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Application PCA Analysis in Audit Variable: Evidence from Indonesia

[1]Jamaludin Iskak

[1]Universitas Tarumanagara,

Jakarta.

Abstract

This study aims to investigate the components of audit variables within the company go public in Indonesia, using sample data of 20 state-owned companies that have been going public for financial year 2011-2016. The dimensions of the variables used in the study are the length of days required auditor's report on the audit, Audit Fee and Audit Specialization. This research uses PCA analysis model, with correlation and covariance model. The essence of using the PCA methodology is used to reduce the number of variables present in the dataset so that from the 13 variables contained in the dataset only one variable is known to actually affect the prose disease in generating the audit report within the specified time, with the PCA methodology representing 2 variables that exist in the dataset.

Key Word: PCA analisys, time of financial statement audit, audit fee and specialization audit.

1. Introduction

Auditing for the company is quite important because it gives a big influence in the activities of the company concerned. At the beginning of its development, auditing is only intended to find and find fraud and mistakes, then developed into the examination of financial statements to provide opinions on the correctness of the presentation of corporate financial statements and also become one of the factors in decision making. As the company grows, the audit function becomes increasingly important and the need arises from governments, shareholders, financial analysts, bankers, investors and the public to assess the quality of management's operating results and achievements of managers. To address these needs, management audits arise as a reliable means of assisting the implementation of their responsibilities by providing analysis, assessment, recommendations on activities that have been undertaken.

The main purpose of this study is to provide empirical evidence related to the length of days required auditor's report on the audit, Audit Fee and Audit Specialization. More precisely, the variables used are investigating factors that may affect the timeliness of the annual report. In this study consist of: Part 1 is an introduction, part 2 relates to the literature, part 3 research methods and analysis of research data, part 4 research results and discussion, and part 5 conclusions on the research.

2. Literature Review

In a study conducted [1,2,3 and 4] empirically explained several factors related to the audit process of financial statements, related to the timing of accuracy of the delivery of audit reports. From their study found that the companies in the sample of audit research are some companies that have been listed on the stock exchanges in their respective countries, auditors who have conducted audits of the company's annual financial statements in detail have a period of ninety days from the fiscal year , in order to disclose for disclosure directives, peruses audit implementation, and accounting standards that are used for the audit process. From the research that has been done shows that one variable that has and which have a very significant relationship with the delay of this audit report is the type of variable leverage between the two industries. Perhaps this is in connection with the application of International Accounting Standards slightly different from the local accounting standar. In order to prevent further occurrence or occurrence in other fields and to reduce corruption and to improve the transparency process in generating financial statements, the use of the variable length of days in the audit process can be made as a determinant variable in the research. With the process of transparency and openness in producing the financial statements of the company, it is believed to create an investment environment and to encourage the economy in that country.

In other studies [5,6,7 and 8] also investigated how firms listed in the stock

exchange obtain an opinion of audited financial statements fairly with the exception of paying audit fees for these financial statements are higher, for the results of audits of its financial statements to the auditor who audited. The average in their study uses data from financial statements that have been listed in the capital market. The overall conclusion makes an explanation that high abnormal audit costs can help companies to achieve better audit opinions, thus audit firms can avoid something which is not profitable. Another reason to conclude that the average company that has done the audit but get opinions with low quality, is believed to provide the value of incentives not involved in the influence of opinion. Their study also conducted tests and suggestions on model analysis and model improvements, in increasing the accuracy of the relationship between abnormal audit costs and the model of decreasing audit opinions that could shape the spending of audit opinions. The results of their study provide clues that investors and government decision makers make a special attention to firms that have increased in terms of profitability, driven by an accrual model of an unexplained increase in audit costs in real terms.

However, [9,10 and 11] more clearly discuss how the effect of specialist auditors on an industry over time produces audit reports. Their conclusion explains that companies that have been audited by external auditors, are believed to have relatively faster value to finish when compared to companies located on other industrial scale.

The value of an auditor's specialist in the industry sector has found that by offering faster audit work than non-specialist auditors, this analysis is based on statistical unhelpful analysis methods. The study they do on average using the auditor the Big Four.

This study makes the basis of the authors to carry out this research, using the relationship between audit costs, firm size, length of audit process, quality audit reports and an auditor's specialization, corporate profitability.But at the leverage level the timeliness of audit reports can be considered a report the finances rise a little longer.

3. Research Method

This research was conducted in December 2017, using data from 20 state-owned companies that have been going public for financial year 2011-2016. The variables used in this study consist of length of days required auditor's report on the audit, Audit Fee and Audit Specialization. In this research using data analysis technique by using principal component analysis method (PCA), with correlation and covariance model.

The purpose of using this method is to look at the projection of the variable axis of X, and to see the projection of the Y axis. If the projected data generated on the Y axis is greater than the projection against the X axis, the variable Y reduces the data to 1 dimension only then the Y axis projection will be used as

the principal component of that data. For data with more dimensions, can store more than 1 principal component or the selected principal component order to form the desired dimensions based on the number of variance produced by the principal component).

4. Result and Discussion

Assuming the basis of the study [10], this study uses multiple regression analysis PCA modeled analysis. Before the results of the PCA model are presented, it is first shown for the results of regression analysis with simple equations presented as follows:

Table 1: Result Regression Analisys

Dependent Variable: Y				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	45.95743	34.01642	1.351037	0.1815
X1	-0.506234	1.499940	-0.337503	0.7369
X2	12.89753	3.592861	3.589767	0.0006
R-squared	0.183482	Mean dependent var		53.75758
Adjusted R-squared	0.157561	S.D. dependent var		15.47212
S.E. of regression	14.20100	Akaike info criterion		8.188892
Sum squared resid	12705.12	Schwarz criterion		8.288421
Log likelihood	-267.2334	Hannan-Quinn criter.		8.228220
F-statistic	7.078457	Durbin-Watson stat		1.428940
Prob(F-statistic)	0.001686			

Source: Proceed by author

Regression results can be seen in table 2, this allows to be continued to PCA analysis as a basis for making PCA equations based on regression results obtained. In this study continue the use of major component analysis (PCA) and general factor analysis.

Overall, factor analysis involves techniques to help produce fewer linear combinations of variables so that the minus variables take into account and explain most of the variance in the correlation matrix pattern. The main component analysis is recommended when the researcher's primary concern is to determine the minimum number of factors that will account for the maximum variance in the data used in a particular multivariate analysis, as in the Delphi study.

The use of eigenvalues refers to the total variance described by each factor. The main component analysis task is to identify patterns in the data and direct the data by highlighting the similarities and differences. Here are the results of the analysis model with PCA analysis:

Table 2: Result PCA for Ordinary Correlation

Principal Components Analysis					
Computed using: Ordinary correlations					
Eigenvalues: (Sum = 3, Average = 1)					
				Cumulative	Cumulative
Number	Value	Difference	Proportion	Value	Proportion
1	1.535929	0.635567	0.5120	1.535929	0.5120
2	0.900362	0.336654	0.3001	2.436291	0.8121
3	0.563709	---	0.1879	3.000000	1.0000
Eigenvectors (loadings):					
Variable	PC 1	PC 2	PC 3		
_AFL___X1	-0.412642	0.896790	0.159668		
_ARL__Y	0.625740	0.406459	-0.665763		
_ASP__X2	0.661949	0.174811	0.728879		
Ordinary correlations:					
	_AFL___X1	_ARL__Y	_ASP__X2		
_AFL___X1	1.000000				
_ARL__Y	-0.128321	1.000000			
_ASP__X2	-0.212783	0.426621	1.000000		

Source: Proceed by author.

Thus the value of PC generated in table 2 can be taken from the loading eigenvector to transform the return value of the factor to be used with the ordinary model of correlation.

PC1	PC2	PC3
-0.412642	0.896790	0.159668
0.625740	0.406459	-0.665763
0.661949	0.174811	0.728879

If the change will be as follows:

$W1 = PC1$

$W1 = -0.412641z_1 + 0.896790z_2 + 0.159668z_3$

$W2 = PC2$

$W2 = 0.159668z_1 - 0.665763z_2 + 0.728879z_3$

$y = 45.9 - 0.51 W1 + 12.9 W2$

$y = 45.9 - 0.51 (-0.412642z_1 + 0.896790z_2 + 0.159668z_3)$
$\quad + 12.9 (0.661949z_1 + 0.174811z_2\ 0.728879z_3)$

Table 3: Result PCA for Ordinary Covariance

Principal Components Analysis					
Computed using: Ordinary Covariances					
Eigenvalues: (Sum = 237.4299, Average = 79.1433)					
				Cumulative	Cumulative
Number	Value	Difference	Proportion	Value	Proportion
1	235.8282	234.4219	0.9933	235.8282	0.9933
2	1.406278	1.210821	0.0059	237.2344	0.9992
3	0.195457	---	0.0008	237.4299	1.0000
Eigenvectors (loadings):					
Variable	PC 1	PC 2	PC 3		
_AFL___X1	-0.010031	0.996925	0.077712		
_ARL__Y	0.999854	0.011076	-0.013028		
_ASP__X2	0.013849	-0.077570	0.996891		
Ordinary covariances:					
	_AFL___X1	_ARL__Y	_ASP__X2		
_AFL___X1	1.422555				
_ARL__Y	-2.349991	235.759412			
_ASP__X2	-0.126369	3.261708	0.247934		

Source: Proceed by author

Thus the value of PC generated in Table 2 can be taken from eigenvector loading to transform the return value of the factor to be used with the covariance ordinary model.

PC1	PC2	PC3
-0.010031	0.996925	0.077712
0.999854	0.011076	-0.013028
0.013849	-0.077570	0.996891

If the change will be as follows:

$W1 = PC1$

$W1 = -0.0100031z_1 + 0.996925z_2 + 0.077712z_3$

$W2 = PC2$

$W2 = 0.013849z_1 - 0.077570z_2 + 0.9966891z_3$

$y = 45.9 - 0.51\,W1 + 12.9\,W2$

$y = 45.9 - 0.51\,(-0.0100031z_1 + 0.996925z_2 + 0.077712z_3)$
$+ 12.9\,(0.013849z_1 - 0.077570z_2 + 0.9966891z_3)$

It should be noted that the correlation does not show the direction causality of the observed variable, so a strong Y variable between X1 and X2 can not be said 'X1 causes X2', since the variable 'X2 causes X1, or it can be explained that variable X2 has a positive relationship with X1.

5. Conclusion

From the research that has been done in the results can be that the value of eigenvector value using correlation and covariance analysis model. PCA analysis basically aims to simplify the observed variables by shrinking or reducing their dimensions. This is done by eliminating the correlation between the independent variables through the transformation of the free variable of origin to a new variable that is not correlated at all or commonly called the principal component. After data analysis done by using component of result of PCA, hence variable in doing research expected free to assumption of muticollinearity. Thus the components of the variables in carefully will be able to be a new free variable through regression yng in produce. This process will produce multiple eigenvectors which are a combination of all the variations of features contained in all data. If the object used is a variable audit, then the eigenvector is called by the name eigenaudits.

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804

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