



Risk Assessment & Statistical Sampling

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Audit Risk

- ★ Risk assessment is an analytical tool for audit planning and execution.
- ★ It focuses on areas which are likely to be more error prone (risky).
- ★ It is cost effective .
- ★ It uses the information already available.



Audit Sampling

- ★ Audit sampling is the application of an audit procedure to less than 100% of the items within a class of transactions for the purpose of evaluating some characteristic of the class.
- ★ It may be statistical or non-statistical
- ★ Sampling based on risk analysis or audit judgment is non-statistical. Here the audit conclusions are on direct observed evidence .
- ★ The audit conclusions are only for the part of the population.



Risk Assessment & Sampling in Audit Planning



- ★ **Statistical Sampling** is a tool for cost effective audit that is free from any personal bias of auditor.
- ★ **Risk Assessment** is another tool for cost effective audit and uses some available information about the population under study.
- ★ Statistical sampling can **extrapolate** some characteristics of the population from the sample observation that is widely accepted & capable of estimating **sampling error**.
- ★ **Integration of these two concepts** to arrive at some rational & cost effective audit plan that is capable of drawing widely acceptable conclusions about the entire population under study and satisfies the audit objective.



Risk Assessment & Sampling in Audit Planning

- ★ The proposed sampling design effectively utilizes the audit risk assessment & statistical sampling so that,
 - (I) All the significant auditable units are covered with due importance.
 - (II) Optimizes the use of available resources and minimizes personal bias.
 - (III) Minimizes redundant audit.
 - (IV) Maximizes acceptability of audit reports.



RASA in Receipt Audit

- ★ **A *Stratified Two-Stage* sampling design** is proposed .Stratification of auditable units is based on risk assessment. Here quantitative risk assessment (score) is proposed.
- ★ **First stage (selection of auditable entities) :**Stratify the auditable units into High-risk, Medium-risk or Low-risk units etc. based on risk-score .Randomly select more samples from High-risk stratum and less sample from low risk stratum.
- ★ **Second stage (selection of transactions within selected auditable entities):** With the help of audit risk model & statistical formula determine the sample size and select the sample at random after stratification of transactions.Here qualitative risk assessment is proposed.

In the absence of any data-base on various parameters to assess the distribution of errors , many assumptions are made in the beginning, that are subject to verification.



Risk model in audit

A risk analysis approach concentrates on those areas where the possibility of misstatement is the greatest.

* Helps to ensure a cost effective audit

Audit Risk Model

- ★ **OAR = IR x CR x DR**
- ★ Where,
- ★ OAR= Overall Audit Risk
- ★ IR= Inherent Risk
- ★ CR=Control Risk
- ★ DR=Detection Risk



Detection Risk

★ Function of the effectiveness of the audit procedures

★ Two aspects of detection risk are

** Sampling risk

** Non Sampling risk



Assurance Guide Table

This table will provide the required confidence level (CL) on the basis of your judgment on IR & CR. This CL may be used to arrive at the optimum sample size for acceptable audit conclusion.



Objective of the proposed methodology



- ★ To generate estimates at the State / National level of population proportion of errors(audit objections).
- ★ To try extrapolation of monetary value (of the errors) at the National level .
- ★ To try best uses of the audit observations in the sample for further investigation for better audit conclusion. For example, If no error is observed in the sample it may be concluded that the population is free from any significant error etc.. In other words ,we may go in for a **Testing of Hypothesis** approach for statistical evaluation of sample result in place of **Estimation** approach, in future.



Thank you all



<https://t.me/learningnets>

Risk Analysis & statistical sampling in audit

1. The risk model

Risk based approach is an important state of the methodology of audit planning. Risk assessment, as the core of this approach, is an analytical tool for audit planning and execution. This approach focuses on areas, which are likely to be more error-prone (risky). Thus one can optimally use the available resources by focusing more attention on high- risk areas than low risk areas. This is very effective when the resources are limited and some information is available to assess the risk. It stresses on structuring the audit procedures and reorganisation of audit work in terms of risk factors. Risk methodologies can be developed along with the existing audit procedures. Risk approach was developed for financial audits and later also found applicable in performance audit. Risk analysis is a pervasive practice for both internal auditors and external auditors and is part of their best practices. All the developed countries and international organisations adopted risk based approach in audit.

The Risk Model can be expressed by the following equation:

$$\text{OAR} = \text{IR} \times \text{CR} \times \text{DR}$$

Where, OAR is the overall audit risk acceptable to the auditor

IR is the inherent risk, i.e. the risk that an error will occur in the first place

CR is the control risk, i.e. the risk that internal controls will fail to detect the error.

DR is the detection risk, i.e. the risk that the audit procedures will fail to detect the error

And the underlying assumption is that the individual risks, viz., IR, CR, DR are independent of each other.

The overall audit risk is defined by the audit institution and hence is a constant pre-determined quantity. The objective for the auditor is to first assess inherent and control risks of the entity, and then to design and perform appropriate compliance and substantive tests that provide sufficient assurance such that the product of the risks identified is less than or equal to the overall audit risk that the auditor is willing to accept. If the inherent risk and control risk are low, audit will be required to provide less assurance from substantive tests, while if the inherent risk and control risk are high, the amount of assurance required from substantive audit less tests will be high. In the risk model, thus, the auditor assesses the inherent risk and control risk and solves the equation for detection risk. The detection risk (DR) is actually a combination two risks; analytical procedures risk (AP) which is the risk that analytical procedures will fail to detect material errors and tests of detail risk (TD) which is the risk that detailed test procedures

will fail to detect the material errors. These two risks are again considered independent and thus a multiplicative model is possible.

$$DR = AP \times TD$$

$$OAR = IR \times CR \times AP \times TD$$

The auditors exercise professional judgement in assessing the IR, CR and AP. Then solve the model to arrive at the test of details risk (TD).

2.Materiality and audit risk

While risk is concerned with the likelihood of error, materiality deals with the extent to which we can tolerate error. Materiality relates to the maximum possible mis-statements/error. The auditor needs to do just enough work to conclude that the maximum possible mis-statement/error at the desired level of assurance is less than the materiality. Materiality is determined from the user's point of view, and is independent of the overall audit assurance (risk). While making materiality judgements three main factors are considered; the value of the error, the nature of the error and context in which the transaction has occurred. It is normally sufficient to determine a single materiality level for the audit. However, in some situations it may be desirable to use different materiality levels for different components/areas of audit.

The auditor is concerned only with material errors. Risk assessment will thus focus on the likelihood of material error. To use the risk model, the auditor has thus to specify the materiality level along with the overall assurance required from the audit.

3.To assess inherent risk

Inherent risk assesses the nature, complexity, and volume of the activities that given rise to the possibility of error occurring in the first place. The assessment of inherent risk factors would to a large extent be based on the knowledge and understanding of the business of the auditee based on our experience from previous audits and identification of events, transactions and practices which may have a significant impact on the audit area. Different audits will have a different set of risk parameters for assessment of inherent risk.

Inherent risk has to be assessed for each audit assertion/opinion. Inherent risk factors impacting the audit assertion need to be documented. The risk associated with each individual factor is then assessed as high, moderate or low. The assessment is then consolidated for overall assessment of inherent risk. It is possible to assign numerical values to the risk assessed, or the assessment can be done quantitatively in terms of high, moderate and low.

4. To assess control risk

Control risk assesses the adequacy of the policies and procedures in the auditee organization for detecting material error for identified functions or activities. For assessing the control risk, the auditor considers both the control environment and control

systems, together. Techniques used to evaluate internal control are narrative descriptions, questionnaires; check lists, flow charts, inspection, inquiries, observation and re-performance of internal controls. Different kinds of audit will have a different set of control factors to be considered.

The auditor evaluates the control environment and systems (both manual and IT) and places reliance on them. This evaluation is the preliminary systems examinations and are designed to assess whether the activities undertaken by the audited body are in accordance with the statutory and other authorities, whether the audited body's structure is likely to ensure adequate internal control, the adequacy of general financial controls, whether the employees in areas critical to internal controls are competent and whether there are adequate other general controls in areas relevant to audit. The control risk is then assessed and expressed either in numerical (percentage terms) or qualitative (high, medium, low) terms.

5.To assess detection risk

Having assessed the inherent and control risks, the risk equation can be solved for detection risk, i.e. the assurance required from audit procedures. This assurance level will be used as input in determining the sample size on which the audit tests need to be performed to arrive at the required overall assistance.

6. Risk Assessments & Statistical Sampling in Audit.

Sampling is merely a tool available to the auditor to make wise decisions by auditing only a part of the population. But it does not do away with the risk assessment based on the professional judgment of the auditor. The question to answer is how to integrate these two concepts in audit planning. The statistical sampling may effectively utilise the audit risk assessment in audit planning so that,

- (i) all the significant auditable entities are covered with due importance,
- (ii) optimises the use of available resources ,and
- (iii) minimises redundant audit .

In addition, the auditor can extrapolate his findings along with measure of its reliability and also safeguard against any possible error of judgment in his risk assessments. Thus the audit findings will be more acceptable.

One possible way of achieving this in regulatory audit is to follow a **two-stage approach**.

1st Stage (selection of auditable entities): Audit planner can stratify the population (auditable entities) under consideration based on risk assessment and can give more importance to those strata where there is a high probability of locating audit objections (high-risk areas) and less importance to those strata with low probability of locating such objections (low-risk areas) but he should give some importance to all the strata. This way an auditor can balance between his professional judgment and statistical sampling and optimally use his resources. Audit planning steps are: -

- **Define the audit objective-** what to measure, what type of information will provide sufficient facts for the formation of an opinion, and where to measure;
- **Define the population (auditable entities) and the coverage-** All the auditable entities need to be covered after analysing available information. The audit planner also decides about the number of units to be audited (sample units) in the given time frame with the available resources.
- **Assessment of risks:** Assign certain score to all the auditable entities under consideration based on various well thought parameters from the audit risk point of view. Evaluate the individual score by summing the scores. Scores are to be assigned in such a way that more risky is the unit, greater value to be assigned.
- **Stratify the population based on risk assessment–** Arrange the entities from high-risk units to low-risk units. Based on certain threshold limits one can stratify (grouping) the population into different strata say high-risk, medium-risk and low-risk strata.
- **Allocation of number of units to be audited –** Allocate the sample units as per risk associated with the strata. For example, one plan could be to audit 60% (of total sample units) units from the high-risk stratum, 30%(of total sample units) units from medium-risk stratum and 10 %(of total sample units) units from low-risk stratum.
- **Selection of Auditable Units from each Stratum.** – One may adopt simple random sampling technique in each of the strata or any other suitable sampling techniques as discussed.

2nd Stage :(selection of items/transactions in the selected auditable entities)

The audit risk model:

$$\text{OAR} = \text{IR} \times \text{CR} \times \text{DR}$$

The underlying assumption is that the risks are independent of each other.

The overall audit risk is defined by the audit institution and hence is a constant of pre-determined quantity. Generally, it is taken at 5%.

It is very difficult to quantify these risks for an entity. This is a subjective professional judgment. In practice a qualitative assessment of IR and CR are generally made as High, Medium, Low or No-Control based on some pre-defined parameters and procedure. Then the sampling risk is arrived at from the Assurance Guide Table (Annex I). The point to be noted here that are opposite of risk is assurance (High risk means Low assurance) and $[100 \times (1 - \text{sampling risk})]$ % may be viewed as confidence level.

Audit planning steps in the 2nd stage: -

- **Decide the margin of errors** that will be considered acceptable, as well as the definition of an error.
- **Assess the expected error rate or standard deviation** from the past data or by auditing a random sample of 30 cases from the population.

- **Specify the level of confidence-** The level of confidence is the probability that an estimate made from the sample will fall within a stated interval of the true but unknown value for the population as a whole. This can be evaluated based on risk assessment as indicated above.
- **Determine the sample size** – based on above parameters calculate the optimum sample size using the formulae /tables/package.
- **Selection of samples** – selects the sample as per sampling design and derived sample size.
- **Evaluation of observations:** -Extrapolation of audit observation depending on the sampling plan adopted
- **Draw conclusions about the population** from the extrapolated results.

Annex ‘I’

Assurance Guide Table

Assurance from Inherent Risk evaluation	Assurance from Control Risk evaluation	Required assurance from detailed substantive tests Confidence Level
High	High	75 %
	Medium	80%
	Low	85%
Medium	High	85%
	Medium	90%
	Low	92%
Low	High	94%
	Medium	95%
	Low	96%

The above confidence level may be used to determine the optimum sample size required to audit with over all 95 % audit assurance.

Z- Table

Confidence Level	Z -value
75 %	1.15
80%	1.28
85%	1.44
90%	1.65
92%	1.75
94%	1.88
95%	1.96
96%	2.05
99%	2.58

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