# COMPARATIVE ANALYSIS OF PRECISION PREDICTION OF LIQUIDITY STATIC, DYNAMIC LIQUIDITY AND ALTMAN Z-SCORE RELATED TO THE PROVISION OF AUDIT OPINION GOING CONCERN

**Sugiono Poulus**

Lecturer, Padjadjaran University & Doctoral Student, Accountancy Department,

Faculty of Economics and Business, Padjadjaran University, Bandung, Indonesia

sugiono.poulus@yahoo.com

**Abstract**

*This study aims to analyze how much the accuracy of prediction of liquidity static, dynamic liquidity, and the Altman Z-Score related to administration of going concern audit opinion on the companies listed in the Indonesia Stock Exchange. The method used in this research is explanatory research by cross sectional and time series. Companies under study consists of 373 manufacturing companies went public listed on the Indonesia Stock Exchange in 2010-2012. The test statistic used is discriminant analysis, which works to find the best linear combination can be composed of independent variables in explaining the grouping variables predicted. Simultaneous testing results with statistical tests showed that the variables static liquidity has higher prediction accuracy compared to the dynamic liquidity and the Altman Z-Score. This shows that static liquidity is a proxy that is more precise in predicting the provision of audit opinion related to going concern of a company.*

*Keywords: Liquidity static, Dynamic liquidity, Altman Z-Score, Going Concern Audit Opinion*

## INTRODUCTION

The survival of the company is always associated with the ability of management to manage the company in order to survive. When the uncertain economic conditions, the investors expect the auditors give an early warning of financial failure (Chen and Church, 1996). According to Laitinen and Sormunen (2010) in his study, the determination of a company's going concern status at the time of post-audit accounting period is a challenge for the practitioners and

researchers. Opinion given audit means the auditor is important to the company, because it can also affect the fate of future sustainability. Therefore, auditors should have full confidence in what opinion will be given to prevent errors that occur. According to Ryu and Spirit (2007) there are two types of errors that may occur on the provision of related opinion going concern entity, namely Type I Error, the company received related to going concern opinion but do not go bankrupt in a year in the future, despite experiencing financial distress; and Type II Error, the company went bankrupt in the next year after receiving a non-going concern opinion by the auditor. The financial condition of the company has great influence in the provision related to going concern opinion by the auditors, which indicates the company's financial condition soundness of the company. Increasingly disturbed or worsening of a company's financial condition will increase the possibility of the provision related to going concern opinion by the auditors. Poor financial condition giving doubts whether the company can sustain life in the years ahead.

On-Penetian previous studies, mostly using the Altman Z-Score as a tool to see its influence in giving the reference to the auditor as consideration for the provision of related opinion going concern. Altman Z-Score model allows to predict bankruptcy for up to two years before it was time. On the other hand, Kuruppu, et al. (2003) describe a healthy liquidity ratios can explain whether the company Seara better. Liquidity describes the company's ability to repay short-term debt. Laitinen and Sormunen (2010) further divides the two liquidity ratios into static and dynamic liquidity liquidity. Both are able to describe the ability of the company to meet its debts, which each seen from the balance sheet and cash flow statement. The main objective of this study was to see which of the liquidity static, dynamic liquidity, and the Altman Z-Score can provide the highest prediction accuracy against the granting of related going concern audit opinion. If you look at the research done by Laitinen and Sormunen in 2010, then the static liquidity has the highest prediction accuracy among the three.

## REVIEW OF LITERATURE

In carrying out the audit process, auditors are required not only see limited to things that are revealed in the financial statements alone but must be wary of things that can potentially interfere with the viability of an entity. This is the reason why the auditor take responsibility for the survival of an entity though within certain time limits. Belkaoui (2000) describes a going concern are: "A proposition which states that the entity will continue to carry out its operations in a period of time long enough to realize the project, the responsibilities as well as its activities were not stopped."

Here are some examples of conditions that indicate disbelief in maintaining the viability of the entity according to PSA No. 30, section 341, namely:

a. Negative trends, such as recurring operating losses, working capital shortages, the negative cash flow, an important financial ratio that bad.

b. Another hint about the possibility of financial difficulties, for example a failure to meet its debt obligations, dividend payments penunggakkan.

c. Internal problems, such as strikes.

d. External problems, such as a lawsuit the court complaint, the disaster that is not covered by insurance, the loss of major customers or suppliers. "

In this study, consideration will refer to the liquidity static, dynamic liquidity, and the Altman Z-Score company. Or liquidity refers to the ability of the company to meet its short term obligations (Wild, et al., 2005). According Stefanski (2011), the liquidity of a company can be measured and estimated by considering: a. Current assets and liabilities at a particular moment - the size of the static liquidity  b. Cash flow generated by the company during the period under analysis - the size of the dynamic liquidity.

According Berezhnitska (2013) refers to static liquidity at certain times and uses the basic parts of a balance: the balance of profit and loss, which is supported by the traditional indicators of financial liquidity.

Table 1. Ratios in the Static Liquidity Measure

| Static Liquidity | Current Assets/Current liabilities (Current Ratio) |
|---|---|
| | Current Assets-Inventories [Quick Assets]/Current liabilities (Quick Ratio) |
| | Quick Assets/Total Assets |
| | Total Liabilities/Total Assets |
| | Net Worth/Total Liabilities |
| | Cash/Current Liabilities |

Source: Laitinen and Sormunen. 2010.

On the other hand, Berezhnitska (2013) stated dynamic liquidity refers to the specific period berdasaran at the cash flow statement. According Bolek (2013), dynamically linked to the turnover liquidity metrics, unlike the static liquidity that reflects the nature of the balance sheet structure.

Table 2. Ratios in Dynamic Liquidity Measure

| Dynamic Liquidity | Traditional cash flow/Revenue |
|---|---|
| | Traditional cash flow/Total liabilities |
| | Traditional cash flow/Current liabilities |
| | Traditional cash flow/Total assets |
| | Operating cash flow/Total liabilities |
| | Operating cash flow/Current liabilities |

Source: Laitinen and Sormunen. 2010

Altman Z-Score to predict bankruptcy allows up to two years before it was time. Altman (1993) formulated it as:

Z = 0,717Z1 + 0,84 Z2 + 3,107Z3 + 0,420Z4 + 0,998Z5

Specification:

Z1 = *Working Capital/ Total Assets*

Z2 = *Retained Earnings/ Total Assets*

Z3 = *Earnings Before Interest and Taxes/ Total Assets*

Z4 = *Book Value of Equity/ Book Value of Debt*

Z5 = *Sales/ Total Assets*

The relationship between liquidity static, dynamic liquidity, and the Altman Z-Score related to administration of going concern audit opinion is the third can be used as a measuring tool in determining the survival of a company in terms of its financial situation. Carcello and Neal (2000) states that the worse the financial situation of the company, the greater the probability the company received a going concern opinion.

**RESEARCH METHODOLOGY**

The object of this research is the static liquidity, dynamic liquidity, and the Altman Z-Score as independent variables. Meanwhile, the dependent variable is represented by an audit opinion related to going concern. This research subject is an industrial manufacturing company listed on the Indonesia Stock Exchange in the period 2010-2012.

Based on available data, of the 453 companies listed for three years, 373 companies have been the subject of research. Source of research data is secondary data and research methods used by the author is explanatory research method. Below is a table presenting the operationalization of variables:

Table 3. Variable Operationalization

| Variable | Indicator | Measurement Scale | Data Source |
|---|---|---|---|
| Static Liquidity (X1) (Source: Laitinen and Sormunen, 2010. The Auditor's Going Concern Decision and Alternative Financial Ratios.) | • *Current asset/Current liabilities (Current Ratio)*<br>• *Current assets-Inventories/Current liabilities (Quick Ratio)*<br>• *Quick assets/Total assets*<br>• *Total liabilities/Total assets*<br>• *Net worth/Total liabilities*<br>• *Cash/Current liabilities* | ratios | Financial Statements |
| Dynamic Liquidity (X2) (Source: Laitinen and Sormunen, 2010. The Auditor's Going Concern Decision and Alternative Financial Ratios.) | • *Traditional cash flow/Revenue*<br>• *Traditional cash flow/Total liabilities*<br>• *Traditional cash flow/Current liabilities*<br>• *Traditional cash flow/Total assets*<br>• *Operating cash flow/Total liabilities*<br>• *Operating cash flow/Current liabilities* | ratios | Financial Statements |
| Altman Z-Score model (X3) (Source: Altman.1993. Corporate Financial Distress and Bankruptcy) | $Z = 0{,}717Z1 + 0.84 + Z2 + 3{,}107Z3$ $0{,}420Z4 + 0{,}998Z5$<br>Specification:<br>Z1 = working capital / total assets<br>Z2 = retained earnings / total assets<br>Z3 = earnings before interest and taxes / total assets<br>Z4 = book value of equity / book value of debt<br>Z5 = sales / total assets | interval | Financial Statements |
| Related to Going Concern Audit Opinion (Y) (Source: SPAP, 2011) | Code 1 for companies that obtain an audit opinion related to going concern, the code 0 for companies that obtain non going concern audit opinion. | nominal | Independent Auditor's Report |

The statistical method used in this research is discriminant analysis. According to Kuruppu et al., (2003), discriminant analysis models have greater accuracy in predicting the company liquidation when compared to the logit model developed from the same data. Sharma (1996) further elaborated that is based on the objective, relative to logistic regression analysis, discriminant analysis has advantages in terms of finding the best linear combination can be composed of independent variables in explaining the grouping variables predicted.

According to Sharma (1996), discriminant analysis relating to the following stages:

1. Identify variables that are able to differentiate between groups (identifying discriminant variable) according to the best way.

2. Using the variables that have been identified to formulate an equation or function to calculate new variables or indices that can explain the differences between groups.

3. Using the variables that have been identified or indexes for developing rules or how to classify future observations into one of the groups.

Discriminant validity of the model the influence of static and dynamic liquidity liquidity related to the administration of going concern audit opinion will then be compared with the discriminant validity of the model of the Altman Z-Score is based on the same category, namely: no going concern audit opinion related to (1) or there is no relevant audit opinion going concerned (0), proportional to the value of Z is greater. The level of validity of each model are shown by grouping group discriminant accuracy of the results of the estimation group classification with the classification of the actual or real group through cross validation. Difference accuracy between the three models tested, as has been hypothesized by statistical hypothesis as follows:

• *H0: the proportion of liquidity static model accuracy equal to or lower than the dynamic liquidity and model of the Altman Z-Score*

• *H1: the proportion of static and dynamic accuracy of the model, liquidity is higher than the dynamic liquidity and model of the Altman Z-Score.*

## ANALYSIS &RESULTS

After outlining the things that are behind the research, theories that strengthen research and research methods are used, then in this section will be presented regarding the results of research. The Company is divided into non-going concern and going concern, where the specifications are as follows:

Table 4. Data Specifications

|  | 2010 |  | 2011 |  | 2012 |  | Total |  |
|---|---|---|---|---|---|---|---|---|
| **Non Going Concern** | 101 | 88.5% | 118 | 90% | 117 | 90.7% | 336 | 90.1% |
| **Going Concern** | 12 | 11.5% | 13 | 10% | 12 | 9.3% | 37 | 9.9% |
| **Total** | 113 | 100% | 131 | 100% | 129 | 100% | 373 | 100% |

A total of 113 companies studied in 2010, then 131 companies researched in the epidemic of 2011, and in 2012, 129 companies were investigated. It appears that the trend of companies receiving going concern audit opinion related to decline, which means the better the condition of the company. In the stepwise process static liquidity, of the six variables as indicators initially, ie current ratio, quick ratio, the quick assets to total assets, total liabilities to total assets, net worth to total liabilities, and cash to current liabilities, only elected three ratios, ie total liabilities to total assets (TL_TA), net worth to total liabilities (NW_TL), and quick assets to total assets (QA_TA). These variables were chosen because it has the smallest significant value compared to other variables.

Table 5. Variable Entered/Removed Static Liquidity

**Variables Entered/Removed[a,b,c,d]**

| Step | Entered | Min. D Squared | | | | | |
|---|---|---|---|---|---|---|---|
| | | Statistic | Between Groups | Exact F | | | |
| | | | | Statistic | df 1 | df 2 | Sig. |
| 1 | TL_TA | 8.415 | non going concern and going concern | 280.483 | 1 | 371.000 | 2.74E-047 |
| 2 | NW_TL | 9.369 | non going concern and going concern | 155.707 | 2 | 370.000 | 8.64E-050 |
| 3 | QA_TA | 10.412 | non going concern and going concern | 115.053 | 3 | 369.000 | 1.32E-052 |

At each step, the variable that maximizes the Mahalanobis distance between the two closest groups is entered.

a. Maximum number of steps is 12.

b. Minimum partial F to enter is 3.84.

c. Maximum partial F to remove is 2.71.

d. F level, tolerance, or VIN insufficient for further computation.

After it formed a discriminant function where the coefficient is formed of canonical discriminant function coefficient. By using canonical discriminant function coefficients, then the discriminant function can be obtained as follows:

**D = -1,615 – 2,212Quick Assets to Total Assets + 3,285Total Liabilities to Total Assets + 0,283Net Worth to Total Liabilities**

The usefulness of this function to determine a case goes on one group, or belonging to the other group. Discriminant coefficient values on the independent variables describe when the

independent variable is expected to rise by one unit and the estimated value of the other independent variables constant or equal to zero, then the value of the dependent variable can be expected to go up or down according to the sign of the discriminant coefficient independent variable.

Tabel 6. Hasil Klasifikasi Model Static Liquidity

**Classification Results[b,c]**

| | | opini_audit | Predicted Group Membership | | Total |
|---|---|---|---|---|---|
| | | | non going concern | going concern | |
| Original | Count | non going concern | 334 | 2 | 336 |
| | | going concern | 15 | 22 | 37 |
| | % | non going concern | 99.4 | .6 | 100.0 |
| | | going concern | 40.5 | 59.5 | 100.0 |
| Cross-validated[a] | Count | non going concern | 334 | 2 | 336 |
| | | going concern | 18 | 19 | 37 |
| | % | non going concern | 99.4 | .6 | 100.0 |
| | | going concern | 48.6 | 51.4 | 100.0 |

a. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

b. 95.4% of original grouped cases correctly classified.

c. 94.6% of cross-validated grouped cases correctly classified.

Based on output above, in the original, it appears that the company is in preliminary data are categorized as non going concern, and of the classification discriminant function remains on the non going concern, is 334 companies. While the discriminant model, the company that originally entered the group of non going concern, turned out to be members of the group going concern, is the second company. Likewise, the group's going concern, which remains the group's going concern some 22 companies, and the misses as many as 15 companies. Thus the prediction accuracy of the model is (334 + 22) /373=0.954 or 95.4%.

For the dynamic model of liquidity, of the six original variables studied, the traditional cash flow to revenue, traditional cash flow to total liabilities, traditional cash flow to current liabilities, traditional cash flow to total assets, operating cash flow to total liabilities, and operating cash flow to current liabilities, elected only two variables, namely, traditional cash flow to total assets (TCF_TA) and operating cash flow to current liabilities (OCF_CL).

Table 7. Variable Entered/Removed Dynamic Liquidity

**Variables Entered/Removed[a,b,c,d]**

| Step | Entered | Min. D Squared | | | | | |
|---|---|---|---|---|---|---|---|
| | | Statistic | Between Groups | Exact F | | | |
| | | | | Statistic | df 1 | df 2 | Sig. |
| 1 | TCF_TA | .479 | non going concern and going concern | 15.949 | 1 | 371.000 | 7.85E-005 |
| 2 | OCF_CL | .779 | non going concern and going concern | 12.949 | 2 | 370.000 | 3.67E-006 |

At each step, the variable that maximizes the Mahalanobis distance between the two closest groups is entered.

a. Maximum number of steps is 12.

b. Minimum partial F to enter is 3.84.

c. Maximum partial F to remove is 2.71.

d. F level, tolerance, or VIN insufficient for further computation.

As with static liquidity, variable chosen because it has the lowest significant value compared to the other variables when inserted one by one in a stepwise process. Furthermore, forming the discriminant function dynamic liquidity of the selected variables. By using canonical discriminant function coefficients, then the discriminant function can be obtained as follows:

**D = -0,654 + 7,010 *Traditonal Cash Flow to Total Assets* + 0,140 *Operational Cash Flow to Current Liabilities***

The usefulness of this function to determine a case goes on one group, or belonging to the other group. Testing was conducted to test the accuracy of the function.

Table 8. Dynamic Classification results Liquidity

**Classification Results[b,c]**

| | | opini_audit | non going concern | going concern | Total |
|---|---|---|---|---|---|
| Original | Count | non going concern | 207 | 129 | 336 |
| | | going concern | 6 | 31 | 37 |
| | % | non going concern | 61.6 | 38.4 | 100.0 |
| | | going concern | 16.2 | 83.8 | 100.0 |
| Cross-validated[a] | Count | non going concern | 207 | 129 | 336 |
| | | going concern | 7 | 30 | 37 |
| | % | non going concern | 61.6 | 38.4 | 100.0 |
| | | going concern | 18.9 | 81.1 | 100.0 |

*The "Predicted Group Membership" header spans the "non going concern" and "going concern" columns.*

a. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

b. 63.8% of original grouped cases correctly classified.

c. 63.5% of cross-validated grouped cases correctly classified.

Based on output above, in the original, it appears that the company is in preliminary data are categorized as non going concern, and of the classification discriminant function remains on the non going concern, dalah 207 companies. While the discriminant model, the company that originally entered the group of non going concern, turned out to be members of the group going concern, is 129 companies. Likewise, the group's going concern, which remains the group's going concern some 31 companies, and the misses as many as six companies. Thus the prediction accuracy of the model is (207 + 31) /373=0.638 or 63.8%. Last testing the accuracy of the predictions of the model Altman Z-Score, which in this study criteria cutoff score only model is divided into two, namely:

Table 9. Modification Criteria Cutoff Point Altman Z-Score Model

| Criteria | value Z |
|---|---|
| Not bankrupt / healthy if Z is more than (>) | 1,81 |
| Bankrupt / unhealthy if Z is less than (<) | 1,81 |

This is done to adjust the dependent variable also just split in two. Based on the above modifications, the accuracy of test results are:

Table 10. Based on the results of the Company Classification Model Altman Z-Score

| Actual Membership | Predicted Membership | | |
|---|---|---|---|
| | Healthy / NonGoing Concern | Unhealthy / Going Concern | Total |
| Healthy / NonGoing Concern | 224 | 112 | 336 |
| Unhealthy / Going Concern | 3 | 34 | 37 |
| | | Total | 373 |

It appears that the company which was initially included in the group of healthy / non-going concern and remain in the group is counted 224 companies, while the misses as many as three companies. On the other hand, the company predicted that the group will go to the group classified unhealthy / going concern and the actual situation is in the same condition is 34 companies, and that turned out to be in the healthy group was 112 companies. Based on these results can be calculated prediction accuracy using the Altman Z-Score, namely: (224 + 34) / 373 = 0.692 or 69.2%. Value prediction accuracy is still far below the accuracy by using static liquidity and almost the same as using dynamic liquidity. After knowing the prediction accuracy of each model, then sorted from highest if the result is:

Table 11. Percentage Accuracy Prediction Models

| model | Prediction Accuracy Percentage |
|---|---|
| *Static Liquidity* | 95.4% |
| *Z-Score Altman* | 69.2% |
| *Dynamic Liquidity* | 63.8% |

Based on the above data, the percentage of the highest accuracy is owned by a static model of liquidity, followed by the Altman Z-Score, and the last is a dynamic liquidity. Seeing these results, actually three variables can be used to predict the provision related to going concern audit opinion of a company, because all three have value accuracy above 50%, but in this case, because the static liquidity has the highest accuracy values, namely 95.4%, then the static liqudity is the most appropriate model to use. The above results are consistent with the research conducted by Laitinen and Sormunen (2010) and Kuruppu et al., (2003). The result was in line with the statistical hypotheses were proposed, namely:

H1: the proportion of static and dynamic accuracy of the model, liquidity is higher than the dynamic liquidity and model of the Altman Z-Score.

The accuracy of the prediction variables Altman Z-Score, which is 69.2% also almost resemble that of previous studies conducted Altman, where it is stated that: "The precision and accuracy of the model Z-Scoreini have been tested and shown to be that the classification accuracy of 96% for a period of one year prior to bankruptcy and up to 70% for the five periods prior to bankruptcy.

## CONCLUSION

At the beginning of the background of this study, it is mentioned that the purpose of the study was to determine which of the liquidity static, dynamic liquidity, and the Altman Z-Score has the highest prediction accuracy of the related audit opinion going concern. The results showed that the static liquidity as seen from the balance sheet the company has the highest prediction accuracy than the remaining variables. The Company must maintain its ability to repay short-term debt. Accrual-based financial ratios have more ability to classify the company in the category going concern or a non-going concern compared with cash flow based ratios. Value on the balance sheet shows total resources of the company to meet its debts, not only the value of the cash held in the period. Therefore, good / bad value on the company's financial ratios contained in the balance sheet, will provide a major influence in the company's going concern assessment. The better value on the balance sheet sebuha financial ratios of the company, will reduce the possibility of the company received related to going concern audit opinion from the auditor, and vice versa. Most influential financial ratios are Quick Assets to Total Assets, Total Liabilities to Total Assets, and Net Worth to Total Liabilities. With the results of this study proved that the model of liquidity, especially static liquidity could be used as a valuable tool in assessing the audit company's going concern status. Static model of liquidity is expected to be considered parties using financial statements, particularly the auditor to determine whether there are doubts on the sustainability of the company's business. The Company itself also can use static models to assess the health of their business liquidity.

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