Comparing the Earning Quality Methods of the companies Accepted in Tehran Stock Exchange

Nahid Momenzadeh (Corresponding Author)
Faculty of Economics and Business Administration, Ferdowsi University of Mashhad (FUM), Iran

Mohammad Reza Abbaszadeh
Faculty of Economics and Business Administration
Ferdowsi University of Mashhad (FUM), Iran

Abstract:
Although the scientific research in earnings quality field has developed due to evolution of different measurement methods, but in general, there is not an acceptable consensus in this field. The main aim of this research is comparing four different earnings quality measurement indices in 159 companies listed in Tehran Stock Exchange during 2001-2011. The results of comparing these methods in each company shows that only 15 out of total selected companies, satisfy the requirements of low or high quality. So, it can be concluded that these indicators do not confirm each other meaningfully. The results of Chi-2 test verify this, too. Also, the most compatibility is observed between Leoz and modified Jones model and the least between Leoz and Dichev & Dechow ones.

Keywords: Earnings quality measures, Financial analysis, earnings forecast

1. Introduction
Capital market plays a vital role in the economy of all countries. This market not only activates dull money and investment via companies but also acts as an economical prosperity index. So, paying attention to this market and the decision making principles of it, is essential. One of the key elements of decision making in such markets is their financial statement and specially their income statement which represents the results of an entity’s operational activities in a financial period and its bottom line is assumed as the basis for most of decisions made, assessment models and stock pricing, so that its accuracy, precision, reliability, assurance, predictability and realization have a direct relationship with decision making accuracy and assessment.

Considering realities like the conflict of interests between information providers and investors, using estimation in some elements of profit and loss, possibility of using different acceptable accounting methods and subjects like smoothing and earnings management, threaten the application of earnings as a criterion for decision making. This doubles the necessity of studying earnings quality issue.
2. Theoretical background

2.1 Earnings quality

The initial aim of an earnings report is to provide and present useful information for those people who have high interest in financial reports.

But, accounting earnings cannot be always a good criterion for investors’ decision making and sometimes is manipulated by management. Therefore, earnings quality was put forward to help investors in making proper decisions. Financial analysts have to note not only to the quantity but also to the quality of earnings. Earnings quality means the earnings growth potential and probability of expected future earnings to be realized. In other words, the value of each stock does not depend merely on current year’s earnings per share but it depends on our expectations regarding the future of company and its expected profitability and reliability of such earnings (Jahankhani and Zarif fard, 1996)

Earnings quality is an important criterion for financial salience of an entity. It is a multidimensional concept with different aspects and does not have a unique sense (Bellovary, 2006). Therefore, a variety of definitions and measurement criteria have been put forward for it. Some of definitions stated for earnings quality are as follows:


Application of different concepts and definitions about earnings quality by researchers and Analysts, has led to the evolution of a variety of earnings quality measurement models. Each earnings quality model can be used for limited targets and though each of them uses different criteria, none of them gives a comprehensive prospective of earnings quality (Bellovary et al., 2006).
3. Literature Review

3.1 Comparison among different earnings quality measurement indices

In recent three decades, earnings quality has attracted special attention of researchers and their endeavor has been to achieve a valid and reasonable method to assess earnings quality and its decisive factors (Desai et al. 2009). Since earnings quality is not observable directly, empirical studies use different indices for its measurement. Versatility of definitions in this regard leads to a plenty of criteria for earnings quality. But in general there is not a single acceptable method for earnings quality measurement (Hermans, 2006).

These criteria root from logical and intuitive reasoning on accounting system characteristics. Thus, proper selection of the criteria is an effective and essential issue affecting on the results of researches.

Francis et al. (2003), have classified the criteria used for earnings quality measurement into two categories: Market-based and accounting principles-based. Market-based earnings quality includes relevance, conservatism and timeliness. The criteria used for these characteristics are based on the estimated relationships between accounting earnings and market return or market prices. Accounting-based earnings quality includes accruals quality, predictability, smoothing and consistency; these characteristics are measured and assessed using information like cash, earnings and accruals.

Some former researches suggest that accounting-based criteria are more explanatory power compared to market-based ones (Francis, LaFond and Ohlson. 2004), while others show that using market-based criteria such as Earnings Reaction Coefficient and relevance lead to more return and explanatory power compared to accounting-based ones like accruals quality or abnormal accruals (Ewert and Wagenhofer, 2010, Perotti and Wagenhofer, 2011).

Marinovic (2010) found out through studying earnings management and capital market reaction that earnings consistency is a useful indicator to reflect earnings quality, while predictability and income smoothing cannot represent earnings quality because they are not in uniform correspondence with informative content of reported earnings.

Existence of these contradictions shows that there is a little overlap among different earnings quality measurement indices which in turn leads to contradictory and conflicting research results (Dechow and Schrand, 2010; Francis, LaFond and Ohlson, 2004).

Abdolghani (2005) and Nazemi & Seyyedi (2009) comparing three different earnings quality measurement indices i.e., Leoz, Penman & Barton and Simco, found out that different earnings
quality measurement methods lead to different assessments and an industry or company cannot be assessed as having poor or high earnings quality by using only one method. Therefore, they suggested that stakeholders should select more than one method for assessment of earnings quality before any investment decision making.

Totally, it can be concluded that despite many researches having been done on earnings quality, there are still few studies which can assist investors choose and interpret earnings quality indices. However, differences among varied criteria for earnings quality assessment which reflect different viewpoints, does not mean that they are useless, because anyhow, earnings quality assessment help the users of financial statements to judge about reliability of current profit and predict future. In short, we can assess the usefulness of high quality of earnings from the viewpoints of financial information users, investors and accounting standards regulators.

From the first viewpoint, high quality financial information reports the real value of an entity (Ricol, 2004). Also, when the users receive real financial information, they can make better decisions which in turn leads to better assignment of resources. From the second viewpoint, high quality of earnings entails more economical growth because it is followed by an increase in financial information validity which in turn is in relation with economical development (Ricol, 2004). Besides, high earnings quality decreases the cost of capital. With any increase in ambiguity about earnings, cost of capital increases and amount of transactions in stock market decreases (Battacharya, Daouk and Welker, 2003). Moreover, high earnings quality increases the tendency of investors to invest. Also, high earnings quality satisfies the requirements of theoretical framework to provide useful information for financial accounting users and finally it decreases the risks for shareholders and creditors and plays an effective role in financial consistency and economical growth of the country (Thai, 2004).

4. Research hypothesis

The main problem of this research is studying the relationship among different earnings quality measurement. The question of this research is: what relationship is there among different methods and models of earnings quality estimation? Do different methods and models confirm each other? To answer those questions the following hypothesis has been built:

“The assessment criteria confirm one another”
5. Statistical population and sample

The statistical population of this study is the companies in Tehran Stock Exchange and the statistical sample of it are selected applying the following five criteria:

1. The company stocks should have been transacted during 2001-2011
2. In the studied span, there must not be a fiscal year change.
3. The company cannot be a broker or investment company.
4. The financial information must be available.
5. It cannot be an unprofitable one.

Considering these criteria, among Tehran Stock Exchange listed companies during 2001-2011, 159 companies were selected. The classification into different industries and the number of companies in each category has been shown in table 1. All the information has been extracted from www.irbourse.com and www.rdis.ir sites and Rahavard software.

<table>
<thead>
<tr>
<th>Type of industry</th>
<th>Number of companies in the sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phar maceutical materials and products</td>
<td>21</td>
</tr>
<tr>
<td>Machineries and equipments</td>
<td>11</td>
</tr>
<tr>
<td>Vehicle and Parts Manufacturing</td>
<td>20</td>
</tr>
<tr>
<td>Mining and Mineral Industry</td>
<td>33</td>
</tr>
<tr>
<td>Chemical industry</td>
<td>24</td>
</tr>
<tr>
<td>Food and Beverage Industry</td>
<td>21</td>
</tr>
<tr>
<td>Metal Industry</td>
<td>19</td>
</tr>
<tr>
<td>Other Industries</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 1: Statistical sample

6. Research variables

Since operational definition of earnings quality is difficult, Researchers use different criteria to measure this parameter. In this research, the parameter is measured using 4 methods:

6.1 Penman index (Operational cash flow to Net profit ratio)

This criterion measures the quality using conservatism principle. Managers tend to announce the net earnings so that in successive years it shows growth. Their main incentive to do so is gaining bonus (Penman, 2001). In years with high net profit, the management worries that incoming years the profit may go down and its performance would be under question. So management tends to be conservative in calculating earnings and thus transfers a portion of earnings to future. The transferred earnings is recognized incoming years and through that
profitability of the company is shown to be properly growing. This is done normally through transferring the non-operational revenues and costs to future.

Since cash items can less be manipulated, this is done via non-operational accrued revenues and costs. With this, the earning quality decreases, too (Penman, 2002). In these circumstances, “operational cash flow to net profit ratio “ is used to measure earnings quality. If the management using conservatism has been avoiding to identify some of net earnings, this ratio would increase and this increasing means diminishing of earnings quality. In other words, the more conservative management means the more this ratio and the less earnings quality would be. (Penman, 2002). Initially Penman and then Basu (1997) used this criterion to measure earnings quality and conservatism. Following that, Givoly and Hayn (2002), Abdolghani (2005), Ball and Shivakumar (2006), Givoly et al, Roychowdhury, Waats and Shrof et al (2007) have used this criterion to measure earnings quality.

6.2 Leoz index (operational profit standard deviation to operational cash flow standard deviation ratio)

This criterion focuses on profit changeability which is in turn based on tendency of managers to income smoothing. Having access to analysts’ estimation reflecting a progressive long-term trend and having access to rewarding system conditions are among the factors which cause income smoothing (Abdolghani, 2005). Operational earnings consists of cash and accrual items. Therefore, the existing figures of operational earnings can be manipulated; but operational cash flow is an objective real number which is less subject to manipulation. With smoothing of income, standard deviation in several successive years will become less than operational cash flow standard deviation. So, the low number of this ratio is a sign of low earnings quality. Leuz et al (2003), Schipper & Vincent (2003), Abdolghani (2005) and Katz (2009) have used this concept for measuring earnings quality, too.

6.3 Modified jones model

Modified jones model is used to estimate discretionary accruals. The starting point of the above-mentioned model is obtaining total sum of accruals using the following equation:

$$TA_t = \frac{\Delta CA_t - \Delta CL_t - \Delta cash_t + \Delta STD_t - Dep_t}{A_{t-1}}$$

$TA_t$= total Accruals in year $t$
\[ \Delta CA_t = \text{Change in current assets in year } t \]

\[ \Delta CL_t = \text{Change in current liabilities in year } t \]

\[ \Delta cash_t = \text{Change in cash and liquidities in year } t \]

\[ \Delta STD_t = \text{Current portion of long term liabilities in year } t \]

\[ \text{Dep}_t = \text{Depreciation in year } t \]

\[ A_{t-1} = \text{Total assets in year } t-1 \]

The next step is calculating non-discretionary accruals using the following formula:

\[
NDA_t = \alpha_1 \left( \frac{1}{A_{t-1}} \right) + \alpha_2 \left[ \Delta REV_t - \Delta REC_t \right] + \alpha_3 \left( \frac{PPE_t}{A_{t-1}} \right)
\]

\[ NDA_t = \text{non-discretionary accruals in year } t \]

\[ A_{t-1} = \text{Total assets in year } t-1 \]

\[ \Delta REV_t = \text{Revenue difference ( revenue in year } t \text{ minus revenue in year } t-1) \]

\[ \Delta REC_t = \text{Recievable difference ( receivables in year } t \text{ minus receivables in } t-1) \]

\[ PPE_t = \text{property and machinery(Equipments) in year } t \]

To estimate \( \alpha_1, \alpha_2, - \alpha_3 \), the following model is used:

\[
TA_t = \alpha_1 \left( \frac{1}{A_{t-1}} \right) + \alpha_2 \left[ \frac{\Delta REV_t - \Delta REC_t}{A_{t-1}} \right] + \alpha_3 \left( \frac{PPE_t}{A_{t-1}} \right) + \varepsilon_t
\]
\[ \alpha_1, \alpha_2, \alpha_3 \] are the OLS overestimations of the corresponding parameters and \( TA_t \) is the total accruals in year \( t \).

Finally, subtracting the non-discretionary accruals from total accruals we will obtain discretionary accruals:

\[ DA_t = TA_t - NDA_t \]

This parameter is a reverse index for earnings quality.

6.4 Dichev & Dechow model
In this approach, the remainder of working capital regression based on current, past and future cash flows for a certain company shows the total estimation error of accruals (both unintentional and manipulated by management) and is used as a reverse criterion for earnings quality.

\[ WCA_{it} = c + \lambda_1CFO_{it} - 1 + \lambda_2CFO_{it} + \lambda_3CFO_{it} + 1 \]

\( WCA \) = Working capital accruals  
\( CFO_{it} - 1 \) = operational cash flow in year \( t-1 \)  
\( CFO_{it} \) = operational cash flow in year \( t \)  
\( CFO_{it} + 1 \) = operational cash flow in year \( t+1 \)

\[ WCA_{it} = \Delta CA_{it} - \Delta CL_{it} - \Delta Cash_{it} + \Delta STDEBT_{it} \]

\* Note: all the variables are homogenized by mean value of assets

In this model the working capital accruals is calculated as follows:

\[ WCA_{it} = \Delta CA_{it} - \Delta CL_{it} - \Delta Cash_{it} + \Delta STDEBT_{it} \]

\( \Delta CA_{it} \) = Change in current assets  
\( \Delta CL_{it} \) = Change in current liabilities  
\( \Delta Cash_{it} \) = Change in cash and liquidities  
\( \Delta STDEBT_{it} \) = Change in current portion of debts caused by received finances

The standard deviation of these remainders is a criterion for the measurement of accruals quality and as a result, a high standard deviation of accounting earnings, shows a low earnings quality.
7. Research method and testing of hypotheses
This research studies the relationship among different models and indices based on a descriptive method. Considering the aim of this research, it is categorized as an applied research and its results can be used for a wide range of users including shareholders, auditors, Stock Exchange and standards bodies.

In this research four viewpoints and methods of earnings quality measurements have been compared with one another. Firstly, these four indices are calculated for each company and then according to the results the companies are classified in 5 categories. This is done in such a way that a number is designated for each index (numbers from 1 to 5). In all of these indicators based on the direct or inverse relationship between earnings quality, if they obtained number is 1 or 2, then the ratio will be less than half and if it is 4 or 5, then the quality index is considered to be high. If there is a similarity among these indices, it can be concluded that we have strong evidences to validate the earnings quality level. Otherwise, the quality level will be considered to be ambiguous and we need more analysis to determine the earnings quality level. Also, to make sure about the meaningful difference among four indices, Chi-2 test is used. To do this, the results of each index are compared to any other index.

<table>
<thead>
<tr>
<th>Leoz</th>
<th>Penman</th>
<th>Modified jones model</th>
<th>Dichev and Dechow model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of earnings is measured by variability of earnings which is equal to the standard deviation of operating income divided by the standard deviation of cash flow from operation</td>
<td>Quality of earnings is measured by the ratio of cash flow from operation divided by the net income</td>
<td>Quality of earnings is measured by the absolute value of discretionary accruals</td>
<td>Quality of earnings is measured by the the standard deviation of the residuals From regression model</td>
</tr>
<tr>
<td>The smaller the ratio the lower the quality of earnings</td>
<td>The smaller the ratio the higher the quality of earnings</td>
<td>The smaller $</td>
<td>DA_{it}</td>
</tr>
</tbody>
</table>

Table 2: Earnings quality indices
8. Results

Table 3 shows the descriptive statistics calculated for each index in the companies.

<table>
<thead>
<tr>
<th>Earnings quality incidies</th>
<th>max</th>
<th>min</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penman</td>
<td>223.890</td>
<td>-231.667</td>
<td>1.6882</td>
<td>13.142</td>
</tr>
<tr>
<td>Leoz</td>
<td>4.63147</td>
<td>0.11891</td>
<td>0.90539</td>
<td>0.5866</td>
</tr>
<tr>
<td>Modified jones model</td>
<td>2.11495</td>
<td>-1.08697</td>
<td>0.15950</td>
<td>0.192077</td>
</tr>
<tr>
<td>Dichev and Dechow model</td>
<td>1.43045</td>
<td>-0.98013</td>
<td>0.000</td>
<td>0.1427</td>
</tr>
</tbody>
</table>

Table 3: Descriptive statistics for variables

The results of the research showed that in only 15 companies out of total population, the results of all four indices were similar. These companies cover only 9% of total samples. Therefore, the hypothesis that indices can confirm one another is correct only for 9% of companies and for the remaining it is rejected.

Moreover, in this research we used Chi-2 test and contingency tables. For this purpose, the results of each index were compared with others bilaterally and the results are shown in tables 4 and 5.

<table>
<thead>
<tr>
<th>Comparison of two indices</th>
<th>High homoscedasticity percentage</th>
<th>Medium homoscedasticity percentage</th>
<th>Heteroskedasticity percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penman with Leoz</td>
<td>%52/8</td>
<td>%25/2</td>
<td>%22</td>
</tr>
<tr>
<td>Leoz with modified Jones model</td>
<td>%42/8</td>
<td>%27/7</td>
<td>%29/5</td>
</tr>
<tr>
<td>Leoz with Dechow and Dichev model</td>
<td>%33/9</td>
<td>%32/7</td>
<td>%33/3</td>
</tr>
<tr>
<td>Penman with modified Jones model</td>
<td>%32/1</td>
<td>%30/2</td>
<td>%37/7</td>
</tr>
<tr>
<td>Penman with Dechow and Dichev model</td>
<td>%24/5</td>
<td>%25.5</td>
<td>40 %</td>
</tr>
<tr>
<td>Modified Jones model with Dichev and Dechow model</td>
<td>%60/4</td>
<td>%31/4</td>
<td>%8/2</td>
</tr>
</tbody>
</table>

Table 4: Degree of similarity between the four indicators to measure the quality of earnings

<table>
<thead>
<tr>
<th>Comparison of two indices</th>
<th>Chi-2 statistic</th>
<th>Freedom degree</th>
<th>significant level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penman with Leoz</td>
<td>21/116</td>
<td>4</td>
<td>0.000</td>
</tr>
<tr>
<td>Leoz with modified Jones model</td>
<td>5/085</td>
<td>4</td>
<td>0.279</td>
</tr>
<tr>
<td>Leoz with Dechow and Dichev model</td>
<td>3/623</td>
<td>4</td>
<td>0.458</td>
</tr>
<tr>
<td>Penman with modified Jones model</td>
<td>5/626</td>
<td>4</td>
<td>0.229</td>
</tr>
<tr>
<td>Penman with Dechow and Dichev model</td>
<td>12/283</td>
<td>4</td>
<td>0.015</td>
</tr>
<tr>
<td>Modified Jones model with Dichev and Dechow model</td>
<td>58/439</td>
<td>4</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 5: The results of the chi-square test to test hypothesis
Based on the obtained results, we can conclude that the Penman and Jones, Leuz and Jones, Leuz and Dichev do not confirm one another in 95% level and the only meaningful relationships exist between Jones and Dichev, Penman and Dichev and penman and Leoz. Moreover, there is the most compatibility between Dichev and Jones and least between Leos and Dichev. All together, based on above descriptive statistics, evidences show lack of confirmation of research hypothesis.

9. Conclusion
In this research, empirical studies on using different earnings quality measurement have been presented. Since, there isn’t any consensus regarding definition of earnings quality or its measurement techniques, we cannot classify a company in high or low earning quality categories only based on one technique. In other words, if there is not any compatibility among the results of more than one method of earnings quality measurement, one cannot comment on the earnings quality of that company.

The results of this research show that the indices do not confirm one another for every company. Therefore, investors and creditors have to consider more than one criterion in their assessments because if based on one criterion a company has a low earnings quality and based on another one it shows a high quality, shareholders cannot assert anything about the earnings quality of that company. Therefore, it seems that we need other tools and confirming indices for such assessments.
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