COMPARISON OF QUALITATIVE AND QUANTITATIVE MEASURES OF EARNINGS MANAGEMENT: THE CASE OF AN ELECTRICITY UTILITY

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ABSTRACT

The paper compares the qualitative and quantitative methods of earnings management. Data is obtained from annual reports of Fiji Electricity Authority (an electricity utility company) to compute discretionary accruals using the modified Jones model. These results are compared with the results based on the qualitative measure (Mulford & Comiskey, 2002) from a master's thesis (Lata, 2007). The results suggest that the earnings management model requires further developments since the outcome of the two measures differ.

Quantitative measure, qualitative measure, discretionary accruals, earnings management

INTRODUCTION

Earnings management has been a major concern for all business organization for few decades. It has always been a concern because it is committed within the bounds of regulations and also is a step towards fraudulent activities. These concerns have motivated researchers in developing models to detect instances of earnings management in businesses. Two approaches have been identified in literature: the quantitative and the qualitative approach. While both approaches have the objective of detecting earnings management, no research to date has been conducted to determine whether both approaches provide similar results. The

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objective of this paper is to investigate whether qualitative and quantitative models lead to similar results and conclusions. This paper considers the use of both measures in detecting earnings management in an electricity utility company, Fiji Electricity Authority (FEA) in Fiji.

Quantitative measure for earnings management implies the use of empirical models to compute discretionary accruals, which indicates the presence/absence of earnings management in an entity for the period considered. Dechow *et al.* (1995) briefly discusses most of these empirical models[i] and concludes that the modified Jones model (MJM) provides the most powerful test of earnings management among all the models discussed. Hence, the focus of this paper would be the MJM and its power in detecting earnings management.

Earnings management is also detected using qualitative measures. Mulford and Comiskey (2002) have developed a qualitative framework to detect earnings management. This measure employs four categories to detect earnings management. The categories are:

1) recognizing premature or fictitious revenue;
2) aggressive capitalization and extended amortization policies;
3) misreported assets and liabilities; and
4) use of operating cash flows.

This paper discusses MJM and the qualitative method identified by Mulford and Comiskey (hereafter MCM). It attempts to compare and contrast the two approaches to detect earnings management. The following section provides a brief overview of FEA and then discusses the two approaches to detect earnings management. The next section identifies the research method and then we discuss the results based on the data obtained from FEA annual reports. Finally, we conclude the paper discussing limitations and areas of future research.

1. OVERVIEW OF FIJI ELECTRICITY AUTHORITY

FEA commenced operations on 1 August 1966 when it was only responsible for supplying electricity to Nadi, Lautoka and Levuka. FEA was "established under the provisions of the Electricity Act 1966, which constituted it to provide and maintain a power supply that is financially viable, economically sound and consistent with the required standards of safety, security and quality" (Lata, 2007). Since 1978 the Authority's customer base increased significantly from 13400 to 32000 when Suva was incorporated within its market. Since then FEA's customer base continued to increase as its service was extended to other urban areas of the country.

In the early 1970s the government implemented the Monasavu Hydro Scheme to generate electricity. This was due to the world oil crisis which made the conventional diesel generators a very costly source of power generation. The Chief

Executive of the FEA stated in the 1991 Annual Report that apart from the savings in the foreign exchange, the Monasavu Hydro Electric Scheme had met FEA's expectations in operational efficiency.

The FEA is the only electricity utility company in Fiji currently providing electricity all over Fiji except some interiors and islands. Like other state owned enterprises, FEA also have various incentives for earnings management. These include the accounting regulations and cultural influences in Fiji. The focus of this paper is the earnings management models, thus the incentives are not discussed here[ii].

2. THE QUANTITATIVE MODEL

The two approaches to detect earnings management employed in this study are the modified Jones Model, which represents the quantitative measure and the measure used in Mulford and Comiskey (2002), the qualitative measure. The Modified Jones Model (MJM) has been identified as a powerful tool for measuring earnings management among the other quantitative approach (Dechow *et al.* 1995). Hence, we use MJM as the quantitative approach in this paper.

The MJM computes discretionary accruals (DAC), by considering the accruals in the business organization. It computes DAC as a residual from the model, that is, total accruals less non-discretionary accruals. The MJM is shown below:

$$\frac{TA_{it}}{A_{it-1}} = \frac{\alpha}{A_{it-1}} + \beta_1\left(\frac{(\Delta REV_{it} - \Delta AR_{it})}{A_{it-1}}\right) + \beta_2\left(\frac{PPE_{it}}{A_{it-1}}\right) + \varepsilon_{it}$$

where,

TA_{it} = total accruals for firm i in year t,
A_{it-1} = net total assets for firm i in year t-1,
ΔREV_{it} = change in revenue for firm i from year t-1 to year t,
ΔAR_{it} = change in accounts receivable for firm i from year t-1 to year t,
PPE_{it} = gross property plant and equipment for firm i in year t,
ε_{it} = error term for firm i in year t.

The model is divided into three components. On the left, we have total accruals (TA) ($\frac{TA_{it}}{A_{it-1}}$) and on the right we have non-discretionary (NDAC) component ($\beta_1\left(\frac{(\Delta REV_{it} - \Delta AR_{it})}{A_{it-1}}\right) + \beta_2\left(\frac{PPE_{it}}{A_{it-1}}\right)$) and discretionary component (ε_{it}). Our focus when detecting earnings management is DAC because management uses the discretionary components to cook the books. The other components are equally

important as they are used to determine the magnitude and directions of DAC, or earnings management (using this model).

Jones (1991) explains total accruals (TA) as the change in noncash working capital less depreciation expense. There are two approaches to compute TA, the income approach and the balance sheet approach. Since balance sheet approach has been widely used in research[iii], it is used in this paper to compute TA. According to balance sheet approach TA is calculated as follows:

TA = ΔCurrent Assets – ΔCurrent Liabilities – ΔCash + ΔCurrent Maturities of Long-Term Debt – Depreciation and Amortization Expense

NDAC is also a vital component of MJM. The user (researcher) identifies all the accruals which cannot be manipulated by the management or which is very difficult to be manipulated. First, we have ΔREV – ΔAR. All changes in revenues and accounts receivable are accruals and can be manipulated. However, the difference could be cash, which cannot be manipulated. For example,

Account	2007 ($)	2008 ($)	Transaction during the year
Revenue	100	230	1. Cash Sales $40
Accounts Receivable	50	140	2. Credit Sales $70
Cash	40	80	3. Credit Sales $20

If we compute ΔREV – ΔAR, we will get:
$$= \ 130 - 90$$
$$= \ 40$$
The result we get from the computation is one that may not be manipulated by the management, such as cash. Hence, it is part of NDAC component.

The second part of NDAC component is *gross* property, plant and equipment (PPE). This is the value of the physical assets recorded in the balance sheet. Entities are required to record PPE at original cost if they are using the cost model. Cost model was used by almost all entities before fair value accounting was introduced. If PPE are recorded using the cost model, management may not be able to manipulate it. Hence, it is considered as a NDAC component. However, the use of fair value accounting requires management's judgments. It may not be appropriate to use MJM for firms using revaluation model where PPE could be a discretionary component.

The last part of the MJM, the error term, is the component that implies earnings management. It is a residual from TA after considering NDAC. Hence, it is an indirect measure. The MJM does not identify items that are considered to be discretionary accruals; however, it identifies NDAC and calculates the residual from TA.

3. THE QUALITATIVE MODEL

The qualitative method, unlike MJM, provides a direct measure to detect earnings management. It attempts to identify all the discretionary components instead of computing it as a residual. Mulford and Comiskey (2002) present checklists to detect earnings management. There are four checklist, detecting premature or fictitious revenue, detecting aggressive capitalization and extended amortization, detecting misreported assets and liabilities, and using operating cash flows to detect earnings management. These checklists outline questions that need to be answered to decide whether management has managed earnings. The following paragraphs briefly describe these checklists[iv].

The first checklist, which highlights on recognizing premature or fictitious revenue, is divided into few sections. The first requires individuals (personnel's identifying instances of earnings management) to understand the entity's revenue recognition policy. Such understanding could be gathered from careful evaluation of the notes section of the Annual Report. Review of the disclosure of related party transaction is also considered to be imperative. Thirdly, individuals are required to analyze the physical capacity of the firm to see its potential to generate reported revenue. Overstatement or understatement of accounts receivable is also considered due to double entry concept. This means that any premature or fictitious revenue would be recorded against an asset account. Hence, other asset accounts could also be used, such as prepaid expenses, which are considered in the last section.

Checklist two is divided into two parts; detecting aggressive capitalization policies and detecting aggressive amortization policies. The first part highlights four useful analytical tools:
1) review of the entity's capitalization policy;
2) careful consideration of what the capitalized cost represent;
3) check whether the entity has been aggressive in its capitalization policy in the past;
4) check for cost capitalized in stealth.

Other methods are also considered to be useful such as comparing the capitalization policies with the competitors' and the industry. However, competitors could also be employing aggressive capitalization policies.

The second part of this checklist deals with detecting extended amortization policies. This is done, firstly, by computing the average amortization period for a company's depreciable asset and secondly, checking for extended amortization periods in prior years.

The next Checklist detects any misreported assets and liabilities. This checklist is also divided into two parts, detecting Overvalued Assets and detecting undervalued liabilities. The earlier concentrates on assets like accounts receivable, inventory

and investments. Assets subject to annual depreciation are considered in earlier checklist. Although accounts receivable is examined in the first checklist, this checklist considers improper valuation of accounts receivable through adjusting entries. Entities could manipulate provision for doubtful debts to misreport earnings.

Inventories can be manipulated by misreporting the physical count, misreporting the dollar value without altering the quantity or postponing transactions. Consideration also could be given on the method used to record inventories. Internal control procedures are also considered in this checklist. The checklist allows investigation on investments with major focus on changes in fair value.

Checklist three is also used to gather information on understatement of liabilities like accrued expenses and accounts payable. Trends in accrued expenses could be identified and compared with the growth rate of revenue. Time series comparison of administrative expenses as a percentage of revenue could also be a useful test. Furthermore, accounts payables increases due to credit purchase of inventory. The growth rate of accounts payable could be compared against inventory to figure any unusual change. Computation of accounts payable days is also a method to detect any understatement.

The last checklist uses cash flows from operations to detect earnings management practices. Operating cash flows may not be helpful exclusively but it could be used in conjunction with income from continuing operations adjusted for nonrecurring events. The checklist requires computation of adjusted cash flow-to-income ratio. This will be useful in identifying discernible trends over a period of time. Any unusual change in trends would mean employment of earnings management practices.

These checklists would identify any unexplained behavior or unusual trends which could be analyzed case by case. Analysis will involve explanations for any unusual behavior and any incentives driving the behavior. Also, whether generally accepted accounting principles was followed.

Limitations of MCM

MCM is a recent development and has not been extensively used in research, therefore, lacks practical guidance. The qualitative method is subjective to the interpretation of data based on the researcher's ability while MJM objectively determines the presence and directions of earnings management. The qualitative approach will not yield the magnitude of earnings management. It only attempts to identify the existence of earnings management and possibly the directions based on the researcher's interpretations. However, it is difficult to identify the extent of earnings management.

4. OVERLAP BETWEEN THE TWO APPROACHES

The logic behind the two measures is same. Both methods identify the same variables as discretionary components. This implies that the same variables are used in both measures to detect the instances of earnings management. However, MJM uses an empirical approach and MCM uses a qualitative approach. For instance, the variables that are used to calculate TA are used in the checklists. Net income before extra ordinary items and net cash flows from operations are used in checklist 4. Checklist 3 consist of variables like accounts receivable and accounts payable, which are used in the balance sheet approach to calculate TA. Depreciation expenses are used in checklist 2.

The independent variables in the MJM are revenue, receivables and property, plant and equipment. These are also used in the checklists. Revenue is used to identify premature and fictitious revenue. Property, plant and equipment are used in the checklists to determine the physical capacity of the entity to generate reported revenue. Receivables are used in detecting misreported assets.

Although the two measures employ the same variables, MJM is an indirect approach and MCM is a direct approach. MJM is concerned about the NDAC and computes DAC as a residual which represents the instances of earnings management. The models also differ because MJM only uses financial figures while the other approach is more exhaustive. MCM analyzes the same variables with all other factors that affect the variable. MCM analyzes, for instance, revenue values, revenue recognition policy, credit policy, related party transactions and physical capacity to generate the reported revenue. The other factors used apart from revenue values make the analysis more effective and robust in detecting instances of earnings management. Thus, the results from computing earnings management using the two measures may not be the same. This could be due to the comprehensive nature of MCM.

5. RESEARCH DESIGN

5.1 Sample Selection

For the purpose of this research we have used Fiji Electricity Authority (FEA) to empirically test the presence of earnings management. We selected FEA considering the availability of annual reports so that MJM could be used. We used annual reports from 1981 to 2007 to collate data to compute earnings management using MJM. The sample excluded 1986 and 1987 data from the analysis because annual reports were not accessible for those periods.

5.2 Research Method

As discussed earlier, this paper uses the MJM as the quantitative approach to detect earnings management. We use the qualitative results from Lata (2007).

Lata (2007) (hereafter thesis) is a masters thesis considering two state owned entities in Fiji, FEA and Housing Authority. The thesis explains in depth the incentive for earnings management in these entities and also detects earnings management practices for selected periods using the qualitative approach. We adopt the results calculated using MCM for FEA from this thesis. The results adopted was only for selected years, therefore, all the years between 1981 and 2007 are not compared.

While comparing the results, we consider the direction of earnings management, either income-increasing or income-decreasing for the respective years. First, we identify the direction of earnings management practice based on the results from the thesis. Then we compare this individually for each periods with the results computed using MJM. Hence, this paper provides year by year comparison of the directions of earnings management between the two measures and is not a statistical comparison.

We are unable to make a statistical comparison due to the limitations of MCM. MCM is unable to produce discrete values which could be used for statistical comparison. Hence, this paper restricts to period by period comparison.

6. RESULTS

6.1 Qualitative Results

Table 1 provides the summary of earnings management evidence from the thesis. It describes the incentives for earnings management and the approach used to practice earnings management for the respective years considered. It considers approach like changes in depreciation rates, revaluation of non-current assets and items being reported as equity instead of liability.

Table 1. **Summary of Earnings Management Evidence**

Year	Event	Incentive
1985 to 1992	Capitalization of Research and training costs	Avoid operating large expense in a single year and to meet the debt covenant
1992	Revaluation of non-current assets	Improve the equity position and meet the debt covenant set by the offshore lenders
Prior to 1995	Deferred income was reported as equity instead of liability	Improve the equity position and debt to equity ratios
1994 and 1996	Cease to capitalize certain overheads to property, plant and equipment	To make a case to the government to extend the tax exempt status and reimburse the cost of universal service obligations
1999	Adopted high tax depreciation rates	

6.2 MJM Results

Table 2 presents the results computed using the MJM and also compares it individually with the MCM results for the respective years. The direction of earnings management is same for the following years: 1985, 1991, 1992 and 1996 while it differs for other periods. The following paragraphs discuss possible foundations for the inconsistency.

Table 2. **Comparative Results for Modified Jones Model and Mulford and Comiskey Model**

Years	DAC	Directions as per MCM	Comparisons
1985	0.017522815	Income – increasing	Same
1988	-0.02991077	Income – increasing	Different
1989	-0.086808461	Income – increasing	Different
1990	-0.035343362	Income – increasing	Different
1991	0.05742709	Income – increasing	Same
1992	0.009431291	Income – increasing	Same
1994	0.085266286	Income – decreasing	Different
1996	-0.013065127	Income – decreasing	Same
1999	0.017037038	Income – decreasing	Different
2004	-0.046831935	Income – increasing	Different

6.3 Foundations for Inconsistency between MCM and MJM

Earnings management is achieved through various means including the use of accruals, changes in accounting methods and policies and changes in capital structure like debt defeasance or debt-equity swaps (Jones, 1991). While scrutinizing earnings management using MCM, all possibilities, which could lead to management of earnings, are considered. The checklists discussed in this study demonstrate that MCM incorporates most techniques of effecting earnings management. However, MJM only focuses on the use of accruals to manage earnings. This is a major drawback of MJM and also a major difference between the two models.

The results imply that the directions of earnings management differ between the two models as presented in *Table 2*. MJM is able to capture the following variables; current assets, current liabilities, cash, current maturities of long term debt, amortization/depreciation, revenue, accounts receivables and property, plant

and equipment. The model only considers accruals in determining earnings managements. It only considers the financial figure for the respective years.

MJM tends to ignore other important factors which lead to earnings management. These factors include changes in accounting policies such as revenue recognition policies, credit policies. For example, FEA capitalized research and training costs instead of treating them as expenditures. This is a major limitation of the use of MJM and further research is required to further develop the model.

CONCLUSION

The discussions and the results in this paper indicate the differences between the two measures of earnings management. The paper also attempts to identify some limitations of each method discussed. The qualitative approach seems to be a better approach in detecting earnings management, however, it does not indicate the magnitude of earnings management and it is a subjective approach. Considering these two limitations indicates that MJM objectively determines the presence of earnings management and could be reliably used in empirical research. However, the model is unable to capture some important factors. Ignorance of these factors leads to bias and dishonest results, hence, research based on MJM would lack reliability.

The use of data from only one company is a major limitation of this study. This idea requires further exploration using more data so that the results could be validated. The paper also indicates that MJM requires further development by incorporating ideas from Mulford and Comsikey (2002).

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[i] The models discussed in the paper are: Healy model, DeAngelo model, Jones model, Modified Jones model and Industry model.

[ii] The economic incentives are discussed in Lata (2007).

[iii] Kothari *et al.* (2005) and Cheng and Reitenga (2001) uses the balance sheet approach to compute total accruals.

[iv] Detail explanation is available in Mulford and Comsikey (2002).