A Comparison of Alternative Measures of Discretionary Accruals

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Abstract

In this paper I review the academic evidence on earnings management and its implications on research designs. I structure my review around questions of which accrual prediction models are the most powerful in giving insight to the incentive of earnings management. Thomas and Zhang (2000) research paper is reviewed and discussed along with Dechow et al (1995). Kang (1999) indicates the serious potential bias in Jones model and concludes that the KS model can perform better than Jones model. Furthermore, this paper provides an insightful discussion concerning each accrual prediction model. Random Walk Model, Mean-Reverting Model and Component Model are referred to as peak-ahead. The other three; Industry Model, Jones model and KS models are referred to as Non-peak ahead. Among these models, the KS model seems to give the most powerful accruals prediction. Therefore, this paper will outline the direction of my future research.

Keywords: Accounting Accruals, Discretionary Accruals.

1. Introduction

There are numerous papers which have previously examined earnings management. Healy (1985) introduced accruals–based measures which were widely employed in tests of earnings management. He uses total accruals to measure management's discretion over earnings. DeAngelo (1986), on the other hand, uses change in total accruals to measure earnings management. DeAngelo develops with the prior total accruals scaled by total assets. Both Healy's and DeAngelo use an estimate of total accruals in order to isolate discretionary accruals. The total accruals serve as the starting point for the measuring discretionary accruals.

McNichols (2000) refers to Healy's and DeAngelo's approaches as "aggregate accruals" estimation approaches. She points out a major difficulty that discretionary accruals cannot be directly observed; consequently some proxies must be used, since by using total accruals alone,

one would not be able to capture earnings management by discretionary accruals. The need to accurately separate reported accruals in their discretionary and non–discretionary components is resolved by Jones (1991).

Jones (1991) introduced a regression approach to control discretionary factors influencing accruals, specifying a linear relation between total accruals and changes in sales and property, plant and equipment. Jones (1991) provides a more refined way to estimate non–discretionary accruals. While most studies rely on the accrual prediction model of Jones (1991), the power and the reliability of the model are questioned by Dechow, Sloan, and Sweeney (1995, hereafter DSS) and Kang and Sivaramakrishnan (1995, hereafter KS). In particular, both of these studies note that the Jones model provides a relatively weak test for detecting earnings management. Although KS propose an alternative model that is more powerful than the Jones model and less susceptible against false inferences in earnings management, the Jones model continues to be the most popular procedure for testing earnings management. Usually, realized accruals are assumed to represent discretionary accruals, or earnings management. In effect, forecast accruals are assumed to represent non–discretionary accruals, the accruals that cannot be observed to present any incentives to manage earnings. However, the Jones (1991) model has a limitation in its failure to consider the effects on non-discretionary accruals of changes in a firm's economic circumstances. Consequently, Dechow et al (1995) proposed a Modified Jones model which eliminates the conjectural tendencies of the Jones model.

While these models have been used often, Thomas and Zhang (2000) suggest that little attention has been paid to the relative or absolute accrual accuracy of different accruals models. More recent studies which have examined the accuracy of accrual models are Dechow et al (1995), Kang and Sivaramakrisnan (1995) and Kang (1999). These papers examine the ability of models in detecting earnings management by identifying type I error which reject the null hypothesis that no earning management is true. Type II errors oppose the null hypothesis claming that it is false. It is an important issue for accounting researchers to figure out how to improve the ability of models to detect earnings management.

DSS (1995) evaluates alternative accruals–based models for detecting earnings management by comparing the specification and power of commonly used test statistics across the measures of discretionary accruals generated by the models and provides the following major insights:

Kang and Sivaramakrisnan (1995) argue that important methodological issues arise in part because the most useful variables in predicting the unmanaged components are themselves accounting numbers which are likely to be affected by earnings management. They investigate a simple method of addressing some of these issues by testing for earnings management in context–specific cases.

Finally, Kang (1999), provides the conceptual and empirical reevaluation of the accrual

prediction models advanced by Jones (1991) and Kang and Sivaramakrisnan (1995), and he proposes new ways to improve these models.

1.1 Problem Statement

Earnings management studies frequently relate discretionary accruals with managerial incentive and rely on accrual models to segregate accruals into discretionary and non-discretionary components (e.g., Jones, 1991; Holthausen et al., 1995). The ability of accrual models to isolate the discretionary component in accruals is thus essential to the hypothesis tests in earnings studies. Beneish (1998) mentions research that uses accrual models to investigate whether earnings are managed in a growing industry and if its foundations are in need of redefinition. Thomas and Zhang (2000) argue that not much is known about the accuracy of these models, both relative and absolute, of these models. Their findings do not provide explicit evidence on the most powerful models, instead they show that all models are less accurate than they appear. It is simply assuming that total accrual equal −5% of total assets outperform most models.

DSS (1995) point out that all models generate results that indicate a low power for earnings management. All of the accrual models reviewed by DSS are related to the context in which earnings management is hypothesized. Kang (1999) suggests that the most popular approach for an accrual prediction model was developed by Jones (1991) in its statistical properties however the extent of potential bias are not well known.

According to these points, it is necessary to reevaluate and reconsider where we are. Although, until now, there have been many accruals models which have been proposed and modified, those models have hardly detected earnings management as we expected. We should be concerned about what are the strong points and weak points of each representative model which we choose to discuss. What statistic methods are employed in these models? To debate the alternative measures on discretionary accrual requires analysis of the major research papers. In order to address these questions, reviewing alternative measures on discretionary accrual models or unexpected accruals models will lead us to some illuminating points regarding earnings management studies.

1.2 Objectives of the Study

The proposal of this paper is to review comparatively and summarize accrual prediction models in representative papers, and to reassess the alternative measures of discretionary accrual models testing. I aim especially to identify from the most powerful accrual model for future academic research.

Several main papers discuss these very issues by comparing their research designs,

sample selections and results. In the famous research paper of DSS, they propose the innovative and insightful nondiscretionary accruals testing under detecting earnings management. Five models are employed in order to detect earnings management. As in DSS, Thomas and Zhang (2000) emphasize the more general issue of forecasting accruals, rather than earnings management per se.

The main objective here is to compare alternative measure accrual models which are used to predict non–discretionary accruals by isolating discretionary accruals. Beneish (1998) suggest that forecast errors are unexpected or unpredictable accruals. In both papers, the Jones model is seriously concerned with the potential bias in estimation of parameters. Kang (1999) uses anecdotal evidence to conclude that the Jones model has an inherent bias of estimation. Thus, the KS model is more accepted as more insightful given the results of the outperformed model.

Investigations of forecast error for models that predict accruals, which are unrelated to any links to earnings management, are necessarily in order to improve our understanding of accrual prediction models. The reviews of these accrual models debate further our understanding of discretionary accruals measurement in earnings management literature. Methodological measurement issues allow us to examine the reliability of prior research findings in the area (see Healy 1996). They also lead to a new stage of accrual prediction and accrual development. Thus, the core of accounting is based on accruals basis; additional understanding of the behavior of accruals should be valuable for all aspects of accounting.

1.3 Research Method

This study reviews the alternative measures of discretionary accruals in six models. Sample selections, empirical studies and results reflect deeply on the performances of these models. Thomas and Zhang (2000) use the competing six models concerning current accruals to find the most powerful accrual prediction model. DSS (1995) examine five models by using non-discretionary accruals. Both papers examine the accuracy of accruals models. Moreover, these papers propose an insight into the extant models and suggest innovative ways to improve the ability to detect earnings management. However, the conclusion of the Jones and KS models are not adequate. Kang (1999) attempts to provide evidence that the Jones model is inadequate; he compares the Jones and KS models and test them by using significant different sample selections. His study provides a conceptual and empirical reevaluation of the accrual prediction model advanced by Jones (1991) and KS (1995) models. A comprehensive analysis of the efficacy of the alternative specifications for both the Jones model and the KS model is comprehensively described.

2. Earnings Management and Accounting Accruals

2.1 Definition of Earnings Management

The academic literature defines earnings management in different ways. For example Schipper (1989), Scott (2003), and Healy and Wahlen (1999) define in the follows:

Schipper "...A purposeful intervention in external financial reporting process, with the intent of obtaining some private gain (as opposed to, say, merely facilitating the neutral operation of the process)..." (1989, pp. 92)

Scott " Given that managers can choose accounting policies from a set of policies (for example, GAAP), it is natural to expect that they will choose policies so as to maximize their own utility and/or the market value of the firm" (2003, pp.368)

Healy and Wahlen "Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stockholders about the underlying economic performance of the company, or to influence contractual outcomes that depend on reported accounting numbers " (1999, pp.368)

Schipper (1989) views accounting numbers as information. They also subsumed management of the components or of earnings of supplementary disclosures.

Under this definition, earnings management could occur in any part of the external disclosure process, and could take a number of forms. Moreover, Schipper (1989) also defines a minor extension of the definition that would encompass "real" earnings management, accomplished by timing investment or financial decisions to alter reported earnings or some set of it. Hand (1989) suggests that the resulting accounting numbers could be "smoothed" in the sense that over–time variability is reduced, but they need not be. Similar to the view of Schipper, Scott (2003) investigates how earnings management can be a vehicle for the communication of management's inside information to investors. Managers have a strong interest in the bottom line. An understanding of earnings management is important to accountants, because it enables an improved understanding of the usefulness of net income, both for reporting to investors and for contracting. Earning management is the choice made by a manager of accounting policies so as to achieve some specific objective.

2.2 Positive Accounting Theory and Earnings Management studies

Positive accounting theory attempts to understand and predict a firm's accounting policy choices. At its most general level, it asserts that accounting policy choice is part of the firm's overall need to maximize its cost of capital and contracting. The accounting policies that do this are largely determined by the firms' organizational structure, which in turn is determined by environment. Thus, accounting policy choice is part of the overall process of corporate governance.

Positive accounting theory has produced a rich body of empirical literature. An important starting point of positive accounting theory is the incentive of the manager who selects accounting policies. A manager of the firm is assumed to be self-interested and to behave as a maximizer of personal wealth. Earnings management is a consequence of the maximizing decisions of a self-interested manager.

2.3 Definitions of Accounting Accruals

Healy (1985) proposes a seminal investigation of a contractual motivation for earnings management. Healy observes that managers have inside information on the firm's net income before earnings management. Since outside parties, including the Boards, may be unable to learn what this number is, Healy predicted that managers would opportunistically manage net income so as to maximize their bonuses under their firm's compensation plans. Here, Healy's methods and findings will be discussed as follows:

Healy's paper is based on positive accounting theory. It attempts to explain and predict managers' choices of accounting policies. More specifically, it is an extension of the bonus plan hypothesis, which states that managers of firms with bonus plans will maximize current earnings. By looking more closely at the structure of bonus plans, Healy comes up with specific predictions of how and under what circumstances managers will engage in this type of earnings management.

Healy's study was confined to firms whose compensation plans are based on current reported net income only. These will be called bonus schemes. It is needless to say that the incentives to manage reported net income faced by a manager is subject to such a scheme.

Healy suggests two approaches on managers manage net income as follows:

1. By controlling various accruals, where accruals are defined broadly to include that portion of revenue and expense items on the income statement that is not represented by cash flows.
2. By controlling accounting policies per se.

Referring to the first approach of Healy on earnings management of managers, Scott (2003) provides the following in brief:

Net Income=Operating Cash Flows $\pm$ Net Accruals

The above formula is shown how accruals may be used to manage earnings,

This can be broken down into:

Net Income=Operating Cash Flow $\pm$ Net Non-Discretionary Accruals $\pm$ Net Discretionary accruals[1].

It is easy to determine a firm's total accruals for the year. One approach is to take the difference between operating cash flows and net income. Accruals are interpreted quite broadly here, being the net effect of all recorded operating events during the year other than cash flows. Changes in accounts receivable and payable are accruals, as are changes in inventories. Amortization expense is a negative accrual, being the portion of the cost of capital assets that is written off in the year. Jones (1991) used an equivalent approach, by taking the change in non-cash working capital for the year from the comparative balance sheets, plus amortization expense, as her measure of total accruals. However, separating total accruals into discretionary and non-discretionary components presents a major challenge. This is because non-discretionary accruals are correlated with the level of business activity. If a firm is suffering from foreign competition, it may have lower receivables, it may have to delay payment of current liabilities, and it may have to write off large amounts of slow-moving inventory. In effect, these are negative accruals, but they can hardly be regarded as discretionary.

These are accruals over which the manager can exercise some control. As it is pointed out earlier, the estimation of discretionary accruals by researchers poses a major challenge. The Jones (1991) model is currently accepted as an estimation method. However, other approaches are possible. One of these is an item-by-item procedure, which considers each accrual and classifies it as primarily discretionary or primarily non-discretionary.

For simplicity, Scott has assumed that there are no extraordinary income statement items

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[1]Scott (2003) suggests that an effective way to reduce reported earnings in a hard-to-detect manner is to manipulate accounting policies relating to accruals. For example, a firm may increase amortization charges; it may record generous provisions for doubtful accounts and obsolescence of inventories. Thus, Scotts defines discretionary accruals.

and no income tax expense. Typical items are as follows:

1. Amortization expense: Annual amortization expense is laid by the firm's amortization policy and its estimates of assets' useful lives. Given this policy, amortization expense is a non-discretionary accruals.

2. Increase in net accounts receivable: Assumes that this derives from a decrease in the allowance for doubtful accounts, resulting from a less conservative estimate than in the previous year. This accrual is discretionary, because management has some flexibility to control the amount. Other reasons for the increase could include a more generous credit policy, keeping the books open beyond the year-end, or simply an increase in volume of business.

3. Increase in inventory: Assumes that this derives from the firm manufacturing stock during a period of excess manufacturing capacity. The result is to include fixed overhead costs in inventory rather than charging them off to expense as unfavorable volume variances.

4. Decrease in accounts payable and accruals liabilities: Assumes that this derives from the firm being more optimistic about warranty claims on its products than it has been in previous years. Alternatively, or in addition, the decrease could be due to regarding certain borderline items as contingencies rather than accruals. Again, we see that there can be ample room for discretionary accruals in accounts payable.

The main point to note is that the manager has considerable discretion to manage reported net income within the rules of GAAP. Notice also that, for many of these discretionary accruals, it would be difficult for the firms auditors to discover the earnings management or, if they did discover it, to object, since all of the techniques mentioned, with the exception of holding the books open past the year-end, are within GAAP. It is also clear that a similar set of discretionary accruals to decrease reported net income is available to the manager, simply by reversing those described above.

2.4 Measurement of Accounting Accruals

McNichols (2000, pp.319) suggests research design for accounting accruals as follows:

"Research design issues associated with discretionary accruals proxies based on aggregate accruals". There are several issues that affect inferences from aggregate accruals studies. As

noted by McNichols and Wilson (1988), accruals-based tests of earnings management require a proxy for management discretion over accruals. McNichols and Wilson (1988, p.5) characterize this proxy. DAP, as measuring discretionary accruals, DA, with error, η.

$$DAP = DA + \eta$$

The error, η, reflects the effects of omitted variables in the estimation of DA, as well as idiosyncratic variation. Jones (1991, pp. 210-212) measures DAP as A, aggregate accruals, less estimated nondiscretionary accruals, NAEST

$$DAP = A - NAEST$$

Where NAEST is characterized as the prediction error from an equation regressing total accruals on the change in revenues and level of property, plant and equipment.
McNichols and Wilson (1988, pp. 5–6) characterized test for earnings management where DA is observed in terms of following regression:

$$DA = \alpha + \beta PART + \varepsilon$$

Where PART is an indicator variable partitioning the sample into two groups, for which differences in earnings management behavior are predicted, α is the mean discretionary accruals of observations in the first group and $\alpha + \beta$ is the mean discretionary accruals of observations in the second group. However, the researcher does not observe DA but rather an estimate, DAP. Test of earnings management are therefore characterized by the following regression:

$$DAP = \phi + \gamma PART + v,$$

$$\gamma = \beta + \rho(PART, \eta) * \frac{\sigma_\eta}{\sigma_{PART}},$$

$$\gamma = \beta + bias$$

The error term η reflects the effects of omitted variables in the estimation of DA as well as an idiosyncratic variation in DAP conditional on DA. As McNichols and Wilson (1988, pp.6) show γ is a biased estimate of β if the partitioning variables are correlated with η the measurement error in the estimate of discretionary accruals.

In summary, McNichols (2000) concludes that to interpretate accruals-based tests as evidence that earnings management did not occur, one must be confident that the discretionary proxy is sufficiently sensitive to reflect it. To interpret accruals-based tests as evidence that earnings management occurred, one must be confident that measurement error in the discretionary accruals proxy is not correlated with the partitioning variable in the studys' research design.

3. Alternative Measurement Views on Discretionary Accruals

Healy and Wahlen (1999) mention that although earnings management exists, it has been remarkably difficult for researchers to document it convincingly. This problem arises primarily because, to identify whether earnings have been managed, researchers first have to estimate earnings before the effects of earnings management. Healy and Wahlen (1999) suggest that one common approach is to first identify conditions in which manager's incentives to manage earnings are likely to be strong, and then test whether patterns of unexpected accruals (for accounting choices) are consistent with these incentives. Thus, two critical research design issues arise for these studies. First, we have to identify managers' reporting incentives (discussed above). Second, we have to measure the effect of managers' use of accounting discretion in unexpected accruals or accounting method choices.

With regard to the second issue, Healy and Wahlen (1999) suggest that estimates of unexpected accruals which measure the effects of managers' use of accounting discretion with some (inevitable) degree of error. To estimate unexpected accruals, many studies begin with total accruals, measured as the difference between reported income and cash flows from operation. Total accruals are then regressed on variables that are proxies for normal accruals, such as revenues (or cash collections from customers) to allow for typical working capital needs (such as receivables, inventory and trade credit), and gross fixed assets to all for normal depreciation. Unexpected accruals are thus the unexplained (i.e., the residual) components of total accruals. A number of recent studies have developed estimates of the unexpected components of specific accruals, such as loan loss provisions for banks, claim loss reserves for property causality insurers, and deferred tax valuation allowance[2].

The ability to detect earnings management (see Dechow et al 1995, Thomas and Zhang

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[2] McNichols and Wilson (1988) were one of the first studies to model specific accruals, but they did not directly examine specific earnings management incentives.

2000, Kang 1999) is an important issue because most hypotheses about the implications of accounting choice rely on the premise that the interested parties are unable (or possibly unwilling) to detect the effect of accounting method choice, accounting procedures and accounting estimations on the reported numbers. Since researchers have used statistical techniques to detect earnings management, it is not implausible that the third parties lack confidence in their ability to identify earnings management and take appropriate corrective action[3] (Field et al (2001)). Therefore, Field et al (2001) propose at least three approaches to dealing with the multiple methods problems[4]: The first is to continue using the discretionary accruals methods; the second is to continue to develop and test more powerful techniques for detecting earnings management (e.g., Kang and Sivaramakrishnan in (1995) instrumental variables approaches) and the third approach is to return to the basics and use our expertise as accountants to measure multi-dimensional accounting choice directly via the financial statements.[5]

According to the second suggestion of Field et al (2001), it is necessary work to search for the most powerful statistic model which can detect when earnings management are employed, along with a developing model which explains the cause of incentives on earnings management.

Recently, there have been many attempts to search for the incentive of earnings management based on the development of the innovative accrual model which takes a considerable estimating period to decompose in to non-discretionary and discretionary accruals. The proportion of accruals amount are separated into two parts then required to estimate one or more parameters.

Earnings management studies frequently relate discretionary accruals with material incentives and rely on accrual models to segregate accruals into discretionary and non-discretionary components (e.g., Jones, 1991; Holthausen et al; 1995). The ability of accrual models in isolating the discretionary component in total accruals is thus essential to test earnings management studies. This ability has, however, come under criticism. McNichols and Wilson (1988, p.8) and Holthausen et al. (1995, p. 66) argue that when the incentive context study is related with performance and inferences the studies are confounded. Guay et

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[3]Moreover, Field et al (2001) suspect that the results are affected by a self–selection bias. Field et al question if geography (placement of the financial statement) matters, why do not all firms take advantage of this reporting discretion?

[4]See Field et al (2001, p.288) indicate that "the choice of a particular accounting method within the context of the goals driving the accounting choice, whereas managers may make multiple accounting method choices to accomplish a specific goal."

[5]See Hagerman and Zimijewski (1979)

al (1996, p. 104) conclude that extant accrual models estimate discretionary accruals with considerable imprecision and that some accrual models randomly decompose accrual amounts into discretionary and non-discretionary components. Beneish (1997) provides evidence that accruals models have poor detective performance even among firms whose behavior is extreme enough to warrant the attention of regulators.

Thomas and Zhang (2000) conclude that the performance of accrual models is dismal. Their conclusions are similar to Guay et al (1996, p. 104) and they refer to forecast errors from accruals models as unexpected accruals rather than discretionary accruals.

4. Unexpected Accruals versus Discretionary Accruals

Thomas and Zhang (2000) focus on the properties of forecast accruals per se. In brief, they discuss the relation between forecast errors from accrual prediction models (unexpected accruals) and the ability to detect earnings management (discretionary accruals).

Consider the usual separation of total accruals ($TOTACC_{it}$), for firm i in year t, into the following two parts: true discretionary ($DISCACC_{it}$) and true non- discretionary accruals ($NONDISCACC_{it}$)

$$TOTACC_{it} = NONDISCACC_{it} + DISCACC_{it} \dots\dots\dots\dots\dots\dots\dots (1)$$

$$FE_{it} = TOTACC_{it} - TOT\hat{A}CC_{it} = NONDISCACC_{it} - NONDI\hat{S}CACC_{it} + DISCACC_{it} + DISCACC_{it} \ (2)$$

Each model then generates a forecast for total accruals ($TOTACC_{it}$), which can in turn be viewed as the sum of the forecast values of non–discretionary ($NONDISCACC_{it}$) and discretionary accruals ($DISCACC_{it}$). Therefore, forecast error FC_{it} and $DISCACC_{it}$, without imposing an additional structure.

Previous literature has assumed that discretionary accruals are negligible during the estimation period, and the model used is in effect derived from non–discretionary accruals alone (e.g., Dechow et al., 1995, p. 195). As a result, Thomas and Zhang (2000) propose that any forecast error in the period of suspected earnings management should be viewed as a

reasonable estimate for discretionary accruals in that period. If, however, discretionary accruals exist even in the estimation period, the model reverts to predicting unexpected accruals, since the prediction portion of non-discretionary and discretionary accruals is captured in the forecast[6].

Thus, it is essential to discuss the forecast errors as being unexpected or unpredictable accruals in order to compare the properties of their statistics. The review starts from the simplest model of early days to the latest advanced model used in general testing earnings management since the most important work for researching the incentive of earnings management is a consideration of an appropriate model in order to separate the components of accruals amount.

DeAngelo (1986) and Mean-Reverting of DSS are primary models. These models do not require an estimate of parameter, rather they are a convenient first approximation of how non-discretionary accruals behave. Then, it is drawn on a sophisticated accrual model, in calculation of forecast errors, such as Jones (1991), DSS (1995) and KS (1995) papers. These papers would be discussed in detail on many aspects according to alternative comparison on the advantages and disadvantages.

Table one illustrates the merit and demerit of each accrual models. The Appendix shows more detail in each formula.

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[6]It has been suggested that discretionary accruals are easier to detect by researchers focusing on any one component of accruals, rather than the total accrual (see Beneish, 1998a, pp. 86-87). McNichols and Wilson (1988) and Miller and Skinner (1998) are examples of such studies.

Table 1 Summaries the Merit and Demit of Each Model

MODEL	MERIT	DEMERIT
Random Walk Model	Relatively simple to use and no estimation period is required.	A predictor of accruals (E.g., DeAngelo, 1986.pp.409)
Mean–Reverting Model	Equal weight to accruals from each of the prior five years. No estimation period is required.	Accruals cannot be forecast if there are missing values of scaled accruals exists for any of the previous five years.
Components Model	Improvising of prediction by using current and non–current accruals to have separate weights.	Non–missing prior period accruals are strict.
Jones Model	ΔREV and PPE are great explanatory variables in the first stage regression which help to control for unmanaged accruals associated with the depreciation charge and changes in economic activity.	The inability to capture the impact of sale–based manipulation.
Industry Model	Explicitly explained accruals made by other firms in the same industry	Similar to other non–missing prior period accruals are strict.
KS Model	Mitigating the omitted variables problems by including additional variables; simultaneity and errors in variable problems	GMM estimators require less stringent assumptions than the standard IV method, and hence are expected to be more robust.

5. Conclusion

Although many papers attempt to search for earnings management based on the development of the innovative accrual prediction model, they break down into discretionary and non–discretionary accruals. By the proportion of accruals amount which are separated into two parts then it is required to estimate by one or more parameters. Those accrual models do not perform well due to the lack of their evident results. In general, the results of these papers are not convincing. Earnings management studies frequently relate to discretionary and non–discretionary accruals with managerial incentive and rely on accrual models to segregate accruals into discretionary accruals and non–discretionary accruals (e.g., Jones, 1991, Holthasen et al, 1995). The ability of accrual models to isolate the discretionary component in accruals is thus essential to tests in earnings management studies. DSS (1995) and Thomas and Zhang (2000) use research approaches and criteria that differ from Guay et al[7] (1996) to analyze the models. While these alternative approaches seem to have limitations, their overall conclusion that even the best of the current models, such as the Jones and Modified–Jones model as well as Thomas and Zhang's Component model , perform relatively poorly in separating total accruals into discretionary accruals and non-discretionary earnings–is remarkably similar to Guay et al (1996). One of the key points raised by the performance of existing accrual models is whether earlier studies have misstated the frequency of earnings management. Either innovative reliable accrual models have been developed or researchers can revise many of these studies. Healy (1996) comments that the evidence of earnings management is not likely to disappear, since all existing studies rely on accruals models. On this point, the improvement of statistic techniques and research design of earnings management literature have to continue to modify and choose the most powerful models as well as the appropriate methodologies, it is therefore important for the development of earnings management literature.

To improve the testing of accrual prediction models and develop more effective procedures for estimating the discretionary accruals, as well as, providing additional evidences in the performance of existing model

Fields et al (2001) suggest that the literature has begun this process by examining the adequacy of existing statistical methods. Such efforts should be expanded to the testing of more alternative models.

Fields et al (2001) also suggest that recent work by Hunt et al (1996), Beatty et al (1995) and Kang and Savaramakrishnan (1995) provide good examples of extending the methodological boundaries with the application of simultaneous equations and instrumental

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[7]Guay et al (1996) evaluate five models similar to DSS.

variables techniques to accounting problems. New methodologies should be explained if we are to move forward.

Both small sample studies and field studies might fit well into this approach which would create a more explicit examination of the fundamental question. Fields et al (2001) mention that this research design might fit in with this approach. It probably allows them to make better use of their expertise as accountants. Although the small sample size might rise issues of generality, this approach would consistently complement existing large sample studies and provide a more valid insight into the underlying cases of the empirically observed effects. It might also provide additional evidence for earnings management literature.

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Appendix: A summary of Accrual prediction models

1. Random Walk Model

$$\frac{TOTACC_{it}}{TA_{it-1}} = \frac{TOTACC_{it-1}}{TA_{it-2}} + \varepsilon_{it}$$

2. Mean-reverting accruals model

$$\frac{TOTACC_{it}}{TA_{it-1}} = \frac{1}{5}\left(\sum_{\tau=t-5}^{t-1} \frac{TOTACC_{i\tau}}{TA_{i\tau-1}} \right) + \varepsilon_{it}$$

3. Components Model

$$\frac{CURACC_{it}}{TA_{it-1}} = (\alpha)\frac{CURACC_{it-1}}{TA_{it-2}} + (1-\alpha)\left(\frac{1}{5}\sum_{\tau=t-5}^{t-1} \frac{CURACC_{it}}{TA_{i\tau-1}} \right) + \varepsilon_{it}$$

$$\frac{NONCURACC_{it}}{TA_{it-1}} = (\beta)\frac{NONCURACC_{it-1}}{TA_{it-2}} + (1-\beta)\left(\frac{1}{5}\sum_{\tau=1-5}^{t-1} \frac{NONCURACC_{it}}{TA_{i\tau-1}} \right) + \varepsilon_{it}$$

4. Jones Model

$$\frac{TOTACC_{it}}{TA_{it-1}} = a_i \frac{1}{TA_{it-1}} + b_{1i}\frac{\Delta REV_{it}}{TA_{it-1}} + b_{2i}\frac{PPE}{TA_{it-1}} + \varepsilon_{it}$$

5. Industry Model

$$\frac{TOTACC_{it}}{TA_{it-1}} = i_{1i} + i_{2i}\left(industrymedian\frac{TOTACC_{it}}{TA_{it-1}} \right) + \varepsilon_{it}$$

Which is estimated over two-digit SIC industry groups

6. KS model

$$\frac{ACCBAL_t}{TA_{t-1}} = c_0 + c_1 \frac{REV_t}{TA_{t-1}}\left(\frac{ART_{t-1}}{REV_{t-1}} \right) + c_2 \frac{EXP_i}{TA_{t-1}}\left(\frac{OCAL_{t-1}}{EXP_{t-1}} \right) + c_3 \frac{GPPA_t}{TA_{t-1}}\left(\frac{DEP_{t-1}}{GPPE_{t-1}} \right)$$