Statistical Sampling Techniques for the IT Auditors

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Abstract: This study aims to examine how IT auditors make a framework to audit a company in terms of statistical point of view. Furthermore, this study also aims to test statistical tech tools such as spss, eviews, etc contribution to the audit performance of IT auditors. This study uses Secondary data analysis as a method of analysis. The results of this study indicate that, when using statistical tools such as spss and eviews make significant impact on sampling techniques in IT Auditors performance. In addition, Statistical sampling techniques has many advantages in helping auditors to audit a company.
Keywords: Statistical sampling techniques, Audit performance.

INTRODUCTION

The growing business scales, operations of business units in different geographic areas, the changing partnership structures to form a multipartner capital structure and management of businesses by professional administrators due to institutionalization, the Enron scandal and the fraudulent incidents in the financial statements have increased the importance of the audits (Kılınç, 2008). Business partners and managers, institutions providing loans to businesses, those who want to invest in business shares, buyer and seller associates, competitors and government entities can benefit from business audits. As a result of audit activities, financial statements also provide resources for business activities and financial situations. The increasing importance of audits in all sectors has brought the intensity of work along. In this workload, auditors have had to research and analyze a large amount of data in order to be able to give an accurate view that the financial statements are accurate and factual. But under competitive conditions, auditors should work within economic limits and obtain their views at an affordable time and cost. For this reason, the examination of all data during audit activities in an enterprise will cause cost increase and loss of time. To avoid this, the concept of sampling, which first appeared in the 1930's, has been used. By sampling, generalization is made by getting an idea about all data (Kılınç, 2008). The establishment of internal control systems in enterprises in the 1980s has also provided an opportunity for sampling in supervision (Kishalı and Pehlivanlı, 2007: 122).

Sampling in an accounting audit is used to enable the auditor to control large data fields more efficiently, faster and with less cost. Accounting universes, often formed from numbers or the data convertible to numbers, are well suited to the use of statistical models that use these numbers and produce results. From this point of view, the connection between the universe and the sampling units that constitute the sample is extremely important. The auditor withdraws the sampling units from the frame indicating this physical structure of the universe. Because of this, the results obtained by sample that has been gained with selection will be attributed to the universe. In this respect, if there is any difference between the trace quantity of sampling framework and the universe, the auditor gets incorrect results about the universe at the end of the sampling. The way to get accurate results about the universe with a sampling method is possible by using the sampling technique to determine the sampling units representing the universe in the most appropriate way and accurately from a fully specified sampling frame (Yıldırım and İnel, 2012: 262). In the sampling in an accounting audit, applying sampling to a part of the audit procedures or to only one category of transactions helps auditors reach a conclusion on the whole of the universe or draw conclusions by evaluating the selected units. Each data set (sales invoices, inventories, fees, etc.) forms a universe, which is very convenient for the application of sampling methods. In this respect, auditing and statistical sampling show a great harmony as application and concept. Two basic sampling approaches in accounting audit are statistical sampling and non-statistical sampling (Yıldırım and İnel, 2012: 261).

LITERATURE REVIEW
The Accounting Audit Concept
An accounting audit is the examination of financial statements and accounting records in a narrow sense. However, the stages of accounting audit as a

1

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profession do not appear in this definition. In this respect, this definition is inadequate at present (Türedi, 2001: 5). An accounting audit is the process of collecting and evaluating evidence made by an independent expert in order to investigate the compliance of an economic unit or the periodic information with predetermined criteria and preparing a report in this subject (Bozkurt, 2000: 23). As it is understood from the definition, accounting audit operations have some basic qualities. These qualities can be listed as follows (Türedi, 2001: 6):

Work that is the subject of an accounting audit is made for an economic unit or period,
The controlled information is compared with the predefined criteria,
Accounting audit work is carried out by experts who know the profession well,
An accounting audit is the collection of the evidence required for the audit and evaluation of the collected evidence,
As a result of the audit, the results are presented in a report to those who are in charge of management or supervision.

There are three types of accounting audits in general. These are the audit of financial statements, the conformity audit, and the activity audit. In the audit of financial statements, it is investigated whether the financial statements are in compliance with the determined measures. In the conformity audit, it is investigated whether the rules established by a higher authority are followed. This higher authority can be from within or outside the enterprise. In the course of the activity audit, the methods and procedures of the activities of the relevant departments are examined in order to evaluate the efficiency and productivity of the departments of the enterprise (Güredin, 2007: 16-17).

Sampling Method
Statistics deals with the collection, organization, summarization, presentation, and analysis of data, along with the interpretation of the results obtained through these analyzes and a conclusion to a decision (Başar and Oktay, 1999: 1). Sampling as an area of specialization in statistics is increasingly being referred to, and sampling methods have a privileged place in modern enterprise management. Because of this, sampling is used in many areas of business management, such as quality control, audit of business records, continuous inventory control, determination of workload, market and marketing research, new

product research, advertising effectiveness tests, and investment decisions (Çakır, 2000: 234). Audit sampling is accepting the audition of a certain amount of samples, not all the sub accounts in the account deposit, and that the obtained results represent the whole account (Kaval, 2008: 156). Audit sampling gives all the sampling units the chance to be selected and includes the application of audit procedures to less than 100% of items in a process group or the account deposit. A statistical or a non-statistical approach can be used in audit sampling (TÜDESK, 2008: 451). Similar operations in similar situations have more effect on the sampling. For example, for the audit of a commercial receivables account, the surplus amount of invoices in the system can be applied to the sampling as the same procedures are applicable for most of them. But, if a similar case is non-existent in a small amount of data set, an appropriate sampling may not be in applied (Hubbard, 2001: 27).

METHOD
This research uses a qualitative approach where the data were collected through some resource (internet, books, etc). The object of this study is statistical techniques which was used by some IT auditors to audit a company. The collected data were subsequently analyzed through the framework analysis method.

For the purpose of the study, the data were analyzed using the framework analysis method. Framework analysis is a method for analyzing qualitative research data, developed in the 1980s by the Qualitative Research Unit at the National Centre for Qualitative Research in the UK (Jones, 2000). It is a content analysis method that involves summarising and classifying data within a thematic framework (Jones, 2000).

The method provides a versatile means for qualitative analysis, rather than being a highly specific technique and also provides a procedural structure that can be applied to make the data-analysis process become more systematic. Framework analysis was considered appropriate to analyze the data for this study because:

it gives unwieldy data coherence and structure (Jones, 2000, p. 560);
it facilitates systematic analysis (Jones, 2000, p. 560); and
it relies on the creative and conceptual ability of the analyst to make sense of the meaning, salience

and connections by sifting, charting and sorting the material (Ritchie and Spencer, 1994, pp. 176-8).

According to Ritchieand Spencer, (1994) there are five key stages that need to be followed in executing framework analysis. Those five stages are familiarization, identifying a thematic framework, indexing, charting, and mapping and interpretation. In the first stage of familiarization,all data inputs were transcribed into data transcripts as well as readable text. The transcripts were then returned to the respondents for review and comment to ensure the validity of interpretation by the researchers.Subsequently,all key ideas and recurring themes generated from the interview sessions were listed to be used for the following thematic framework stage. The thematic framework output was developed from the transcribing and text reading obtained from the familiarization stage. This process involves both logical and intuitive thinking – making judgments about meaning, the relevance and importance of issues and implicit connections about ideas (Ritchie and Spencer, 1994) in making sure that the formulated research questions were addressed completely. The third stage, indexing, is where the thematic framework based on the interview transcripts is interpreted with numerical codes and annotated by short text descriptors to elaborate the index headings. The charting stage is used to develop a visualization of the data by considering the familiarity of the themes. Charts with two-way headings of thematic framework and research considerations are set up. The arrangement of charts however, depends on whether the data analysis is "tobe thematic (foreach the meacross all respondents) orbycase (foreach respondent across all themes)" (Ritchie and Spencer, 1994, pp. 182-3). The final stage in implementing this framework analysis is known as mapping an dinterpretation. According to Krueger(1994), there are seven established criteria, which suggest the following headings as a framework for interpreting coded data, namely: words, context, internal consistency, frequency and extensiveness of comments, specificity of comments, intensity of comments and big ideas. However, in any circumstance, the research questions and the theme from the data must be used as a guide for analysis as well as to extrapolate the findings.

RESULTS AND DISCUSSION

The main purpose of auditors is to collect and evaluate a sufficient amount of reliable evidence and to present it to audit opinion. Auditors do various testing works to collect evidence about the enterprise's internal control structure, the loop processes and the balance. Various audit procedures are applied during the testing work. At this stage, the auditor should decide the number of units that audit procedures should be applied to (Çömlekçi, 1978: 25).

Audit sampling is accepting the audition of a certain amount of samples, not all the sub accounts in the account deposit, and that the obtained results represent the whole account (Kaval, 2008: 156). Audit sampling gives all the sampling units the chance to be selected and includes the application of audit procedures to less than 100% of items in a process group or the account deposit. A statistical or a non-statistical approach can be used in audit sampling (TÜDESK, 2008: 451). Similar operations in similar situations have more effect on the sampling. For example, for the audit of a commercial receivables account, the surplus amount of invoices in the system can be applied to the sampling as the same procedures are applicable for most of them. But, if a similar case is non-existent in a small amount of data set, an appropriate sampling may not be in applied (Hubbard, 2001: 27).

If the auditor makes a decision about the main mass by selecting a part of the main mass, the work s/he does is defined as audit sampling (Elder et al., 2010: 478). The auditor should collect a sufficient amount of reliable evidence in the main mass and evaluate to present his/her audit opinion (Yıldırım and İnel, 2012: 263).

The need for auditors has increased due to the intensity in funding and accounting processes of companies recently. But, the companies trying to get rid of the time and costs of employing extra auditors have decided to use sampling methods (Giorgi, 2006: 27).

There are two general approaches in accounting audit sampling. These are the non-statistical sampling and the statistical sampling methods (Messier, 1997: 275).

Non-statistical sampling is the selection of the sample from the main mass according to the will of the auditor. In non-statistical sampling, the auditor's professional knowledge and experience has effect on the creation of the size of the sample. However, the selection of samples is completely arbitrary (Türedi, 2001: 234). When non-statistical sampling methods are applied, highly subjective methods are used to obtain results. The auditor

uses his/her professional reasoning ability rather than mathematical methods in decision stages such as determining the size of the sample, selecting the sample and evaluating the sampling results according to the selected samples (Larry, 1996: 402). The main mass of the examples selected by statistical sampling cannot be regarded as representing the whole mass completely (Güredin, 2007: 514). Non-statistical sampling methods are the most widely used in the audit of the enterprises where the size of the main mass is not big and the number of documents to be examined is small (Sipahi, 2003:106). Non-statistical sampling is a sampling procedure where the risk cannot be measured; audits prefer this sampling mostly because it requires no training and because of the low sample selection and audit costs (Hitzig, 2004: 30). However, as there is no mathematical basis for the adaptation of the sample results to the main mass, the use of non-statistical sampling is limited (Willingham and Carmichael, 1971: 158).

Non-statistical sampling has some advantages over statistical sampling.

These are (Taylor and Glezen, 1991: 567):

In the non-statistical sampling method, the auditors don't need to have a special knowledge about the theory of statistics; thereby, it is preferred due to its simplicity,
Auditors in the audit team don't need to receive special training,
This method saves time with its convenient application.

There are some disadvantages of non-statistical sampling, even though it provides convenience by taking the burden of statistical calculations from the auditor. These are (Gavenda, 2001: 67-68):

Results gained by non-statistical sampling can't be scientific, and they can't be proven, as the will of the auditor is used in all stages,
As the data is selected according to the will of the auditor, the selected data may not represent the main mass. For example, using the non-statistical sampling method, the auditor may select the data for a certain period of time. For example, s/he may want to examine the invoices of the first two months, but the selected data may be highly likely don't represent the main mass. Because of this, the impact of seasonal and economic variables can be different for each month and the first two months may not give an idea about all of the months,
In non-statistical sampling, auditors usually prefer to examine the units with high costs, they may

overlook the units were small but extraordinary situation may be present. Because, as it doesn't allow stratification like statistical sampling, the high-cost processes are considered as ordinary units,
Non-statistical sampling may overlook minor changes. However, the changes appearing to be small may cause big problems in the future.

Statistical sampling is the sampling method where the sample units are chosen randomly (Güredin, 2007: 514). Generalization of the results obtained from a small number of units selected from a main mass to the whole mass is called statistical sampling (Gürbüz 1995: 123). The statistical sampling method is based on the principle of the examination and generalization of the randomly selected sample from the main mass to the whole mass. Determining the sample size suitable for the statistical sampling and audit work, estimation of sample errors easily, obtaining more accurate results compared to non-statistical sampling methods when large amount of mass is required to be analyzed, working opportunity with a smaller sample size, the savings in terms of cost and time, and evaluability by all auditors (even when the auditors who made the audition are different as it is based on numeric value) can be considered to be the superiority of the statistical sampling method (Türedi, 2007: 191-192). The important characteristics of statistical sampling are the measurement of the risk, the basis of the theory of probability, and the ability of each unit examined to be selected randomly (Pany and Whitingtons, 1997: 353).

Statistical sampling methods are divided in two categories: *quantity sampling methods* and *quality sampling methods*. As quantity sampling methods are not used widely in accounting audits, quality sampling methods should be emphasized. Quality sampling methods are the works to estimate a specific feature or the rate of including certain units in a main mass. Quality sampling methods are divided in three categories: estimation sampling method according to the qualifications, acceptance sampling method and discovery sampling method (Yıldırım and İnel, 2012: 265).

Estimation sampling according to qualifications is used for the detection of a certain quality and used as one of the most important statistical methods in an accounting audit. This method, in a certain reliability level[1], is based on the estimation of a quality in the main mass. With this method, incorrect records in the book of account are

estimated at a certain reliability level. This method is typically used in the audit of the internal control system. In addition, whether there is an error in the documentation, journal or general ledger records can easily be detected with the help of this method (Türedi, 2001: 244).

Acceptance sampling is one of the most frequently used sampling methods in an accounting audit. This sampling method is based on the principle of accepting or rejecting the mass of the audit according to the number of errors found by the auditor in a sample. If the errors detected by the auditor are in tolerable limits, the sample and the main mass are considered to be correct (Türedi, 2001: 240).

Discovery sampling is another one of the most frequently used sampling methods in accounting audits. The essence of this method is selecting a sample size that allows a specific quality in the main mass to occur at least for once in certain periods and reliability level. If the quality cannot be found in the selected sample, the main mass is considered to be correct. As a result, the main mass is considered as accurate (Türedi, 2001: 241).

There are some advantages provided by the statistical sampling to the auditor. They (Guy, Carmichael and Whittington, 1994: 8):

Help with calculating the sample reliability, determining the error amount to be accepted and calculating the sampling risk,
Enable more accurate plans,
Can provide the opportunity to work with the optimal sample size by adjusting the sample size according to risk measurements,
Allow for more realistic decisions to be made about the main mass of the sampling because the sample results can be evaluated more objectively,
Saving time,
Provide sampling results that can be combined even when they are obtained by different auditors,
Provide results that can be proven, as the method is based on scientific principles.

Although the statistical sampling method reflects the most accurate and reliable results, there are some disadvantages of this method. These are (Erdoğan, 2006: 206):

Statistical sampling can be costly in sample design and in the training of the audit personnel,
Statistical sampling can lead the auditor to excessive sampling. Because, with the logic that more samples provide better results, the auditor

may examine more samples of the same type. But this approach is contrary to the logic of sampling. It should be noted that, the logic of sampling is to get rid of examining all the data by analyzing the selected data to have an idea about the main mass, As the units are selected randomly in statistical sampling, sometimes a one-time transaction may be selected. But the selected one-time transaction cannot be capable of representing the main mass. In such cases, sampling error can be avoided with stratification.

CONCLUSION
Statistics both develop itself and contributes to the development of other fields of science by solving the problems with opportunities it provides, such as sampling method. Social sciences, used as a social and economic behavior research laboratory, are especially in need of more statistical methods day by day. Sampling methods frequently used in management and in different areas of science, especially in accounting audits, provide help for accounting auditors.

Today, businesses set targets suitable for themselves while conducting their activities by reviewing the events that are similar to each other. Developments in information and communication technology and the increased competition, combined with the changes that occur in the target company, have led to changes in audit methods. In this case, many auditing companies have started looking for different solutions to gain the most reliable information in the least amount of time, and auditing by sampling has become more important. As such, auditing is a systematic process of collecting evidence and evaluating this evidence. In the application of this process, evidence collection methods have a high importance. It is not possible to reveal all errors in accounting by performing full research. Therefore, with sampling methods based on statistical foundations, it is possible to obtain all the information about the accounting data in less time and with lower cost. As a result, it can be emphasized that the use of sampling methods in accounting audits has become an inevitable situation.

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