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Managerial choice of discretionary accounting methods: An empirical evaluation of security market response

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MANAGERIAL CHOICE OF DISCRETIONARY ACCOUNTING METHODS:
AN EMPIRICAL EVALUATION OF SECURITY MARKET RESPONSE

by

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Managerial Choice of Discretionary Accounting Methods:
An Empirical Evaluation of Security Market Response

by Kumar N. Sivakumar

Abstract

This study presents a comprehensive evaluation of managerial choice of
discretionary accounting methods and the use of the reporting process in income
smoothing. After analyzing concepts of smoothing behavior, including managerial
motivations to engage in smoothing, security market reactions to smoothing efforts are
empirically tested to corroborate managerial motivations for, and security market
evaluations of, income smoothing.

This study looks at income smoothing using reporting variables as involving the
choice of a portfolio of discretionary accounting methods over a period of time with the
effect of reducing the fluctuations of reported earnings relative to cash flows. After
identifying smoothing behavior, the study tests hypotheses of differential information
content of accounting earnings by looking at the security market reactions to the release of
financial reports. In addition to changes in security prices, the study also looks at other
capital market variables such as the systematic risk and changes in dividends.

A pooled time-series cross sectional regression analysis using an estimated
generalized least squares estimator finds significant differences in the risk-adjusted security
returns of 104 smoothing and 29 non-smoothing firms around the quarterly earnings
announcement dates from June 1984 to March 1987. Non-smoothing firms have a higher
market reaction around the announcement time, implying a higher level of prior market
uncertainty about their future earnings and cash flows. This result is consistent across
different estimation methods and sub-samples. In addition, a cumulative average abnormal
return analysis shows similar differences in the indirect information content of accounting
earnings over a period of 12 months for the three years 1984 to 1986.

In additional empirical tests, the study finds that the average systematic risk of the
smoothing firms is significantly lower than the average systematic risk of non-smoothing
firms. This is in line with the conclusions about the higher prior level of uncertainty of the
market about the future earnings and cash flows of non-smoothing firms. The non-
smoothing firms had fewer changes in dividends declared, probably due to the dividend
payments being used as a signalling device to reduce some of the prior uncertainties about
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Chapter 1

INTRODUCTION

Accounting can be viewed, in a broad sense, as a measurement and communication process which generates economic information about the financial position and performance of firms on a periodic basis. Studies in finance and accounting have shown that information provided by financial statements about the economic environment of a firm affects the firm's security prices. Considerable evidence exists (Ball and Brown [1968]; Beaver [1968]) to confirm that the security market adjusts prices on the basis of any new information provided by accounting statements. It is also recognized that the accounting methods and techniques used in the measurement and communication process affect the nature of information about the economic environment of a firm (Dharan [1983]; Gonedes and Dopuch [1979]). However, the generally accepted accounting principles (GAAP) which govern the measurement and communication process provide managers with a certain degree of discretion on the choice of accounting methods. The strategic managerial choice of these accounting methods to report an income stream with low volatility over time is defined as income smoothing.

This dissertation has two objectives. First, it will show how managers use discretionary accounting methods to smooth income. It departs significantly from previous work by looking at the cumulative and interactive effects of different accounting methods on the reported income of firms over time. Whereas previous research has considered one, or a limited number of accounting methods, as the instrument of smoothing, this study examines a comprehensive portfolio of accounting methods. In addition, it considers the cumulative effect of this portfolio of accounting methods over a number of time periods rather than just a single period analysis.
Second, after identifying managerial smoothing behavior, the study will empirically test security market reactions to any differences in the information conveyed by the financial statements of smoothing and non-smoothing firms. Security market reactions to income numbers resulting from managerial income smoothing have not been previously examined. The empirical analysis will add to a better understanding of the relationship between changes in security prices and accounting information by examining the differential information content of accounting statements of smoothing and non-smoothing firms. Moreover, by deriving hypotheses of security market reactions from managerial motivations to smooth income, this study provides a more comprehensive understanding of the market evaluation of managerial motivations to smooth.

While recent research has addressed the issue of the type of factors affecting the managerial choice of accounting methods, there are still many gaps in our overall understanding of the phenomenon. More specifically, the managerial motivations underlying the choice of accounting methods and the impact of accounting choice on security prices through reported financial statements represent two critical areas warranting further research.

The use of accrual accounting for financial reporting is significant since it permits a certain degree of discretion for managers on the specific choice of accounting methods. Its use is justified by the Financial Accounting Standards Board (FASB), on the basis that, "it provides a better indication of enterprise performance," (FASB [1983], p.19, para.44). Within the accrual framework, managers have considerable discretion in choosing different specific accounting accrual methods for measuring the various elements of the financial statements.

Choice among discretionary accrual methods is guided by managerial objectives such as conformity with industry practices, the likely impact on the security prices through reported financial statements, maximizing managerial compensation and other concerns
such as debt covenants. The potential for managers to influence the level of reported earnings has perhaps the most significant implications since the manipulation of such a key performance indicator usually acts as the means by which the above objectives can be achieved. For various reasons to be considered below, managers may seek to minimize the volatility of reported earnings, i.e., to smooth income.

Although there is evidence that managers do engage in the practice of smoothing reported income (Cushing [1969]; Barefield and Comiskey [1972]; Ronen and Sadan [1981]) existing research presents only a fragmented and partial insight into the phenomenon. As Ronen and Sadan ([1981], p.vii) observed,

"the literature on smoothing to date offers glimpses here and there into the phenomenon. The bits and pieces of research conducted and published shed light on various angles of the problem; but only a vague contour of the illusive creature we call 'smoothing' has become visible, not the animal itself"

In particular, there is a need to integrate the concepts of smoothing behavior, managerial motivations, and security market reaction, into a comprehensive picture of the overall smoothing process. This dissertation is an attempt to move in this direction.

The present lack of a satisfactory smoothing model can be largely explained by the unusual problems encountered in attempting to operationalize the concept of income smoothing for empirical research purposes. As Gonedes ([1972], p.571) argued, "it is difficult to test for the existence of something that cannot even be identified when, in fact, that something does exist." Problems in the identification of income smoothing behavior have been compounded by the simplified research design of most previous studies. Most research studies examining whether or not managers engaged in income smoothing behavior have done so by considering only a limited number of accounting accrual methods as the smoothing instrument (Cushing [1969]; Dasher and Malcom [1970]; Barefield and
Comiskey [1972]; Beidleman [1973]). In addition, even studies that used a more appropriate multi-period model (Barefield and Comiskey [1972]; Barnea, Ronen and Sadan [1976]), as against simple single-period models (Archibald [1967]; Copeland [1968]; Copeland and Licastro [1968]), did not employ their analysis in conjunction with a portfolio of accounting accrual methods. This dissertation looks at income smoothing as involving the choice of a portfolio of discretionary accounting methods over a period of time.

Furthermore, even when income smoothing has been identified, managerial motivations for such behavior should be analyzed in order to comprehend fully the entire smoothing process. With the exception of a few studies (Smith [1976]; Karnin and Ronen [1978]; Moses [1987]), there has been little attempt to explain and test why smoothing was undertaken by managers. It is worth noting however, that none of these studies simultaneously employed multi-period analysis with a portfolio of accounting methods to present a comprehensive picture of the income smoothing process. This dissertation tests hypotheses of security market reactions to smoothed accounting information where the hypotheses are derived from the association between managerial motivations and capital market requirements. As indicated above, this analysis will be undertaken in a multi-period setting with a portfolio of accounting methods.

The remainder of the dissertation is organized as follows. Chapter 2 defines and elaborates on income smoothing and provides a summary of prior work in the area. Chapter 3 develops a model of accounting choice in financial reporting and discusses how managers use discretionary accounting methods to smooth income. It also analyzes the issue of identification of income smoothing behavior by using the portfolio of discretionary accounting accruals as the smoothing device. Hypotheses specification and the empirical design used in the study are discussed in chapters 4 and 5 respectively. Chapter 6 describes the empirical results. Chapter 7 presents the conclusions of this study.
Chapter 2
INCOME SMOOTHING

A smooth income stream results from the decisions and choices made by managers. The managerial choice of operating, investing and financing decisions determines a firm's cash flows and thus earnings. In addition, managers can smooth reported income by their selection of accounting alternatives to measure and communicate earnings.

Operating, investing and financing decisions affect the economic events, and hence the cash flows, of an entity. Managers can take decisions on the basis of their smoothing effect on reported income. Managers may choose, for example, to incur additional research and development expenses during a year when they expect to report a higher than usual net income. This decision is a real economic decision which affects the cash flows and reported income for the current period and also the profitability of the entity in future periods.

Managers may also use the measurement and communication process to smooth income. The use of the reporting process may or may not have secondary effects on the underlying economic events of the entity, but its primary effect is on how the events are reported. This kind of smoothing primarily uses the accrual accounting system to shift revenues and costs from one reporting period to another. A manager, for example, could use an accelerated depreciation method instead of the straight line method to charge more expense during the early years of an asset's life. This can be summarized as follows:
In this study, attention will be focused on income smoothing by the use of the financial accounting reporting process, i.e., the managerial choices within the measurement and communication system. Hence, this study looks at income smoothing as managerial financial reporting behavior by which the periodically reported income numbers are manipulated to reduce the magnitude of period-to-period fluctuations. In its general form, income smoothing is viewed as, "an aspect of managerial behavior directed at the production and communication of financial information to the outside public," (Ronen and Sadan [1981], p.6). This definition has been operationalized as the reduction of variation of reported earnings around some predetermined level, by the use of reporting variables.

Ronen and Sadan [1981], in reviewing the work done in the area of income smoothing, discuss the following four aspects:
1. The **objective** of smoothing, i.e., managerial motivation for smoothing;
2. The **object** of smoothing, i.e., the variable which the management wishes to smooth;
3. The **dimension** of smoothing, i.e., intertemporal or classificatory; and
4. The **instruments** of smoothing, i.e., the smoothing variables chosen by the managers.

The following sections will look at each of the above aspects as it relates to this study.

### 2.1. Managerial Motivations for Smoothing

There have been a number of motives attributed to managers for engaging in smoothing behavior.

Beidleman [1973] attributes income smoothing to a managerial perception that investors prefer a smooth earnings pattern. Investors are hypothesized to interpret a smooth earnings stream as leading to steady dividends and capital appreciation and hence, prefer such a smooth stream of earnings. As a special case of such an investor preference, managers expect investors to have a lower perception of risk for their stock because of the lower variability of the reported income. Such a relationship between fluctuations in reported income and investors' perception of riskiness of the firms' stock has also been put forward by Hepworth [1953].

Barnea, Ronen and Sadan [1975] hypothesize that managers wish to convey information which would enable investors to make predictions of future cash flows. Under this hypothesis, income smoothing conveys information within the framework of GAAP which improves the ability of investors to predict cash flows. This hypothesis is consistent with the FASB's standpoint that one of the major objectives of financial reporting is to help investors to predict future cash flows. The FASB in its Concept Statement No. 1 ([1983], para. 25) stated.
"Potential users of financial information most directly concerned with a particular business enterprise are generally interested in its ability to generate favorable cash flows because their decisions relate to amounts, timing, and uncertainties of expected cash flows."

From such a perspective, the managers, based on their inside knowledge, may wish to report earnings which would enable investors better to predict long run future cash flows. As Barnea, Ronen, and Sadan [1976, p.10] state, ".. smoothing is used as a vehicle for management to convey its expectations within the framework of conventional accounting practices which do not permit direct forecasts."

Such a line of reasoning is not without problems, since it fails to consider why managers would seek to disclose superior private information to investors. Furthermore, managers might also be expected to withhold information which they may consider would evoke an unfavorable market reaction. However, this might not necessarily be the case since Verrecchia [1983] analytically shows that managers are better served to disclose both "good" and "bad" information available to them. He argues that the existence of disclosure-related costs and noise in the traders' expectations due to the information withheld by the managers will lead to full disclosure. Additional reasons have been forwarded, however, as to why managers might seek to smooth reported income. Foster [1986] notes that the desire to maintain satisfactory industrial relations, minimize taxation and promote external perception of competent management might also be other managerial reasons for smoothing income.

While the stock market might be anticipated to view the above motivations for managerial smoothing favorably, to the extent they are effective, the practice of smoothing may also be viewed negatively. Ronen and Sadan [1981, p.vi] state that, "for example, the press, which is an agent of public opinion and sentiment, views the smoothing
phenomena as revelations of 'cheating,' of 'misleading,' and of other 'immoral' deeds on the part of managers of corporations." Such a perception by the market would imply an unfavorable reaction.

Finally, increased managerial compensation has also been advanced as a motivation for income smoothing (Foster [1986], Moses [1987]). It is not clear, however, what the security markets' reaction would be to such a motive.

This study will examine the managerial motivation for smoothing from a capital market perspective. It will attempt to derive conclusions regarding motivations and market perceptions from an examination of the security market reactions to smoothing. Successful smoothing efforts by managers which provide additional information regarding long-term future cash flows and a lower perception of risk would be expected to have a favorable reaction from the market. Alternatively, managerial attempts to obscure and mislead would be expected to result in an unfavorable market reaction.

2.2. Object of Smoothing

The object of smoothing is determined to a large extent by the underlying managerial motives for smoothing. For example, if the motivation is to reduce the perceived riskiness of the firm or to convey the management's expectations of future long-term performance, the object of smoothing would be that accounting measure which the manager believes is used by the market for such purposes. This study will use the reported income from continuing operations as the object of smoothing because of the centrality of reported earnings as a performance indicator for a wide number of purposes and its pervasive use by investors for valuation purposes.
2.3. Dimensions of Smoothing

Smoothing of income numbers is often categorized as either classificatory or intertemporal (Ronen and Sadan [1981]). Classificatory smoothing refers to the attempts to reduce the fluctuations over time of the object of smoothing by the use of alternative classification of intra-income statement elements. This can be done only when the object of smoothing is an accounting measure other than net income. For example, when the object of smoothing is income before extraordinary items, variations can be controlled by classifying income statement elements as ordinary or extraordinary. However, Accounting Principles Board Statement No. 30, and other subsequent FASB pronouncements have now severely restricted the discretion of managers in classifying an item as extraordinary.

Intertemporal smoothing consists of reducing the variations of reported income over time, either through managerial decisions concerning actual economic events (e.g. the timing of research and development expenses) or through accounting accruals (e.g. accelerated depreciation method versus straight line method).

This study will center on smoothing operations of the second type, viz., intertemporal smoothing using accounting accruals.

2.4. Instruments of Smoothing

Given that the reporting process can be used by managers to smooth income, different accounting methods may be used by management as instruments to effect smoothing. Prior studies have looked individually at a variety of accounting methods including depreciation, the treatment of dividend income from unconsolidated subsidiaries, the treatment of investment tax credit, pension accounting, and accounting for business combinations. No previous work, however, has examined the interactive effect of all discretionary accruals as an instrument of smoothing, which captures both the direct effect of each of these accounting methods and their interactive effects on reported income.
2.5. Survey of Prior Research

The phenomenon of income smoothing has been the focus of a number of accounting research studies. However, the literature has developed in a very fragmented manner, mainly due to the lack of a coherent theoretical model of income smoothing. Such a model should incorporate the multi-period nature of smoothing, the wide range of smoothing instruments available to managers and the managers' motivations to smooth. From the early work in the 1950's through to the 1980's the literature has lacked any specific focus, with different researchers addressing a variety of problems from a variety of perspectives.

Early work by Hepworth [1953] described possible motivations for smoothing, looking in particular at taxation and managerial relations with investors and employees as key variables. By the 1960's this work had been supplemented by the empirical findings of Dopuch and Drake [1966], who looked at intertemporal smoothing of reported income using investment transactions, and Gordon at al., [1966], who looked at smoothing net income per share using investment tax credits. Both studies indicated that inconclusive evidence was available that smoothing existed. Copeland and Licastro [1968], Copeland [1968] and White [1970] examined dividend income from unconsolidated subsidiaries as the instrument of smoothing and concluded that no strong support existed for this particular accounting method as a smoothing device. White [1970] also studied depreciation policy and pension costs as smoothing instruments and found that no evidence existed for the smoothing of earnings per share.

Support for income smoothing was found by other studies. Archibald [1967], examining the effect of changes in depreciation methods on net income, concluded that there was evidence that this was used for reporting higher profits. Analysis by Cushing [1969] also showed that firms employed changes in accounting methods to smooth
reported earnings per share. Indeed, a number of studies throughout the 1970's generated moderate to strong support for smoothing. Dasher and Malcom [1970] using research and development expenses, pension costs and dividends from unconsolidated subsidiaries, Barefield and Comiskey [1972] using the accounting method from unconsolidated subsidiaries, and Beidleman [1973] using a number of accounting treatments (including pension costs, research and development expenses, and sales and advertising expenses) all subscribed to the belief that smoothing existed.

Apart from the intertemporal smoothing studies noted above, the early classificatory smoothing attempts by managers were also examined by researchers. Support for classificatory smoothing was found in a number of studies. Ronen and Sadan [1975] and Barnea, Ronen and Sadan [1976], examining the classification of ordinary and extraordinary items in income statements, had also found strong evidence of classificatory smoothing.

From an analytical perspective, Gonedes [1972] derived a framework for clarifying and testing income smoothing behavior. He established conditions under which optimal income smoothing actions are undertaken by managers under selected stochastic processes.

Recent research has attempted to refine the methodology to test for smoothing. Ronen and Sadan [1981] looked at industrial differences, and examining depreciation and extraordinary expenses found that some industries (oil and steel–minor) were more likely to smooth than others. Koch [1981] used a laboratory methodology to model the costs of smoothing (measured by the change in the reported earnings per share) and concluded that there was an inverse relationship between the costs of smoothing and the propensity to smooth. He also found that smoothing was more likely when the stock ownership was widely held and occurred with greater frequency by the use of accounting variables rather than with real variables. Eckel [1981] looked at the possible constraints on managerial discretion to smooth and suggested that firms were unable to reduce the variability of their
income time series below the variability of sales time series. Eckel concluded, interestingly, that, "For the income smoothing hypothesis this may indicate that the jury is still out."

One possible way of influencing the jury's mind is to develop a more rigorous model of specific managerial motivations to smooth income. Surprisingly few studies have addressed this issue. Lev and Kunitzky [1974] examined the association between smoothing measures and the risk of common stock. They found a significant association between the extent of smoothness of sales, capital expenditure, dividends, and earnings series with the risk of common stock. The study, however, used the variability of these measures as reported, and did not examine whether such smoothness was due to managers' choice or a "natural" occurrence. In other words no specific evidence existed that managerial smoothing had indeed taken place.

Smith [1976] and Kamin and Ronen [1978] looked at the relationship between managerial smoothing behavior and degree of managerial ownership of the firm. Smith found support for the hypothesis that owner-managers are less likely to engage in income smoothing. The results of Kamin and Ronen also confirmed that management-controlled firms, where ownership was not concentrated in management, were most likely to smooth income.

Healy [1985] examined whether accounting accruals were affected by the existence of management bonuses tied to income. He looked at the use of total accruals by managers in maximizing their bonus, subject to any lower and upper bounds set by the bonus schemes. The lower bound was the minimum level of reported earnings at which managers earned bonus and the upper bound was the level over which increasing the reported earnings did not result in an increase in managerial bonus. Healy found empirical evidence that managers attempted to maximize earnings within the range imposed by the bonus plans. He also found that managers were more likely to reduce earnings which exceeded
the upper bound. Though his was not a study of managerial income smoothing, the
managerial motive to maximize compensation and attempts to get report income within a
range, in this case one imposed by the bonus plans, is of importance. Of special interest to
the present study is Healy's use of a total accrual measure as the means used by managers
to manipulate income. Moses [1987] also found support for the hypothesis that managers
smoothed income when compensation was tied to corporate reported earnings. However,
he considered only changes in accounting methods in a single period model.

Income smoothing hypothesis has also attracted a growing interest from an agency
theory perspective. Lambert [1984] used agency theory to model real income smoothing,
(i.e., the use of operating, financing and investing decisions as opposed to accounting
variables in smoothing), and analytically derived that an optimal compensation scheme
would cause managers to smooth. He concluded that smoothing can arise as an optimal
equilibrium behavior.

In reviewing the empirical income smoothing literature, one problem common to all
studies is the unsatisfactory means employed to identify managerial smoothing behavior.
The identification of smoothing is primarily dependent upon the specification of an
acceptable model of managerial behavior. A simple model using one or a limited number of
accounting methods as the smoothing instrument would overlook the impact of the
remaining accrual methods. The smoothing effect of one accrual method could very well
be offset by the variability of other omitted accrual methods. Similarly, looking at the
effect of the accrual methods on the earnings of a single period will disregard the effect of
such choice on past and subsequent periods. The effect of an accrual method on the
earnings of one year cannot form the basis for arriving at the conclusions regarding
smoothing behavior, which by definition is a multi-period phenomenon. Hence, any
income smoothing study has to adopt a multi-period model to identify such behavior
(Imhoff [1981]; Eckel [1981]).
A further critical aspect of the specification of a model of managerial behavior is that even when empirical studies have found some basis to conclude that there was smoothing by managers, there has been no attempt to explain and test why such smoothing was done by managers. Ball and Foster [1982], in a general methodological review of empirical research in accounting, criticized the smoothing literature for not incorporating the motivations for smoothing in the research design. It is this integration of total discretionary accruals, multi-period analysis and managerial motivations which forms the basis for this study.

The following chapter will develop a model of managerial behavior in the choice of accounting methods for financial reporting.
Chapter 3

MODEL OF ACCOUNTING CHOICE IN FINANCIAL REPORTING

Financial statements are periodic releases of information about economic events of firms. The information provided is intended to be useful to investors and others for making investment and economic decisions (FASB [1983]). Perhaps most critically, financial statements have been looked upon as one of the means of conveying information on the outcome of decisions made by managers, which are not directly observable by investors.

This role of financial reporting can be modeled from a principal-agent (P-A) perspective. The manager/agent takes decisions and actions on behalf of the claimholder/principal for certain consideration (remuneration which may or may not be related to the outcome of the managers’ decisions). This remuneration is transferred from the principal to the agent at the end of each period. The outcome of the manager’s choice is not observable by the principal. The manager measures the outcome and conveys this information to the principal through financial reports. The information signal, however, is imperfect, since financial statements, "often result from approximate, rather than exact, measures," and, "the measures commonly involve numerous estimates, classifications, summarizations, judgements and allocations" (FASB [1983], para 20). The manager, in measuring and conveying financial information is required to follow a set of accepted accounting principles, adherence to which is commonly checked by means of external auditors.¹

Penno [1985] is an example of such a P-A model of the financial reporting process. His model is a single-period P-A analysis with a risk-averse agent who provides a privately

¹See Antle [1982] for a model of the role of auditors in financial reporting in the principal/agent framework.
observable effort, input a, into a production technology, generating a random outcome with realization x. The agent privately observes the outcome x and reports \( \hat{x} \) as the value of x. A verification technology, for example, the audit process, produces a signal y, which Penno assumes to be imperfect and noisy. The model, on a time line, can be stated as follows:

\[
\begin{array}{cccc}
\text{Time} & \text{agent enters agency and contract } (\hat{x}, y) & \text{agent takes action, a} & \text{agent observes random outcome } x & \text{agent reports } \hat{x} \\
\to & \text{y is publicly revealed and transfer, } t(\hat{x}, y) \text{ is made}
\end{array}
\]

A modified version of Penno's simple P-A model can be constructed with the manager's choice of discretionary accounting methods being incorporated into the analysis. In the modified model, the manager/agent takes action a, which generates a random outcome set \( \Theta(c) \). This action a would consist of all the financing, investing and operating decisions made by the manager. The outcome of the manager's decisions is measured and reported by means of financial statements. The financial numbers reported comprise of a whole range of elements, such as sales, purchases, expenses, financing sources, and uses of funds. The manager evaluates the information system I(D), where D is the complete set of discretionary accounting methods which are permitted to be used under GAAP. The manager chooses a subset of I(D), I(\hat{D}), which would consist of discretionary accounting treatments for each of the various elements of the financial statements. I(\hat{D}) can be viewed as a portfolio of accounting methods chosen by the manager. This conforms to Zmijewski and Hagerman [1981], who made the important observation that managers do not select individual accounting procedures but choose a portfolio of accounting methods which
would meet their income objective and conclude that "individual accounting policy choice decisions are part of an overall firm strategy" (p. 148). The manager measures outcome set Θ (c) using I(ι) and reports Θ (x). The reported outcome set Θ (x), of which net income is one element, is subject to a verification process, which in the case of auditing verifies that I(ι) is in accordance with GAAP and that it produces outcome Θ (x) as one of all possible signals.²

This model can be stated on a time line as follows:

```
  |  |  |  |  | time--->
agent enters agency and contract
agent takes action, a random outcome Θ (c)
agent observes
agent evaluates information system I(ι)
agent selects portfolio of accrual methods
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```
  |  |  |  |  | time--->
agent measures Θ (c) using I(ι) and reports Θ (x)
y is publicly revealed and transfer t(Θ (x)) is made
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Currently, the accounting literature has looked at the information system as consisting of two sets of accounting methods (Healy [1985]; DeAngelo [1986]). The first set consists of accounting methods mandated by regulatory bodies (such as the Securities

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²There are a number of possible signals that the accounting system could produce due to the discretion involved in the information system I and also because of the inherent noise in the measurement process. The audit process verifies that Θ (x) is one of all possible signals.
and Exchange Commission (SEC) and FASB). Managers would have no discretion in the use of these particular methods. The second set consists of accounting methods, where in the absence of a single regulatory mandate, discretion exists for managers to choose a specific accounting accrual method from a range of GAAP alternatives. Managerial choice of depreciation and inventory methods would be illustrations of this process. This line of argument continues by specifying that the discretionary accounting methods are the accounting tools which the managers can use to affect the measurement process, since mandatory accounting methods are, by definition, fixed.

However, it is interesting to consider the extent to which any specific accounting method is indeed mandated by regulatory bodies. Certainly, managers are required to conform to the principles of accrual accounting, but the extent to which specific accounting methods are stipulated is open to question. Within the mandatory accrual system, managers usually have substantial discretion as regards the actual accounting methods used for measurement purposes. Therefore, it is essentially the underlying adherence to an accrual accounting system which presents a mandatory constraint on managerial choice. Once within this framework, managers have substantial flexibility for discretionary choice of accrual methods. As the FASB ([1983], p.36, para. 7) notes,

"... there are now and will always be many accounting decisions to be made by reporting enterprises involving a choice between alternatives for which no standard has been promulgated or a choice between the ways of implementing a standard."

The accrual model essentially requires managers to recognize revenue on the basis of sale and to match expenses considered to be associated with those revenues. But within this general dictum, managers may recognize revenue using any number of acceptable revenue recognition methods; recognize the cost of goods sold using some inventory cost flow assumption; allocate the cost of a fixed asset over its useful life; and estimate and
provide for doubtful debts. The manager has the choice, for example, to use the percentage of completion method or the installment method for long-term contract revenue recognition; to use LIFO or FIFO as the cost flow basis for computing the cost of goods sold; to use straight line or accelerated methods of depreciation; and to use the percentage of sales or the aging method for estimating uncollectibles. In each of these cases, the accrual accounting system provides the manager with the opportunity for discretionary choice.

The conclusion to be drawn from this analysis is that while the accrual concept is mandatory, the amount of accruals is determined by discretionary choices made by the managers. Consequently, it is hardly surprising that previous attempts to separate discretionary and mandatory managerial choices have been unsuccessful.

Of course, the amount of accruals in any given year is not entirely the product of discretionary managerial choices made during that year. Indeed, there will be a component of total accruals which management would not have the current discretion to affect because this component has been determined by past managerial choices. These choices, though discretionary in the past, now constitute a backdrop which is relatively fixed. As Kaplan ([1985], p.111) correctly notes in the context of depreciation, "[t]he great bulk of depreciation charges arises from fixed assets acquired in previous years. The depreciation on these assets is predictable and unaffected by managerial decisions in the most recent year." If managers wish to change these factors, they must do so by an explicit change in accounting methods. Therefore, there are two components to discretionary managerial behavior. Initially, there is a choice of accounting methods which might affect the total amount of accruals in the current and subsequent periods. Subsequently, managers have the opportunity to change from a previously chosen accounting method to an alternative one.

To summarize, this study looks at the total accruals as being the result of discretionary managerial choice of accrual methods within a mandated accrual system. The
total amount of accruals in any given year, however, is not entirely the result of current discretion. The current discretionary accruals made by the manager would comprise of (i) accounting choices relating to new and originating transactions during the current year and (ii) changes in accounting methods already chosen in earlier periods. As regards (ii), these could involve change from one specific accounting method to another or a change in some of the accrual assumptions of previous accounting choices. In terms of depreciation, for example, the change might involve changing from one depreciation method to another, say straight line to a declining balance method. It could also involve changing the assumption in the estimated useful life or salvage value of the asset. With most accounting changes, managers risk getting a qualified report from auditors. Changes in assumptions underlying accrual methods, however, are less visible to outside users, since they do not usually lead to qualified reports from auditors.

Both the initial choice of accounting methods and subsequent change in methods, are used by managers to fulfill their financial reporting objectives. When the objective is to smooth reported earnings, the discretionary accounting methods, \( D \), will consist of a set selected by the managers such that the reported earnings will fall within an acceptable range of volatility. When the choice of accounting methods relating to new and originating transactions and the fixed component of the total accruals, which is a product of past decisions, results in a reported income outside the acceptable range, managers may opt to change one or more accounting methods used in the past.

The notion of a manager incorporating the impact of past decisions on current reported earnings and current decisions on future reported earnings is consistent with Gonedes [1972], who proposes that any selected smoothing strategy is a redistribution of rates of returns (ex ante) rather than a permanent effect. The smoothing effect over the life of the firm is assumed, therefore, to sum to zero. It should be noted, however, that the smoothing effect over the tenure of a manager need not sum to zero.
For firm $j$, let $c_t$ be the cash flows for period $t$. Within the mandated accrual accounting system, the manager evaluates $I(D)$ and selects a portfolio of accrual methods, $I(D)$, and measures $c_t$ and reports,

$$x_t = c_t + a_t$$

$$t = 1, 2, \ldots, N$$

where $a_t$ is the total discretionary accruals. Following Gonedes [1972],

$$\sum_{t=1}^{N} a_t = 0$$

That is, the smoothing strategy simply redistributes accruals over time. Such an assumption is consistent with the FASB's ([1983], p.20, para 46) statement that, "Over the life of an enterprise (or other very long period) total reported earnings equals the net cash receipts excluding those from capital changes." For example, although annual depreciation charges would differ under two alternative depreciation methods, the total depreciation expense over the life of the asset would be the same under both the methods and would be equal to the net cash outflow for the asset.

Let the vector $X = \{x_t\}$ be the time series of reported earnings of firm $j$, and define the measure of variability of $X$ (inverse of smoothing) as $\text{Var}(X) = \sum(x_t - \bar{x})^2$, where $\bar{x}$ is the mean or normal earnings. The smoothing problem for firm $j$ can then be formalized as:

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3Though the outcome set $O(c)$ and reported set $O(x)$ comprise of a whole range of accounting numbers, the following discussion will assume, for the sake of simplicity, that the cash flows and reported earnings each are scalars.

4 For the sake of simplicity, the measurement process is assumed to introduce no measurement error. However, an error can be included in this equation without affecting much of the discussion which follows.
max \[ L = E \left[ \sum_{t=1}^{N} x_t - \lambda \left( \text{Var} \left( X \right) \right) \right], \]

\[ \{ a_t : 1 \leq t \leq N \} \]  \hspace{1cm} (3.1)

subject to \[ x_t = c_t + a_t \] \hspace{1cm} (3.2)

\[ \sum_{t=1}^{N} a_t = 0 \] \hspace{1cm} (3.3)

where \( E \) is the expectation operator and \( \lambda \) is a parameter with a value greater than 0, which defines the disutility of the manager to variance in reported earnings. The primary problem maximizes the reported earnings over time, \( t = 1, ..., N \), subject to a managerial disutility associated with a high variance in reported earnings over time, \( t = 1, ..., N \). This problem can be restated as:

Min \[ \lambda \left( \text{Var} \left( X \right) \right), \] \hspace{1cm} (3.4)

subject to \[ x_t = c_t + a_t \] \hspace{1cm} (3.5)

\[ \sum_{t=1}^{N} a_t = 0 \] \hspace{1cm} (3.6)

\[ E \left( \sum_{t=1}^{N} x_t \right) > A, \] \hspace{1cm} (3.7)

where \( A \) is a minimum level of earnings that the managers would want to report over the time horizon. This minimization of the variance can be more readily related to the earlier
discussion on income smoothing being the reduction of variance of reported earnings over time.

It is possible to examine these equations in terms of the distinction between managerial smoothing using operating, investing and financing variables and reporting variables. The use of operating, investing and financing variables would represent management decisions affecting the economic events of the entity, and would therefore have a real impact upon cash flows. The managerial manipulation of reporting variables would not affect the transactions of the entity, but would instead represent the use of the measurement and communication process to minimize fluctuations in reported earnings. It is assumed in this study that managers would attempt to smooth income, $x_t$, by using operating, investing and financing variables for their effect on $c_t$ and by using reporting variables for their effect on $a_t$.

Manipulation of $c_t$ results from operating, investing and financing decisions made by managers. Managerial smoothing using reporting variables have their impact solely on $a_t$. Therefore any reduction in the variation of $x_t$ by the use of reporting variables can be empirically identified if reported earnings, $x_t$, can first be broken up into $c_t$ and $a_t$. This is empirically feasible since the published financial statements of entities provide sufficient information to disaggregate the components of $x_t$. The reported net income of an entity is $x_t$, the cash flow from operations are $c_t$ and the difference between the two is the total accruals $a_t$. By comparing the variance of reported income both before and after the inclusion of accruals, it is possible to arrive at conclusions about the managerial use of reporting variables to smooth income. This analysis allows the researcher to capture not

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5In the following sections the time subscript for reported earnings, cash flows and accruals will be dropped. The vector of reported earnings, cash flows and accruals for $t=1$ to $n$ will be referred as $X$, $C$ and $A$ respectively.
only the incremental effects of reporting variables, but also the total effect of these variables.

As indicated in chapter 2, the primary problem for empirical research in income smoothing is identifying managerial smoothing behavior. Past studies have attempted to identify smoothing by assuming that a limited number of accounting methods were used as smoothing instruments. By reducing the number of accounting methods examined, they isolated the effect of the particular accounting variable and expected to find evidence for smoothing.

An important factor to bear in mind is that the reported earnings are the outcome of past managerial decisions, which are not directly observable, measured using a set of accrual methods chosen by the managers. The researcher therefore, needs information on the underlying true outcomes to arrive at any conclusion concerning managerial smoothing behavior. As Foster [1986] states:

"...managements may take actions that maximize their own vested self-interest at the expense of shareholder interest. It is likely that such management would also take actions that make their self-interest maximizing behavior difficult for other parties (including an outside researcher) to detect."

One means of overcoming this problem would be to specify a model of managerial behavior which, while sufficiently robust to capture the essence of managerial choice, is capable of being operationalized for research purposes. The model proposed in this study attempts to satisfy these criteria. The actual methodology of computing the accrual component and identifying smoothing firms is detailed in sections 5.1 and 5.2. First, however, the following chapter develops the hypotheses, derived from managerial
motivations relating to the capital markets. These hypotheses will be empirically tested after smoothing and non-smoothing firms have been identified. The empirical test design and sample selection are described in chapter 5.
Chapter 4

HYPOTHESES SPECIFICATION

Hypothesis 1: Information conveyed through accounting earnings differs between smoothing and non-smoothing firms.

Accounting earnings which have been smoothed by managers may or may not convey information different from that conveyed by the earnings of non-smoothing firms. If there is a difference in the information conveyed, the direction of the difference depends on the effect of income smoothing. On the one hand, earnings subjected to income smoothing might be more informative if the managers enable investors to predict more successfully the future cash flows of the firm. On the other hand, earnings subjected to smoothing might not only fail to allow investors to make better predictions of long-term future cash flows, but also act as an actual impediment to investor predictions. This would be the case if managerial actions are motivated by a wish to obscure actual firm performance, and hence impose additional costs on investors who would need to "untangle" the effects of smoothing behavior. In both these cases the reaction of investors to the accounting earnings of smoothing firms can be expected to be different from their reaction to the accounting earnings of non-smoothing firms.

The relationship between accounting earnings and security prices is modeled following Jennings [1986] to enable the specification of the above hypothesis in a testable form. It is assumed that the security returns are a linear function of the present value of the change in the expectation of future cash flows. We then have,

\[ R = a + PV(\Delta E(FCF)) \]  \hspace{1cm} (4)
where $R$ is the return and $PV(\Delta E(FCF))$ is the present value of the change in expectation of future cash flows. The latter can be modeled as:

$$PV(\Delta E(FCF)) = [PVF(R,K) \times (\text{Annuity})]$$  \hspace{1cm} (5)

where $PVF(R,K)$ is the present value factor for discounting an annuity over $K$ periods at discount rate $R$. The above relationship assumes that the change in the expectation of the future cash flows is an annuity, the decision horizon for investors is $K$ periods and discount rate $R$ is constant over the life of the annuity. Let this annuity be a linear function of earnings and be related to the change in accounting earnings by a parameter $\gamma$ as follows:\(^6\)

$$\text{Annuity} = \gamma \Delta \text{Earnings}$$  \hspace{1cm} (6)

Substituting (5) and (6) in (4) we have,

$$R = a + b \Delta \text{Earnings}$$  \hspace{1cm} (7)

where

$$b = PVF(R,K) \gamma$$  \hspace{1cm} (3)

$b$ is the earnings response coefficient which relates the change in accounting earnings to security returns. Under the null hypothesis that information contained in the earnings

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\(^6\)If there is a component in $\Delta E$ which is not permanent, then $\gamma$ in respect of this transitory component would be 0 and $\Delta E$ in the following discussion would be the change in permanent earnings.
releases of smoothing firms do not enable investors to make any better or worse predictions of the future cash flows relative to the information contained in the earnings releases of non-smoothing firms, the estimate of parameter $b$ for income smoothing firms will not be different from the estimate of parameter $b$ for non-smoothing firms. This null hypothesis can be stated as:

$$H_1^0: b_S = b_N$$

where $S$ and $N$ are smoothing and non-smoothing firms respectively.

Under the alternate hypothesis the estimate of parameter $b$ for income smoothing firms will be different from the estimate of parameter $b$ for non-smoothing firms. This alternative hypothesis can be stated as:

$$H_1^1: b_S \neq b_N$$

Under the null hypothesis of no differential information content, there will be no differences in the market reactions to accounting earnings. This is based on the assumption that the underlying economic information about the firm is not affected by any managerial choices in the accounting measurement and communication process. In other words, the managerial use of the accrual methods for income smoothing does not affect the economic events and does not convey any additional information about the future outcomes to the market.

The alternative hypothesis of differential information content is consistent with two alternative models. First, the security market, having been conditioned in the past by the smoothing behavior of certain firms, might establish a narrower range of expectations for the accounting earnings of these firms. Consequently, when the reported earnings fall
outside this range, the market reaction might be expected to be stronger because the unexpected earnings would be viewed as contravening past behavior. The market would be surprised at the managerial inability to smooth earnings within the expected range and hence, react more strongly than it would otherwise. Similarly, the range of market expectations would be wider for non-smoothing firms since the past behavior of these firms would have exhibited a much greater degree of fluctuations in reported earnings. Given, therefore, this much wider range of expectations, reported earnings are less likely to be outside this range and hence, the reaction would be lower. Under these circumstances, the alternative hypothesis, $H_1^1$, would be:

$$H_1^1: b_S > b_N$$

Second, since non-smoothing firms have a higher variance of market expectations of current and future earnings and cash flows, the market is more uncertain regarding the level of earnings and cash flows of these firms. Hence, the earnings announcements are likely to lead to a greater reduction of this uncertainty and result in a higher market reaction. For smoothing firms, earnings announcements would result in a lower reduction in uncertainty regarding future earnings and cash flows, and hence result in a lower market reaction. Under these circumstances, the alternative hypothesis, $H_1^1$, would be:

$$H_1^1: b_S < b_N$$

This response coefficient could differ between smoothing and non-smoothing firms at the time of earnings announcements and also during the period preceding and following such announcements. Accounting earnings, being a measure of firm performance, functions as a summary statistic for the underlying events of a firm which affects its
valuation. Any difference in the information conveyed by a smooth income stream would lead to a difference in the extent to which accounting earning would serve as a summary statistic for all other signals used in the security valuation process. Under these circumstances, there would be a difference in the coefficient b for a longer time period, like the fiscal year of the firm. This study tests the hypothesis of differences in the information of accounting earnings between smoothing and non-smoothing firms both at the time of earnings announcement and during the fiscal year.

**Hypothesis 2:** Income smoothing firms have a smaller systematic risk compared to non-smoothing firms.

If the variability of reported accounting earnings has an effect on the market perception of the riskiness of the firm, then the beta for smoothing firms will be lower than the beta for non-smoothing firms. The managerial motivation in this case would be to convey such a perception. Under the null hypothesis of no such difference, the betas can be expected to be the same. This can be stated as:

\[ H_2^0: B_S = B_N \]

and under the alternate hypothesis,

\[ H_2^1: B_S < B_N \]

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7 Ohlson [1983] identifies conditions under which earnings are a sufficient statistic for security valuation.
where $B_S$ and $B_N$ are the estimated betas for the portfolios of smoothing and non-smoothing firms respectively.

The systematic risk, or beta, of a firm is defined as:

$$B_j = \frac{\text{Cov}(R_j, R_m)}{\text{Var}(R_m)}$$

where $B_j$ is the beta for firm $j$,

$\text{Cov}(R_j, R_m)$ is the covariance of the firm's security returns and the market return, and

$\text{Var}(R_m)$ is the variance of the market return.

In practice, the systematic risk or beta for a firm is estimated by the OLS estimate of the following regression equation:

$$r_{jt} = A_j + B_j r_{mt}$$

where $r_{jt}$ and $r_{mt}$ are the portfolio and market index returns respectively for time $t$.

**Hypothesis 3:** Income smoothing firms have a lower variability of dividends compared to non-smoothing firms.

Prior research in income smoothing has put forward the notion that managers tend to smooth income because of a perception of investor preference. It is argued that investors hold the expectation that steady dividends and capital appreciation follow smooth earnings.
Investors are hypothesized to prefer a steady payment of dividends by firms. Managers, therefore, guided by a motive to convey such a perception of steady dividend payments, would engage in income smoothing. Empirical work in dividend payments have found evidence for a managerial objective of a "target" payout, where managers desire to maintain a consistent and stable relationship between dividends and reported income (Lintner [1956], Fama and Babiak [1968]). If this relationship between dividends and reported earnings is constant, then a smooth income stream would result in lower fluctuations of payments by smoothing firms. Under the null hypothesis of no such relationship, the changes in dividend payments of smoothing firms will not be different from the changes in dividend payments of non-smoothing firms. The null and the alternate hypotheses can then be stated as follows:

\[ H^0_3: \text{CH}(D)_S = \text{CH}(D)_N \text{ and} \]

\[ H^1_3: \text{CH}(D)_S < \text{CH}(D)_N \]

where \text{CH}(D) is the change in dividend payments.
Chapter 5

EMPIRICAL DESIGN

This chapter describes the design of the empirical tests used in the study. This consists of the sample selection procedure and description of the data in section 5.1; the empirical identification of smoothing behavior in section 5.2; the empirical design for hypothesis testing in section 5.3; and the statistical test procedures in section 5.4.

5.1. Sample Selection and Data Sources

The sample consists of firms satisfying the following criteria:

(1) Data on net income, cash/funds flow and working capital items should be available for the period 1971 to 1983 and additional data on firm characteristics should be available for the period 1984 to 1986 in the Compustat annual file.\(^8\)

(2) The firm must be listed in the New York (NYSE) or American (AMEX) stock exchanges with daily stock returns available on the CRSP file from January 1982 to July 1987.

(3) Financial analysts' concensus forecasts of the firm's annual earnings for the years 1984 to 1986 must be available in the IBES file.

(4) The financial analysts' forecasts of the firm's quarterly earnings from the second quarter of 1984 to the first quarter of 1987 must be available in the IBES file. In addition, the quarterly earnings announcement dates, the

\(^8\)The identification period uses data beginning in 1971 and not earlier because the Compustat annual file has provided data relating to cash/funds flows of firms only since 1971.
number of common shares outstanding and the closing market share price must also be available in the Compustat quarterly file.

(5) The firm must have a fiscal year end in December.9

The financial data for the sample firms were obtained from the Compustat annual and quarterly files, the Center for Research in Security Prices' (CRSP) daily returns file, and the IBES Financial Analysts' Forecast tape.

5.2. Identification of Smoothing Behavior Using Accounting Accruals

For empirical testing, reporting-variable based income smoothing is defined as the reduction in the variability of reported earnings relative to the underlying cash flows of the firm. As discussed in chapter 3, any reduction in this variance can be empirically identified if reported earnings, X, can first be broken up into cash flows, C, and accruals, A. The published financial statements provide sufficient information to disaggregate the components of X, which are available in the Compustat tape for the firms in the sample. As mentioned in sections 2.2 and 2.3, reported income is widely used as a performance indicator and for valuation purposes. APB statement no. 30 and other subsequent FASB pronouncements have severely restricted the discretion of managers in classifying an item as extraordinary. Hence, this study uses the reported "income from continuing operations" as the object of managerial smoothing, X. The income from continuing operations is disaggregated into cash flows from operations, C, and accruals, A. The operationalization of C follows the FASB definition of cash flows from operations in its standard for

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9The choice of a common fiscal year end follows Freeman [1987] and permits, especially for the CAAR test for differences in indirect information content, a common time period to aggregate and analyze security market reactions.
statement of cash flows \(^{(\text{FASB [1987]}\text{)}}\). The exact methodology of the computation of cash flows from operations is described in Appendix A.

Given that \(X = C + A\), reporting-based income smoothing would involve the use of A in the reduction of the variance of \(X\) relative to the variance of \(C\). The variability of the cash flows is determined by a number of factors including the nature of business, the cash flow generation process (which is dependent on the financing, investing and operating decisions made by the manager), and any use made of these variables by the manager to affect cash flows. Smoothing with reporting variables, on the other hand, is the manipulation of the amount of total accruals, A, for its effect on the variability of \(X\). The effect of the reporting variables is captured by A and any reduction in the variance of reported earnings \(X\) can be estimated by comparing the variance of reported earnings, \(X\), and cash flows, \(C\). The distribution of \(X\) and \(C\) are obviously dependent. Hence, even if normal distributions can be assumed for \(X\) and \(C\), it is not possible to use the regular tests of comparisons of variances and the conventional F test to conclude about differences in variances. Therefore, after comparing the magnitude of the variances of earnings and cash flows, this study uses the value of the correlation coefficient between the cash flows and accruals to identify reporting-based smoothing behavior.

This study uses a two-stage process to identify reporting smoothing behavior by managers. In the first stage, for each firm, the variance of the time series of earnings is compared to the variance of the time series of its cash flows for the period from 1972 to 1983. Firms whose earnings have greater variance than that for their cash flows do not use the reporting process (or accounting accruals) to reduce the variance of earnings. These firms are classified as non-smoothing firms.

The remaining firms, with the variance of earnings lower than the variance of their cash flows during the period from 1972 to 1983, are likely to be engaged in income smoothing using the reporting process. A second stage condition that the correlation
between the accounting accruals and cash flows be significantly negative is imposed. To understand the motivation for this condition, note that,

$$\text{Var}(X) = \text{Var}(C) + \text{Var}(A) + 2 \text{Cov}(C, A)$$

(9)

where 'Var' and 'Cov' are variance and covariance respectively. When managers smooth $X$ by using $A$, then $\text{Var}(X) < \text{Var}(C)$. This implies that,

$$\text{Var}(A) + 2 \text{Cov}(C, A) < 0$$

or $$\text{Cov}(C, A) < 0$$

or $$\rho_{(c,a)} < 0.$$  

(10)

where $\rho_{(c,a)}$ is the correlation coefficient between the cash flows, $C$, and accruals, $A$.\textsuperscript{10}

Thus, reporting-based income smoothing implies that the correlation between the accruals and cash flows should be negative. That is, a manager of a firm with a high cash flows in one period will have lower accruals (or higher expenses and lower revenue), to the extent possible, to reduce reported earnings. Similarly, when the cash flows are lower, the net accruals will be higher (or lower expense and higher revenue), to the extent possible, to report an overall higher net income.

\textsuperscript{10}Even though the test uses $\rho_{(c,a)} < 0$ for identification purposes, the actual value for $\rho_{(c,a)}$ under the above formulation should be less than $-1/2 \sqrt{\frac{\text{Var} A}{\text{Var} C}}$. 
Thus, in the second stage of identification the correlation between accruals and cash flows is computed and when \( \rho_{(c,a)} \) is "significantly" negative the firm is identified as smoothing. For this purpose, this study uses a cut-off value of -0.95 for \( \rho_{(c,a)} \).

In addition to the above sample which identifies smoothing with the total accruals defined as the instrument of smoothing, this study also looks at a reduced sample with the current discretionary choices as the smoothing instrument. As discussed in Chapter 3, even though the total accruals are the result of managerial choice, only a portion of the total accruals results from discretionary choices made during the current period. This current period discretionary choice would be more amenable to managerial manipulation and hence, would be the primary instrument of income manipulation. This current discretionary choice in a year is operationalized as the difference in the total accruals from the previous year:

\[
CDA_t = A_t - A_{t-1}
\]  

(11)

where CDA is the current discretionary accruals. In the second stage of the identification process, instead of \( \rho_{(c,a)} \) the correlation coefficient between cash flows and the current discretionary accruals is used as the criterion for identifying income smoothing. For this purpose, this study uses a cut-off value of -0.70 as the correlation coefficient for the purposes of identification of firms using current discretionary accruals. Tests for differences in the direct information content of accounting earnings are then performed on the original sample based on total accruals and this second sample based on current discretionary accruals as the smoothing instrument.

5.3. Empirical Design for Hypotheses Testing

One of the motives attributed to managers for smoothing earnings is to convey information which enables investors to make better predictions of future long term cash
flows. If smooth income numbers enable investors to make better predictions of future earnings, and consequently future cash flows, security prices of smoothing firms would reflect more precise estimates of future earnings. Since such precision can be obtained for non-smoothing firms only after costly search, security prices of these firms would reflect less precise estimates of earnings. In other words, the earnings response coefficient for non-smoothing firms would be higher.

If however, managers smooth to withhold information about their actual performance and attempt to convey smooth earnings to create a perception of stable performance, investors will have to incur additional costs to unravel the effects of the managerial use of the discretionary accounting methods upon reported income. Under these circumstances, therefore, security prices of non-smoothing firms would reflect more precise estimates of earnings. In other words, the earnings response coefficient for non-smoothing firms would be lower.

Hypothesis 1, stated earlier, is motivated by these considerations. To test for such postulated differences in the relationship between security prices and accounting earnings for smoothing and non-smoothing firms the literature suggests two methods. Under the first method (Beaver [1968]; Pincus [1983]), security returns around the date of release of accounting earnings (event date) are studied based on whether the reported accounting earnings are greater or less than those anticipated by the market. This method, therefore, tests for a direct relationship between changes in security prices and the disclosure of accounting earnings. The announcement of earnings is treated as news when the reported earnings are not the same as expected and the market revises its expectations of the future cash flows of the firm. This change in the market expectations results in changes in the security prices.

Under the second method, the statistical association is tested between security returns measured over an accounting period of time and the accounting earnings for the
same period. This method tests the extent to which accounting earnings function as a summary statistic for all the other signals that affect security values. Jennings [1986] differentiates between these two types of information content by referring to the news function of the disclosure as the direct information content and to the summary statistic function of the disclosure as the indirect information content.

Tests of indirect information content are based on the expectation that accounting earnings capture the effects of economic events of a firm that are relevant to the investors in their valuation of its securities. Earnings, therefore, reflect the effect of all the information that investors use to revise their expectations about the future performance of the firm (i.e., their expectations about the future cash flows of the firm). Thus, tests of indirect information content measure the association between the unexpected portion of accounting earnings and the changes in the market expectations of the firm's long-term future cash flows as measured by the changes in the security prices during the same period (Ball and Brown [1968], Beaver, Clarke, and Wright [1979] and Freeman [1987]).

This study tests for differences in both the direct and the indirect information content of accounting earnings of smoothing and non-smoothing firms. The differences in the direct information content of accounting earnings are tested by the use of a pooled time series cross-sectional regression analysis. The differences in the indirect information content are tested by using a cumulative average abnormal return analysis. The actual procedures are detailed in the following section.

5.4. Test Procedures

5.4.1. Differences in the Direct Information Content

Differences in the direct information content of accounting earnings are tested by a pooled time series cross-sectional analysis.
A test for direct information content or differences in the direct information content between smoothing and non-smoothing firms is cross-sectional by nature. A cross-sectional aggregation of time series data which ignores any cross-sectional dependencies in the stock return data, would lead to serious misstatement of significance levels and in certain cases lead to bias in the estimation of standard errors (Collins and Dent [1984]; Christie [1986]; Bernard [1987]). This problem is of particular concern when some of the returns are sampled from common time periods as is the case in this study. Hence, any pooling of time series and cross-sectional data will have to incorporate the cross-sectional dependencies in any statistical tests. This study uses the estimated generalized least squares method (EGLS) where an estimated variance/covariance matrix of the error term, incorporating the cross-sectional and time-series dependencies, is used in estimating and testing the parameters.

When employing a regression analysis which uses cross-sectional data, there is normally an assumption of homoscedasticity or constant variances at all levels of the independent variables. One of the problems in cross-sectional analysis is the violation of this assumption or the presence of heteroscedasticity. Similarly while using time series data, the most common problem encountered is autocorrelation. Thus, a regression analysis which combines the two types of data, requires a model which captures both effects. The test used in this study uses such a model.

The pooled regression equation has the form (Judge [1985], p.518):

\[ y_{it} = \sum_{k=1}^{p} X_{kit} \beta_k + e_{it} \]  \hspace{1cm} (12)

\( i=1,2,\ldots, N \) and \( t=1,2,\ldots, T \), for \( N \) firms and \( T \) time periods, or in matrix notation,
\[ y_i = X_i \beta + e_i \] (13)

where

\[ y_i = (y_{i1}, y_{i2}, \ldots, y_{iT})' \]

\[ X_i \] is a \((T \times K)\) matrix of observations on \(K\) explanatory variables for the \(i\)th firm,

\[ \beta = (\beta_1, \beta_2, \ldots, \beta_K)' \] is a vector of parameters to be estimated, and

\[ e_i \] is vector of the regression disturbances.

The assumptions regarding the covariance matrix of the regression disturbances determine the method that should be used to estimate the parameters. Parks [1967] discusses efficient estimation of a system of regression equation when the disturbances are both serially and contemporaneously correlated. This study uses Parks' method of estimation, in addition to a variance component model using the Fuller and Battese [1974] method and a mixed variance component and moving average model. The following paragraphs describe the assumptions underlying the covariance matrix of the disturbance terms and the properties of the estimators under the Parks' method. The other two methods are described in Appendix B.

The specification of the behavior of the disturbances in the Parks' model is as follows (Kmenta [1971], pp. 512-514):

\[
\begin{align*}
\text{E}(e_{it}) &= 0 \quad \text{(i)} \\
\text{E}(e_{it}^2) &= \sigma_{ii} \quad \text{(ii)} \\
\text{E}(e_{it}, e_{ij}) &= \sigma_{ij} \quad \text{(iii)} \\
e_{it} &= \rho_i e_{i,t-1} + u_{it} \quad \text{(iv)}
\end{align*}
\]

where
\[ u_{it} \sim N(0, \phi_{ii}) \]  
(v)

\[ E(e_{i,t-1}, u_{it}) = 0 \]  
(vi)

\[ E(u_{it}, u_{jt}) = \phi_{ij} \]  
(vii)

\[ E(u_{it}, u_{js}) = 0, \ (t \neq s) \]  
(viii)

\[ E(e_{i0}) = 0 \]  
(ix)

\[ E(e_{i0}, e_{j0}) = \frac{\phi_{ij}}{1 - \rho_i \rho_j} \]  
(x)

Equations (ii), (iii) and (iv) are the heteroscedastic, contemporaneous correlation and autocorrelation of the disturbances. Equations (ix) and (x) are assumptions regarding the initial value of \( e \).

The variance/covariance matrix \( \Omega [E(ee')] \) is:

\[
\Omega = \begin{bmatrix}
\sigma_{11}P_{11} & \sigma_{12}P_{12} & \ldots & \sigma_{1N}P_{1N} \\
\sigma_{21}P_{21} & \sigma_{22}P_{22} & \ldots & \sigma_{2N}P_{2N} \\
\vdots & \vdots & \ddots & \vdots \\
\sigma_{N1}P_{N1} & \sigma_{N2}P_{N2} & \ldots & \sigma_{NN}P_{NN}
\end{bmatrix}
\]

where
Thus the model assumes that (1) the disturbance vector for a given firm follows a first-order autoregressive process; (2) the variance of the disturbance can be different for different firms; (3) the disturbances for different firms are contemporaneously correlated; and (4) the coefficients \( \beta \) are the same across the firms. For the regression equation estimated in the test, the coefficients for the intercept and size are assumed to be the same across firms. Under the null hypothesis of no difference in the direct information content of accounting earnings, the coefficient for the unexpected accounting earnings would be the same across all firms. Under the alternative hypothesis of difference in the direct information content of accounting earnings, this coefficient would be different across the two groups of firms.

Under the assumptions listed, the variance/covariance matrix \( \Omega \) is estimated by a two-stage process. After estimation of the \( \Omega \), the vector of parameters \( \beta \) is estimated by the estimated generalized least squares method (EGLS). Under the EGLS method, an estimate, \( \hat{\Omega} \), replaces the \( \Omega \), in a generalized least squares estimator (SAS, [1985], pp.629-631).

The first step in the estimation of \( \Omega \) uses the ordinary least squares (OLS) on the specified model to estimate the OLS \( \beta \) and obtain the fitted residuals:
\[ U = Y - X \beta_{OLS} \]

A consistent estimator of the first-order autoregressive parameter is then obtained as:

\[
\rho_1 = \frac{\sum_{j=2}^{T} U_{ij} U_{i,j-1}}{\sum_{j=2}^{T} U_{i,j-1}^2}
\]

The autoregressive portion of the data is then removed by the usual transformation of weighted differences.

In the second step, OLS is applied to the transformed model. The residuals are used to obtain an estimate \( \hat{\Omega} \), which is a consistent estimator of \( \Omega \). EGLS then substitutes this estimate \( \hat{\Omega} \) for \( \Omega \), to obtain the parameters:

\[
\hat{\beta} = (X'\hat{\Omega}^{-1}X)^{-1} X'\hat{\Omega}^{-1}y
\]  \hspace{1cm} (14)

Parks [1967] shows that this estimator is consistent and asymptotically normally distributed with:

\[
\text{Var}(\hat{\beta}) = (X'\hat{\Omega}^{-1}X)^{-1}
\]

As mentioned earlier, the above tests are repeated using a variance component model and a mixed variance component, moving average model. The assumptions of these other two methods and the estimation processes are described in Appendix B. The results
using the Parks' method and the variance component model and the mixed variance component, moving average model are presented in Chapter 6.

The following regression equation is estimated:

\[
ER_{jq} = \beta_0 + \beta_1 UE_{jq} + \beta_2 S_{jq} + \beta_3 D_j UE_{jq} + e_j
\]  \hspace{1cm} (15.1)

where:

- \( ER_{jq} \) is the risk adjusted excess return for firm \( j \) (\( j=1,\ldots,12 \)) at quarterly announcement \( q \) (\( q=1,\ldots,Q \)) where the second quarter of 1984 is \( q=1 \), ...., and the first quarter of 1987 is \( q=12 \), measured by the absolute value of the standardized residual return;

- \( UE_{jq} \) is the unexpected accounting earnings for firm \( j \) at announcement \( q \), measured by the absolute value of the relative forecast error;

- \( S_{jq} \) is a measure of size of firm \( j \) at announcement \( q \) measured by the natural logarithm of the market value of the firm;

- \( D_j \) is a dummy variable, indicating whether firm \( j \) is a smoothing or non-smoothing firm. \( D_j=1 \) when the firm is smoothing and \( D_j=0 \) when the firm is identified as non-smoothing; and

- \( e_j \) is the regression error term.

The variables in the regression equation are operationally defined in the subsections 5.4.1a to 5.4.1c.

The coefficient \( \beta_1 \) is expected to be positive because of the relationship between unexpected earnings and price changes (Beaver, Clarke and Wright [1979]). \( \beta_1 \) would be the measure of the direct information content of unexpected accounting earnings. Prior
research (Atiase [1985], Freeman [1987]) would suggest that the coefficient $\beta_2$ should be negative because of the inverse relationship between the security returns and firm size.

$\beta_3$ is the coefficient which would provide the basis to statistically test for differences in the direct information content of accounting earnings (Choi [1985]) between smoothing and non-smoothing firms. The dummy variable $D$ is coded 1 or 0 based on whether the firm is smoothing or non-smoothing. When the firm is identified as non-smoothing, $D=0$, and hence the regression equation 15.1 is:

$$ER_{jq} = \beta_0 + \beta_1 UE_{jq} + \beta_2 S_{jq} + \epsilon_j \quad (15.2)$$

For the smoothing firm, $D=1$, and hence the regression equation 11.1 is:

$$ER_{jq} = \beta_0 + (\beta_1+\beta_3) UE_{jq} + \beta_2 S_{jq} + \epsilon_j \quad (15.3)$$

If there is no difference in the direct information content of the unexpected accounting earnings at the time of announcement for smoothing and non-smoothing firms, then $(\beta_1+\beta_3)$ would not be significantly different from $\beta_1$, i.e., $\beta_3$ would not be significantly different from 0. However, if there is any difference in the direct information content of unexpected accounting earnings, then this coefficient, $\beta_3$, would be significantly different from 0. Therefore, the hypothesis of a difference in the direct information content of unexpected accounting earnings for the two groups can be stated as:

$$H_1^0: \beta_3 = 0$$

and

$$H_1^1: \beta_3 \neq 0.$$
Since $D_j$ has a value of 1 for smoothing firms, the coefficient for the unexpected accounting earnings of smoothing firms is $(\beta_1 + \beta_3)$. The coefficient for the non-smoothing firms is $\beta_1$. If the null hypothesis can be rejected, then $\beta_3 \neq 0$, and the security market reactions to the unexpected earnings of smoothing firms is significantly different from the market reactions to the unexpected earnings of the non-smoothing firms at the time of announcements of accounting earnings. If $\beta_3$ is negative, then the coefficient for the smoothing firms is lower than that for the non-smoothing firms. If, on the other hand, $\beta_3$ is positive, then the market reaction to the unexpected earnings of the smoothing is significantly higher than the market reactions to the unexpected accounting earnings of the non-smoothing firms.

In the following sections, the variables used in the regression analysis are operationally defined.

5.4.1a. Risk adjusted excess return

The risk-adjusted excess return is calculated using the Sharpe [1964] market model. The following market equation is estimated using OLS:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + e_{jt}$$

where $R_{jt}$ and $R_{mt}$ are the returns at $t$ for the security $j$ and the market portfolio $m$ respectively. The value-weighted market portfolio in the CRSP file is used as the market portfolio in the above estimation. The firm specific parameters $\alpha$ and $\beta$ are estimated using the daily returns in the quarter prior to the one for which the earnings are released. For example, for a quarterly earnings announcement for the second quarter of 1984, the market model is estimated using the daily returns for the trading days in the first quarter of 1984.
The risk-adjusted excess return ($AR_{jt}$) during the announcement period is then given by:

$$AR_{jt} = R_{jt} - \hat{\alpha}_j - \hat{\beta}_j R_{mt}.$$  

The earnings announcement period is defined as the day before and the report date of quarterly earnings per share in the *Compustat* quarterly file. The report date in the *Compustat* quarterly file is the date, "on which the quarterly earnings per share are first publicly reported in the various news media (such as *The Wall Street Journal* or the *Dow Jones News Service*)," (SPCS [1987], p.80). The actual announcement of the earnings per share can be expected to have occurred on the day prior to the report in the news media, and hence, the return on the day prior to the report date is also included in the risk-adjusted excess return following the event.

The cumulative excess return for the two-day announcement period, $AR_{jq}$, is:

$$AR_{jq} = AR_{j,-1} + AR_{j,0}$$

where $t=0$ is the date of announcement.

Thus, for each firm $j$, at the time of announcement of quarter $q$'s earnings per share, the risk-adjusted excess return is:

$$ER_{jq} = |AR_{jq}|.$$  

**5.4.1b. Unexpected accounting earnings**

The unexpected accounting earnings for firm $j$ for quarter $q$ ($UE_{jq}$) is operationally defined as the absolute value of the forecast error of the firm's accounting earnings, i.e.,
\[ UE_{jq} = \left| \frac{(EPS_{iq} - FEPS_{iq})}{EPS_{jq}} \right| \]

EPS$_{jq}$ is the actual quarterly earnings per share announced by firm j for quarter q, and FEPS$_{jq}$ is the financial analysts' mean forecast of quarterly earnings per share for that firm for quarter q. The financial analysts' mean forecast is used as a proxy for the market expectation of the quarterly earnings per share. EPS$_{jq}$ and FEPS$_{jq}$ are obtained from the IBES file. This measure of unexpected earnings has been used in past (Fried and Givoly [1982]; Choi [1985]). Following Choi [1985], the unexpected earnings measure with values of UE$_{jq}$ greater than 3 were set equal to 3 to avoid the problem of high values for UE$_{jq}$ because of small denominator. This would also avoid any distortive effect of potential data errors. Studies have shown that analysts' forecasts possess better predictive ability than earnings expectation models and incorporate more timely and comprehensive information about expectations (Brown and Rozeff [1978, 1979]; Givoly and Lakonishok [1979]; Fried and Givoly [1982]).

5.4.1c. Firm size

Prior research (Atiase [1985]; Freeman [1987]) has shown that firm size and information content of accounting earnings are inversely related. A variable $S_{jq}$ is included in the regression analysis to control for firm size. This variable is measured by the natural logarithm of the market value of the firm's common stock outstanding at the end of the quarter. This corresponds to the size-variable used by Atiase [1985] and Choi [1985]. The data for the closing share price and the number of common shares outstanding are obtained from the Compustat quarterly file.
5.4.2. Differences in the Indirect Information Content

Differences in the indirect information content of accounting earnings are tested by analyzing the cumulative average abnormal returns (CAAR) for the respective portfolios of smoothing and non-smoothing firms.

The CAAR analysis employed in this study modifies the methodology used by Freeman [1987]. Two portfolios are formed for each year, one for smoothing firms and one for non-smoothing firms. In each portfolio, a firm is defined as a good news firm if its annual earnings per share is greater than the market expectation and as a bad news firm if its annual earnings per share is lower than the market expectation. For this analysis, the financial analysts' year-ahead mean forecast is used as the market's expectation of the firms' earnings per share. In each portfolio, long positions are taken in good news firms and short positions are taken in bad news firms for each respective classification. This procedure eliminates the problem associated with abnormal returns of good news firms in a portfolio and the abnormal return of bad news firms in the same portfolio offsetting each other.

Average abnormal returns (AAR) are then calculated for good news firms and bad news firms for each of the portfolios over the period of 12 months, that is 9 months of the fiscal year and the three months following the fiscal year. The AAR for the J good news firms in the smoothing portfolio is:

$$\text{AAR}(S)_{jt} = \frac{1}{J} \sum_{j=1}^{J} \text{AR}_{jt}$$

where \( \text{AR}_{jt} \) is the market model residual for firm \( j \) in month \( t \).

The AAR for the \( J' \) bad news firms in the smoothing portfolio is:
\[ AAR(S)_{bt} = \frac{1}{J'} \sum_{j=1}^{J'} AAR_j' \]

and

\[ J' + J = \text{the number of firms in the portfolio}. \]

Given the long and short positions, the AAR for the entire portfolio of smoothing firms is:

\[ AAR(S)_t = AAR(s)_{gt} - AAR(s)_{bt}. \]

The cumulative abnormal returns (CAARs) are then calculated for each month \( t = 1, \ldots, 12 \). The CAARs, therefore, for smoothing firms is,

\[ CAAR(S)_T = \sum_{t=1}^{T} AAR(S)_t \]

Similarly, CAARs for the non-smoothing firms is:

\[ CAAR(N)_T = \sum_{t=1}^{T} AAR(N)_t \]

The CAARs for the two portfolios for each of the periods are then tested using the \( t \) statistics for any significant differences between the portfolios of smoothing and non-smoothing firms. Since CAARs measure the magnitude in the reactions to the unexpected accounting earnings of firms in the two portfolios, differences in the CAAR values will test
the extent of the differences in the market reactions to unexpected accounting earnings of
the smoothing and the non-smoothing firms.

The CAARs for the years tested are also pooled across the years in the sample. The
pooled CAARs are then plotted against time (months -8 to 3) which gives a graphical
indication of the difference in the timing and magnitude of such reactions.

Prior research indicates that the abnormal market security returns precede
accounting earnings by several months (Beaver, Lambert and Morse [1980]) and persist
after the announcement of earnings (Foster, Olsen and Shevlin [1984]). The latter is
commonly referred to as "post-earnings-announcement drift." This adjustment process is
in addition to any reaction at the time of announcement. Accumulating the abnormal returns
over a period of 12 months beginning in the second quarter (April) of the fiscal to the end
of the first quarter of the following year would capture this adjustment process, and form
the basis to conclude about the indirect information content of accounting earnings.

If the market reactions and adjustments to earnings announcements do not differ
between the smoothing and non-smoothing firms, then there would be no significant
difference between the CAARs of the two groups (null hypothesis). However, when the
market reactions to the unexpected accounting earnings are different, the movement of the
CAARS for the two groups would be different. This difference in the movement of the
CAARs between the two groups would depend upon the anticipated effect of some of the
components of earnings on cash flows and other financial variables of the firms. When
smooth income provides additional information which permits a better prediction of future
cash flows, there would be less uncertainty and hence, the market would react to this
additional information immediately. In the case of non-smoothing firms, however, there
would be a higher level of uncertainty associated with the earnings, and consequently cash
flows. The uncertainty would extend till after the announcement date and hence, the
reaction would extend over a longer time and be higher at the time of announcement. This hypothesized behavior is graphed in Figure 1.

Alternatively, when managers of smoothing firms obscure information, the market uncertainty regarding future earnings and cash flows prior to the earnings announcements would be higher for the smoothing firms relative to the non-smoothing firms. Under these circumstances, as the relative uncertainty gets resolved, the market reaction would be greater for the smoothing firms when compared to the non-smoothing firms. This hypothesized behavior, graphed in Figure 2, would be the opposite of that depicted in Figure 1.

5.4.3. Test for Differences in Systematic Risk

The test for differences in the systematic risk of the smoothing and non-smoothing firms involves the computation of the beta based on the firm's and market returns using the Sharpe [1964] model. This is similar to the betas computed in the earlier tests for differences in the direct and indirect information content of accounting earnings. The beta for each firm is estimated by an OLS regression of the firm's monthly returns on the market index return for a period of 36 months prior to the beginning of each of the test years. The mean beta for the smoothing firms is then compared to the mean beta of the non-smoothing firms by using a t test. The t statistic for testing the equality of means assumes that the population variances of the two groups are equal. Under that assumption, the statistic is:

\[ t = \frac{(X_1 - X_2)}{\sqrt{s^2 \left( \frac{1}{N_1} + \frac{1}{N_2} \right)}} \]

where \( s^2 \) is the estimated pooled variance:
\[ s^2 = \frac{\{(N_1 - 1) s_1^2 + (N_2 - 1) s_2^2\}}{(N_1 + N_2 - 2)} \]

However, when the variances in the two population cannot be assumed to be equal and there is an unequal number of observations in each group (as in this test), the value for the degrees of freedom is corrected as follows:

\[ \text{Corrected df} = \frac{(s_1^2/N_1 + s_2^2/N_2)}{((s_1^2/N_1)^2/(N_1-1) + (s_2^2/N_2)^2/(N_2-1))} \]

In such circumstances, the \( t \) statistic is computed as follows:

\[ t = \frac{(X_1 - X_2)}{\sqrt{s_1^2/N_1 + s_2^2/N_2}} \]

rather than with the use of the estimated pooled variance.

The betas for the two groups, smoothing and non-smoothing, are first tested for the assumption that the variances are equal by using the following \( F' \) statistic:

\[ F' = \frac{(\text{Larger of } s_1^2, s_2^2)}{(\text{Smaller of } s_1^2, s_2^2)} \]

which is a two-tailed \( F \) test.

**5.4.4. Test for Differences in Variability of Dividends**

The changes in dividend payments for smoothing and non-smoothing firms are tabulated using a 3 X 2 table and differences are tested for by the use of chi-square statistics. The changes in the dividends declared per share for the firms for the years 1984 to 1986 are classified under three categories as follows:
(1) **No Change (NC):** When the dividends declared per share for the current year is the same as the dividends declared in the previous year,

(2) **Increase (INC):** When the dividends declared per share for the current year is greater than the dividends declared in the previous year

(3) **Decrease (DEC):** When the dividends declared per share for the current year is less than the dividends declared in the previous year

The changes are cumulated for each of the above three categories for the two groups of firms for the three years from 1984 to 1986 and for each of the three years. Any differences in the changes in dividends declared by the two groups is then tested by the use of a chi-square statistic.
Chapter 6

EMPIRICAL RESULTS AND EVALUATION

The sample selection process described in section 5.1 and a cutoff value of -0.95 for the correlation coefficient between cash flows and accruals resulted in 133 firms being included in the final sample, 104 of which are identified as smoothing and 29 as non-smoothing. A list of all the firms included in this final sample with their SIC code and identification status is given in Appendix C.

As described in chapter 2, research on identification of smoothing behavior has found moderate to strong support for managerial income smoothing. This study identifies a firm as non-smoothing when the addition of accruals to cash flows increases the variance of its earnings, i.e., \( \text{Var} (X) > \text{Var} (C) \). In other words, these firms not only do not use accounting accruals to significantly reduce the variability of their earnings, but in fact have a higher variance for their reported earnings relative to their cash flows. This would explain the difference in the number of smoothing and non-smoothing firms. The choice of the cutoff value determines the number of smoothing firms in the sample. A value of -0.95 was selected so as to contrast the firms whose accruals are significantly and negatively correlated with their cash flows.

A sample of 43 firms are identified as income smoothers with the use of current discretionary choices. A cutoff value of -0.70 is used for the correlation coefficient between cash flows and current discretionary accruals. These 43 firms and the 29 firms identified earlier as non-smoothers, make this second sample to have 73 firms.

The average mean and variance of the income from continuing operations, cash flows from operations and accruals for the sample of 133 firms using total accruals are presented in Table 1. The same data for the sample of 72 firms using the current discretionary accruals are presented in Table 2. The average mean value of income, cash
flows and the absolute value of accruals are significantly larger for the sample of 133 firms. The differences are not significant for the sample of 72 firms using current discretionary accruals. The average variance of cash flows and accruals are significantly larger for smoothing firms using total accruals. However, the average variance of income for these firms are not significantly different from the average variance of the income of non-smoothing firms. When the current discretionary accruals are used, only the average variance of income is different with a t value of 1.8752 significant at 0.10.

Descriptive information on certain economic characteristics of the firms are presented in section 6.1. Sections 6.2 and 6.3 gives the results of the empirical tests for differences in the information content of accounting earnings. Sections 6.4 and 6.5 present the empirical results on firm risk and dividend variability respectively for smoothing and non-smoothing firms. Section 6.6 summarizes the empirical results.

6.1. Descriptive Characteristics

Table 3 presents the market value, average sales, total assets, net income, debt equity ratio and debt to tangible equity ratio for the years 1984, 1985 and 1986 respectively for the sample of 133 firms which have been identified as smoothers using total accruals as the instrument of smoothing.

For each of the years, the average market value and the average sales are different for the two groups of non-smoothing and smoothing firms with t values significant at 0.05 level. The average total assets for the two groups is different in 1984 with a t value of 2.0290. However, the average total assets are not significantly different in 1985 and 1986. Assuming these variables to be proxies for firm size, the smoothing firms, on an average, are larger than the non-smoothing firms in each of the three years. This confirms the need for the inclusion of a variable representing size in an analysis for differences in the
information content of accounting earnings. As discussed earlier, such an approach would conform to prior research (Atiase [1985]; Freeman [1987]).

It should, however, be noted for subsequent analysis that a comparability problem between this study and Freeman's work does exist. Freeman [1987] confirmed Atiase [1985] that an inverse relationship exists between firm size and the information content of accounting earnings. Freeman, however, in looking at the period 1966 to 1982, classified firms as large and small using the top and the bottom quartiles of market values respectively. His large firms in 1982 had an average beginning of the year market value of 3574 ($ million) and an average for the small firms of 61 ($ million). In this study, it should be noted that the average market value for non-smoothing firms is lower than the average market value for smoothing firms, leading to the conclusion that these firms are smaller. However, the average market value for non-smoothing firms at the end of 1984 is 609.9 ($ million). They are, therefore, much larger than the "small" firms in Freeman's analysis.

Given a positive correlation between total assets and depreciation, and sales and other accruals, a larger value of total assets and sales would result in a higher level of accruals. Thus, managers of those firms potentially would have a wider range of accruals to manipulate and smooth income. Hence, it is not surprising that larger firms use total accruals to smooth income much more than smaller firms, which tend to be non-smoothers.

Table 4 presents similar data for the sample of 72 firms using current discretionary accruals. There is no significant difference in the size of the 43 smoothing firms and 29 non-smoothing firms.

The debt to total-equity and debt to tangible-equity ratios are not significantly different between smoothing and non-smoothing firms.

The industry classification of the sample is presented in Table 5. The majority of the firms in the sample belong to the manufacturing classification, with 50 and 23 firms in
the smoothing and non-smoothing groups respectively. 27 of the 104 smoothing firms are in SIC single digit 4 classification, which includes public utilities. There are no non-smoothing firms in this category. Though the procedures for testing for differences in the direct information content of accounting earnings incorporate cross-sectional dependencies, which would include industry effects, the tests are repeated using a reduced sample of 106 firms which excludes these 27 firms.

6.2. Differences in Direct Information Content

The summary statistics and simple correlations for the dependent and the independent variables for the sample of 133 firms, segmented by smoothing behavior, are presented in Table 6. The dependent variable, risk adjusted abnormal return, and the independent variables size and unexpected accounting earnings have the hypothesized signs. The firm size, $S_j$ (log market value), is negatively correlated with the risk adjusted abnormal return $ER_j$, consistent with prior results. Unexpected accounting earnings $UE_j$ and $ER_j$ are positively correlated, also consistent with prior information content studies.

The multiple regression analysis for tests of differences in the direct information content of accounting earnings consists of estimating and testing the following two models:

Model 1: Equation 15.1 without the dummy variable for smoothing:

$$ER_{jq} = \beta_0 + \beta_1 UE_{jq} + \beta_2 S_{jq} + e_j$$

Model 2: Equation 15.1 with the dummy variable for smoothing:

$$ER_{jq} = \beta_0 + \beta_1 UE_{jq} + \beta_2 S_{jq} + \beta_3 D_j UE_{jq} + e_j$$

The differences in the $R^2$ between model 1 and model 2 gives the incremental explanatory power of the smoothing classification.

These two models were estimated using each of the following four methods:
Method 1: OLS estimation.

Method 2: Pooled time series cross-sectional regression analysis using the Parks method (a first-order autoregressive, heteroscedastic and contemporaneously correlated error structure) as discussed in section 5.4.1.

Method 3: Pooled time series cross-sectional regression analysis using the Fuller and Battese method (a variance component model) described in Appendix B.

Method 4: Pooled time series cross-sectional regression analysis using the Da Silva method (a mixed variance-component moving average model) described in Appendix B.

The regression estimates for the full sample of 133 firms are presented in Tables 7 and 8. 27 firms belonging to the SIC two-digit classifications 40 to 49 (utilities) were dropped and models estimated for the reduced sample of 106 firms. The regression estimates for the reduced sample are presented in Tables 9 and 10. In addition, as discussed in section 5.2, firms were identified as smoothing based on the current discretionary accruals. The regression estimates for the 72 firms and a reduced sample of 65 firms (which excludes futilities) are presented in Tables 11 to 14.

For the full sample of 133 firms, both the models are significant at the 0.0001 level with F values of 43.250 and 33.057 respectively. The inclusion of the smoothing classificatory variable increases the $R^2$ from 0.0515 to 0.0586. The coefficients for firm size and unexpected earnings have the hypothesized sign. The coefficient for firm size, $\beta_2$, is negative and significant. The coefficient for unexpected earnings, $\beta_1$, is positive and significant. The coefficient $\beta_3$ for the dummy variable is significantly negative across the different methods.

The negative value for the coefficient $\beta_3$ means that the earnings response (i.e., coefficient for the unexpected accounting earnings) for the non-smoothing firms is higher
than that for the smoothing firms. In other words, the market reaction to unexpected earnings at the time of announcements is higher for non-smoothing firms than for smoothing firms. This result is consistent across the different samples and different estimation methods. The models are significant for each of the other three samples: (1) the sample excluding utilities, (2) the sample using the current discretionary choice as the smoothing instrument, and (3) sample 2 excluding utilities.

The regression results lead to the following conclusions:

(1) As hypothesized, firms size and risk adjusted excess returns are inversely related.

(2) There is a significant difference in the market reactions to unexpected accounting earnings at the time of earnings announcements. The mean unexpected earnings for the non-smoothing firms is higher than that for the smoothing firms. The earnings response for the unexpected earnings of non-smoothing firms at the time of announcements of accounting earnings is higher compared to the earnings response for the unexpected earnings of smoothing firms. This difference persists even after controlling for firm size.

6.3. Differences in the Indirect Information Content

The cumulative average abnormal returns for each of the years 1984, 1985 and 1986 and the average CAARs for the three years are presented in Table 15, with the t statistics and significance levels. The average CAARs are different for the two groups. On an average, non-smoothing firms have a much higher CAAR than smoothing firms over the three years. This is graphically presented in Figure 3. On an average, abnormal returns for smoothing firms begin marginally earlier than for non-smoothing firms. However, the magnitude of the CAAR over the 12 month period is higher for the non-smoothing firms.
The difference in the magnitude of the CAAR between the smoothing and non-smoothing firms confirms the results of the tests for differences in the direct information content of unexpected accounting earnings. The magnitude of market reactions for non-smoothing firms is not only higher at the time of earnings announcements, but also prior-to and after the accounting earnings announcements.

The tests for differences in the indirect information content do not control for the effects of firm-size and the magnitude of unexpected earnings. The regression analyses for differences in the direct information content includes the effects of firm-size and magnitude of unexpected earnings. Since the differences in the CAAR between non-smoothing and smoothing firms are in the same direction as at the time of earnings announcements, it is possible to conclude that there are similar differences in the indirect information content of unexpected accounting earnings.

6.4. Differences in Systematic Risk

Table 16 presents the mean and the standard deviations of the systematic risk, beta, and the t statistic for the mean difference between smoothing and non-smoothing firms. As explained in section 5.4, the t statistics reported uses unequal variances when the F' statistic is significant at 0.05 and equal variances otherwise. The F' statistic is significant for 1984 and 1985.

The betas for the smoothing and non-smoothing firms are significantly different for each of the three years at at least 0.05 level. The mean beta for non-smoothing firms is higher than the mean beta for smoothing firms. In 1986, the mean beta for non-smoothing firms is 1.54 relative to the mean beta of 1.05 for the smoothing firms. The standard deviations of the beta for the two groups appear to be different. The betas for the non-smoothing firms have a higher standard deviation relative to the smoothing firms.
6.5. Differences in the Variability of Dividends

The summary of dividend changes for smoothing and non-smoothing firms cumulated for the three years is presented in Table 17 and for each of the years 1984, 1985 and 1986 in Table 18. The chi-square statistics for the cumulative data and for each of the years is significant at a minimum level of 0.03. There are significant differences in the changes of dividends declared between smoothing and non-smoothing firms. The non-smoothing firms appear to have less changes in dividends when compared to smoothing firms. For the three years, 67.8% of the non-smoothing firms did not change their dividends declared per share compared to the previous year. Only 34.6% of the smoothing firms did not change their dividends declared per share. Smoothing firms also, on average, have a much higher percentage of both increases and decreases in dividends declared, with 46.2% and 19.2% respectively, compared to 19.6% and 12.6% for the non-smoothing firms. This difference is common to each of the three years as shown by the results in Table 18.

The above analysis includes firms which have not declared any dividends. These firms have been classified as having had no change in their dividend payments. Table 19 presents a similar analysis excluding those firms which have not paid dividends at all (i.e., those firms which have not initiated dividend payments). The chi-square value of 11.4 for this analysis is significant at 0.003. The difference between non-smoothing and smoothing firms in the percentage with dividend decreases is smaller, with 19.6% of the non-smoothing and 21.2% of the smoothing firms having decreased dividend payments. The major differences are in the number of firms with no change and increase in their dividend payments. 50% of the non-smoothing firms have not changed their dividends compared to 27.9% of the smoothing firms. However, only 30.4% of the non-smoothing firms have increased their dividends compared to 50.9% of the smoothing firms.
6.6. Summary of empirical results

The primary conclusion of the empirical analyses is that there are differences in the information content of unexpected accounting earnings, the systematic risk and dividend changes for smoothing and non-smoothing firms. The direct information content of unexpected accounting earnings during a two-day test period around the announcement date is significantly higher for non-smoothing firms. This difference persists for some time following the announcement as confirmed in the test for differences in the indirect information content of earnings for a 12-month period from April of the fiscal year to March of the following year. Over the three years, 1984 to 1986, though the market reactions occur marginally earlier for the smoothing firms, the cumulative average abnormal returns for the non-smoothing firms is higher. The systematic risk is significantly smaller for the smoothing firms than for the non-smoothing firms for the same three year period. Smoothing firms have more changes in dividends declared per share, both increases and decreases, during the three years, relative to the non-smoothing firms.

The empirical results of the tests for differences in information content of accounting earnings confirm prior findings in security market research that, (1) the security market reaction to the announcements of accounting earnings is an increasing function of the unexpected portion of accounting earnings, and (2) the security market reaction to accounting earnings is inversely related to the size of the firm. The empirical tests in this study show that even after controlling for the size of a firm, the security market reaction to the unexpected accounting earnings of smoothing firms is different from the market reaction to the unexpected earnings of non-smoothing firms.

The differences in the market reactions to the unexpected accounting earnings of the two groups of firms, both at the time of announcement of earnings and a period following the announcement, lead to the conclusion that the earnings of non-smoothing firms have more information content. The stronger market reaction at the time of earnings
announcements (direct information content) exists across different sub-samples and estimation methods. The differences in the market reactions around the period of announcements persists in the months following the quarterly and annual announcements (indirect information content).

The result rejects the null hypothesis of no differential information content. In chapter 4, two alternative perspectives were considered. Under the first alternative, the security market is postulated to have a narrower range of expectations for the earnings of smoothing firms than for the non-smoothing firms. Consequently, when reported earnings fall outside this range for the smoothing firms, the market reaction is likely to be stronger. For the non-smoothing firms, the range of market expectations would then be wider and hence, the market reaction is likely to be lower than that for the smoothing firms. Under the other alternative, investors are postulated to have a greater prior degree of uncertainty about the earnings level of non-smoothing firms than for the smoothing firms. This implies, ceteris paribus, stronger investor reaction to earnings disclosures of non-smoothing firms.

The empirical results support the latter line of reasoning. The security market reactions at the time of quarterly earnings announcements indicate that the investors are primarily concerned with the uncertainty of the future earnings and cash flows of firms. As such, the market reacts more strongly to the earnings of non-smoothing firms. Furthermore, the post-announcement drift is also more pronounced for a few months following the earnings announcements of non-smoothing firms.

Data on the systematic risk of smoothing and non-smoothing firms confirms this inference. Ceteris paribus, the systematic risk of firms with a higher uncertainty of future earnings and cash flows would be expected to have a higher systematic risk. If the market's prior level of uncertainty for the future earnings and cash flows of the non-smoothing firms is higher than that of the smoothing firms, then the systematic risk of the
non-smoothing firms can be expected to be higher. The results in Table 16 are consistent with this argument.

The dividend changes results in Table 17 needs to be interpreted with caution. The results show that non-smoothing firms have fewer dividend changes than smoothing firms. It may very well be that the non-smoothers, recognizing that the market has higher uncertainty about their future earnings and cash flows, try to mitigate the uncertainty with a more stable dividend pattern. However, when firms that have not initiated dividend payments are excluded, the difference between non-smoothing and smoothing firms in the percentage of firms decreasing dividend payments almost disappears. Though a smaller percentage of smoothing firms do not change their dividends when compared to non-smoothing firms, a much larger percentage of smoothing firms increase their dividends. This is consistent with the usual dividend signalling model.

In summary, the results of the empirical analyses confirm that there are significant differences between smoothing and non-smoothing firms. The differences in the market reactions to the accounting earnings announcements and the differences in the systematic risks of smoothing and non-smoothing firms would lead to the conclusion that there is a higher uncertainty relating to the future earnings and cash flows of non-smoothing firms. This higher uncertainty results in higher market reaction at the time of earnings announcements and a higher systematic risk for non-smoothing firms. Moreover, the non-smoothing firms are less prone to effect changes in their dividends, probably due to the higher uncertainty in the market's expectations of future earnings and cash flows.
Chapter 7

CONCLUSIONS

This study presented the managerial choice of discretionary accounting methods as being based on a reporting objective. The measurement and communication of the transactions of a public firm are governed by statutory bodies like the FASB and the SEC. Firms are required to use an accrual basis of accounting for transactions and adherence to this is verified by independent auditors. However, within this mandated accrual system, managers have considerable discretion initially to choose particular accounting methods. Subsequently they have the discretion to change from one accounting method to another or to change an underlying accrual assumption, for example the useful life of a fixed asset. This original choice and subsequent changes can be used by managers to fulfill their reporting objectives.

Income smoothing is a reporting behavior by which managers reduce the volatility of reported earnings over time. This smoothness in reported earnings can be achieved by managers by means of decisions which affect the economic events of an entity or by affecting how these economic events are reported to outside users. This study concentrated on the managerial use of the financial reporting process to smooth income.

This dissertation had two stated objectives. First, to develop a model of accounting choice which would describe and explain how managers would use the choice of discretionary accounting methods in the reporting process to achieve a reporting objective, namely smooth income. The second objective was to evaluate empirically security market reactions to the accounting reports of these smoothing and non-smoothing firms for any differences in the information conveyed by the financial statements and used by investors.

Even though a number of past studies have looked at managerial income smoothing, with fairly strong empirical evidence that managers do engage in such
smoothing behavior, existing models are deficient from a number of methodological perspectives. This study attempted to provide some improvements. One problem common to most previous studies has been the unsatisfactory means employed to identify smoothing behavior. Central to the specification of the model used in this study was an analysis whereby managerial smoothing using investing, financing and operating variables was effectively isolated from the use of reporting variables. By identifying managerial smoothing as the reduction in the variance of earnings relative to cash flows, the model separated the effects of the reporting variables from other economic variables.

The use of the cash flows as a benchmark facilitated the identification of smoothing behavior without the specification of an earnings model which would otherwise have been necessary. The specification of an earnings model is necessarily arbitrary and any errors in the specification of the earnings model would result in misidentification. The isolation of the effects of the reporting variables from other financing, investing and operating decisions permitted better conclusions about the choice of accounting methods and the impact of such choices on financial statements.

In looking at the managerial use of the measurement and communication process to smooth reported income, this study examined a choice of a portfolio of accounting methods over time. Previous research had looked at a limited number of accounting accrual methods as the instrument of smoothing. The interactive effects of the different accrual methods necessitate the examination of a complete set of accounting accrual methods. This study achieved this by considering a portfolio consisting of a complete set of accrual methods and their accumulative effect over a period of time.

The second objective of this dissertation was to evaluate empirically differences, if any, in security market reactions to the financial statements of smoothing and non-smoothing firms. The empirical tests for differences in the security market evaluation of the accounting information consisted of,
(1) tests for the differences in the direct information content of accounting earnings by the use of a pooled time-series cross sectional regression analysis,

(2) tests for differences in the indirect information content by analyzing the cumulative average abnormal returns,

(3) tests for differences in the systematic risks by comparing betas and

(4) tests for differences in changes in dividends declared by means of a chi-square analysis.

The empirical analyses provided statistical evidence that there are differences in the information conveyed through the financial statements of smoothing and non-smoothing firms.

The empirical tests for differences in the direct and indirect information content of accounting earnings indicated that the earnings releases of non-smoothing firms result in a higher market reaction relative to the earnings releases of smoothing firms. This study concluded that this difference in the reactions to unexpected earnings is probably due to the differences in the uncertainty in the market expectations of future earnings and cash flows. The security market appears to have a much lower uncertainty about the future earnings and cash flows of smoothing firms. Hence, the earnings announcements result in a lower reduction of uncertainty, and subsequently a lower price reaction at the time of earnings announcements. The market appears to have a higher level of uncertainty about the future earnings and cash flows of the non-smoothing firms. This uncertainty is reduced by a higher degree at the time of earnings releases resulting in a higher price reaction.

The results of the tests for differences in the systematic risk and dividends were consistent with the conclusions about the level of uncertainty regarding the future earnings and cash flows of these firms. The average systematic risk of the smoothing firms was significantly lower than that for the non-smoothing firms. The dividends were changed
less often by non-smoothing firms indicating that these firms use dividends as a signalling device to reduce the level of prior market uncertainty about their future financial performance. However, when firms that have not initiated dividends were excluded, the difference in the percentage of firms decreasing their dividends was considerably narrowed.

This study was also concerned with examining the managerial motivations for smoothing. As explained in sections 2.1 and 2.5, previous research had largely ignored this aspect of income smoothing. This is hardly surprising since it is very difficult either to observe directly the actual smoothing behavior or to elicit and verify managerial explanations of this behavior. This study approached the problem from another direction.

In developing the hypothesis of the differential information content of accounting earnings for smoothing and non-smoothing firms, it attempted to associate the managerial motivations to engage in smoothing to security market reactions to successful smoothing attempts.

This line of analysis starts from the premise that managers can successfully smooth income using the accounting reporting process. Two alternative explanations were considered for this behavior. Either managers sought to provide the market with additional information which would enable the market to better predict future earnings and cash flows or managers sought to convey a misleading impression of the financial performance of the entity. If managers convey additional information, then one might anticipate the market to have a lower uncertainty about future earnings and cash flows. This would result from the past smoothing behavior and the additional information it conveyed having already been incorporated into market expectations. If, however, smoothing behavior acts as an impediment to investor predictions, then it would increase the level of uncertainty about future earnings and cash flows.
Empirical differences in the market reactions to the accounting earnings of smoothing and non-smoothing firms would indicate the relative level of uncertainty in the market expectations of future earnings and cash flows of these firms. This, in turn, would shed some light on the market evaluation of managerial income smoothing. The empirical results and analysis presented in chapter 6 suggest that there is a higher level of uncertainty about the future earnings and cash flows of non-smoothing firms which results in a higher market reaction to accounting earnings announcements. Smoothing firms, however, have a much lower market reaction, implying a lower level of market uncertainty about their future financial performance.

The lower market reaction and the implied lower level of market uncertainty for smoothing firms indicate that managerial smoothing behavior may indeed provide additional information to the market. Managerial motivations for smoothing therefore have positive implications since such behavior provides additional information to used by the market for decision making.

In summary, this study contributed to a better appreciation of the managerial choice of discretionary accounting methods and the security market reactions to this behavior. It established a new framework for isolating the effect of reporting variables and integrated total discretionary accruals with a multi-period analysis. It also sought for the first time to study empirically differences in the security market reactions to smoothing behavior. In interpreting the results of the tests of security market reactions, it also considered some managerial motivations for income smoothing. In addition, the empirical analysis added to a better understanding of the relationship between changes in security prices and accounting information by examining the differential information content of the financial statements of smoothing and non-smoothing firms.
Table 1

Average mean and variance of income, cash flows and accruals
for full sample of 133 firms

<table>
<thead>
<tr>
<th></th>
<th>Sample Firms</th>
<th>SM Firms</th>
<th>NS Firms</th>
<th>t^1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of firms</td>
<td>133</td>
<td>104</td>
<td>29</td>
<td></td>
</tr>
</tbody>
</table>

AVERAGE MEAN ($ million)

Income from continuing operations | 186          | 234      | 16       | 3.3292*    |
Cash flows from operations        | 421          | 516      | 83       | 2.8059*    |
Accruals                          | -235         | -282     | -67      | 2.2509*    |

AVERAGE VARIANCE

Income from continuing operations | 63900        | 70968    | 38557    | 0.8467     |
Cash flows from operations        | 337934       | 426893   | 18908    | 1.8681**   |
Accruals                          | 138475       | 172000   | 18250    | 1.6739**   |
Table 2

Average mean and variance of income, cash flows and accruals
for sample of 72 firms using current discretionary accruals

<table>
<thead>
<tr>
<th></th>
<th>Sample Firms</th>
<th>SM Firms</th>
<th>NS Firms</th>
<th>( t^1 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of firms</td>
<td>72</td>
<td>43</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td><strong>AVERAGE MEAN ($ million)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income from continuing operations</td>
<td>33</td>
<td>44</td>
<td>16</td>
<td>1.4958</td>
</tr>
<tr>
<td>Cash flows from operations</td>
<td>91</td>
<td>95</td>
<td>83</td>
<td>0.3259</td>
</tr>
<tr>
<td>Accruals</td>
<td>-58</td>
<td>-47</td>
<td>-67</td>
<td>0.6087</td>
</tr>
<tr>
<td><strong>AVERAGE VARIANCE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income from continuing operations</td>
<td>17202</td>
<td>2800</td>
<td>38557</td>
<td>1.8752**</td>
</tr>
<tr>
<td>Cash flows from operations</td>
<td>20842</td>
<td>22145</td>
<td>18908</td>
<td>0.2168</td>
</tr>
<tr>
<td>Accruals</td>
<td>15093</td>
<td>12963</td>
<td>18250</td>
<td>0.4859</td>
</tr>
</tbody>
</table>

\(^1\) \( t \) statistic is for difference in the mean value for non-smoothing and smoothing firms.

* significant at 0.05

** significant at 0.10
Table 3

Firm Characteristics for sample of 133 firms using total accruals

<table>
<thead>
<tr>
<th></th>
<th>Sample Firms</th>
<th>SM Firms</th>
<th>NS Firms</th>
<th>t (^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of firms</td>
<td>133</td>
<td>104</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td><strong>YEAR: 1984</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market value(^2)</td>
<td>2865.6</td>
<td>3494.6</td>
<td>609.9</td>
<td>3.2861*</td>
</tr>
<tr>
<td>Sales(^3)</td>
<td>4940.5</td>
<td>5662.1</td>
<td>2352.5</td>
<td>2.1972*</td>
</tr>
<tr>
<td>Total Assets(^2)</td>
<td>5352.8</td>
<td>6080.4</td>
<td>2743.4</td>
<td>2.0290*</td>
</tr>
<tr>
<td>Total Debt to Equity Ratio</td>
<td>0.342</td>
<td>0.333</td>
<td>0.373</td>
<td>0.4839</td>
</tr>
<tr>
<td>Total Debt to Tangible Equity Ratio</td>
<td>0.353</td>
<td>0.356</td>
<td>0.342</td>
<td>0.1239</td>
</tr>
<tr>
<td><strong>YEAR: 1985</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market value(^2)</td>
<td>3563.1</td>
<td>4315.4</td>
<td>865.0</td>
<td>3.0933*</td>
</tr>
<tr>
<td>Sales(^3)</td>
<td>5083.1</td>
<td>5833.9</td>
<td>2390.6</td>
<td>2.2393*</td>
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<tr>
<td>Total Assets(^2)</td>
<td>5953.9</td>
<td>6655.1</td>
<td>3439.0</td>
<td>1.5059</td>
</tr>
<tr>
<td>Total Debt to Equity Ratio</td>
<td>0.407</td>
<td>0.319</td>
<td>0.571</td>
<td>0.9631</td>
</tr>
<tr>
<td>Total Debt to Tangible Equity Ratio</td>
<td>0.384</td>
<td>0.362</td>
<td>0.356</td>
<td>0.3081</td>
</tr>
<tr>
<td><strong>YEAR: 1986</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market value(^2)</td>
<td>3791.0</td>
<td>4613.9</td>
<td>840.0</td>
<td>3.7026*</td>
</tr>
<tr>
<td>Sales(^3)</td>
<td>4917.4</td>
<td>5645.1</td>
<td>2307.5</td>
<td>2.3142*</td>
</tr>
<tr>
<td>Total Assets(^2)</td>
<td>6260.1</td>
<td>6937.4</td>
<td>3830.9</td>
<td>1.3381</td>
</tr>
<tr>
<td>Total Debt to Equity Ratio</td>
<td>0.395</td>
<td>0.385</td>
<td>0.431</td>
<td>0.6558</td>
</tr>
<tr>
<td>Total Debt to Tangible Equity Ratio</td>
<td>0.446</td>
<td>0.435</td>
<td>0.482</td>
<td>0.5992</td>
</tr>
</tbody>
</table>

* significant at 0.05 level.

\(^1\) t statistic is for difference in the mean value for non-smoothing and smoothing firms.
\(^2\) End of the year
\(^3\) During the year.
### Table 4

**Firm Characteristics for sample of 72 firms using current discretionary accruals**

<table>
<thead>
<tr>
<th></th>
<th>Sample Firms</th>
<th>SM Firms</th>
<th>NS Firms</th>
<th>t&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of firms</td>
<td>72</td>
<td>43</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td><strong>YEAR: 1984</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market value&lt;sup&gt;2&lt;/sup&gt;</td>
<td>847.2</td>
<td>1007.2</td>
<td>609.9</td>
<td>1.1415</td>
</tr>
<tr>
<td>Sales&lt;sup&gt;3&lt;/sup&gt;</td>
<td>1797.4</td>
<td>1423.1</td>
<td>2352.5</td>
<td>0.9723</td>
</tr>
<tr>
<td>Total Assets&lt;sup&gt;2&lt;/sup&gt;</td>
<td>2694.2</td>
<td>2661.0</td>
<td>2743.4</td>
<td>0.0552</td>
</tr>
<tr>
<td>Total Debt to Equity Ratio</td>
<td>0.376</td>
<td>0.378</td>
<td>0.373</td>
<td>0.0635</td>
</tr>
<tr>
<td>Total Debt to Tangible Equity Ratio</td>
<td>0.385</td>
<td>0.414</td>
<td>0.342</td>
<td>0.6282</td>
</tr>
<tr>
<td><strong>YEAR: 1985</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market value&lt;sup&gt;2&lt;/sup&gt;</td>
<td>1108.8</td>
<td>1273.3</td>
<td>865.0</td>
<td>0.8686</td>
</tr>
<tr>
<td>Sales&lt;sup&gt;3&lt;/sup&gt;</td>
<td>1847.2</td>
<td>1480.7</td>
<td>2390.6</td>
<td>0.8993</td>
</tr>
<tr>
<td>Total Assets&lt;sup&gt;2&lt;/sup&gt;</td>
<td>3162.3</td>
<td>2975.7</td>
<td>3439.0</td>
<td>0.2297</td>
</tr>
<tr>
<td>Total Debt to Equity Ratio</td>
<td>0.463</td>
<td>0.390</td>
<td>0.571</td>
<td>0.8247</td>
</tr>
<tr>
<td>Total Debt to Tangible Equity Ratio</td>
<td>0.400</td>
<td>0.430</td>
<td>0.356</td>
<td>0.6235</td>
</tr>
<tr>
<td><strong>YEAR: 1986</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market value&lt;sup&gt;2&lt;/sup&gt;</td>
<td>1324.0</td>
<td>1650.5</td>
<td>840.0</td>
<td>1.2904</td>
</tr>
<tr>
<td>Sales&lt;sup&gt;3&lt;/sup&gt;</td>
<td>1940.7</td>
<td>1693.4</td>
<td>2307.5</td>
<td>0.5853</td>
</tr>
<tr>
<td>Total Assets&lt;sup&gt;2&lt;/sup&gt;</td>
<td>3449.9</td>
<td>3192.9</td>
<td>3830.9</td>
<td>0.2851</td>
</tr>
<tr>
<td>Total Debt to Equity Ratio</td>
<td>0.411</td>
<td>0.397</td>
<td>0.431</td>
<td>0.4488</td>
</tr>
<tr>
<td>Total Debt to Tangible Equity Ratio</td>
<td>0.465</td>
<td>0.453</td>
<td>0.482</td>
<td>0.3554</td>
</tr>
</tbody>
</table>

---

1. t statistic is for difference in the mean value for non-smoothing and smoothing firms.
2. End of the year  
3. During the year.
Table 5
Industry Classification of Firms in Sample

<table>
<thead>
<tr>
<th>SIC</th>
<th>Industry Description</th>
<th>Sample Firms</th>
<th>SM Firms</th>
<th>NS Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-14</td>
<td>Mining (including oil and gas) extraction</td>
<td>11</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>Construction</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>20-39</td>
<td>Manufacturing</td>
<td>73</td>
<td>50</td>
<td>23</td>
</tr>
<tr>
<td>40-45</td>
<td>Transportation</td>
<td>9</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>48</td>
<td>Communications</td>
<td>10</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>49</td>
<td>Electric, Gas and Utilities</td>
<td>8</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>50-59</td>
<td>Trade - Wholesale and Retail</td>
<td>6</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>61-67</td>
<td>Finance, Insurance and Real Estate*</td>
<td>9</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>70-89</td>
<td>Services</td>
<td>6</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

Total firms 133 104 29

* Does not include any firm in Banking (SIC 6011 to 6059)
**Table 6**

**Correlation Matrices and Summary Statistics for Dependent and Independent Variables**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Dev</th>
<th>ER</th>
<th>S</th>
<th>UE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All firms (133 firms)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ER</td>
<td>0.0258</td>
<td>0.0281</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>20.5084</td>
<td>1.8076</td>
<td>-0.2150*</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>UE</td>
<td>0.5370</td>
<td>0.7711</td>
<td>0.1305*</td>
<td>-0.2833*</td>
<td>1.000</td>
</tr>
</tbody>
</table>

| **Smoothing Firms (104 firms)** |      |          |       |       |       |
| ER             | 0.0228   | 0.0230   | 1.0000 |       |       |
| S              | 20.8652   | 1.6739   | -0.1387* | 1.000 |       |
| UE             | 0.4468    | 0.6970   | 0.0937* | -0.2280* | 1.000 |

| **Non-smoothing firms (29 firms)** |      |          |       |       |       |
| ER             | 0.0363   | 0.0398   | 1.0000 |       |       |
| S              | 19.2285   | 1.6879   | -0.2034* | 1.000 |       |
| UE             | 0.8604    | 0.9234   | 0.0876** | -0.2106* | 1.000 |

* significant at 0.05  
** significant at 0.10
Table 7
Regression Estimates
Sample of 133 firms using total accruals
Model 1: $ER_{jq} = \beta_0 + \beta_1 UE_{jq} + \beta_2 S_{jq} + \epsilon_j$

<table>
<thead>
<tr>
<th>Method</th>
<th>$\beta_0$</th>
<th>$\beta_1$</th>
<th>$\beta_2$</th>
<th>F</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 1</td>
<td>0.0860</td>
<td>0.0028</td>
<td>-0.0030</td>
<td>43.250*</td>
<td>0.0515</td>
</tr>
<tr>
<td></td>
<td>(10.369)*</td>
<td>(2.976)*</td>
<td>(-7.607)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 2</td>
<td>0.0922</td>
<td>0.0032</td>
<td>-0.0033</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(184.34)*</td>
<td>(11.731)*</td>
<td>(-122.90)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 3</td>
<td>0.0845</td>
<td>0.0022</td>
<td>-0.0029</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(7.525)*</td>
<td>(2.289)*</td>
<td>(-5.429)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 4</td>
<td>0.0862</td>
<td>0.0021</td>
<td>-0.0030</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(7.761)*</td>
<td>(2.255)*</td>
<td>(-5.648)*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figures within parentheses are t values
* significant at 0.05 level.

**Method 1:** OLS estimation.

**Method 2:** Pooled time series cross-sectional regression analysis using the Parks method (a first-order autoregressive, heteroscedastic and contemporaneously correlated error structure) as discussed in section 5.4.1.

**Method 3:** Pooled time series cross-sectional regression analysis using the Fuller and Battese method (a variance component model) described in Appendix B.

**Method 4:** Pooled time series cross-sectional regression analysis using the Da Silva method (a mixed variance-component moving average model) described in Appendix B.
Table 8

Regression Estimates

Sample of 133 firms using total accruals

Model 2:  $ER_{jq} = \beta_0 + \beta_1 UE_{jq} + \beta_2 S_{jq} + \beta_3 D_j UE_{jq} + e_j$

($D_j = 1$ for smoothing firms and $D_j = 0$ for non-smoothing firms)

<table>
<thead>
<tr>
<th>Method</th>
<th>$\beta_0$</th>
<th>$\beta_1$</th>
<th>$\beta_2$</th>
<th>$\beta_3$</th>
<th>F</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 1</td>
<td>0.0808</td>
<td>0.0060</td>
<td>-0.0027</td>
<td>-0.0053</td>
<td>33.057*</td>
<td>0.0586</td>
</tr>
<tr>
<td></td>
<td>(9.612)*</td>
<td>(4.571)*</td>
<td>(-6.852)*</td>
<td>(-3.474)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 2</td>
<td>0.0853</td>
<td>0.0062</td>
<td>-0.0029</td>
<td>-0.0044</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(69.464)*</td>
<td>(4.621)*</td>
<td>(-44.864)*</td>
<td>(-2.928)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 3</td>
<td>0.0810</td>
<td>0.0046</td>
<td>-0.0027</td>
<td>-0.0038</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(7.271)*</td>
<td>(3.207)*</td>
<td>(-5.150)*</td>
<td>(-2.231)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 4</td>
<td>0.0827</td>
<td>0.0046</td>
<td>-0.0028</td>
<td>-0.0038</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(7.518)*</td>
<td>(3.207)*</td>
<td>(-5.378)*</td>
<td>(-2.258)*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figures within parentheses are t values
* significant at 0.05 level.

Method 1: OLS estimation.

Method 2: Pooled time series cross-sectional regression analysis using the Parks method (a first-order autoregressive, heteroscedastic and contemporaneously correlated error structure) as discussed in section 5.4.1.

Method 3: Pooled time series cross-sectional regression analysis using the Fuller and Battese method (a variance component model) described in Appendix B.

Method 4: Pooled time series cross-sectional regression analysis using the Da Silva method (a mixed variance-component moving average model) described in Appendix B.
Table 9
Regression Estimates
Sample of 106 firms (133 firms less utilities)
Model 1: $ER_{jq} = \beta_0 + \beta_1 UE_{jq} + \beta_2 S_{jq} e_j$

<table>
<thead>
<tr>
<th>Method</th>
<th>$\beta_0$</th>
<th>$\beta_1$</th>
<th>$\beta_2$</th>
<th>F</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 1</td>
<td>0.0861</td>
<td>0.0024</td>
<td>-0.0030</td>
<td>32.062*</td>
<td>0.0481</td>
</tr>
<tr>
<td></td>
<td>(9.133)*</td>
<td>(2.259)*</td>
<td>(-6.566)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 2</td>
<td>0.0957</td>
<td>0.0027</td>
<td>-0.0034</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(17.650)*</td>
<td>(3.348)*</td>
<td>(-14.574)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 3</td>
<td>0.0843</td>
<td>0.0020</td>
<td>-0.0029</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(6.777)*</td>
<td>(1.814)**</td>
<td>(-4.776)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 4</td>
<td>0.0863</td>
<td>0.0019</td>
<td>-0.0030</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(6.998)*</td>
<td>(1.733)**</td>
<td>(-4.985)*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figures within parentheses are t values
* significant at 0.05 level.
** significant at 0.10 level

Method 1: OLS estimation.
Method 2: Pooled time series cross-sectional regression analysis using the Parks method (a first-order autoregressive, heteroscedastic and contemporaneously correlated error structure) as discussed in section 5.4.1.
Method 3: Pooled time series cross-sectional regression analysis using the Fuller and Battese method (a variance component model) described in Appendix B.
Method 4: Pooled time series cross-sectional regression analysis using the Da Silva method (a mixed variance-component moving average model) described in Appendix B.
Table 10
Regression Estimates
Sample of 106 firms (133 firms less utilities)
Model 2: $ER_{jq} = \beta_0 + \beta_1 UE_{jq} + \beta_2 S_{jq} + \beta_3 D_j UE_{jq} + \epsilon_j$
($D_j = 1$ for smoothing firms and $D_j = 0$ for non-smoothing firms)

<table>
<thead>
<tr>
<th>Method</th>
<th>$\beta_0$</th>
<th>$\beta_1$</th>
<th>$\beta_2$</th>
<th>$\beta_3$</th>
<th>F</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 1</td>
<td>0.0821</td>
<td>0.0054</td>
<td>-0.0028</td>
<td>-0.0054</td>
<td>24.938*</td>
<td>0.0557</td>
</tr>
<tr>
<td></td>
<td>(8.657)*</td>
<td>(3.803)*</td>
<td>(-6.074)*</td>
<td>(-3.197)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 2</td>
<td>0.0860</td>
<td>0.0070</td>
<td>-0.0029</td>
<td>-0.0071</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(16.106)*</td>
<td>(5.604)*</td>
<td>(-12.435)*</td>
<td>(-5.867)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 3</td>
<td>0.0814</td>
<td>0.0043</td>
<td>-0.0027</td>
<td>-0.0041</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(6.635)*</td>
<td>(2.817)*</td>
<td>(-4.601)*</td>
<td>(-2.147)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 4</td>
<td>0.0835</td>
<td>0.0042</td>
<td>-0.0028</td>
<td>-0.0041</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(6.849)*</td>
<td>(2.795)*</td>
<td>(-4.805)*</td>
<td>(-2.204)*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figures within parentheses are t values
* significant at 0.05 level.

**Method 1:** OLS estimation.

**Method 2:** Pooled time series cross-sectional regression analysis using the Parks method (a first-order autoregressive, heteroscedastic and contemporaneously correlated error structure) as discussed in section 5.4.1.

**Method 3:** Pooled time series cross-sectional regression analysis using the Fuller and Battese method (a variance component model) described in Appendix B.

**Method 4:** Pooled time series cross-sectional regression analysis using the Da Silva method (a mixed variance-component moving average model) described in Appendix B.
### Table 11

Regression Estimates

Sample of 72 firms using current discretionary accruals as smoothing instrument

Model 1: \[ ER_{jq} = \beta_0 + \beta_1 UE_{jq} + \beta_2 S_{jq} e_j \]

<table>
<thead>
<tr>
<th>Method</th>
<th>( \beta_0 )</th>
<th>( \beta_1 )</th>
<th>( \beta_2 )</th>
<th>( F )</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 1</td>
<td>0.0865</td>
<td>0.0016</td>
<td>-0.0029</td>
<td>12.799*</td>
<td>0.0289</td>
</tr>
<tr>
<td></td>
<td>(6.387)*</td>
<td>(1.241)</td>
<td>(-4.353)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 2</td>
<td>0.0818</td>
<td>0.0029</td>
<td>-0.0027</td>
<td>12.895*</td>
<td>0.0289</td>
</tr>
<tr>
<td></td>
<td>(9.151)*</td>
<td>(4.454)*</td>
<td>(-6.088)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 3</td>
<td>0.0881</td>
<td>0.0009</td>
<td>-0.0030</td>
<td>12.905*</td>
<td>0.0289</td>
</tr>
<tr>
<td></td>
<td>(4.747)*</td>
<td>(0.678)</td>
<td>(-3.213)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 4</td>
<td>0.0887</td>
<td>0.0007</td>
<td>-0.0030</td>
<td>12.905*</td>
<td>0.0289</td>
</tr>
<tr>
<td></td>
<td>(4.737)*</td>
<td>(0.547)</td>
<td>(-3.207)*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figures within parentheses are t values

* significant at 0.05 level.

**Method 1:** OLS estimation.

**Method 2:** Pooled time series cross-sectional regression analysis using the Parks method (a first-order autoregressive, heteroscedastic and contemporaneously correlated error structure) as discussed in section 5.4.1.

**Method 3:** Pooled time series cross-sectional regression analysis using the Fuller and Battese method (a variance component model) described in Appendix B.

**Method 4:** Pooled time series cross-sectional regression analysis using the Da Silva method (a mixed variance-component moving average model) described in Appendix B.
Table 12

Regression Estimates

Sample of 72 firms using current discretionary accruals as smoothing instrument

Model 2: ER_{jq} = \beta_0 + \beta_1 UE_{jq} + \beta_2 S_{jq} + \beta_3 D_j UE_{jq} + e_j
(D_j = 1 for smoothing firms and D_j = 0 for non-smoothing firms)

<table>
<thead>
<tr>
<th>Method</th>
<th>(\hat{\beta}_0)</th>
<th>(\hat{\beta}_1)</th>
<th>(\hat{\beta}_2)</th>
<th>(\hat{\beta}_3)</th>
<th>F</th>
<th>R^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 1</td>
<td>0.0864</td>
<td>0.0049</td>
<td>-0.0029</td>
<td>-0.0069</td>
<td>12.912*</td>
<td>0.0431</td>
</tr>
<tr>
<td></td>
<td>(6.424)*</td>
<td>(3.061)*</td>
<td>(-4.358)*</td>
<td>(-3.576)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 2</td>
<td>0.0671</td>
<td>0.0068</td>
<td>-0.0020</td>
<td>-0.0077</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(5.354)*</td>
<td>(5.867)*</td>
<td>(-3.202)*</td>
<td>(-4.805)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 3</td>
<td>0.0881</td>
<td>0.0036</td>
<td>-0.0030</td>
<td>-0.0055</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.929)*</td>
<td>(2.139)*</td>
<td>(-3.337)*</td>
<td>(-2.519)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 4</td>
<td>0.0890</td>
<td>0.0035</td>
<td>-0.0030</td>
<td>-0.0057</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.903)*</td>
<td>(2.095)*</td>
<td>(-3.324)*</td>
<td>(-2.618)*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figures within parentheses are t values
* significant at 0.05 level.

Method 1: OLS estimation.
Method 2: Pooled time series cross-sectional regression analysis using the Parks method (a first-order autoregressive, heteroscedastic and contemporaneously correlated error structure) as discussed in section 5.4.1.
Method 3: Pooled time series cross-sectional regression analysis using the Fuller and Battese method (a variance component model) described in Appendix B.
Method 4: Pooled time series cross-sectional regression analysis using the Da Silva method (a mixed variance-component moving average model) described in Appendix B.
Table 13
Regression Estimates

Sample of 65 firms using current discretionary accruals less utilities

Model 1: \( \text{ER}_{jq} = \beta_0 + \beta_1 \text{UE}_{jq} + \beta_2 \text{S}_j e_j \)

<table>
<thead>
<tr>
<th>Method</th>
<th>( \beta_0 )</th>
<th>( \beta_1 )</th>
<th>( \beta_2 )</th>
<th>( F )</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 1</td>
<td>0.0890</td>
<td>0.0014</td>
<td>-0.0031</td>
<td>11.490*</td>
<td>0.0287</td>
</tr>
<tr>
<td></td>
<td>(6.146)*</td>
<td>(1.035)</td>
<td>(-4.209)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 2</td>
<td>0.0925</td>
<td>0.0022</td>
<td>-0.0032</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(18.239)*</td>
<td>(5.661)*</td>
<td>(-14.910)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 3</td>
<td>0.0908</td>
<td>0.0006</td>
<td>-0.0031</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.545)*</td>
<td>(0.547)</td>
<td>(-3.095)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 4</td>
<td>0.0916</td>
<td>0.0005</td>
<td>-0.0032</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.543)*</td>
<td>(0.391)</td>
<td>(-3.095)*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figures within parentheses are t values
* significant at 0.05 level.

**Method 1:** OLS estimation.

**Method 2:** Pooled time series cross-sectional regression analysis using the Parks method (a first-order autoregressive, heteroscedastic and contemporaneously correlated error structure) as discussed in section 5.4.1.

**Method 3:** Pooled time series cross-sectional regression analysis using the Fuller and Battese method (a variance component model) described in Appendix B.

**Method 4:** Pooled time series cross-sectional regression analysis using the Da Silva method (a mixed variance-component moving average model) described in Appendix B.
Table 14
Regression Estimates
Sample of 65 firms using current discretionary accruals less utilities

Model 2: \( ER_{jq} = \beta_0 + \beta_1 UE_{jq} + \beta_2 S_{jq} + \beta_3 D_j \text{UE}_{jq} + e_j \)

\((D_j = 1 \text{ for smoothing firms and } D_j = 0 \text{ for non-smoothing firms})\)

<table>
<thead>
<tr>
<th>Method</th>
<th>(\beta_0)</th>
<th>(\beta_1)</th>
<th>(\beta_2)</th>
<th>(\beta_3)</th>
<th>F</th>
<th>(R^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 1</td>
<td>0.0904</td>
<td>0.0047</td>
<td>-0.0031</td>
<td>-0.0073</td>
<td>12.112*</td>
<td>0.0447</td>
</tr>
<tr>
<td></td>
<td>(6.284)*</td>
<td>(2.843)*</td>
<td>(-4.321)*</td>
<td>(-3.606)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 2</td>
<td>0.0839</td>
<td>0.0061</td>
<td>-0.0029</td>
<td>-0.0082</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(11.852)*</td>
<td>(7.372)*</td>
<td>(-9.525)*</td>
<td>(-7.993)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 3</td>
<td>0.0921</td>
<td>0.0035</td>
<td>-0.0032</td>
<td>-0.0058</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.793)*</td>
<td>(2.011)*</td>
<td>(-3.286)*</td>
<td>(-2.551)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 4</td>
<td>0.0931</td>
<td>0.0034</td>
<td>-0.0032</td>
<td>-0.0061</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.772)*</td>
<td>(1.962)*</td>
<td>(-3.278)*</td>
<td>(-2.676)*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figures within parentheses are t values
* significant at 0.05 level.

Method 1: OLS estimation.

Method 2: Pooled time series cross-sectional regression analysis using the Parks method (a first-order autoregressive, heteroscedastic and contemporaneously correlated error structure) as discussed in section 5.4.1.

Method 3: Pooled time series cross-sectional regression analysis using the Fuller and Battese method (a variance component model) described in Appendix B.

Method 4: Pooled time series cross-sectional regression analysis using the Da Silva method (a mixed variance-component moving average model) described in Appendix B.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NS</td>
<td>SM</td>
<td>t</td>
<td>NS</td>
</tr>
<tr>
<td>1</td>
<td>0.0288</td>
<td>-0.0001</td>
<td>1.90**</td>
<td>0.0035</td>
</tr>
<tr>
<td>2</td>
<td>-0.0055</td>
<td>0.0056</td>
<td>-0.42</td>
<td>0.0657</td>
</tr>
<tr>
<td>3</td>
<td>0.0580</td>
<td>0.0059</td>
<td>1.71**</td>
<td>0.1034</td>
</tr>
<tr>
<td>4</td>
<td>0.0957</td>
<td>0.0373</td>
<td>1.55***</td>
<td>0.0485</td>
</tr>
<tr>
<td>5</td>
<td>0.1087</td>
<td>0.0574</td>
<td>1.32</td>
<td>0.0529</td>
</tr>
<tr>
<td>6</td>
<td>0.1273</td>
<td>0.0553</td>
<td>1.73**</td>
<td>0.0686</td>
</tr>
<tr>
<td>7</td>
<td>0.1626</td>
<td>0.0669</td>
<td>2.23*</td>
<td>0.1244</td>
</tr>
<tr>
<td>8</td>
<td>0.1821</td>
<td>0.0667</td>
<td>2.10*</td>
<td>0.1225</td>
</tr>
<tr>
<td>9</td>
<td>0.2033</td>
<td>0.0738</td>
<td>2.22*</td>
<td>0.1117</td>
</tr>
<tr>
<td>10</td>
<td>0.2217</td>
<td>0.0774</td>
<td>2.43*</td>
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<tr>
<td>11</td>
<td>0.2310</td>
<td>0.0878</td>
<td>2.32*</td>
<td>0.1329</td>
</tr>
<tr>
<td>12</td>
<td>0.2281</td>
<td>0.0838</td>
<td>1.98*</td>
<td>0.1128</td>
</tr>
</tbody>
</table>

* significant at 0.05 level  ** significant at 0.10 level  *** significant at 0.15 level
The t statistics reported is adjusted for unequal variances when the F statistic is significant at at least 0.15.
Table 16
Differences in Systematic Risk

<table>
<thead>
<tr>
<th>YEAR</th>
<th>SMOOTHING</th>
<th></th>
<th>NON-SMOOTHING</th>
<th></th>
<th>t</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>Mean</td>
<td>Std. Dev.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td>1.0325</td>
<td>0.4803</td>
<td>1.2933</td>
<td>0.6593</td>
<td>1.9862</td>
<td>0.0545</td>
</tr>
<tr>
<td>1985</td>
<td>1.0615</td>
<td>0.4694</td>
<td>1.4403</td>
<td>0.6705</td>
<td>2.8503</td>
<td>0.0072</td>
</tr>
<tr>
<td>1986</td>
<td>1.0455</td>
<td>0.4746</td>
<td>1.5374</td>
<td>0.5436</td>
<td>4.7666</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

* The F' statistic for 1984 and 1985 are significant at 0.01 and 0.02 respectively. The t statistics and the degrees of freedom for 1984 and 1985 are adjusted for unequal variances.
Table 17
Changes in Dividends Declared by Smoothing (SM) and Non-smoothing (NS) firms
during the three years from 1984 to 1986.

<table>
<thead>
<tr>
<th>Frequency Percent</th>
<th>STATUS</th>
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<th></th>
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<tbody>
<tr>
<td></td>
<td>SM</td>
<td>NS</td>
<td>Total</td>
</tr>
<tr>
<td>CHANGE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INC</td>
<td>144</td>
<td>17</td>
<td>161</td>
</tr>
<tr>
<td></td>
<td>(46.2)</td>
<td>(19.6)</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>108</td>
<td>59</td>
<td>167</td>
</tr>
<tr>
<td></td>
<td>(34.6)</td>
<td>(67.8)</td>
<td></td>
</tr>
<tr>
<td>DEC</td>
<td>60</td>
<td>11</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>(19.2)</td>
<td>(12.6)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>312</td>
<td>87</td>
<td>399</td>
</tr>
</tbody>
</table>

Chi-square = 31.5  
Significance=0.0001
Table 18

Changes in Dividends Declared by Smoothing (SM) and Non-smoothing (NS) firms for each of the three years from 1984 to 1986.

<table>
<thead>
<tr>
<th>Year: 1984</th>
<th>Chi-square = 12.848</th>
<th>Significance=0.002</th>
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</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>STATUS</td>
<td></td>
</tr>
<tr>
<td>Percent</td>
<td>SM</td>
<td>NS</td>
</tr>
<tr>
<td>CHANGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INC</td>
<td>60 (57.7)</td>
<td>7 (24.1)</td>
</tr>
<tr>
<td>NC</td>
<td>31 (29.8)</td>
<td>19 (65.5)</td>
</tr>
<tr>
<td>DEC</td>
<td>13 (19.2)</td>
<td>3 (12.6)</td>
</tr>
<tr>
<td>Total</td>
<td>104</td>
<td>29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year: 1985</th>
<th>Chi-square = 12.645</th>
<th>Significance=0.002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>STATUS</td>
<td></td>
</tr>
<tr>
<td>Percent</td>
<td>SM</td>
<td>NS</td>
</tr>
<tr>
<td>CHANGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INC</td>
<td>55 (52.9)</td>
<td>6 (20.7)</td>
</tr>
<tr>
<td>NC</td>
<td>37 (35.6)</td>
<td>21 (72.4)</td>
</tr>
<tr>
<td>DEC</td>
<td>12 (11.5)</td>
<td>2 (6.9)</td>
</tr>
<tr>
<td>Total</td>
<td>104</td>
<td>29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year: 1986</th>
<th>Chi-square = 6.793</th>
<th>Significance=0.033</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>STATUS</td>
<td></td>
</tr>
<tr>
<td>Percent</td>
<td>SM</td>
<td>NS</td>
</tr>
<tr>
<td>CHANGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INC</td>
<td>29 (27.9)</td>
<td>4 (13.8)</td>
</tr>
<tr>
<td>NC</td>
<td>40 (38.5)</td>
<td>19 (65.5)</td>
</tr>
<tr>
<td>DEC</td>
<td>35 (33.6)</td>
<td>6 (20.7)</td>
</tr>
<tr>
<td>Total</td>
<td>104</td>
<td>29</td>
</tr>
</tbody>
</table>
Table 19

Changes in Dividends Declared by Smoothing (SM) and Non-smoothing (NS) firms
during the three years from 1984 to 1986.
(excluding firms which have not paid any dividends)

<table>
<thead>
<tr>
<th>Frequency Percent</th>
<th>STATUS</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SM</td>
<td>NS</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>CHANGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INC</td>
<td>144</td>
<td>17</td>
<td>161</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(50.9)</td>
<td>(30.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>79</td>
<td>28</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(27.9)</td>
<td>(50.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEC</td>
<td>60</td>
<td>11</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(21.2)</td>
<td>(19.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>283</td>
<td>56</td>
<td>339</td>
<td></td>
</tr>
</tbody>
</table>

Chi-square = 11.4  Significance=0.003
Figure 1
Average CAAR
NS > SM

Figure 2
Average CAAR
NS < SM

0: Fiscal year end (December)
NS: Non-smoothing firms
SM: Smoothing firms
Figure 3

AVERAGE CAAR 1984 TO 1986

0: Fiscal year end (December)
NS: Non-smoothing firms
SM: Smoothing firms
Appendix A

Computation of cash flows from operations

The following variables are obtained from the Compustat annual tape (the Compustat data item number is stated within parenthesis):

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FO</td>
<td>Total funds from operations for year t (110)</td>
</tr>
<tr>
<td>XT</td>
<td>Extraordinary items and/or discontinued operations in the statement of changes for year t (124)</td>
</tr>
<tr>
<td>CA</td>
<td>Current assets at the end of year t (4)</td>
</tr>
<tr>
<td>CL</td>
<td>Current liabilities at the end of year t (5)</td>
</tr>
<tr>
<td>CE</td>
<td>Cash and short term investments at the end of year t (1)</td>
</tr>
<tr>
<td>CD</td>
<td>Current portion of long-term debt in current liabilities at the end of year t (34)</td>
</tr>
<tr>
<td>FU</td>
<td>Definition of 'funds' in statement of changes (Footnote number 21).</td>
</tr>
</tbody>
</table>

Footnote number 21 is either a blank or 'TD.' When the footnote entry is a blank, funds are defined as working capital. When the footnote entry is 'TD,' then the statement of changes is a cash statement.

When the statement of changes in financial position is prepared on cash basis (i.e., FU = TD), the cash flows from operations, \( c_t \), is the reported total funds from operations (110) less extraordinary and discontinued items (124). That is,

\[
c_t = FO_t - XT_t \tag{A1}
\]

When funds are defined as working capital, (i.e., \( FU = ' ' \)), all changes to the various working capital accounts, excluding cash, are adjusted to arrive at the cash flows from operations. Therefore,

\[
c_t = FO_t - XT_t - (CA_t - CA_{t-1}) + (CE_t - CE_{t-1}) + (CL_t - CL_{t-1}) - (CD_t - CD_{t-1}) \tag{A2}
\]
Appendix B

Description of the variance component model and variance component-moving average model of pooled time-series cross sectional regression analysis:

B.1. Variance Component Model

The variance component model used in this study follows Fuller and Battese [1974]. The model with a fixed intercept and slope coefficient can be extended such that the intercept varies across firms and time. The regression equation 12 can then be restated as (Judge [1985], p.530):

\[ y_{it} = \beta_1 + u_i + \lambda_t + \sum_{k=2}^{p} X_{kit} \beta_k + e_{it} \]  \hspace{1cm} (B.1.1)

i=1,2,..., N and t=1,2,...,T, for N firms and T time periods, with the intercept \( \beta_{1it} = \beta_1 + u_i + \lambda_t \). \( \beta_1 \) is the "mean intercept," \( u_i \) represents the difference from the mean for the ith firm and \( \lambda_t \) represents the time effects or the influence of factors that are common to all firms at time t. For the ith firm, the equation is:

\[ y_i = X_i \beta + u_i j_{iT+1} I_T \lambda + e_i \]  \hspace{1cm} (B.1.2)

where

\( y_i \quad = (y_{i1}, y_{i2}, ..., y_{iT})' \),

\( X_i \quad = \) a \( (T x K) \) matrix of observations on \( K \) explanatory variables for the ith firm,

\( \beta \quad = (\beta_1, \beta_2, ..., \beta_k)' \) is a vector of parameters to be estimated,

\( u_i \quad = \) a vector of the firm-specific random effects,

\( \lambda_t \quad = \) a vector of time-specific random effects,

\( e_{it} \quad = \) the residual error term for the ith firm at time t.
\[ \lambda = (\lambda_1, \lambda_2, \ldots, \lambda_T)', \]
\[ j_T = (1, 1, \ldots, 1)' \text{ with dimension } (T \times 1), \]
\[ I_T = \text{identity matrix of dimension } T, \text{ and} \]
\[ e_i = \text{vector of the regression disturbances}. \]

When all the \( N \) firms are included, the model is:
\[ y = X \beta + u \otimes j_T + (j_N \otimes I_T) \lambda + e \]  \hspace{1cm} (B.1.3)
where \( u = (u_1, u_2, \ldots, u_N)' \).

The complete disturbance covariance matrix is:
\[ E(vv') = \phi = \sigma_e^2 I_{NT} + \sigma_u^2 (I_N \otimes j_T j_T') + \sigma_{\lambda}^2 (j_N j_N' \otimes I_T) \]  \hspace{1cm} (B.1.4)

The variance components are estimated using the 'fitting of constants' method (Fuller and Battese [1974] with any negative variance being set equal to 0. EGLS, using the estimated covariance matrix, is then used to obtain
\[ \beta = (X'\hat{\phi}^{-1}X)^{-1} X'\hat{\phi}^{-1}y \]  \hspace{1cm} (B.1.5)

Fuller and Battese [1974] show that the parameter estimates are unbiased when (i) the errors are symmetric about zero and have fourth moments and (ii) the expectation of \( (\hat{\sigma}_e^2)^{-1} \) exists (p. 74).
B.2. Mixed Variance Component-Moving Average Model

In the model discussed in the previous section, when the error term, \(e\), is assumed to be the result of a moving average time series process of order \(M(< T-1)\) for each firm \(i\), the parameters are estimated by a two stage process, where the moving average parameters are first estimated and used to estimate the covariance matrix. The estimated covariance matrix is then used in the EGLS process to obtain estimates of the parameters.
### Appendix C

**List of Firms in sample**

<table>
<thead>
<tr>
<th>CUSIP</th>
<th>SIC</th>
<th>FIRM NAME</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>008677</td>
<td>AHManson (H.F.) &amp; CO</td>
<td>SM</td>
</tr>
<tr>
<td>2</td>
<td>011659</td>
<td>ALASKA AIRGROUP INC</td>
<td>SM</td>
</tr>
<tr>
<td>3</td>
<td>020039</td>
<td>ALLTEL CORP</td>
<td>SM</td>
</tr>
<tr>
<td>4</td>
<td>025321</td>
<td>AMERICAN CYANAMID CO</td>
<td>SM</td>
</tr>
<tr>
<td>5</td>
<td>030177</td>
<td>AMERICAN TELE &amp; TELEGRAPH</td>
<td>SM</td>
</tr>
<tr>
<td>6</td>
<td>030411</td>
<td>AMERICAN WATER WORKS INC</td>
<td>SM</td>
</tr>
<tr>
<td>7</td>
<td>031105</td>
<td>AMETEK INC</td>
<td>SM</td>
</tr>
<tr>
<td>8</td>
<td>031905</td>
<td>AMOCO CORP</td>
<td>SM</td>
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<tr>
<td>9</td>
<td>035229</td>
<td>ANHEUSER-BUSCH COS INC</td>
<td>SM</td>
</tr>
<tr>
<td>10</td>
<td>037411</td>
<td>APACHE CORP</td>
<td>SM</td>
</tr>
<tr>
<td>11</td>
<td>042735</td>
<td>ARROW ELECTRONICS INC</td>
<td>SM</td>
</tr>
<tr>
<td>12</td>
<td>048825</td>
<td>ATLANTIC RICHFIELD CO</td>
<td>SM</td>
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<tr>
<td>13</td>
<td>077491</td>
<td>BELLING HEMINWAY</td>
<td>SM</td>
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<tr>
<td>14</td>
<td>081437</td>
<td>BEMIS CO</td>
<td>SM</td>
</tr>
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<td>15</td>
<td>081721</td>
<td>BENEFICIAL CORP</td>
<td>SM</td>
</tr>
<tr>
<td>16</td>
<td>087851</td>
<td>BEVERLY ENTERPRISES</td>
<td>SM</td>
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<tr>
<td>17</td>
<td>099599</td>
<td>BORDEN INC</td>
<td>SM</td>
</tr>
<tr>
<td>18</td>
<td>110097</td>
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</tr>
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<td>19</td>
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</tr>
<tr>
<td>20</td>
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<tr>
<td>21</td>
<td>139859</td>
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