THE APPLICATION OF STATISTICAL AND/OR NON-STATISTICAL SAMPLING TECHNIQUES BY INTERNAL AUDIT FUNCTIONS IN THE SOUTH AFRICAN BANKING INDUSTRY

D.P. van der Nest*, Louis Smidt**, Dave Lubbe***

Abstract

This article explores the use by internal audit functions of audit sampling techniques in order to test the effectiveness of controls in the banking sector. The article focuses specifically on the use of statistical and/or non-statistical sampling techniques by internal auditors. The focus of the research for this article was internal audit functions in the banking sector of South Africa. The results discussed in the article indicate that audit sampling is still used frequently as an audit evidence-gathering technique. Non-statistical sampling techniques are used more frequently than statistical sampling techniques for the evaluation of the sample. In addition, both techniques are regarded as important for the determination of the sample size and the selection of the sample items.

Keywords: Internal Audit, Chief Audit Executive, Non-Statistical Sampling, Sampling Risk, Statistical Sampling, Tests of Controls

* Tshwane University of Technology, South Africa
Email: Vandernestdp@tut.ac.za
** Department of Auditing, Tshwane University of Technology, South Africa
*** Department of Auditing, University of the Free State, South Africa

1. Introduction

Companies of all types and sizes are facing a number of risks that influence the reliability of financial statements and the effectiveness of internal controls and corporate governance practices (Rezaee, 2010:50). The 2009 King Report on Corporate Governance for South Africa (King III Report) requires a company's board of directors to oversee the risk management and governance practices of a company, to ensure that the stakeholders' interests are protected, and that the company conducts business in an ethical and transparent manner (Institute of Directors (IOD), 2009:29).

Banks are key role players in the overall health and wealth-generation capacity of a country's economy, and it is therefore crucial for a country to have a sound banking system as this will stimulate economic growth and improve investors' confidence (Makhubela, 2006:6; KPMG, 2012a:10). The banking industry, like any other business sector or industry, is however not immune to risks and can also run into financial difficulty. For this reason, internal audit functions in the banking industry play a vital role in evaluating the bank's controls in order to be able to express an overall opinion as to the effectiveness of internal controls, risk management and governance.

This opinion must be supported by the presence of sufficient, reliable, relevant and useful evidence, and must consider the expectations of senior management, the board of directors and other stakeholders (Institute of Internal Auditors, (IIA), 2012a). If an auditor's opinion is questioned, outsiders should be able to evaluate the audit evidence to determine whether the evidence gathered by the auditor was sufficient, reliable, relevant and useful, and consistent with what another reasonable, prudent and competent auditor would have gathered (Stuart, 2012:140). However, an assessment of all internal controls is not always feasible because of resource limitations, such as staff (both in numbers and specialist skills), time constraints and limited audit budgets (Aghili, 2011:19). Therefore, internal auditors make use of sampling to select items that will be subjected to the internal auditor's audit procedures in order to collect evidence regarding the operational effectiveness of controls (tests of controls) (Apostolou, 2004:11; Reding, Sobel, Anderson, Head, Ramamoorti, Salamasick & Riddle, 2009:11-1) as well as performing other tests, e.g., substantive testing (Apostolou, 2004:7; IFAC, 2012d ISA 530 par. A7). Statistical and non-statistical sampling techniques can be used to select items to be subjected to audit procedures. It should be noted that

for the purposes of this article the use of the term audit sampling includes both statistical and non-statistical sampling techniques.

The Standards (IIA, 2012a), for internal auditors do not prescribe the use of either a statistical or a non-statistical sampling technique, and internal auditors therefore use statistical and non-statistical sampling techniques as the situations dictate (Maingot & Quon, 2009:218; Reding et al., 2009:11-2; IIA, 2012a; Crous, Lamprecht, Eilifsen, Messier, Glover & Prawitt, 2012:236). Similarly the International Standards on Auditing (ISAs) for external auditors also do not prescribe the use of either a statistical or a non-statistical sampling technique, but they do provide a guideline on the appropriate use of audit sampling in gathering audit evidence for tests of controls and for substantive tests (International Federation of Accountants (IFAC), 2012d ISA 530).

There is currently no consensus as to which sampling technique is the best, as each technique has its unique advantages and disadvantages (Mckee, 1984:30; Colbert, 1990:120; Hitzig, 2004:35; Maingot & Quon, 2009:233; Singleton, 2009:13; Applegate, 2010:21). Applegate (2010:19) points out that even a well-designed non-statistical sampling plan cannot measure the risk that the selected sample will in fact be representative of the population: the ability of statistical sampling techniques to do exactly this is their major advantage. Many auditors believe that statistical sampling techniques are more defensible than non-statistical sampling techniques due to the fact that the risk related to the sample is objectively quantifiable (Colbert, 1990:120; Hall, Hunton & Pierce, 2002:132). Other auditors are of the opinion that the use of professional judgment in the application of non-statistical sampling techniques is more defensible than is a mechanistically derived, statistical measure of sampling risk that states that the auditor's opinion was incorrect (Colbert, 1990:120; Hall et al., 2002:132).

After careful consideration of the audit objective it is still the internal auditor who must determine which sampling technique (statistical or non-statistical) is most appropriate to achieve the intended audit objective, and thus to be able to express a reliable audit opinion.

2. Research Objectives and Methodology

The debates and differences of opinion as to which sampling technique is "the best", or should be the preferred sampling technique, are at times quite heated. The objective of this article is to discover and examine the sampling techniques that are used by locally controlled South African banks' in-house internal audit functions when performing tests of controls, for determining the sample size, for selecting the sample, and for the evaluation of the characteristics of the sample.

The research design reported on in this article makes use of a mixed method approach. Bryman and Bell (2011:628) define a mixed method approach as a combination of quantitative and qualitative research in the same project. The primary method of data collection used in this research was by means of a structured questionnaire (quantitative method), which was then followed up with a semi-structured telephonic interview (qualitative method).

The research population consisted of Chief Audit Executives (CAEs) of in-house internal audit functions from the ten (10) locally controlled banks that were at that stage registered with the South African Central Bank (Reserve Bank), and that were thus permitted to conduct the business of a bank in South Africa (a list of these 10 locally controlled banks is included in Annexure A). A structured questionnaire was e-mailed to each of the CAEs, requesting that they complete and return the questionnaire. The total number of questionnaires returned was nine (9), a response rate of 90% of the research population. The questionnaires were followed up by a semi-structured interview with the nine participating CAEs. The locally controlled banks were specifically selected as their internal audit methodologies and procedures have been developed and maintained by their respective South African head office internal audit functions, in compliance with South African legislation. Internal audit methodologies used in the locally operating foreign banks have been developed and are maintained at the banks' international head offices, and were therefore excluded from this research because of the diversity of jurisdictions and legislation governing these functions.

3. Literature Review

3.1 Statistical and Non-Statistical Sampling – an Overview

At the outset of an audit engagement the internal auditor should document the plan for that engagement, which should include the engagement's objectives and its resource requirements (IIA, 2012a, Standard 2310). The internal auditor should also prepare an engagement work program which identifies the audit procedures that are to be used to identify, analyse and evaluate the audit evidence in order to achieve that specific engagement's objectives (IIA, 2012a, Standard 2240.A1). The IIA's Practice Advisory 2240-1 states that the methodologies to be followed (such as sampling techniques), should be included in the engagement work program (IIA, 2013b, Practice Advisory 2240-1). The internal audit function should therefore carefully plan and consider the tools and techniques that will be utilised during the fulfilment of an audit engagement in order to discharge their assurance responsibility.

One of the first (of many) considerations for the internal auditor, prior to the commencement of audit testing, is the decision as to whether the use of sampling is appropriate to achieve the engagement objectives. If the audit objective is to test a full population then obviously the use of sampling will not be applicable. If, however, the internal auditor decides to test only a portion of the population in order to collect audit evidence for the achievement of the engagement objectives, then the use of sampling will be applicable and appropriate. Once the internal auditor has determined that the use of sampling is the most suitable technique to collect audit evidence, the next decision concerns which sampling technique to use. Figure 1 below illustrates the audit sampling decision-making process.

As mentioned in section 1 above, and illustrated in Figure 1 below, the internal auditor has the option to choose between a statistical and a non-statistical sampling technique. The three steps to follow, irrespective of whether a statistical or non-statistical technique will be employed, are sample size determination, selection of the sample, and the evaluation of the sample results (Guy et al., 2002:2; IFAC, 2012d ISA 530 par. 6-8).
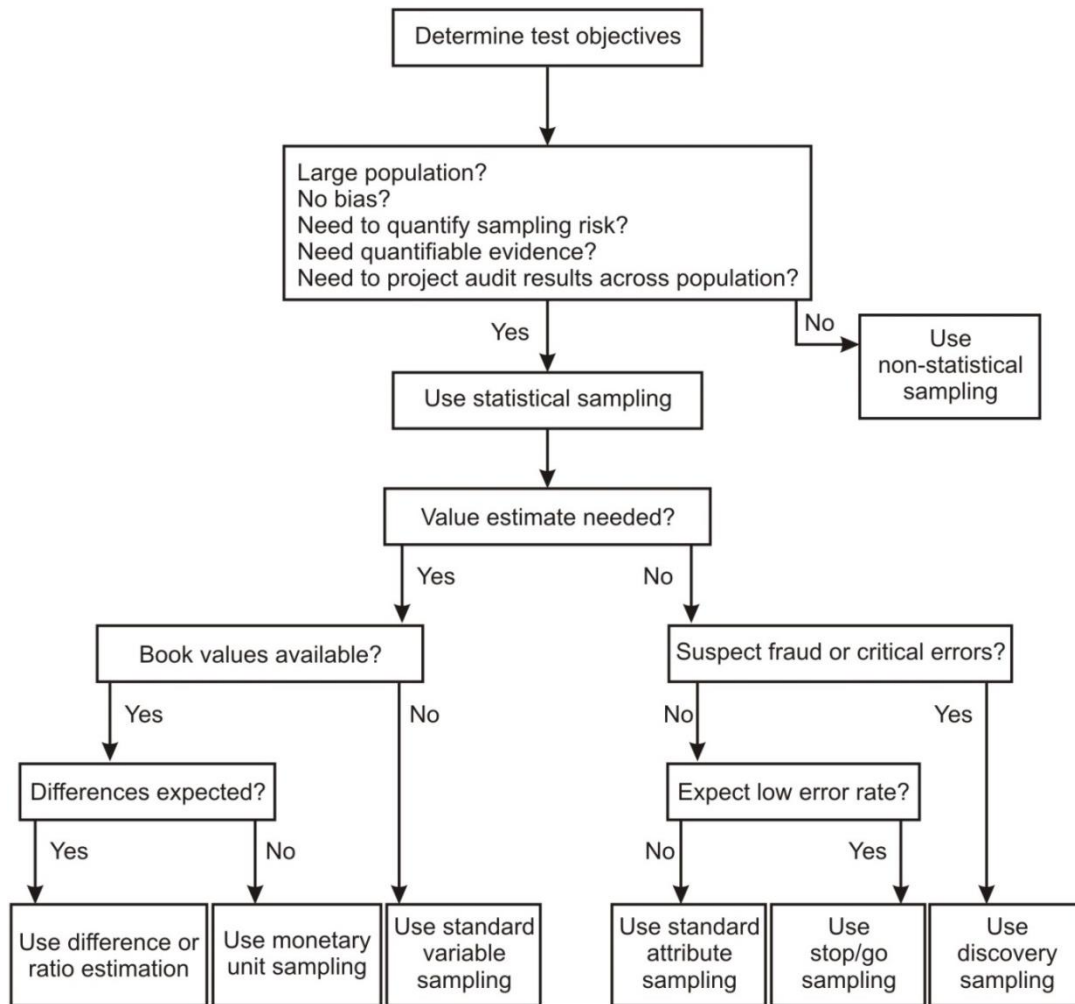

Figure 1. Decision Process for Sampling (IIA (UK & Ireland), 2008)

Hitzig (2004:31) points out that the implementation of a statistical or a non-statistical sampling technique is determined by the sample selection method, and should not simply be an arbitrary decision to apply/not apply statistical techniques, made by the auditor. In addition, the ISA on Audit Sampling 530 (IFAC, 2012d ISA 530 par. A9) indicates that the sample size cannot be used as a criterion to determine whether to use statistical or non-statistical techniques. The choice of non-statistical sampling techniques does not imply the use of smaller sample sizes in order to provide sufficient audit evidence (Crous et al., 2012:257-258).

The internal auditor should apply professional judgment in determining whether to use a statistical or a non-statistical technique, and should also evaluate the significance of matters in relation to the relevant audit objectives. It is important to note that both statistical and non-statistical sampling techniques require the use of the auditor's professional judgment regarding the planning of the sample, conducting of the audit procedures, and the

evaluation of the audit evidence collected (De Bruyn, 1981:116; Guy et al., 2002:10; Crous et al., 2012:240; Reding et al., 2009:11-2; Stuart, 2012:237). The ISA on Audit Sampling 530 reiterates the need for the auditor to use professional judgment with the application of both statistical and non-statistical sampling techniques (IFAC, 2012d ISA 530 par. A9 - A12). There is often a misconception that the use of statistical sampling techniques obviates the need for the auditor to use his judgment, and that the auditor's judgment need only be applied when non-statistical sampling techniques are used. Hitzig (2004:35) also highlights the point that some auditors have expressed concern that the use of statistical sampling techniques eliminates the need for auditor judgment. Contrary to this view, statistical sampling techniques are not mechanical but rather require good auditor judgment in deciding on the nature and extent of testing to be conducted, deciding on the tolerable deviation rate, choosing the technique for selecting the sample, analysing and assessing the population characteristics, and deciding the appropriate risk level (De Bruyn, 1981:119; Hitzig, 2004:35). Guy et al., (2002:10) supports this view, and reiterates the point that the use of statistical sampling does not eliminate professional judgment.

Significant additional factors that may affect the internal auditor's decision in whether to choose a statistical or a non-statistical sampling technique include the influence of external auditors, the influence of internal audit management, and the training and background of internal audit staff. It is not uncommon for overlaps to occur between a company's internal auditors and external auditors with regard to the tests of controls. The Professional Auditing Standards allow the external auditor to place reliance on the work of internal audit after having performed an assessment of the internal audit function (IFAC, 2012a ISA 610 par. A4 – A6). Klein and Ferris (1989:2) explored the extent to which the internal auditors of the largest commercial banks in the United States of America used statistical sampling techniques as a result of the bank's external auditor's influence in favour of the usage of such techniques. They (1989:2) found that 59% of respondents (banks' internal auditors) used statistical sampling techniques as a result of being encouraged in the usage of such techniques by their external auditors. Klein and Ferris (1989:6) further found that 81% of respondents indicated that their bank's external auditors used statistical sampling techniques to conduct the annual financial statement audits. In addition, Swanepoel (2011:79) found that 75% of registered auditors (external auditors) at companies accredited by the Johannesburg Securities Exchange used statistical sampling as their preferred sampling technique. It is evident from these studies that the external auditors make extensive use of statistical sampling techniques, and that they probably do have a strong influence on the internal auditor's chosen sampling technique. On the other hand, the internal audit function's management team could also have a strong influence on the choice between using a statistical or non-statistical sampling technique.

The IIA Research Foundation (2010a:19-20), in their report on the Core Competencies for today's Internal Auditor, found that chief audit executives and internal audit management rated the use of statistical sampling as the least important technical skill required to perform their work. The report further indicated (2010a:18) that internal audit staff at levels below managerial, still rated the use of statistical sampling as one of the top ten skills required to conduct their work. It appears from this IIA research report that the use of statistical sampling techniques by internal audit functions is on the decline, especially if managerial levels of audit staff are no longer regarding the use of statistical sampling as an important skill, necessary to conduct their work. This might also be indicative of a tendency amongst internal audit functions to employ non-statistical sampling techniques as their preferred sampling technique. This low ranking of the use of statistical sampling as a required skill (as indicated by internal audit management), raises concerns regarding the quality of the audit procedures (including the sampling techniques) recorded in the engagement work program, especially as internal audit management has to approve the relevance (appropriateness) of these audit procedures (IIA, 2012a, Standard 2240.A1). The IIA Standard 2340 also requires all engagements to be supervised, in order to ensure that the quality of the audit work conducted achieves the engagement objectives, and additionally to train and develop staff (IIA, 2012a, Standard 2240.A1). Another important factor that could have an effect on the choice of sampling technique is the level of training and experience of internal audit staff.

Some of the main reasons offered by banks' internal auditors for not utilising statistical sampling techniques were a lack of training and experience in, and understanding of the use of statistical sampling techniques (Scott et al., 1983:55; Klein & Ferris, 1989:8). In contrast, Maingot and Quon (2009:233), in their article on the relative frequencies of the use of statistical and non-statistical techniques for sample size planning, sample selection and sample evaluation by internal auditors, found that the presence of staff who have benefitted from more training in statistical techniques does not necessarily result in more frequent use of such techniques. Maingot and Quon (2009:227) further found that respondents with chartered accountant (CA) qualifications tended to use statistical sampling less frequently than respondents with other professional qualifications, such as the certified internal auditor (CIA) and certified management accountant (CMA) designations.

The similarities and differences between statistical and non-statistical sampling techniques should also be considered by the internal auditor as part of making an informed decision as to the most appropriate sampling technique to be selected. Statistical and non-statistical sampling techniques share three common characteristics. Firstly, both sampling techniques require the use of professional judgment (Guy et al., 2002:10; Apostolou, 2004:7; Stuart, 2012:237; American Institute of Certified Public Accountants) (AICPA), 2012:14; Crous et al., 2012:240; IFAC, 2012d ISA 530 par. A9 - A12). Secondly, the audit procedures to be conducted will be similar, irrespective of whether a statistical or non-statistical sampling technique has been employed (Apostolou, 2004:7; AICPA, 2012:14). Lastly, the professional standards permit the use of both statistical and non-statistical sampling techniques (AICPA, 2012; IFAC, 2012d ISA 530; ISACA,

2013b:55). However, there are also material differences between statistical and non-statistical sampling techniques. One of the primary differences is sampling risk. As mentioned in section 1 above, sampling risk is the risk that the sample characteristics are not representative of the population (Guy et al., 2002:9; Apostolou, 2004:13; Aghili, 2011:19; Stuart, 2012:236). Another key difference is the training requirements the auditor needs to have completed, as statistical sampling will require more technical training in the use of statistics, whereas non-statistical sampling requires substantially less (Apostolou, 2004:8; AICPA, 2012:14).

As with any other audit technique, there are advantages and disadvantages to both statistical and non-statistical sampling techniques. Table 1 below provides a summary of the main advantages and disadvantages associated with the use of statistical sampling.

Table 1. Advantages and disadvantages associated with the use of statistical sampling

Advantages	Disadvantages
It allows the sample results to be projected across the audit population	High costs of training in the use of statistical sampling techniques
A greater reliance can be placed on the audit procedures as this reliance is statistically determined	High costs of designing and implementing the statistical sampling technique
The computer can be used to randomly select sample items	Inconsistency in application between members of the audit department can arise due to the complexities of statistical sampling techniques
The selection of sample items is more objective	Time consuming
It is an efficient sampling plan	If not applied correctly the results could be misleading
Sampling risk can be quantitatively measured	
It quantitatively evaluates the sample results	
(De Bruyn, 1981:119; Scott *et al.*, 1983:55; Wilburn, 1984:16; Klein & Ferris, 1989:3; Van Schalkwyk, 2001:16; Guy *et al.*, 2002:15; Moeller, 2009:201; Reding *et al.*, 2009:11-2; Marx *et al.*, 2011:11-12; Crous *et al.*, 2012:240)	(Scott *et al.*, 1983:55; Klein & Ferris, 1989:7; Van Schalkwyk, 2001:17; IIA (UK and Ireland), 2008:1; Reding *et al.*, 2009:11-2; Marx *et al.*, 2011:11-13; Crous *et al.*, 2012:240)

As can be seen from the disadvantages listed in Table 1 above for the use of statistical sampling techniques, it is perceived to be a more costly sampling technique when compared to non-statistical sampling (Scott et al., 1983:55; Klein & Ferris, 1989:7; IIA (UK and Ireland), 2008:1; Crous et al., 2012:240). Nevertheless, Hitzig (2004:30) points out that continuous professional education is a mandatory requirement for all professional auditors, and emphasizes that there should be little reason not to advance one's skills in sampling techniques. He dismisses the fact that the limited use of statistical sampling makes it a more expensive sampling technique when compared to non-statistical sampling, because of the widespread availability of technology to select a sample.

A low usage factor of statistical sampling techniques was also reported by Maingot and Quon (2009) in their article on the use of sampling techniques by internal auditors in companies listed on the Canadian Standard & Poor's Toronto Stock Exchange. Maingot and Quon (2009:224) found that 15% of respondents used statistical sampling techniques to determine sample size, 21% to select

items, and 10% to evaluate results. As mentioned above, it also appears, from the IIA's research report on the Core Competencies for today's internal auditor, that the use of statistical sampling techniques by internal audit functions is on the decline, and is likely to continue to decline, especially if managerial levels of audit teams do not regard competence in such techniques as important, to effectively conduct their work (IIA, 2010a:19-20). Hitzig (2004:35) encourages the use of statistical sampling techniques, and comes to the conclusion that statistical sampling is a tool that must be consciously employed, based on objective, defensible techniques, and that its use should not rely purely on decisions based on professional judgment, as is the case with non-statistical sampling techniques. Maingot and Quon (2009:233) support this view and point out that the auditing standards should highlight the limitations of the use of non-statistical sampling techniques. Furthermore, they suggest that the use of statistical sampling techniques should be encouraged.

Despite the advantages of statistical sampling techniques, Hitzig (1995) identified a trend amongst auditors to use non-statistical sampling techniques

increasingly more often than they use statistical sampling. Messier et al. (2001:91) have also identified a growing use of non-statistical sampling techniques, and point out that auditors are increasingly relying purely on professional judgment, at the expense of statistical theories. Maingot and Quon (2009:233) are of the opinion that non-statistical sampling techniques are used more often than statistical sampling techniques, perhaps due to

an absence of any requirement or emphasis in the auditing standards or recent literature preferring the use of statistical sampling. However, it must be repeated here that the use of non-statistical sampling, if properly applied, can also be advantageous to the internal auditor. Table 2 below provides a summary of the main advantages and disadvantages associated with the use of non-statistical sampling.

Table 2. Advantages and disadvantages associated with the use of non-statistical sampling

Advantages	Disadvantages
Training expenses are lower	Cannot draw valid statistical inferences from the sample results
Simplicity of implementation	Cannot quantitatively measure and express sampling risk
Not always practical to apply randomised selection as a result of the audit objective	If not applied correctly, the results could be misleading
Proposed audit adjustment is based on qualitative analysis	The existence of personal selection bias (such as haphazard sampling)
(Mckee, 1984:27; Van Schalkwyk, 2001:17; Guy *et al.*, 2002:222; Moeller, 2009:203)	(Van Schalkwyk, 2001:16; Maingot & Quon, 2009:233; Moeller, 2009:204; Hall *et al.,* 2012:127; Sawyer, 2012:128)

It is clear from Tables 1 and 2 above that each sampling technique (statistical and non-statistical) comes with its advantages and disadvantages, and as yet there appears to be no consensus (refer to section 1 above) on which sampling technique is superior (Mckee, 1984:30; Colbert, 1990:120; Hitzig, 2004:35; Maingot & Quon 2009:233; Singleton, 2009:13; Applegate, 2010:21; Hall et al., 2012:127). The internal auditor is however, not only confronted with a choice between a statistical or a non-statistical sampling technique. The decision to apply a statistical sampling technique then presents the internal auditor with various statistical sampling plans to choose from, the final choice being guided by the respective audit and test objectives.

4. Results of the Research

4.1. Sampling Technique of Choice

Audit sampling remains an important element of the internal auditor's toolkit and it requires specific skills in order to select informative samples from which the engagement results will be derived. Examining the averages for use of statistical and non-statistical techniques, it appears that overall both techniques are regarded as important for the determination of the sample size and for the selection of the sample. However, for the evaluation of the sample results non-statistical evaluation methods were used much more often than statistical evaluation methods. Figures 2, 3 and 4 below illustrate the respondents' relative use of statistical and non-statistical sampling techniques for determining the sample size (figure 2), the selection of the sample (figure 3), and the evaluation of the sample results (figure 4).

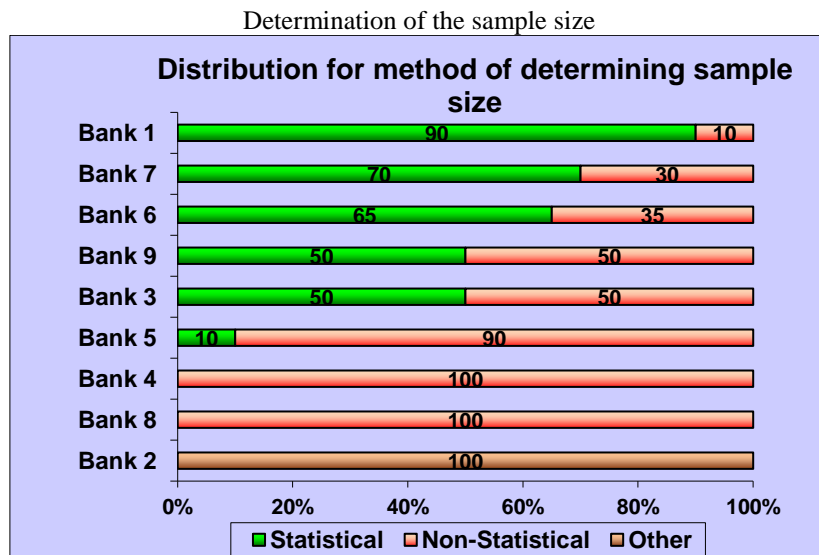Determination of the sample size

Figure 2. Distribution for Method of Determining Sample Size

The empirical research data, as shown in Figure 2 above, illustrates that no definite preference exists for either a statistical or a non-statistical sampling technique as it relates to the determination of the sample size. On average for the nine (9) respondents, statistical sampling techniques for determining the sample size were applied 37.22% of the time, whereas non-statistical techniques were applied 32.78% of the time. "Other" methods of determining the sample size were applied 30% of the time.

Selection of the sample items

Distribution for sample selection methods

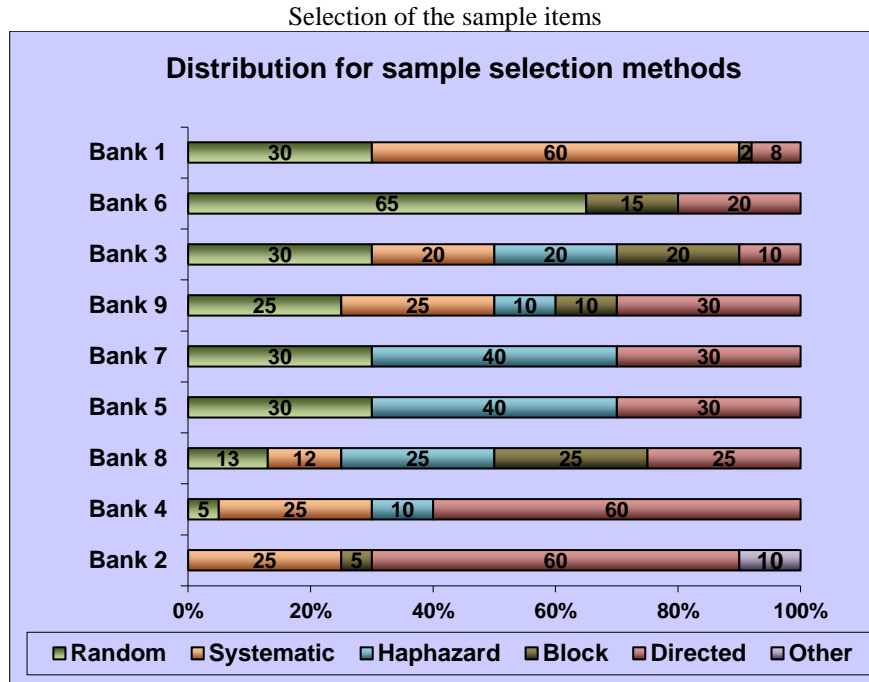| Bank	Random	Systematic	Haphazard	Block	Directed	Other
Bank 1	30	60			2	8
Bank 6	65			15	20	
Bank 3	30	20	20	20	10	
Bank 9	25	25	10	10	30	
Bank 7	30		40		30	
Bank 5	30		40		30	
Bank 8	13	12	25	25	25	
Bank 4	5	25	10		60	
Bank 2		25	5		60	10

Figure 3. Distribution for Sample Selection Methods

As can be seen from Figure 3 above, a marginal difference was identified between the use of statistical and non-statistical sample selection methods. On average, non-statistical sample selection methods were applied 55% of the time, while statistical sample selection methods were applied 43.9% of the time. "Other" methods of sample selection were applied 1.1% of the time.

Evaluation of the sample results

Distribution of the sampling techniques applied for the evaluation of the sample results

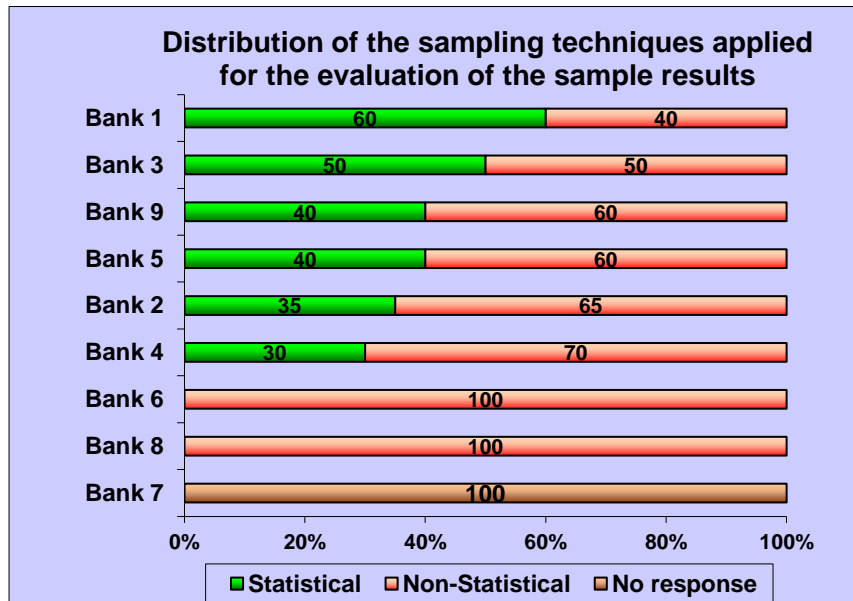| Bank	Statistical	Non-Statistical	No response
Bank 1	60	40	
Bank 3	50	50	
Bank 9	40	60	
Bank 5	40	60	
Bank 2	35	65	
Bank 4	30	70	
Bank 6		100	
Bank 8		100	
Bank 7			100

Figure 4. Distribution of the Sampling Techniques Applied for the Evaluation of the Sample Results

Figure 4 above indicates that non-statistical sampling techniques were significantly more frequently applied than were statistical sampling techniques evaluating the sample results. This result differs considerably when compared to the preferences for determination of the sample size and the selection of the sample items as was indicated above. Non-statistical methods were used for the evaluation of the sample results 60.6% of the time, while the use of statistical methods occurred only 28.3% of the time. All other methods of evaluating the sample results were in total only applied 11.1% of the time.

5. Conclusion

It appears from the above results that audit sampling is still used frequently as an audit evidence-gathering technique in order to test the effectiveness of controls. Both techniques (statistical and/or non-statistical) are regarded as important for the determination of the sample size and the selection of the sample items compared to the evaluation of the sample results where the use of non-statistical sampling techniques were used significantly more than statistical sampling techniques.

It should however be noted that, irrespective of the advantages and/or disadvantages associated with a specific sampling technique (statistical and/or non-statistical), the utilisation of an inappropriate sampling technique can result in significant financial losses to banks and their various stakeholders due to the fact that the audit and/or test objectives might not be achieved. It is therefore important that the heads of the in-house internal auditing departments of the locally controlled banks implement mitigating strategies or techniques in order to ensure that the application of the chosen sampling technique will result in reliable audit opinions.

References:

1. Aghili, S. 2011. Sampling Techniques. The Internal Auditor, December: 19-21.
2. American Institute of Certified Public Accountants (AICPA). 2012. Audit Guide - Audit Sampling. New York: AICPA.
3. Apostolou, B. 2004. Sampling: A Guide for Internal Auditors. Altamonte Springs. Florida. The Institute of Internal Auditors Research Foundation.
4. Applegate, D.A. 2010. Attribute Sampling Plans. The Internal Auditor, 61(4):19-21.
5. Bryman, A. & Bell, E. 2011. Business Research Methods. 3rd ed. New York: Oxford.
6. Colbert, J.L. 2001. Audit sampling. Internal Auditor, 58(1):27-29.
7. Colbert, J.L. 1990. Statistical or Non-Statistical Sampling: Which approach is best? Journal of Applied Business Research, 7(2):117-120.
8. Crous, C., Lamprecht, J., Eilifsen, A., Messier, W., Glover, S. & Douglas, P. 2012. Auditing and Assurance Services. Berkshire: McGraw-Hill.
9. De Bruyn, J.J. 1981. Audit Tests – An Empirical survey of the Sampling Methods used by chartered accounting firms with specific reference to South Africa. Pretoria: UNISA. (DCompt). [Microfiche].
10. Guy, D.M., Carmichael, D.R. & Whittington, O.R. 2002. Practitioner's Guide to Audit Sampling. 5th ed. United States of America: Wiley.
11. Hall, T.W., Hunton, J.E. & Pierce, B.J. 2002. Sampling practices of auditors in public accounting industry and government. Accounting Horizons, 16(2):125-136.
12. Hall, T.W., Higson, A.W., Pierce, B.J., Price, K.H. & Skousen, C.J. 2012. Haphazard Sampling: Selection biases induced by control listing properties and the estimation consequences of these biases. Behavioral Research in Accounting, 24(2):101-132.
13. Hitzig, B.N. 1995. Audit sampling – a survey of current practice. CPA Journal, 65(7):54 (4p). [Online] Available from: EbscoHost: MasterFile Premier: http: http://0-web.ebscohost.com.wagtail.ufs.ac.za/ehost/detail?vid=3&sid=72a42db1-46ee-4a4c-b293-21737ccfbfe3%40sessionmgr11&hid=20&bdata=JnNpdGU9ZWhvc3Qtb Gl2Z Q%3d%3d#db=bth&AN=9507266586 [Accessed 2013-05-08].
14. Hitzig, B.N. 2004. Statistical Sampling Revisited. The CPA Journal, 74(5):30-35.
15. Institute of Directors. 2009. King Report on Governance for South Africa 2009. South Africa. Institute of Directors in Southern Africa.
16. International Federation of Accountants (IFAC). 2012a. International Standard on Auditing 610: Using the Work of Internal Auditors. [Online] Available from: http://www.ifac.org/sites/default/files/downloads/a027-2010-iaasb-handbook-isa-610.pdf [Accessed 24 April 2012].
17. International Federation of Accountants (IFAC). 2012d. International Standard on Auditing 530: Audit Sampling. [Online] Available from: http://www.ifac.org/sites/default/files/downloads/a027-2010-iaasb-handbook-isa-530.pdf[Accessed 2013-01-09].
18. Institute of Internal Auditors. 2010a. Core Competencies for Today's Modern Internal Auditor. [Online] Available from: http://www.theiia.org/bookstore/downloads/freetomembers/1170811_Global%20Internal%20Survey%20Report%20I%20Typeset%206%20PDFX1a2001%20No%20Crops%20Bleeds.pdf [Accessed 2013-02-18].
19. Institute of Internal Auditors. 2012a. International Standards for the Professional Practice of Internal Auditing. [Online] Available from: https://global.theiia.org/standards-guidance/Public%20Documents/IPPF%20Standards%20Markup%20 Changes%202013-01%20vs%202011-01.pdf [Accessed 2012-11-08].
20. Institute of Internal Auditors. 2013b. Practice Advisories. [Online] Available from: https://global.theiia.org/standards-guidance/Member%20Documents/PAs_in_full.pdf [Accessed 2013-05-31].
21. Institute of Internal Auditors (IIA) (UK and Ireland). 2008. Sampling. [Online] Available from: http://www.iia.org.uk [Accessed 2012-11-12].
22. Information Systems Audit and Control Association (ISACA). 2013b. IT Audit and Assurance Standards and Guidelines. [Online] Available from:

http://www.isaca.org/Knowledge-Center/Standards/Documents/ALL-IT-Standards-Guidelines-and-Tools.pdf [Accessed 2013-04-11].

23. KPMG. 2012a. Frontiers in Finance. [Online] Available from: http://www.kpmg.com/ZA/en/IssuesAndInsights/ArticlesPublications/Frontiers-in-Finance/Documents/Frontiers%20in%20Finance%20%28July%202012%29.pdf [Accessed 2013-01-22].

24. Maingot, M. & Quon, K.T. 2009. Sampling Practices of Internal Auditors at Corporations on the Standard & Poor's Toronto Stock Exchange Composite Index. Accounting Practice, 8(3):215-234.

25. Makhubela, S. 2006. Causes of Bank Failure in the Post democratic South Africa: Master thesis: University of KwaZulu-Natal.

26. Marx, B., Van der Watt, A. & Bourne, P. 2011. Dynamic Auditing. 10th ed. South Africa: LexisNexis.

27. Mckee, E.T. 1984. What happened to Judgmental Sampling? The CPA Journal, 54(5):24-30.

28. Messier, W.F., Kachelmeier, S.J. & Jensen, K.L. 2001. An experimental assessment of recent professional developments in non-statistical audit sampling guidance. Auditing: A Journal of Practice and Theory, 20 (1):81-96.

29. Moeller, R. 2009. Brink's Modern Internal Auditing – A Common Body of Knowledge. 7th ed. Canada, John Wiley & Sons.

30. Reding, K.F., Sobel, P.J., Anderson, U.L., Head, M.J., Ramamoorti, S., Salamasick, M. & Ridle, C. 2009. Internal auditing: assurance & consulting services. 2nd ed. United States of America: Institute of Internal Auditors Research Foundation.

31. Rezaee, Z. 2010. The importance of internal audit opinions. The Internal Auditor, 67 (2):47-50.

32. Sawyer, L.B. 2012. Sawyer's guide for internal auditing: Internal Audit Processes and Methods. 6th ed. Altamonte Springs, Florida: Institute of Internal Auditors Research Foundation (IIARF).

33. Sawyer, L.B. & Scheiner, J.H. 1996. Sawyer's Internal Auditing: The practice of modern internal auditing. 4th ed. United States of America: Institute of Internal Auditors.

34. Scott, R., Garrison, J.L. & McCray, J.H. 1983. State of the art in internal auditing in commercial banks. The Internal Auditor, 40(5):53-56.

35. Singleton, T.W. 2009. What Every IT Auditor Should Know About Sampling. ISACA, 1:13-15.

36. Stuart, I.C. 2012. Auditing and Assurance Services – An applied approach. New York: Mcgraw-Hill.

37. Swanepoel, E. 2011. An empirical survey of certain key aspects of the use of statistical sampling by South African registered auditors accredited by the Johannesburg Securities Exchange: Master thesis Stellenbosch: University of Stellenbosch.

38. Van Schalkwyk, J.L. 2001. Estimation of the Total Population Error in Auditing: Master thesis Free State: University of the Free State.

39. Wilburn, A.J. 1984. Practical statistical sampling for auditors. New York: Marcel Dekker, LTD.

ANNEXURE A

The 10 locally controlled banks, in alphabetical order, are:

- African Bank

- Bidvest

- Capitec

- First Rand Bank

- Grindrod

- Investec

- Nedbank

- Sasfin

- Standard Bank

- UBANK.