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An "Intelligent Spreadsheet" to Teach the Student the Basics of Audit Planning

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Abstract

It is important that the auditor properly plan engagements for several reasons: to obtain sufficient competent evidence for the circumstances, to keep audit costs reasonable, and to avoid misunderstandings with the client (Arens and Loebbecke, 1997). The student learns about audit planning through the audit risk model. An intelligent worksheet, designed for student use, has been developed using information from a previously written hybrid system for going concern evaluation (Lenard et al., 1998). The expert system logic and the statistical program that were part of the hybrid system have been incorporated into a menu-driven spreadsheet that uses the technology of Excel (statistical modeling, links, and logical statements) to provide the student with a summary of important concepts of audit planning.

Introduction

The auditor learns the basics of audit planning as the first standard of field work (SAS 1, AICPA). It is important that the auditor properly plan engagements for several reasons: to obtain sufficient competent evidence for the circumstances, to keep audit costs reasonable, and to avoid misunderstandings with the client (Arens and Loebbecke, 1997). The student learns about audit planning through the audit risk model,

$$PDR = \frac{AAR}{IR * CR}$$

where:

- AAR, acceptable audit risk, is a measure of how willing the auditor is to accept that the financial statements may be materially misstated after the audit is completed and the auditor gives an unqualified opinion
- IR, inherent risk, is a measure of the auditor's assessment of the likelihood that there are material misstatements in a business segment before considering the effectiveness of internal controls
- CR, control risk, is a measure of the auditor's assessment of the likelihood that misstatements exceeding a tolerable amount in a segment will not be prevented or detected by the client's internal controls
- PDR, planned detection risk, is a measure of the risk that audit evidence for a segment will fail to detect misstatements exceeding a tolerable amount (SAS 39, AICPA).

The audit risk model can be combined with an analysis of risk levels in order to plan the amount of evidence required for a financial statement audit. Since planned detection risk moves in the same direction as acceptable audit risk, if acceptable audit risk is allowed to be higher (at a level of 10%, for example) then planned detection risk can be higher, and the overall amount of evidence required to be collected is relatively low. However, if acceptable audit risk is set at a lower level , such as 5%, then the calculated planned detection risk will be lower and the amount of evidence required to be collected is relatively high.

An intelligent worksheet, designed for student use, has been developed using information from a previously written hybrid system for going concern evaluation (Lenard et al., 1998). The expert system logic and the statistical program that were part of the hybrid system have been incorporated into a menu-driven system that the student can use to learn how to plan the amount of evidence required for an audit.

Spreadsheet Development

The spreadsheet has been developed for the student to use as part of an annual report project that must be completed for the Auditing class. The purpose is to help the student gain an understanding of audit risk, and also to use the technology they have learned and apply it to an assignment that reflects the use of technology in their field. The students will select a company and obtain a copy of the company's annual report and 10-K report. Using the accounting information obtained from the annual

report, along with the questionnaires provided as part of the worksheet, the students will look at three areas: an analysis of planned detection risk, the possibility of misstated account balances using regression analysis, and the possibility of fraud.

The first page of the spreadsheet contains a statement of the audit risk model. The student will set values for acceptable audit risk and control risk, and receives the instructions to follow, or open, the "Risk" menu to set a value for inherent risk. The Inherent Risk spreadsheet is developed from a hybrid information system that was originally developed to assess the risk of a firm and determine if it should receive an audit report with a going concern modification. The components of the model address the risk of the firm in four areas: operating risk, business risk, debt service risk, and future liquidity risk. Operating risk is assessed using a selected group of the company's financial ratios. The other risk areas are addressed by presenting a series of questions that must be answered by the user. The logical functions available in Excel replace the expert system logic that was originally used to convert the responses into a "risk score" for the company. The company is at risk of receiving a going concern modification, or having high inherent risk, if the "risk score" is 3 or greater on a 5-point scale. The inherent risk is calculated by starting with a value of .5 in the audit risk model, and adding .1 for each risk factor that is scored. Then, for example, a company that receives a "risk score" of 3 would have inherent risk of .8. The spreadsheet evaluation could result in a maximum inherent risk of 1.

Spreadsheet Operation

The student receives an assignment to complete an Annual Report project. The purpose of the assignment is to help the student learn to assess audit risk and inherent risk through the use of the audit risk model, using publicly available information from a selected company's annual report, 10-K, and Internet sources. The student using the intelligent spreadsheet will complete the audit risk model (see Figure 1) to determine the planned detection risk. Acceptable audit risk and control risk will be assigned using the student's judgment. Then, there is a "Risk" pull-down menu that will lead the student through the logic to determine Inherent risk. The menu links to another spreadsheet that assesses inherent risk. The operating risk evaluation works with a modified discriminant model, developed to predict bankruptcy using several of the company's financial ratios. The spreadsheet will require input of several financial ratios to assess operating risk, using a discriminant model to assess the likelihood of bankruptcy. The evaluation for the remaining three risk areas is determined in response to questions that are listed in the spreadsheet. . The student must answer some "yes" or "no" questions about the company's debt service, economic conditions such as legal liability or environmental problems, and future funding possibilities. The questions are designed to accumulate a "score" for the level of risk by making use of Excel's logical expressions. Once the student enters the financial information and answers the questions as they apply to the student's selected company, the system computes the "score" for inherent risk, which links to the summary page shown in Figure 1. The system will compute planned detection risk, and place a conclusion of a "high level" or "low level" as the amount of evidence to be collected.

Possibility of Fraud

Students and auditors must also consider the possibility of fraudulent financial statements (SAS 82, AICPA). Research has shown that there is a possibility of using publicly available financial statements to identify factors associated with fraudulent financial reporting (Persons, 1997). As a result, the spreadsheet includes three extra models for: (1) a prediction of certain account balances using a regression analysis; (2) an analysis of certain financial statement ratios using a logit model to predict fraud ; and (3) a questionnaire that analyzes risk factors presented by SAS 82 to assess fraud.

The regression model is designed for the Excel spreadsheet based on a similar model presented by Winston and Albright (1997). The model can be set to use prior account balances as a predictor of the current year's balance. Students can use any one account (sales, receivables, inventory, etc.) or run models to analyze the balances for several accounts. The regression worksheet will predict the account balance for the current year, compare to the actual, and determine if the predicted amount exceeds an upper confidence limit. If the upper confidence limit is exceeded, the worksheet will reach a conclusion to "Investigate".

The logit model for fraud is developed using similar ratios to those presented by Persons (1997). The logit model has also been written and adapted for the Excel spreadsheet using a technique described by Winston and Albright (1997). The model uses a set of test data to determine the coefficients of the logistic equation. The values of the financial ratios for the student's company are entered into the spreadsheet, and the value of the logistic function is calculated. The model will use a cutoff of .5, so that if the value of the equation is .5 or above, the model will reach the conclusion of "Fraud".

The questionnaire for the second model also assesses fraud, based on responses in three areas outlined by SAS 82: risk factors based on management's characteristics and influence, risk factors relating to industry conditions, and risk factors relating to operational characteristics. The spreadsheet again makes use of Excel's logical functions, and assigns one point to each risk factor. If more than 20% of the questions receive an answer that indicates risk is present, the model will reach the conclusion to "Investigate". The spreadsheet will then incorporate the fraud conclusions into the IR score.

Summary

The results of the evaluations by the "Intelligent Spreadsheet" are presented on the first page of the worksheet. The student can evaluate results using several different parameters for acceptable audit risk and control risk. The student can also examine

several account balances for predicted misstatements. Through the use of student tests and trials, changes may be made to the design of the spreadsheet, to the models used, or to the way the spreadsheet is used.

Current limitations to the spreadsheet are that it now assesses only beta risk, the risk of incorrect acceptance. It also uses a simplified version of the audit risk equation from the one presented in SAS 39, in order to present the equation in the same format as the textbook for student learning purposes. Future development may also address the use of audit sampling in the evaluation of audit risk (Guy et al., 1998).

References

Arens, A., and J. Loebbecke. 1997. *Auditing: An Integrated Approach* (7th ed.). Upper Saddle River, New Jersey: Prentice Hall.

Auditing Standards Board. 1972. *Statement of Auditing Standards No. 1: Generally Accepted Auditing Standards.* New York: AICPA.

Auditing Standards Board. 1981. *Statement of Auditing Standards No. 39: Audit Sampling.* New York: AICPA.

Auditing Standards Board. 1997. *Statement of Auditing Standards No. 82: Consideration of Fraud in a Financial Statement Audit.* New York: AICPA.

Guy, D.M., Carmichael, D.R., Whittington, O.R. 1998. *Audit Sampling, An Introduction.* John Wiley & Sons.

Lenard, M.J., P. Alam, D. Booth, G. Madey. 1998. An Analysis of Decision Making Capabilities in a Hybrid System: An Example from the Auditing Domain. Working Paper, Kent State University.

Persons, O.S. 1997. Using Financial Statement Data to Identify Factors Associated with Fraudulent Financial Reporting. *Journal of Applied Business Research* 11(3), pp. 38-46.

Winston, W.L., Albright, S.C. 1997. *Practical Management Science.* Belmont, CA: Wadsworth Publishing Company.

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Audit Risk Model

Evaluate:

Planned detection risk = AAR / (IR * CR)

Acceptable Audit Risk (AAR) = 5%

Follow "Risk" menu for Inherent Risk (IR)

Control Risk (CR) = 50%

Determine amount of evidence to be collected from the following table:

AAR	IR	CR	PDR	Evidence:
0.05	1	0.5	0.1	High level

Also, use the menu to look at specific risk areas:

- Regression of selected account balances
- Possibility of fraud - ratio analysis
- Possibility of fraud - questionnaire

Conclusions:

Yes, Balance OK

Fraud

Investigate

Figure 1