this section of the chapter examines how the contemporaneous movement between earnings and cash flows is correlated with changes in GDP, money supply and inflation.

5.9.1 Changes in macroeconomic indicators correlated with changes in the association between earnings and cash flows (CF1).

As Table 19 shows, when changes in GDP are correlated with changes in the relationship between earnings and CF1, only the precious metal industry with a correlation coefficient of -0.68 produces any meaningful degree of association between the variables. In all other industries the coefficients of correlation between changes in the association between earnings and cash flows are very low. In the case of changes in money supply, the precious metals industry is again the only industry which produces a moderate degree of correlation with a coefficient of 0.62. Even less evidence exists of an association between the variables when the macroeconomic variable is changes in inflation. In this case the highest coefficient of correlation is for the mineral exploration industry, with a coefficient of -0.37.

5.9.2 Changes in macroeconomic indicators correlated with changes in the association between earnings and cash flows (CF2).

As Table 20 shows, when changes in GDP are correlated with changes in the association between earnings and CF1 there is no material degree of association between the variables. The highest correlations are found in the precious metals industry and the media and communication industries, each with a coefficient of correlation of 0.37.

In this case the precious metals industry has a coefficient of correlation of 0.98, with the next highest being the media and communication industry and the manufacturing

industry, with coefficients of -0.37 and 0.35 respectively. In all other cases the correlation coefficients are so low as to indicate no meaningful correlation.

Inflationary changes show a similar association with changes in the relationship between earnings and cash flows as was found in the previous case. Namely, the majority of cases have a very low degree of association. The precious metals industry records a relatively high degree of association, with a coefficient of correlation of -0.73, with the next highest coefficient being found in the manufacturing industry, with an r = 0.35.

5.10 SUMMARY

This chapter considered the question of whether or not there was a contextual element in the relationship between changes in macroeconomic indicators and changes in earnings or cash flows. Furthermore, it considered how the changing relationship between earnings and cash flows might be associated with changes in macroeconomic indicators.

The results indicate that for the majority of industries changes in GDP, money supply or inflation have little or no association with changes in earnings. A similar conclusion is reached when changes in CF1 are tested against changes in each of the three macroeconomic variables. In this case however, there is evidence of changes in money supply being associated with changes in the traditional cash flow measure, although the correlation coefficients never exceed +/- 0.51. Evidence of changes in

money supply being associated with changes in cash flows becomes more pronounced when the more refined cash flow measure CF2 is correlated with macroeconomic changes. In this case, although the highest correlation coefficient is similar to that of CF1 (-0.51), there are a greater number of industries showing coefficients in the +/- 0.30 to 0.50 range.

In order to allow for the possibility that changes in macroeconomic indicators take time to be seen to have an association with the accounting variables, a time lag of one year was introduced into the tests. This time lag results in a reduction of the coefficient of correlation in some cases, and the frequency of cases having coefficients over +/- 0.30 was decreased. However, for some industries the coefficients of correlation are increased. For example, the precious metals industry shows a dramatic increase in association between changes in earnings and changes in macroeconomic indicators. In particular, changes in GDP and changes in money supply are highly associated with changes in earnings. The precious metals industry also displays a high degree of association when changes in both GDP and money supply are correlated against CF1 and CF2.

When the relationships between the variables are examined by ranking each economic variable and classifying them into three groups, i.e., high, medium and low changes, further evidence is provided of contextuality. It is clear that for nearly all industrial classifications high changes in GDP have little association with changes in earnings. The exceptions to this appear to be the manufacturing industry and, to a lesser extent, the financial institutions industry. High changes in money supply have association

with changes in earnings for many industries. High changes in inflation are similarly associated with earnings changes. When the change in inflation is of a medium magnitude the situation is a little different. Under these conditions changes in GDP frequently have association with earnings changes but not to the same extent as for changes in money supply. In the case of low changes in the macroeconomic variables there are a greater number of occasions when the correlation coefficient is in excess of +/- 0.50 than occur when the macroeconomic variable is either GDP or money supply.

For the traditional measure of cash flow (CF1) the pattern is similar to that for earnings. High changes in GDP have little association in the case of GDP. For changes in money supply and to a lesser extent changes in inflation, there is frequently a high degree of association between changes in the variables. Medium changes in CF1 show that changes in money supply have a greater association than either changes in GDP or inflation, although in this case changes in GDP appear to have a greater association than is the case with changes in inflation. In the case of low changes in macroeconomic indicators, the findings indicate that there are more industries demonstrating association between changes in the variables for the inflation variable compared with changes in money supply, where slightly fewer industries show evidence of an association. However, in two cases, financial institutions and mineral exploration, the level of association is very high.

When the more refined measure of cash flow (CF2) is used in the correlations, patterns emerge similar to those found in the previous examples. For high changes

in the economic variables there is considerable evidence of association in the cases of money supply and inflation but little evidence in the case of GDP. Medium changes in the economic variable produce evidence of association between changes in CF2 and changes in GDP, changes in CF2 and changes in money supply. Under these conditions there is less evidence of association between changes in CF2 and changes in inflation. When changes in the macroeconomic variables are classified as low there is evidence of association between CF2 and changes in money supply and changes in inflation.

It is clear from the foregoing tests that there is sufficient evidence to support the view that the cross-temporal movement between accounting numbers is conditional upon changes in the macroeconomic variables. This is not surprising since one would expect to find that changes in economic activity would be reflected in changes in accounting numbers. The lack of evidence of correlation between changes in the relationship between macroeconomic indicators and accounting numbers is more surprising, and indicates that the variation between earnings and cash flows is less likely to be contextual than critics of accruals-based accounting might suggest; although it is not possible to state that individual companies faced with unfavourable trading conditions do not adjust cash flows to produce favourable earnings figures. The evidence is that when economic conditions are depressed companies *do not as a rule* adjust the relationship between earnings and cash flow. In any event, even if this were to happen, such activity could only at best be short term, since ongoing poor operating cash flows will usually result in the demise of the company as, for example, in the case of W.T. Grant.

The results of this study demonstrate that the association between changes in accounting numbers and changes in the macroeconomic indicators is low for most industries. Examination of the association between changes in the economic indicators and changes in the lagged accounting variables does not produce results which are markedly different. It is still the case that most industries have low coefficients of correlation. Lagging the accounting variables one period behind the economic indicators does however cause some change in the sense that different industries have relatively higher coefficients than was the case with the unlagged tests.

The largest proportion of variation in accounting numbers is explained by factors other than changes in the economy. Nevertheless, there is sufficient evidence to suggest that for some industries the impact of changes in macroeconomic conditions is greater than for others. The fact that this is the case for particular industries supports the view of those such as Bernard and Stober (1989) who suggested that in the case of the association between earnings and valuation, the links are highly contextual to the point that no "parsimonious model" can ever capture them. Certainly the evidence from this study supports the view that the industry to which a business belongs can determine a moderate proportion of the degree of susceptibility to changes in economic indicators.

CHAPTER 6: SUMMARY AND CONCLUSIONS

6.1 INTRODUCTION

The purpose of this final chapter is to summarise the contents of the study, to review the research findings, to emphasise the qualities of the research project which make it unique and to identify opportunities for further research in the area.

6.2 BACKGROUND TO THE RESEARCH STUDY

The attitude towards financial reporting has undergone change over the past few decades and the needs of users of financial information have been more heavily acknowledged in substance and in form. Attention has been drawn in New Zealand and elsewhere to the inadequate information which has, in the past, been provided by the income statement and balance sheet, and new requirements have arisen particularly in the area of disclosure. Increasingly, academic journal articles as well as press reports and commentary have expressed dissatisfaction with financial reporting. In many cases this discontent was focused on the lack of reliability of reported earnings as a measure of performance. In particular, the collapse of companies which had reported healthy earnings and for which subsequent examination revealed a lack of positive operating cash flows drew attention to the shortcomings of reported earnings as an indicator of a company's ability to continue trading. The Russell Committee,

in the case of the 1987 New Zealand Stock Market collapse, was particularly critical of financial reporting. These criticisms created the impetus for this study of the relationship between earnings and cash flows.

Since the study began there have been major changes in financial reporting in New Zealand. The new Companies Act 1993 and the Financial Reporting Act 1993 have made significant changes to the financial reporting environment in terms of disclosure requirements. All companies were required to comply with the new legislation from 1 July 1994.

A major advance for financial reporting has been achieved by the provision of legal backing for the accounting standards issued by the New Zealand Society of Accountants (Financial Reporting Act, 1993, Section 36(2)). Another significant change has been the replacement of the concept of capital maintenance with a new solvency test (Companies Act, 1993, Section 4(1)) with obvious implications for the importance of cash flow in the assessment of the ability of an entity to pay its debts as they fall due. The importance of the Statement of Cash Flow has been formally acknowledged by the mandating of the provision of a statement of cash flows (Financial Reporting Act, 1993, section 8 [1c]).

6.3 SUMMARY OF THE RESEARCH STUDY

Chapter 1 provides an overview of the research project and outlines the aims and objectives of the study. Specifically the objectives of the study were:

(1) to examine the literature on the relationship between cash flows and accruals-based accounting numbers;

(2) to conduct an empirical study, based on New Zealand annual reports, to determine the contemporaneous movement of earnings and cash flow numbers;

(3) to carry out an investigation into the contextual nature of the relationship between earnings and cash flows and to consider the effect of macroeconomic changes on the relationship.

In effect, the fundamental question of the study is " what is the relationship which prevails over time between the two types of accounting information i.e., earnings numbers and cash flow numbers"? The other questions, such as whether or not there are contextual influences on this relationship and what effect changes in economic indicators have on the relationship between the variables, follow from this primary question. Chapter 1 continues by describing the research methodology and acknowledging the project's constraints. The last section of the chapter provides an outline of the thesis.

Chapter 2 reviews the literature on the usefulness of cash flows and earnings numbers. There can be little doubt from an examination of this literature that most commentators consider earnings to have primacy over cash flows in terms of usefulness to users of financial information. There are very few commentators who would suggest that cash flow information has overall superiority, or who would argue in favour of some form of cash flow accounting replacing the existing accruals-based system. Notable and distinguished exceptions to this are the British academics Lawson and Lee. In the early work of Lee (1972 and 1978) and Lawson (1981) they appeared to advocate a cash flow system based on both cash flow accounting (CFA) and value added accounting (VA) as a replacement for the accrual-based system. Eggington (1984) was firmly of the opinion that the CFA and VA models proposed by Lawson and Lee as performance measures "would make them contenders to *usurp rather than supplement the role of profit*" [italics added] (p.99).

Regulatory bodies such as the Financial Accounting Standards Board in the USA are unwavering in their view that earnings are the superior performance measure. The view of such regulatory bodies is sustained by much of the research output in the area of usefulness of accounting numbers and undoubtedly up until the 1980s, there was little convincing evidence that cash flow numbers contained much additional information over and above that contained in the earnings number. However since the mid 1980s, work by Bowen, Burgstahler and Daley (1986 and 1987), Rayburn (1986) and Wilson (1987) among others has provided evidence that cash flow numbers do, in fact, convey information beyond that conveyed by the earnings number alone.

Several interesting occurrences have arisen almost simultaneously with these research findings. First, the provision of cash flow information has become mandatory within many accounting domains. Second, studies have shown the potential of cash flow information as an input into models of corporate failure. With respect to the former, the mandating of a cash flow statement can be viewed as a response to the loss of confidence in 'traditional' accounting numbers. Over the years criticism of the reliability of reported earnings has become more pronounced. The occurrences in 1987 of stock market collapse around the world intensified the loss in confidence which some users of published accounting information experienced. Commentators such as Largay and Stickney (1990) are clear in their opinion that such a loss in confidence has, in fact, occurred. The root cause has been the ability of preparers of financial accounting information to subject the accruals process to "significant manipulation [which] has contributed to a lack of meaningfulness in financial statements" (Neill, Schaefer, Bahnson and Bradbury, 1991, p. 118). Some of the impetus for this manipulation was seen by Healy (1985) and DeAngelo (1986) as stemming from the relationship between management compensation (which is often based on the profit figure) and changes in current accruals. Even without the existence of the implied 'creative' accounting procedures and the negative connotation which is imbued in Healy and DeAngelo's arguments, the subjective nature of the accruals process creates the environment for a loss of faith in the veracity of published accruals-based accounting information.

Much attention in the literature has been focused on the usefulness of the cash flow number as a variable used to predict the future cash flows of an entity. Among the

issues which have arisen is the question of whether or not the usefulness of cash flow numbers is dependent upon factors such as the economic conditions which prevail during the period of the study. Associated with this is the question of whether or not the relationship between the earnings numbers and cash flow numbers is itself contextual. Several studies have addressed the issue of the association between earnings and cash flows (e.g., Bowen *et al.* 1986; Percy and Stokes, 1992) but none has examined the contextual nature of the relationship over a sustained time period. One of the main issues addressed in this thesis is the question of the association between changes in the macroeconomic variables and changes in earnings and cash flows. Furthermore, the study examines the association between changes in the macroeconomic variables and changes in the relationship between earnings and cash flows over time.

The foundation for the study is laid in Chapter 3 which specifically examines the relationship between earnings and various measures of cash flows. Using tests of correlation between the accounting and cash flow variables this section provides validation of the results of overseas studies such as Bowen *et al.* (1986) and Percy and Stokes (1992).

Examination of the relationship between earnings and cash flows was also undertaken to provide insight into the variation between reported earnings and the underlying cash flows. Many of the criticisms which have been made of accruals-based accounting numbers have been based on the subjectivity which is inherent in the accruals process. The measures of correlation between earnings and cash flows provided in Chapter 3

illustrate the difference which the accruals process makes to the cash flow numbers.

The issue of the difference between earnings and cash flows is important for reasons other than subjectivity. Tweedie (1977) was of the opinion that non-specialist users interpreted accruals-based accounting statements as if they were prepared on a cash flow basis. The danger of this is apparent when the collapse of companies which were reporting substantial profits but which had been failing to generate positive operating cash flows is considered. The need to examine the relationship between cash flows and other variables has been emphasised by Lee (1992) who saw such study as being an important activity for accounting academics. The main findings of the tests of association conducted in this study are summarised in section 6.4.

A description of the changes which occurred in the New Zealand economy during the study period is provided in Chapter 4. This provides the background for the study of the contextual nature of the cross-temporal movement in earnings and cash flows.

Chapter 5 examines the issue of whether or not the cross-temporal movement in earnings and cash flows or the relationship between them is contextual. The main findings of this study are summarised in section 6.4.

6.4 MAIN FINDINGS OF THE RESEARCH STUDY

The results of the research study can be considered as comprising two fundamental components:

(1) The degree of association between changes in earnings numbers and changes in cash flow numbers over the time period of the study.

(2) The evidence relating to the possibility of a contextual influence being exerted on the cross-temporal changes in earnings, cash flows and the changing relationship between them.

6.4.1 The degree of association between earnings and cash flows

There was found to be a high degree of correlation between earnings and cash flows when the cash flow measure used was the 'traditional' measure (i.e., net profit before tax adjusted for depreciation but not changes in non-cash working capital). When the refined measure of cash flow was used (adjusted for changes in non-cash working capital) the degree of association was found to be smaller (see Chapter 4, Table 1). This finding is neither surprising nor difficult to explain. The creation of the cash flow surrogate involves the decomposition of the reported earnings figure. This process involves the undoing of the accruals process. In the case of the traditional cash flow surrogate this requires adjustment of non-current items such as depreciation and amortisation. For the refined cash flow, additional adjustments are performed by adjusting for current items, i.e., working capital adjustments. The results of this study

show that these additional adjustments cause the refined cash flow surrogate to deviate further from the earnings number.

When the data were tested for each year of the study period a high degree of association was found between the earnings and cash flow variables for each year using the traditional cash flow measure but lower association for the refined measure. This confirms the results of other studies such as Bowen *et al* (1986) and Percy and Stokes (1991). It also supports the view that early studies which used a similar measure of cash flow to the traditional one used in this study, and found that cash flows had no additional information content over and above that contained in the earnings figure, were using an inappropriate metric.

An interesting observation is made when the correlations are performed on the data scaled by total assets and with outliers removed. In the case of the traditional cash flow measure this procedure makes little difference to the results. However, in the case of the refined cash flow measure the effect of scaling and removing the outliers is to *increase* the coefficients, indicating that larger companies tend to have a greater propensity to create adjustments of a working capital nature. Once these larger companies are removed from the analysis the effect is to reduce the variance between earnings and cash flows, which is reflected in an increase in the correlation coefficients.

For the three year period 1989-1991 the results of tests using actual as distinct from derived cash flows indicate that the variation between cash flows and earnings is quite

high. This finding indicates that the refined cash flow measures are better surrogates than the traditional cash flow measures for actual cash flows. The implication of this is that it provides proof that studies which used the traditional measure as a cash flow surrogate were flawed. The conclusion which they derived, i.e., that cash flows did not contain additional information beyond that contained in the earnings number, was founded on a mis-specification of the cash flow variable.

6.4.2 The association between macroeconomic changes and changes in the accounting variables

One of the major questions which has arisen in the debate about the relationship between earnings and cash flows is whether there is a contextual element in the association between earnings and cash flows. Wilson (1987) raised the issue of contextuality when he suggested that a study similar to his but with an extended time period might "find a systematic change in the sign of the correlation between returns and unexpected cash from operations, *depending on the state of the economy*" [italics added] (p. 320). The current study, in response to this suggestion, examines the issue of contextuality in the relationship between earnings and cash flow numbers for a 21-year period. In particular, Chapter 5 provides an analysis of the association between changes in macroeconomic indicators and changes in the accounting numbers (earnings and cash flows). The approach taken in this study is innovative in the sense that, as well as examining the question of contextuality in terms of how changes in macroeconomic indicators are associated with changes in earnings and changes in cash flows, it also examines how the changing relationship between earnings and cash flows is itself associated with changes in macroeconomic indicators. Furthermore, the

study partitions the data into three classes of economic change - high, medium and low.

This study, in examining the relationship between accounting numbers and changes in macroeconomic conditions, compares the variation in accounting numbers (earnings and cash flows) with that of three macroeconomic indicators (GDP, money supply and inflation). Overall the results demonstrate that there is no particularly strong association between either changes in earnings or cash flows and changes in the macroeconomic indicators. The relatively weak evidence which does exist, suggesting that industry membership may be influential, indicates the possibility of an association between changes in the refined cash flow measure and changes in inflation. It also suggests a similar measure of association between changes in the traditional cash flow measure and changes in money supply. When changes in the earnings numbers and changes in each of the two cash flow measures are correlated with changes in each of the macroeconomic indicators the results indicate that change in inflation and change in money supply have a greater influence than change in GDP. The results are not dissimilar when the analysis is carried out on an industry-by-industry basis, with little evidence of association between changes in accounting numbers and changes in macroeconomic indicators. There are, however, some industries which seem to be more sensitive to changes in macroeconomic activity than others. This becomes apparent when the change in economic activity is partitioned.

It is clear that different industries are affected by different levels of economic activity. The chemical industry is a case in point. When economic activity is at a medium

level the correlation between change in earnings and change in GDP is high at -0.76. Under other economic conditions this correlation is very much lower.

Examples of other industries which appear to be subject to a contextual influence are: manufacturing, electrical machinery, industrial textiles, food and mineral exploration. Whether or not companies in the industry are subject to a contextual influence depends on whether the variable under consideration is earnings or cash flows. Often the influence is mitigated by fluctuation in the economic changes and it is only by adopting the approach taken by Lev and Thiagarajan that the underlying influence can be isolated.

The findings indicate that changes in money supply tend to have a greater association with changes in both earnings and cash flows than changes in GDP. The difference is not so marked for changes in inflation, although it appears that change in money supply is the more influential variable. It is perhaps to be expected that the effect of changes in money supply should be closer to changes in inflation than to changes in GDP, since there is a more direct link between money supply and inflation.

Although changes in economic indicators do not have a strong association with changes in the accounting numbers, there is sufficient evidence to support the view that given specific economic conditions and industry classification there can be a contextual influence. However, this is less the case when the dependent variable is changes in the relationship between earnings and cash flows. The findings of this study show that with one exception there is little evidence of association between

changes in macroeconomic indicators and changes in the relationship between earnings and cash flows. The exception is the precious metals industry which demonstrates much higher correlation coefficients in these tests. This holds true regardless of whether the cash flow variable is the traditional or the refined surrogate. The highest correlation coefficient, however, is obtained when changes in money supply are correlated against changes in the relationship between earnings and the refined cash flow measure (CF2).

The results of the tests of association between changes in the earnings numbers and changes in the cash flow numbers should be interpreted in a New Zealand context. New Zealand suffered badly from the effects of the Stock Market Crash. In particular it took longer than most other Anglo-American countries to recover from the trauma. Criticism from government committees and elsewhere subsequent to the crash may have had an effect on the results. There is some evidence that this did occur and it cannot therefore be assumed that the results of these tests are generalisable.

The evidence from the study of the effect of macroeconomic changes on changes in the accounting variables indicates that any effect is weak. In particular, the relationship between changes in earnings and cash flows is not highly associated with changes in macroeconomic activity. The caveat here is that care has to be exercised in trying to generalise from this result since New Zealand because of its small size, its geographic isolation and its dependence on primary production may have significantly different characteristics from countries with which it may be compared.

The study confirms that refined cash flows are providing different information from that provided by earnings numbers and that refined cash flow surrogates are good proxies for actual cash flows.

6.5 CONTRIBUTION TO KNOWLEDGE

The foregoing findings have been based on an analysis of the reported financial accounting information of New Zealand listed companies. Although other studies have examined various characteristics of earnings and cash flows, the following features are considered to make this research study unique:

(1) No major study has been attempted in New Zealand on the actual relationship between earnings and cash flow numbers over an extended time period. Studies which have been carried out have tended to be based on relatively small samples and have ignored the industrial classifications of the companies in the sample.

(2) No major study has been attempted using a comprehensive database of all companies listed on the New Zealand Stock Exchange over a sustained time period.

(3) The consideration of the effect of changes in three major macroeconomic indicators in the context of the New Zealand economy over a 21-year period has not been attempted in any major way.

(4) The partitioning of the data into different classes of magnitude of change has not been done in studies which specifically examine the relationship between earnings, cash flows and macroeconomic changes.

Both Bowen, Burgstahler and Daley (1986) and Percy and Stokes (1992) in studies of the relationship between earnings and cash flow found high correlations between traditional cash flow measures (earnings plus depreciation) and earnings, which is supported by the findings of this study. Similarly, both studies found that there was a lower correlation between the refined cash flow measure (adjusted for changes in non-cash working capital), which again concurs with the findings of this current study. In each of these studies a shorter time period was used which leads to the question of whether different time periods make a difference in contextuality.

Austin and Graydon (1991) provide one of the few studies in New Zealand to examine the relationship between earnings and cash flows. The study was based on a small sample of companies but included a reasonable time period of 15 years. The conclusions of Austin and Graydon's study, which was based on a different methodology, was that changes in earnings and changes in cash flows are best described by a random walk. The results of the Durbin-Watson tests show little evidence of autocorrelation and would therefore seem to support the view of Austin

and Graydon. Taylor and Tress (1988) found some ambiguity in this area claiming that the relationship was "for the most part random" (p. 26) but citing reasons for significant departure from randomness.

There is evidence from previous studies that changes in macroeconomic conditions and restrictive government economic policies might be correlated with corporate failure (Cumming and Saini, 1981; Rose, Andrews and Giroux, 1982; Alexander and Palmer, 1993).

The finding that when the data are partitioned on the basis of the magnitude of changes in economic activity there is evidence of contextuality, is supported by the findings of Lev and Thiagarajan (1993). They advise caution in drawing conclusions from unconditioned data (non-contextual) analysis. The basis of this conclusion is that with respect to inventory signals the coefficient of correlation "is substantially larger during high and medium inflation than in low inflation" (p.206).

The finding that economic activity influences changes in each accounting variable (earnings and cash flows), but not changes in the relation between the accounting variables, is the primary contribution of this study to this area of enquiry.

6.6 IDENTIFICATION OF FUTURE RESEARCH AREAS

With companies now required to produce a statement of cash flows in most Anglo-American countries it would be beneficial if comparative studies were conducted to determine the generalisability of the results of this study. Research into the question of how accounting regulation affects the association between earnings numbers and cash flow numbers would provide answers which would be of interest to regulators and users of financial information.

Relatively little research effort has been expended on examining the relationship between earnings and cash flow numbers. This study has attempted to fill the gap in the context of New Zealand financial reporting but further study in this area could produce useful results. An understanding of the relationship between earnings numbers and cash flow numbers is of benefit to users of financial reports; and the synergistic use of the two types of information is an area which should be developed.

Finally, now that actual cash flow numbers are widely available, there is a need for further research to be carried out in the area of cash flow numbers as inputs into models of corporate failure prediction. Many previous studies in this area have been predisposed to finding little evidence of the usefulness of cash flow information because of the mis-specification of the cash flow variable. Research which uses actual cash flow information provided directly by statements of cash flows has the potential to provide greater insight into how best to use cash flow numbers in corporate failure prediction models. For example, inquiry into the use of dividend cash flow and

lending cash flows appears to have great potential for development. It would be interesting to observe whether or not these cash flow variables would improve the goodness-of-fit of such models.

6.7 CONCLUDING REMARKS

The association between earnings numbers and cash flow numbers has to date been a somewhat neglected area of study in general and in New Zealand in particular. Yet New Zealand, through being in the vanguard of those countries which mandated the provision of a statement of cash flows, acknowledged both the demand for cash flow information and the potential benefit of that information for users.

An understanding of the relationship between earnings as reported in published financial statements and the cash flows from which those earnings are derived is an important part of the training of both preparers and users of financial information. Accounting research in this area can perhaps take some of the credit for the fact that statements of cash flow are now available internationally. However, there remains a lot of investigation to be done both in the area of international harmonisation of the statement and in the education sector which is responsible for ensuring that accounting graduates are aware of the potential of the statement of cash flows.

The indications are that users like the provision of a statement of cash flows and it seems highly probable that there will be further developments in this area. The type

of system suggested in the early works of Professors Lee and Lawson, as described earlier in this thesis, is unlikely to replace the present accruals-based method of accounting but undoubtedly there will be developments which will affect the presentation of the information, as users become more competent in the use of the statement of cash flows. There are signs that users are already demanding more information of this type.

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APPENDICES

APPENDIX A - CLASSIFICATION OF CASH FLOW STUDIES

TABLE 1

MARKET-BASED STUDIES

AUTHORS	COUNTRY OF DATA STUDIED	YEARS EXAMINED	YEAR PUBLISHED	MAJOR CONCLUSIONS
Ball and Brown	USA	1957-65	1968	Absolute abnormal returns for positive and negative cash flows are lower than those for earnings changes suggesting that current cash flows are less highly associated with abnormal returns.
Beaver and Dukes	USA	1963-67	1972	Unexpected operating cash flows are less highly associated with abnormal returns than are unexpected earnings.
Patell and Kaplan	USA	1972-75	1977	Cash flows as measured by *Compustat* variable 'total funds from operations' do not have any incremental information beyond earnings.
Beaver, Griffen and Landsman	USA	1977-78	1982	Weak evidence that cash flow as measured by the 'traditional' method of net income + depreciation has incremental information content.
Rayburn	USA	1963-82	1986	Both operating cash flow and aggregate accruals have association with abnormal returns. Current accruals have significant explanatory power while the explanatory power of long-term accruals is insignificant.
Schaefer and Kennelly	USA	1977-81	1986	Primitive cash flow measures (NI+D) outperform more refined measures.
Wilson	USA	1977-81	1986	WCFO is known at earnings announcement. Current accruals accounts for the information content of total accruals.
Bowen, Burgstahler and Daley	USA	1972-81	1987	Cash flow has incremental information content over earnings. Earnings has incremental information content over cash flows. WCFO does not have incremental information content.
Wilson	USA	1981-1982	1987	Cash flow and accruals components of earnings have incremental information content over earnings. WCFO does not have incremental information content. Results may be contextual.
Bernard and Stober	USA	1977-84	1989	Unable to confirm Wilson's (1987) observation of a larger price reaction to cash flows than to accruals. Links between detailed earnings components and company valuation highly contextual.

AUTHORS	COUNTRY OF DATA STUDIED	YEARS EXAMINED	YEAR PUBLISHED	MAJOR CONCLUSIONS
Ishmail and Kim	USA	1967-85	1989	A study of whether funds and cash flows possess incremental information content beyond earnings in the context of explaining market risk. The major implication of the results is that earnings is a subset of a broader set of information contained in cash flows.
Livnat and Zarowin	USA	1974-86	1990	Examined the information content of *components* of cash flows as required by FASB (SFAS No.95). Concluded that financing and operating cash flows are differentially associated with stock returns, while investing cash flows are not.
Arnold, Clubb, Manson and Wearing	UK	1965-84	1991	Provided evidence on the relationship between cash flows, funds flows and earnings for UK companies. In general findings supported Bowen *et al* (1986). Did not support the view held by UK regulators that earnings are superior to cash flows as predictors of future cash flows.
Percy and Stokes	Australia		1992	Examined the relationship between earnings and cash flow measures. Provided external validation for Bowen *et al* (1986). Considered industry evidence on a small sample and found that the evidence for traditional cash flow measures being better predictors of future cash flows than earnings was not generalisable across industries.
Lorek, Schaefer and Willinger	USA	1976-85	1993	Examined the time-series behaviour of cash flows and working capital from operations. Concluded that univariate time-series models of CF and WCF are better predictors than multivariate cross-sectional regression models used in prior research.
Riahi-Belkaoui	USA	1981-87	1993	Study examined the relative and incremental information content of value added, earnings and cash flow information. Found that value added information was dominant over earnings and cash flow. Cash flow was found to be dominant over earnings.
Kinnunen and Niskanen	Finland	1976,1979 and 1982 (non-consecutive)	1993	Using a sample from the Helsinki Stock Exchange the authors examined whether observed market reactions to unexpected cash flows are sensitive to random walk model. Findings suggest that prior models which rely on random walk assumption have probably been biased against finding significant market reaction to cash flow information.

Adapted from Neill, Schaefer, Bahnson and Bradbury (1991)

APPENDIX A

TABLE 2

FAILURE PREDICTION MODELS

AUTHORS		YEAR PUBLISHED	MAJOR CONCLUSIONS
Largay and Stickney	USA	1980	CFO is a more timely indicator of bankruptcy because it revealed the downward trend into financial distress earlier than NI and WCFO.
Tabb and Wong	New Zealand	1983	Cash flow measured as net profit adjusted for depreciation is useful within the model to give an indication of volume of cash flow when used as a ratio with total assets. No indication of significance of cash flow ratio in relation to others.
Casey and Bartczak	USA	1985	CFO data do not provide incremental predictive power over accrual-based ratios.
Gentry, Newbold and Whitford	USA	1985a	Dividends cash flow is the only significant variable in the model. Three components of CFO were not significant.
Gentry, Newbold and Whitford	USA	1985b	Dividend cash flow significant in all years. Receivables and investment cash flows significant in year prior to failure. CFO ratios add to explanatory power of model more than traditional ratios.
Ferner and Hamilton	New Zealand	1987	Included ratios of Cash flow/Total Debt and Cash flow/Interest paid. Model 95% accurate in classifying failed and non-failed companies on basis of last annual report. No indication of significance of cash flow ratio in relation to others.
Gentry Newbold and Whitford	USA	1987	Cash based funds flow components and financial ratios provide significant information in classification of failed and non-failed firms.

AUTHORS		YEAR PUBLISHED	MAJOR CONCLUSIONS
Gombola, Haskins, Ketz and Williams	USA	1987	CFO not useful in bankruptcy prediction.
Aziz and Lawson	UK	1989	Cash components model powerful in these tests but not superior to others. CFO component not significant.
Bahnson and Bartley	USA	1991	Cash flow model is the most powerful model and CFO is a significant variable within the cash flow model.
Laitinen	Finland	1994	Traditional cash flow measure is a more stable and reliable predictor of corporate failure than operating cashflows.

Adapted from Neill, Schaefer, Bahnson and Bradbury (1991).

APPENDIX B - TABLES RELATING TO THE EFFECT OF MACROECONOMIC CHANGES

TABLE 1

RANKING AND GDP PER CAPITA OF HIGHEST INCOME COUNTRIES FOR SELECTION OF YEARS FROM 1953 TO 1989 (EXPRESSED AS A PERCENTAGE OF NZ's PER CAPITA GDP).

COUNTRY	1953		1965		1975		1989	
	RANK	PER CAP GDP %	RANK	PER CAP GDP %	RANK	PER CAP GDP %	RANK	PER CAP GDP %
NEW ZEALAND	*3	100	8	100	19	100	24	100
NEW CALEDON.					14	131	23	114
F. POLYNESIA							22	116
UK							21	124
ITALY							20	127
NETHERLANDS					13	137	19	128
BELGIUM					10	145	18	130
AUSTRIA					18	113	17	140
FRANCE					11	144	16	143
AUSTRALIA							15	145
UAE							14	147
LUXEMBOURG					12	138	13	158
QATAR							12	160
F.R.GERMANY					9	153	11	161
DENMARK			7	111	7	159	10	171
CANADA	2	144	4	115	4	163	9	172
ICELAND			6	112	15	128	8	173
USA	1	198	2	172	5	162	7	174
NORWAY					6	160	6	182
SWEDEN			3	128	3	191	5	191
JAPAN							4	193
FINLAND					16	128	3	195
BERMUDA							2	227
SWITZERLAND	*3	100	5	113	2	192	1	231
KUWAIT			1	235	1	256		
LIBYA					17	122		

Source: Gould (1982) for figures up to 1975
United Nations: National Accounts Statistics: Analysis of Main Aggregates, 1988-1989, Table I, for 1989 figures.
* = Joint position

Note: Table only shows figures for countries which are performing as well as or better than New Zealand.

TABLE 2

THE REORIENTATION OF ECONOMIC POLICIES SINCE 1984: A SYNOPSIS

Wage and price controls	- Abolished in 1984. - No government involvement in private wage negotiations. - Rents and energy prices deregulated between 1985 and 1988.
Labour market regulations	- *Labour Relations Act* 1987 to encourage decentralised bargaining and union amalgamation. - However, compulsory unionism remains and national award agreements still dominate. - *State Sector Act* 1988 puts public sector employment on a comparable basis to private sector.
International trade	- *Export subsidies* for agriculture and industry rapidly phased out from 1985. - *Import quotas and licensing* phased out in mid-1988 for industries outside industry plans. - Phasing out of quotas for trade-sensitive industries by the early 1990s. - Rapid bilateral removal of tariffs with Australia by 1990. - Phased unilateral tariff reductions with third countries. Effective rates of industry assistance fell from 37 percent in 1985/86 to 26 percent in 1987/88.
Financial markets	- Removal of controls on international *capital flows* and *domestic credit* in 1984. - Removal of barriers to entry into banking in 1987.
Other private services	- *Deregulation* of road-haulage in 1983 and partial deregulation of airlines in 1987. - Deregulation of telecommunications in 1987 and 1989.
Public sector reforms	- *Tax and transfer reform* establishing the least distortive tax system among OECD countries. - *Corporatisation* of government departments providing commercial services. - *Privatisation* and financial surpluses to reduce public debt by one-third by 1992. - Reform of the *government sector:* emphasis on outputs. - Opening *government procurement* to private competition. - Introduction of greater *local autonomy* and *accountability* for hospital and education boards and for local authorities. - Adoption of *full cost recovery pricing* and *users' cost* principles for government services.

Source: OECD Economic Survey, New Zealand (1988/1989, p.16)

TABLE 3

CORRELATIONS OF MACROECONOMIC VARIABLES WITH ACCOUNTING VARIABLES (TEST 1)

	CHANGE IN NPBT	CHANGE IN CF1	CHANGE IN CF2
	r	r	r
CHANGE IN GDP	-0.013	0.001	-0.01
GDP DELATOR INFLATION	0.003	-0.001	0.01
CHANGE IN MONEY SUPPLY (M3)	-0.04	-0.03	-0.02

r = Pearson's coefficient of correlation

TABLE 4

CHANGE IN EARNINGS BY CHANGE IN MACROECONOMIC INDICATORS

		CHANGE IN		CHANGE IN M3		CHANGE IN INFLATION	
INDUSTRY	**n**	**r**	**P**	**r**	**P**	**r**	**P**
AGRICULTURE	80	.26	.28	-.02	.92	.05	.83
AUTOMOTIVE	265	.12	.60	-.16	.50	-.08	.73
CHEMICALS AND DRUGS	174	-.16	.50	.32	.17	.01	.97
COMMERCE - RETAIL	374	.10	.69	.13	.60	-.20	.39
COMMERCE - W/SALE	307	.35	.13	-.11	.63	-.24	.29
CONSTRUCTION	134	.09	.69	.22	.34	-.05	.84
ELECTRICAL MACHINERY	133	-.09	.70	.05	.84	-.19	.40
FINANCIAL INSTITUTIONS	364	.13	.58	-.07	.78	-.14	.54
FOOD	148	-.27	.26	-.13	.59	.03	.89
FORESTRY	150	-.20	.40	-.43	.06	-.24	.30
GAS	40	-.11	.63	.05	.82	-.07	.77
LIQUOR	138	-.04	.88	-.26	.27	-.06	.79
MEAT AND BY-PRODUCTS	104	.20	.41	.40	.08	-.08	.74
MEDIA AND COMMUNIC.	37	.15	.53	-.06	.80	-.15	.51
METALS & MACHINERY	328	.18	.46	.13	.58	-.14	.53
MINERAL EXPLORATION	4	-.17	.47	.06	.79	.32	.16
MISCELLANEOUS	173	.22	.35	.13	.58	.30	.18
NON-METALLIC	129	-.09	.69	.15	.52	-.14	.54
OTHER MANUFACTURING	19	-.09	.71	.21	.38	-.15	.52
PRECIOUS METALS	76	.22	.35	.29	.22	-.03	.88
PRINTING	197	-.40	.08	-.15	.54	-.08	.74
PROPERTY INVESTORS	350	-.07	.78	-.13	.59	.03	.89
RURAL SERVICES	120	-.04	.86	.31	.19	.00	.99
TEXTILES - UNCLASSIFIED	62	.28	.23	-.14	.55	-.33	.15
TEXTILES - INDUSTRIAL	165	.12	.60	.06	.81	.30	.19
TRANSPORT	199	-.07	.77	-.44	.05	-.25	.27

r = Pearson's coefficient of correlation

P = Significance level

M3 = Money supply

n = number of cases in each classification

TABLE 5

CHANGE IN CASH FLOWS (CF1) BY CHANGE IN MACROECONOMIC INDICATORS

		CHANGE IN GDP		CHANGE IN M3		CHANGE IN INFLATION	
INDUSTRY	n	r	P	r	P	r	P
AGRICULTURE	80	.22	.35	-.03	.91	.05	.83
AUTOMOTIVE	265	.09	.71	-.24	.30	-.08	.74
CHEMICALS AND DRUGS	174	-.21	.38	.34	.14	.06	.81
COMMERCE - RETAIL	374	.06	.80	.02	.93	-.28	.26
COMMERCE - W/SALE	307	.36	.12	-.10	.67	-.23	.32
CONSTRUCTION	134	.05	.82	.25	.29	-.00	.99
ELECTRICAL MACHINERY	133	-.25	.29	-.14	.54	-.33	.16
FINANCIAL INSTITUTIONS	364	.10	.69	-.10	.68	-.20	.41
FOOD	148	-.22	.36	-.13	.59	.08	.72
FORESTRY	150	-.10	.67	-.37	.11	-.12	.62
GAS	40	-.10	.66	.05	.83	-.06	.81
LIQUOR	138	-.11	.63	-.42	.07	-.18	.44
MEAT AND BY-PRODUCTS	104	.17	.48	.42	.06	.11	.64
MEDIA AND COMMUNIC.	37	.07	.77	-.09	.70	-.18	.44
METALS AND MACHINERY	328	.16	.51	.10	.66	-.13	.60
MINERAL EXPLORATION	4	-.18	.43	.04	.88	.31	.18
MISCELLANEOUS	173	.22	.35	.16	.49	.26	.27
NON-METALLIC MINERALS	129	-.04	.87	.25	.30	.00	.99
OTHER MANUFACTURING	19	-.08	.73	.18	.42	-.16	.49
PRECIOUS METALS	76	.22	.35	.28	.22	-.03	.89
PRINTING	197	-.44	.05	-.29	.21	-.19	.42
PROPERTY INVESTORS	350	-.07	.77	.36	.12	.04	.86
RURAL SERVICES	120	-.03	.91	.32	.17	.00	.99
TEXTILES - UNCLASSIFIED	62	.28	.23	-.22	.34	-.27	.26
TEXTILES - INDUSTRIAL	165	.13	.59	.05	.83	.28	.22
TRANSPORT AND TOURISM	199	-.07	.77	-.52	.02	-.29	.21

r = Pearson's coefficient of correlation

P = Significance level

M3 = Money supply

n = Number of cases in each classification

TABLE 6

CHANGE IN CASH FLOWS (CF2) BY CHANGE IN MACROECONOMIC INDICATORS

		CHANGE IN GDP		CHANGE IN M3		CHANGE IN INFLATION	
INDUSTRY	n	r	P	r	P	r	P
AGRICULTURE	80	.04	.88	-.25	.74	-.11	.64
AUTOMOTIVE	265	-.08	.73	-.49	.02	-.08	.75
CHEMICALS	174	-.20	.39	.37	.11	.40	.08
COMMERCE - RETAIL	374	.00	.99	-.30	.19	.03	.91
COMMERCE - W/SALE	307	.24	.31	-.06	.81	-.18	.45
CONSTRUCTION	134	-.11	.63	-.34	.14	-.07	.76
ELECTRICAL MACHINERY	133	.11	.63	-.01	.97	-.00	.99
FINANCIAL INSTITUTIONS	364	-.03	.90	.08	.74	.08	.75
FOOD	148	.12	.60	-.04	.87	.24	.31
FORESTRY	150	.07	.75	-.02	.92	-.10	.66
GAS	40	-.17	.47	.13	.59	.05	.83
LIQUOR	138	.19	.43	-.29	.22	-.09	.70
MEAT AND BY-PRODUCTS	104	-.16	.50	.22	.34	.14	.57
MEDIA AND COMMUNIC.	37	-.21	.38	.18	.43	.06	.81
METALS AND MACHINERY	328	-.08	.73	-.12	.62	-.13	.59
MINERAL EXPLORATION	4	-.00	.99	.15	.53	-.11	.64
MISCELLANEOUS	173	.27	.26	.12	.61	.24	.31
NON-METALLIC MINERALS	129	.10	.65	.01	.96	-.02	.94
OTHER MANUFACTURING	19	-.09	.71	.36	.11	.18	.45
PRECIOUS METALS	76	.18	.44	.30	.19	-.04	.87
PRINTING	197	-.05	.82	-.41	.07	-.06	.81
PROPERTY INVESTORS	350	.13	.59	-.29	.20	.05	.85
RURAL SERVICES	120	-.16	.50	.35	.13	.14	.56
TEXTILES - UNCLASSIFIED	62	.31	.18	-.03	.90	.07	.78
TEXTILES - INDUSTRIAL	165	-.22	.36	-.40	.08	-.03	.90
TRANSPORT AND TOURISM	199	-.10	.68	-.51	.02	-.48	.03

r = Pearson's coefficient of correlation

P = Significance level

M3 = Money supply

n = Number of cases in each classification

TABLE 7

CHANGE IN EARNINGS BY LAGGED CHANGE IN MACROECONOMIC INDICATORS

INDUSTRY	n	CHANGE IN GDP r	CHANGE IN M3 r	CHANGE IN INFLATION r
AGRICULTURE	80	.00	.26	.02
AUTOMOTIVE	265	-.06	-.07	-.01
CHEMICALS	174	.03	-.06	-.04
COMMERCE - RETAIL	374	-.04	-.03	.01
COMMERCE - W/SALE	307	.08	.01	-.00
CONSTRUCTION	134	-.03	-.25	-.17
ELECTRICAL MACHINERY	133	.10	.06	.08
FINANCIAL INSTITUTIONS	364	.12	.17	-.06
FOOD	148	-.00	.02	.07
FORESTRY	150	.13	.29	.10
GAS	40	.06	-.23	-.24
LIQUOR	138	.11	.09	.02
MEAT AND BY-PRODUCTS	104	.05	.27	-.13
MEDIA AND COMMUNIC.	37	.25	-.01	-.12
METALS AND MACHINERY	328	.12	-.14	-.15
MINERAL EXPLORATION	4	-.11	-.11	-.17
MISCELLANEOUS	173	-.05	-.05	.03
NON-METALLIC MINERALS	129	.04	.03	-.11
OTHER MANUFACTURING	19	.04	-.52	-.37
PRECIOUS METALS	76	-.98	-.87	-.30
PRINTING	197	.08	.00	-.07
PROPERTY INVESTORS	350	-.02	-.13	-.08
RURAL SERVICES	120	.01	-.39	-.04
TEXTILES - UNCLASSIFIED	62	.11	-.05	-.03
TEXTILES - INDUSTRIAL	165	.05	-.54	-.10
TRANSPORT AND TOURISM	199	-.03	.11	.11

r = Pearson's coefficient of correlation

M3 = Money supply

n = Number of cases in each classification

TABLE 8

CHANGE IN CASH FLOWS (CF1) BY LAGGED CHANGE IN MACROECONOMIC INDICATORS

		CHANGE IN GDP	CHANGE IN M3	CHANGE IN INFLATION
INDUSTRY	n	r	r	r
AGRICULTURE	80	.01	.29	.06
AUTOMOTIVE	265	-.05	-.02	-.00
CHEMICALS	174	.02	-.05	-.02
COMMERCE - RETAIL	374	-.03	.04	.10
COMMERCE - W/SALE	307	.07	.00	-.00
CONSTRUCTION	134	-.02	-.26	.15
ELECTRICAL MACHINERY	133	.11	.17	.13
FINANCIAL INSTITUTIONS	364	.10	.19	-.03
FOOD	148	-.05	.03	.07
FORESTRY	150	.07	.23	.12
GAS	40	.07	-.25	-.25
LIQUOR	138	.11	15	.05
MEAT AND BY-PRODUCTS	104	.04	.19	-.14
MEDIA AND COMMUNIC.	37	.22	-.02	-.10
METALS AND MACHINERY	328	.07	-.16	-.12
MINERAL EXPLORATION	4	-.11	-.09	.17
MISCELLANEOUS	173	-.04	-.03	.05
NON-METALLIC MINERALS	129	.11	.10	-.04
OTHER MANUFACTURING	19	.07	-.46	-.37
PRECIOUS METALS	76	-.96	-.83	-.22
PRINTING	197	.08	.07	-.05
PROPERTY INVESTORS	350	-.02	-.13	-.08
RURAL SERVICES	120	.01	-.39	-.04
TEXTILES - UNCLASSIFIED	62	.12	-.09	-.03
TEXTILES - INDUSTRIAL	165	.05	-.54	-.08
TRANSPORT AND TOURISM	199	-.00	.11	.12

r = Pearson's coefficient of correlation

M3 = Money supply

n = Number of cases in each classification

TABLE 9

CHANGE IN CASH FLOWS (CF2) BY LAGGED CHANGE IN MACROECONOMIC INDICATORS

INDUSTRY	n	CHANGE IN GDP r	CHANGE IN M3 r	CHANGE IN INFLATION r
AGRICULTURE	80	.01	.04	.04
AUTOMOTIVE	265	-.05	.00	.05
CHEMICALS	174	.01	-.05	.03
COMMERCE - RETAIL	374	-.03	.04	.10
COMMERCE - W/SALE	307	.08	-.02	.01
CONSTRUCTION	134	.01	-.05	.16
ELECTRICAL MACHINERY	133	.10	-.02	-.20
FINANCIAL INSTITUTIONS	364	.00	.03	-.01
FOOD	148	.09	.00	.05
FORESTRY	150	.02	-.01	.10
GAS	40	-.06	-.21	-.20
LIQUOR	138	.05	.33	.08
MEAT AND BY-PRODUCTS	104	-.02	.19	-.06
MEDIA AND COMMUNIC.	37	-.09	-.31	-.03
METALS AND MACHINERY	328	-.01	-.10	-.02
MINERAL EXPLORATION	4	-.04	.02	.18
MISCELLANEOUS	173	-.03	.09	.04
NON-METALLIC MINERALS	129	-.01	.24	-.01
OTHER MANUFACTURING	19	.32	-.38	-.14
PRECIOUS METALS	76	-.99	-.96	-.52
PRINTING	197	.04	.25	.01
PROPERTY INVESTORS	350	.01	.12	.08
RURAL SERVICES	120	.10	-.10	-.10
TEXTILES - UNCLASSIFIED	62	.15	-.03	-.10
TEXTILES - INDUSTRIAL	165	-.04	-.34	.11
TRANSPORT AND TOURISM	199	.05	.27	.12

r = Pearson's coefficient of correlation

M3 = Money supply

n = Number of cases in each classification

TABLE 10

CHANGE IN EARNINGS BY CHANGE IN MACROECONOMIC INDICATORS (HIGH CHANGE)

		CHANGE IN GDP		CHANGE IN M3		CHANGE IN INFLATION	
INDUSTRY	n	r	P	r	P	r	P
AGRICULTURE	80	-.36	.49	.51	.30	.24	.61
AUTOMOTIVE	265	.01	.98	-.85	.03	-.71	.07
CHEMICALS	174	.01	.99	-.40	.44	-.63	.13
COMMERCE - RETAIL	374	-.07	.90	-.60	.21	-.24	.60
COMMERCE - W/SALE	307	-.06	.91	-.32	.54	.04	.93
CONSTRUCTION	164	.01	.98	.67	.14	.28	.54
ELECTRICAL MACHINERY	133	.07	.89	-.73	.10	-.68	.09
FINANCIAL INSTITUTIONS	364	-.44	.39	.45	.37	.27	.57
FOOD	148	-.01	.99	-.72	.10	-.30	.51
FORESTRY	150	.09	.87	-.58	.23	-.46	.30
GAS	40	-.06	.91	-.38	.46	-.49	.27
LIQUOR	138	-.12	.82	-.25	.63	-.32	.49
MEAT AND BY-PRODUCTS	104	.07	.89	-.45	.37	-.51	.25
MEDIA AND COMMUNIC.	37	-.32	.53	-.27	.61	-.46	.30
METALS AND MACHINERY	328	-.07	.89	-.92	.01	-.54	.21
MINERAL EXPLORATION	4	.04	.95	-.14	.79	.10	.83
MISCELLANEOUS	173	.04	.94	-.49	.33	-.46	.29
NON-METALLIC MINERALS	129	.00	.99	.03	.95	-.10	.83
OTHER MANUFACTURING	19	-.84	.04	-.77	.07	-.75	.05
PRECIOUS METALS	76	-	-	-	-	-	-
PRINTING	197	.05	.92	-.18	.73	-.20	.66
PROPERTY INVESTORS	350	.01	.98	.12	.83	.01	.98
RURAL SERVICES	120	.04	.94	-.64	.17	-.73	.06
TEXTILES - UNCLASSIFIED	62	-.24	.65	-.80	.06	-.65	.11
TEXTILES - INDUSTRIAL	165	.08	.87	.75	.09	.73	.06
TRANSPORT AND TOURISM	199	-.15	.78	-.23	.68	.06	.90

r = Pearson's coefficient of correlation

P = Significance level

M3 = Money supply

n = Number of cases in each classification

TABLE 11

CHANGE IN EARNINGS BY CHANGE IN MACROECONOMIC INDICATORS (LOW CHANGE)

		CHANGE IN GDP		CHANGE IN M3		CHANGE IN INFLATION	
INDUSTRY	n	r	P	r	P	r	P
AGRICULTURE	80	.45	.37	-.64	.17	.49	.32
AUTOMOTIVE	265	-.34	.51	-.28	.59	.35	.50
CHEMICALS	174	.24	.65	.03	.96	.15	.78
COMMERCE - RETAIL	374	.17	.75	.28	.59	-.65	.16
COMMERCE - W/SALE	307	.46	.36	.17	.74	-.53	.28
CONSTRUCTION	134	.19	.72	.38	.46	-.67	.15
ELECTRICAL MACHINERY	133	.07	.90	.38	.45	-.62	.19
FINANCIAL INSTITUTIONS	364	.54	.27	-.89	.02	-.42	.40
FOOD	148	.00	.99	.00	.99	-.34	.51
FORESTRY	150	-.49	.32	-.57	.24	-.06	.91
GAS	40	-.21	.69	.32	.54	.31	.55
LIQUOR	138	-.37	.47	-.42	40	.26	.62
MEAT AND BY-PRODUCTS	104	.48	.34	-.07	.90	.56	.24
MEDIA AND COMMUNIC.	37	.36	.48	-.41	.42	-.27	.61
METALS AND MACHINERY	328	.34	.51	.29	.58	-.71	.11
MINERAL EXPLORATION	4	-.41	.41	.90	.01	.49	.32
MISCELLANEOUS	173	.32	.54	.04	.94	.47	.34
NON-METALLIC MINERALS	129	.55	.25	-.12	.82	-.32	.54
OTHER MANUFACTURING	19	-.02	.97	.54	.26	-.42	.40
PRECIOUS METALS	76	.48	.33	-.41	.42	-.42	.40
PRINTING	197	-.46	.36	.29	.58	-.31	.55
PROPERTY INVESTORS	350	.49	.33	.46	.36	-.45	.37
RURAL SERVICES	120	-.24	.64	.72	.11	-.61	.20
TEXTILES - UNCLASSIFIED	62	.27	.60	-.31	.55	-.50	.32
TEXTILES - INDUSTRIAL	165	.08	.88	.09	.87	-.53	.27
TRANSPORT AND TOURISM	199	-.41	.42	-.36	.48	-.64	.17

r = Pearson's coefficient of correlation

P = Significance level

M3 = Money supply

n = Number of cases in each classification

TABLE 12

CHANGE IN EARNINGS BY CHANGE IN MACROECONOMIC INDICATORS (MEDIUM CHANGE)

		CHANGE IN GDP		CHANGE IN M3		CHANGE IN INFLATION	
INDUSTRY	n	r	P	r	P	r	P
AGRICULTURE	80	-.08	.86	.54	.21	-.11	.82
AUTOMOTIVE	265	.51	.24	.32	.48	-.42	.34
CHEMICALS	174	-.76	.05	.67	.10	.44	.33
COMMERCE - RETAIL	374	.06	.90	.34	.46	.30	.51
COMMERCE - W/SALE	307	.70	.08	-.40	.37	.37	.41
CONSTRUCTION	134	-.10	.82	.06	.89	.38	.41
ELECTRICAL MACHINERY	133	-.23	.62	.43	.33	.46	.30
FINANCIAL INSTITUTIONS	364	-.27	.55	.56	.18	-.25	.59
FOOD	148	-.76	.05	-.46	.29	.71	.07
FORESTRY	150	.21	.64	-.38	.40	-.30	.52
GAS	40	-.16	.74	.48	.28	.10	.83
LIQUOR	138	.23	.62	-.34	.45	-.38	.40
MEAT AND BY-PRODUCTS	104	-.69	.08	.68	.09	.14	.77
MEDIA AND COMMUNIC.	37	.23	.62	.22	.63	-.03	.95
METALS AND MACHINERY	328	-.16	.73	.22	.64	.15	.74
MINERAL EXPLORATION	4	.12	.78	-.57	.18	.23	.62
MISCELLANEOUS	173	.38	.40	.66	.10	.11	.82
NON-METALLIC MINERALS	129	-.67	.10	.60	.15	.07	.89
OTHER MANUFACTURING	19	-.30	.51	.56	.19	.57	.18
PRECIOUS METALS	76	-.49	.27	.56	.19	.08	.87
PRINTING	197	-.43	.34	-.48	.27	.03	.94
PROPERTY INVESTORS	350	-.27	.56	.53	.21	.49	.26
RURAL SERVICES	120	-.03	.96	-.20	.67	.45	.31
TEXTILES - UNCLASSIFIED	62	.56	.20	.19	.68	-.05	.92
TEXTILES - INDUSTRIAL	165	.55	.20	-.79	.04	.09	.85
TRANSPORT AND TOURISM	199	.30	.51	-.65	.11	-.13	.78

r = Pearson's coefficient of correlation

P = Significance level

M3 = Money supply

n = Number of cases in each classification

TABLE 13

CHANGE IN CASH FLOW (CF1) BY CHANGE IN MACROECONOMIC INDICATORS (HIGH CHANGE)

		CHANGE IN GDP		CHANGE IN M3		CHANGE IN INFLATION	
INDUSTRY	n	r	P	r	P	r	P
AGRICULTURE	80	-.33	.52	.47	.35	.07	.89
AUTOMOTIVE	265	.01	.99	-.86	.03	-.64	.12
CHEMICALS	174	.01	.99	-.28	.59	-.54	.21
COMMERCE - RETAIL	374	-.06	.91	-.61	.20	-.26	.58
COMMERCE - W/SALE	307	-.06	.91	.07	.89	.34	.45
CONSTRUCTION	134	-.02	.96	.83	.04	.19	.68
ELECTRICAL MACHINERY	133	.03	.95	-.72	.10	-.66	.11
FINANCIAL INSTITUTIONS	364	-.45	.37	.48	.34	.28	.54
FOOD	148	.01	.99	-.25	.64	.18	.70
FORESTRY	150	.07	.90	-.54	.27	-.44	.32
GAS	40	-.13	.81	-.33	.52	-.44	.32
LIQUOR	138	-.21	.69	-.33	.52	-.37	.41
MEAT AND BY-PRODUCTS	104	.06	.92	-.35	.50	-.44	.33
MEDIA AND COMMUNIC.	37	-.34	.51	-.26	.62	-.43	.33
METALS AND MACHINERY	328	-.09	.87	-.86	.03	-.43	.34
MINERAL EXPLORATION	4	.03	.95	-.15	.78	.10	.83
MISCELLANEOUS	173	.03	.96	-.44	.38	-.49	.26
NON-METALLIC MINERALS	129	.01	.99	.44	.38	.27	.56
OTHER MANUFACTURING	19	-.83	.04	-.77	.07	-.76	.05
PRECIOUS METALS	76	-	-	-	-	-	-
PRINTING	197	.05	.90	-.18	.73	-.21	.66
PROPERTY INVESTORS	350	.02	.97	.16	.76	.01	.91
RURAL SERVICES	120	.04	.94	-.63	.18	-.74	.06
TEXTILES - UNCLASSIFIED	62	-.28	.58	-.72	.11	-.64	.12
TEXTILES - INDUSTRIAL	165	.08	.89	.76	.08	.73	.06
TRANSPORT AND TOURISM	199	-.17	.74	-.32	.54	-.01	.98

r = Pearson's coefficient of correlation

P = Significance level

M3 = Money supply

n = Number of cases in each classification

TABLE 14

CHANGE IN CASH FLOW (CF1) BY CHANGE IN MACROECONOMIC INDICATORS (MEDIUM CHANGE)

		CHANGE IN GDP		CHANGE IN M3		CHANGE IN INFLATION	
INDUSTRY	n	r	P	r	P	r	P
AGRICULTURE	80	-.07	.87	.55	.20	-.10	.83
AUTOMOTIVE	265	.43	.33	.13	.79	-.48	.28
CHEMICALS	174	-.77	.04	.65	.11	.50	.25
COMMERCE - RETAIL	374	.08	.86	.29	.52	.22	.63
COMMERCE - W/SALE	307	.71	.07	-.38	.40	.33	.47
CONSTRUCTION	134	-.07	.88	-.04	.94	.41	.36
ELECTRICAL MACHINERY	133	-.37	.41	-.52	.23	.01	.99
FINANCIAL INSTITUTIONS	364	-.33	.47	.57	.18	-.28	.54
FOOD	148	-.48	.28	-.63	.13	.57	.19
FORESTRY	150	.34	.45	-.39	.38	-.34	.45
GAS	40	-.15	.75	.48	.27	.17	.72
LIQUOR	138	.19	.68	-.48	.27	-.42	.34
MEAT AND BY-PRODUCTS	104	-.69	.08	.70	.08	.12	.80
MEDIA AND COMMUNIC.	37	.15	.75	.09	.85	-.10	.84
METALS AND MACHINERY	328	-.23	.63	.13	.78	.12	.81
MINERAL EXPLORATION	4	.11	.81	-.57	.18	.21	.65
MISCELLANEOUS	173	.31	.50	.63	.13	.09	.84
NON-METALLIC MINERALS	129	-.64	.12	.65	.12	.05	.92
OTHER MANUFACTURING	19	-.31	.50	.56	.19	.55	.20
PRECIOUS METALS	76	-.49	.27	.56	.19	.08	.87
PRINTING	197	-.51	.24	-.49	.27	-.11	.81
PROPERTY INVESTORS	350	-.27	.57	.54	.21	.49	.26
RURAL SERVICES	120	-.00	.99	-.04	.94	.46	.30
TEXTILES - UNCLASSIFIED	62	.53	.22	.11	.82	-.26	.57
TEXTILES - INDUSTRIAL	165	.59	.17	-.77	.04	.10	.82
TRANSPORT AND TOURISM	199	.40	.37	-.64	.12	-.24	.60

r = Pearson's coefficient of correlation

P = Significance level

M3 = Money supply

n = Number of cases in each classification

TABLE 15

CHANGE IN CASH FLOW (CF1) BY CHANGE IN MACROECONOMIC INDICATORS (LOW CHANGE)

		CHANGE IN GDP		CHANGE IN M3		CHANGE IN INFLATION	
INDUSTRY	n	r	P	r	P	r	P
AGRICULTURE	80	.43	.40	-.58	.23	.52	.29
AUTOMOTIVE	265	-.46	.36	-.39	.44	.39	.45
CHEMICALS	174	.22	.68	.07	.89	.19	.71
COMMERCE - RETAIL	374	.07	.89	.16	.76	-.65	.16
COMMERCE - W/SALE	307	.48	.33	.17	.75	-.53	.28
CONSTRUCTION	164	.06	.90	.48	.34	-.68	.14
ELECTRICAL MACHINERY	133	-.20	.70	-.06	.91	-.54	.27
FINANCIAL INSTITUTIONS	364	.55	.26	-.90	.01	-.46	.36
FOOD	148	.11	.84	-.09	.87	-.30	.56
FORESTRY	150	-.48	.34	-.43	.39	.28	.59
GAS	40	-.06	.91	.24	.64	.27	.60
LIQUOR	138	-.46	.36	-.58	.23	.18	.74
MEAT AND BY-PRODUCTS	104	.49	.32	-.07	.89	.55	.26
MEDIA AND COMMUNIC.	37	.30	.56	-.44	.39	-.34	.51
METALS AND MACHINERY	328	.35	.49	.28	.59	-.65	.16
MINERAL EXPLORATION	4	-.42	.41	.90	.01	.50	.31
MISCELLANEOUS	173	.37	.47	-.00	.99	.47	.35
NON-METALLIC MINERALS	129	.51	.30	-.16	.76	-.28	.59
OTHER MANUFACTURING	19	-.01	.98	.54	.27	-.42	.40
PRECIOUS METALS	76	.48	.33	-.41	.42	-.42	.40
PRINTING	197	-.45	.37	-.05	.92	-.34	.51
PROPERTY INVESTORS	350	.48	.33	.47	.35	-.45	.37
RURAL SERVICES	120	-.24	.65	.71	.11	-.61	.20
TEXTILES - UNCLASSIFIED	62	.27	.61	-.40	.43	-.19	.71
TEXTILES - INDUSTRIAL	165	.06	.91	.10	.85	-.50	.31
TRANSPORT AND TOURISM	199	-.42	.40	-.53	.28	-.54	.27

r = Pearson's coefficient of correlation

P = Significance level

M3 = Money supply

n = Number of cases in each classification

TABLE 16

CHANGE IN CASH FLOW (CF2) BY CHANGE IN MACROECONOMIC INDICATORS (HIGH CHANGE)

		CHANGE IN GDP		CHANGE IN M3		CHANGE IN INFLATION	
INDUSTRY	n	r	P	r	P	r	P
AGRICULTURE	80	-.10	.85	.45	.37	.14	.76
AUTOMOTIVE	265	-.07	.90	.15	.78	.36	.43
CHEMICALS	174	-.31	.55	.66	.15	.33	.46
COMMERCE - RETAIL	374	-.38	.46	.37	.47	.55	.21
COMMERCE - W/SALE	307	-.08	.88	-.29	.58	-.04	.93
CONSTRUCTION	134	.24	.65	-.65	.16	-.74	.06
ELECTRICAL MACHINERY	133	.16	.76	-.46	.36	-.43	.34
FINANCIAL INSTITUTIONS	364	.07	.90	.50	.31	-.01	.98
FOOD	148	-.03	.96	.33	.53	.51	.24
FORESTRY	150	-.05	.92	-.76	.08	-.36	.43
GAS	40	-.04	.93	-.35	.50	-.40	.37
LIQUOR	138	-.19	.72	.62	.19	.54	.21
MEAT AND BY-PRODUCTS	104	.07	.90	-.54	.27	-.24	.61
MEDIA AND COMMUNIC.	37	-.26	.62	.81	.05	.59	.17
METALS AND MACHINERY	328	-.10	.85	-.23	.66	.01	.98
MINERAL EXPLORATION	4	.08	.87	.18	.74	-.22	.64
MISCELLANEOUS	173	.05	.93	.44	.38	.32	.49
NON-METALLIC MINERALS	129	.06	.90	.60	.21	.68	.10
OTHER MANUFACTURING	19	-.39	.44	.16	.76	-.06	.90
PRECIOUS METALS	76	-	-	-	-	-	-
PRINTING	197	-.05	.92	.59	.22	.54	.21
PROPERTY INVESTORS	350	.00	.99	.64	.17	.69	.09
RURAL SERVICES	120	.10	.85	-.60	.21	-.56	.20
TEXTILES - UNCLASSIFIED	62	-.05	.92	.11	.83	.04	.93
TEXTILES - INDUSTRIAL	165	-.07	.89	.72	.11	.70	.08
TRANSPORT AND TOURISM	199	-.43	.40	-.79	.06	-.69	.09

r = Pearson's coefficient of correlation

P = Significance level

M3 = Money supply

n = Number of cases in each classification

TABLE 17

CHANGE IN CASH FLOW (CF2) BY CHANGE IN MACROECONOMIC INDICATORS (MEDIUM CHANGE)

		CHANGE IN GDP		CHANGE IN M3		CHANGE IN INFLATION	
INDUSTRY	n	r	P	r	P	r	P
AGRICULTURE	80	-.30	.51	-.47	.29	.28	.54
AUTOMOTIVE	265	.37	.42	-.61	.15	-.34	.45
CHEMICALS	174	-.33	.47	-.14	.77	.47	.29
COMMERCE - RETAIL	374	.48	.27	-.57	.18	-.22	.64
COMMERCE - W/SALE	307	.59	.17	-.56	.19	.43	.34
CONSTRUCTION	134	.39	.39	-.68	.09	.11	.81
ELECTRICAL MACHINERY	133	-.18	.70	.59	.16	-.21	.65
FINANCIAL INSTITUTIONS	364	-.47	.29	.66	.11	-.37	.41
FOOD	148	.16	.73	-.44	.32	.71	.07
FORESTRY	150	.0	.03	-.69	.09	.22	.63
GAS	40	-.32	.49	.53	.22	.22	.64
LIQUOR	138	.26	.58	.43	.34	-.37	.41
MEAT AND BY-PRODUCTS	104	-.61	.15	.63	.13	.17	.71
MEDIA AND COMMUNIC.	37	-.20	.67	-.58	.17	.33	.47
METALS AND MACHINERY	328	-.69	.08	-.31	.50	-.03	.94
MINERAL EXPLORATION	4	.02	.97	.44	.33	-.31	.49
MISCELLANEOUS	173	.26	.58	.64	.12	-.16	.73
NON-METALLIC MINERALS	129	-.03	.95	.69	.08	-.34	.46
OTHER MANUFACTURING	19	-.26	.57	-.23	.62	.49	.26
PRECIOUS METALS	76	-.48	.28	.56	.19	.12	.79
PRINTING	197	.18	.69	-.38	.40	-.49	.27
PROPERTY INVESTORS	350	.37	.41	-.57	.18	-.50	.26
RURAL SERVICES	120	-.68	.09	.60	.16	.42	.35
TEXTILES - UNCLASSIFIED	62	.38	.41	.02	.97	.14	.77
TEXTILES - INDUSTRIAL	165	.47	.29	-.64	.12	-.14	.77
TRANSPORT AND TOURISM	199	.23	.62	-.52	.23	-.43	.33

r = Pearson's coefficient of correlation

P = Significance level

M3 = Money supply

n = Number of cases in each classification

TABLE 18

CHANGE IN CASH FLOW (CF2) BY CHANGE IN MACROECONOMIC INDICATORS (LOW CHANGE)

		CHANGE IN GDP		CHANGE IN M3		CHANGE IN INFLATION	
INDUSTRY	n	r	P	r	P	r	P
AGRICULTURE	80	.21	.69	-.09	.87	.00	.99
AUTOMOTIVE	265	-.51	.30	-.48	.33	-.23	.66
CHEMICALS	174	-.15	.78	.74	.09	.39	.44
COMMERCE - RETAIL	374	-.45	.37	-.14	.79	-.28	.59
COMMERCE - W/SALE	307	-.70	.12	.40	.43	-.07	.89
CONSTRUCTION	134	-.43	.39	.51	.30	-.65	.17
ELECTRICAL MACHINERY	133	.51	.30	-.65	.16	.34	.51
FINANCIAL INSTITUTIONS	364	.44	.38	-.35	.50	-.31	.55
FOOD	148	.30	.56	.28	.59	.90	.02
FORESTRY	150	-.53	.27	.38	.46	-.04	.95
GAS	40	.26	.62	-.24	.65	.86	.03
LIQUOR	138	.51	.30	-.59	.22	.65	.16
MEAT AND BY-PRODUCTS	104	.12	.83	-.13	.81	-.40	.44
MEDIA AND COMMUNIC.	37	-.42	.40	.53	.28	-.15	.78
METALS AND MACHINERY	328	.39	.44	-.00	.99	-.32	.53
MINERAL EXPLORATION	4	-.07	.90	-.00	.99	-.94	.00
MISCELLANEOUS	173	.48	.33	-.27	.61	.55	.26
NON-METALLIC MINERALS	129	.52	.30	-.90	.02	.56	.25
OTHER MANUFACTURING	19	.15	.77	.60	.21	.67	.14
PRECIOUS METALS	76	.48	.33	-.16	.76	.39	.45
PRINTING	197	-.43	.39	-.57	.24	-.20	.71
PROPERTY INVESTORS	350	-.38	.46	-.40	.44	-.14	.79
RURAL SERVICES	120	.36	.48	.25	.63	-.04	.94
TEXTILES - UNCLASSIFIED	62	.49	.33	-.29	.58	.76	.08
TEXTILES - INDUSTRIAL	165	-.41	.42	-.08	.88	-.22	.68
TRANSPORT AND TOURISM	199	-.32	.54	-.77	.08	-.63	.17

r = Pearson's coefficient of correlation

P = Significance level

M3 = Money supply

n = Number of cases in each classification

TABLE 19
THE CHANGE IN THE RELATIONSHIP BETWEEN EARNINGS AND CASH FLOWS (CF1) AND ITS RELATIONSHIP WITH CHANGES IN MACROECONOMIC INDICATORS

		CHANGE IN GDP	CHANGE IN M3	CHANGE IN INFLATION
INDUSTRY	n	r	r	r
AGRICULTURE	80	.06	.30	.22
AUTOMOTIVE	265	.05	-.06	.01
CHEMICALS	174	-.10	-.02	.00
COMMERCE - RETAIL	374	.02	-.01	.12
COMMERCE - W/SALE	307	.06	-.03	-.01
CONSTRUCTION	164	-.07	-.02	-.08
ELECTRICAL MACHINERY	133	-.12	-.10	-.12
FINANCIAL INSTITUTIONS	364	.01	-.02	-.08
FOOD	148	.08	.01	-.06
FORESTRY	150	-.05	.02	-.09
GAS	40	-.08	-.06	-.11
LIQUOR	138	.02	-.06	-.01
MEAT AND BY-PRODUCTS	104	-.13	.13	-.04
MEDIA AND COMMUNIC.	37	.24	.13	.04
METALS AND MACHINERY	328	.12	-.01	-.02
MINERAL EXPLORATION	4	-.06	-.06	-.37
MISCELLANEOUS	173	-.12	-.04	.00
NON-METALLIC MINERALS	129	-.10	.06	.11
OTHER MANUFACTURING	19	-.01	-.06	-.36
PRECIOUS METALS	76	-.68	.62.	.30
PRINTING	197	.05	-.01	-.18
PROPERTY INVESTORS	350	.00	.07	.05
RURAL SERVICES	120	.16	-.13	-.03
TEXTILES - UNCLASSIFIED	62	.09	-.18	-.19
TEXTILES - INDUSTRIAL	165	-.00	.13	-.14
TRANPORT AND TOURISM	199	-.00	.04	.01

r = Pearson's coefficient of correlation

M3 = Money supply

n = Number of cases in each classification

TABLE 20
THE CHANGE IN THE RELATIONSHIP BETWEEN EARNINGS AND CASH FLOWS (CF2) AND ITS RELATIONSHIP WITH CHANGES IN MACROECONOMIC INDICATORS

		CHANGE IN GDP	CHANGE IN M3	CHANGE IN INFLATION
INDUSTRY	n	r	r	r
AGRICULTURE	80	.16	.07	.21
AUTOMOTIVE	265	-.09	.01	.03
CHEMICALS	174	-.09	-.06	.03
COMMERCE - RETAIL	374	-.00	-.01	.01
COMMERCE - W/SALE	307	.11	-.00	-.05
CONSTRUCTION	134	-.00	-.02	-.09
ELECTRICAL MACHINERY	133	-.12	-.01	-.12
FINANCIAL INSTITUTIONS	364	.03	.01	-.09
FOOD	148	-.06	.07	-.05
FORESTRY	150	.02	.01	.14
GAS	40	-.19	-.04	-.14
LIQUOR	138	-.09	-.02	-.04
MEAT AND BY-PRODUCTS	104	-.02	-.09	.00
MEDIA AND COMMUNIC.	37	.37	-.36	-.25
METALS AND MACHINERY	328	.12	-.03	-.04
MINERAL EXPLORATION	4	.19	-.06	-.02
MISCELLANEOUS	173	-.03	-.13	.09
NON-METALLIC MINERALS	129	.09	-.00	-.01
OTHER MANUFACTURING	19	.07	.35	.35
PRECIOUS METALS	76	.37	.98	-.73
PRINTING	197	.03	-.07	-.04
PROPERTY INVESTORS	350	.05	-.00	-.06
RURAL SERVICES	120	.20	-.01	-.05
TEXTILES - UNCLASSIFIED	62	.01	-.02	.04
TEXTILES - INDUSTRIAL	165	.11	-.23	-.13
TRANPORT AND TOURISM	199	.16	.06	.08

r = Pearson's coefficient of correlation

M3 = Money supply

n = Number of cases in each classification

APPENDIX C TABLE 1

COMPARISON OF CORRELATIONS OF EARNINGS AND CASH FLOWS WITH AND WITHOUT OUTLIERS

	With Outliers		Without Outliers	
Year	CF1	CF2	CF1	CF2
	r	r	r	r
1971	.99	-.27	.99	-.57
1972	.98	.30	.99	.45
1973	.99	.74	.99	.84
1974	.99	.65	.99	.87
1975	.99	.47	.99	.72
1976	.99	.80	.99	.92
1977	.99	.58	.99	.77
1978	.98	.57	.99	.78
1979	.98	.62	.99	.83
1980	.99	.55	.99	.78
1981	.99	.01	.99	.48
1982	.99	.69	.99	.87
1983	.89	.46	.99	.52
1984	.99	.55	.99	.83
1985	.99	.49	.99	.54
1986	.98	.79	.99	.63
1987	.99	.77	.99	.49
1988	.99	. 83	.99	.86
1989	.99	.14	.98	.82
1990	.99	.64	.98	.82
1991	.99	.88	.98	.73

r = Pearson's coefficient of correlation