The Application Of Variable Sampling Method In The Audit Testing Of Insurance Companies’ Premium Income

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Summary:
The aim of this paper is to present the procedure of audit sampling using the variable sampling methods for conducting the tests of income from insurance premiums in insurance company „Takovo“. Since the incomes from the insurance premiums from vehicle insurance and third-party vehicle insurance have the dominant share of the insurance company’s income, the application of this method will be shown in the audit examination of these incomes - incomes from VI and TPVI premiums. For investigating the applicability of these methods in testing the income of other insurance companies, we shall implement the method of variable sampling in the audit testing of the premium income from the three leading insurance companies in Serbia, "Dunav", "DDOR" and "Delta Generali" Insurance.

Key words:
confidence interval, estimated population value, variable sampling, risk of incorrect acceptance, risk of incorrect rejection.

Rezime:
Cilj ovog rada je da prikaže postupak revizorskog uzorkovanja primenom metode varijabilnog uzorka za sprovođenje testiranja prihoda od premije osiguranja u osiguravajućem društvu „Takovo“ osiguranje. Obzirom da dominantno učešće u ostvarenim prihodima osiguravajućeg društva imaju prihodi od premije osiguranja autoodgovornosti i motornih vozila primena navedene metode biće prikazana u revizorskom ispitivanju ovih prihoda – prihoda od premije MV i AO. Radi sagledavanja primenljivosti navedene metode u postupku ispitivanja prihoda u drugim osiguravajućim društvima, implementiraćemo metodu varijabilnog uzorkovanja u postupku revizorskog testiranja prihoda od premije tri vodeća osiguravajuća društva u Srbiji: „Dunav“, „DDOR“ i „Delta generali“ osiguranje.

Ključne reči:
interval preciznosti, ocenjena vrednost populacije, rizik pogrešnog prihvatanja, rizik pogrešnog odbacivanja, varijabilno uzorkovanje.

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1. INTRODUCTION

Substantive tests of balance positions and control testing are auditing techniques used for reducing the overall audit risk to an acceptable level (6/ p. 10). In addition to testing and evaluation of internal control system and the adequacy of accounting coverage of all transaction groups, it is necessary to directly test the amounts of balance position in order to confirm they do not contain material misstatements. Testing is conducted on the basis of selected samples from the population and is known as the sampling of numeric or variable values.

The substantive tests are designed to detect errors and frauds that may exist in financial statements. Thus, sampling plans, which are used for substantive tests, serve to assess the monetary amount of errors in individual general ledger account balance and in balance sheet position. Based on the sample results, the auditors conclude if there is an unacceptably high risk of material errors in the balance. They directly test the final position value in the balance. The implementation of substantive tests leads to the reasonable assurance of validity and appropriateness of the situation or identification of faulty monetary amounts in the account balance. Monetary misstatement can be caused by various factors, but their impact on financial statements is such that they either increase or decrease the actual amount of the position. In the audit of financial statements of small companies many auditors rely almost exclusively on substantive tests of account balances based on variable sampling.

Sampling of variable values for substantive tests of account balance is carried out through the following steps: (13/ p. 326)

- Determining the test objective;
- Defining the population and sampling units;
- Selecting the sampling techniques;
- Determining the sample size;
- Selecting the sample;
- Testing the sampling units;
- Evaluating the sample results, and
- Documenting the sampling procedures.

By performing these steps, we come to the evidence material that indicates whether there is a material misstatement in financial statements and to what extent the reports are reliable. We shall show the application of variable sampling method in audit tests on the example of testing incomes from
insurance premiums. These incomes represent the most important and the most dominant source of income that insurance companies generate. The largest amount of income from premiums in our insurance companies is realized from the vehicle insurance and third-party vehicle insurance, therefore we shall perform sampling for the purposes of their testing by implementing the sampling methods of numerical or variable values. The principal business of insurance companies is to accept the risk of individual policyholders and their dispersion through the establishment of community risk. (8/ p. 151)

2. PLANNING THE SAMPLE

For the successful implementation of direct testing of premium income, it is necessary to perform properly planned sampling. When planning the sample, the following major issues need to be considered:

- The ratio of the sample and relevant audit objectives;
- The amount of monetary misstatement that can be detected in account balance under condition that the financial statements continue to be eligible;
- The risk of incorrect acceptance, and
- Population features (the character of account balance).

Before the beginning of sampling the auditor should determine the objective, i.e. what is it that the auditor wants to test? The objectives that are relevant to the substantive tests of balance are specific audit objectives for account balances, derived from the broad categories of claims: the existence, completeness, rights or obligations, evaluation, presentation, and disclosure. For example, by selecting the entries that make up the account balance and applying the audit procedure, the auditor can detect fictitious entries, incorrectly included amounts in the balance (misclassification), and misevaluation of the items recorded in the account. The objective of testing the incomes from insurance premiums from vehicle insurance and third-party vehicle insurance (VI and TPVI) is to detect the existence of deviations in the amount of booked income and one that should have been recorded by the findings of the auditor. As soon as the objective is formulated, the auditor identifies the feature of interest. For example, if the auditor determined the objective whether the account is actually disclosed, the feature might be designated as a monetary misstatement - this is a monetary difference between the book and audited amount of money.

Tolerable error for the account balance is in fact the significance at the level of the balance. Tolerable error is the maximum amount of misstatement that
may exist in the account balance which, combined with the monetary misstatement in other account balances, will not affect the financial statements to be significantly flawed. It's a level of error that the auditor is willing to accept, and to continue to express an opinion without reservation. Tolerable error is determined at a level that has to be lower than the materiality limit. As the level of tolerable error increases, the required sample size decreases. For the purpose of testing the "Takovo" Insurance premium income we shall set the tolerable error rate of 2% of net profit. The insurance company reported a profit of 58.132 thousand dinars in 2009, so the tolerable error is 1.162.640 dinars.

In the audit process there are two types of risk: uncontrollable risk, where material misstatement appears in financial statements (the combination of control risk and inherent risk), and controllable risk, where material misstatement can remain undetected (detection risk). (11/ p. 290) The risk of incorrect (wrong) rejection of the population (alpha risk) is the risk that the sample supports the conclusion that the recorded balance is materially misstated when it is not materially misstated. This aspect of risk is not crucial when planning the sample as it is associated with the audit efficiency. Wrong rejection of the sampling results may lead auditors to require correction of client’s financial statements, or to increase the sample size in order to obtain additional evidence. The risk of incorrect (wrong) acceptance of the population (beta risk) is the probability that the sampling results indicate that the population is not materially misstated when it is materially misstated. In planning the sampling for the substantive testing of account balance, the risk of incorrect acceptance is the risk of non-disclosure for the test (detection risk at the account balance level). The auditor evaluates inherent risk and control risk, and establishes the risk of non-disclosure at the appropriate level that retains the audit risk of account balance at a relatively low level. If the auditor concludes that the probability of misstatement in account balance is low, the risk of non-disclosure for substantive balance test based on the sample will be relatively high. With the increase in the acceptable risk of incorrect acceptance required sample size decreases, which depends on the degree to which the auditor intends to rely on the sample results. When the auditor in a particular audit places emphasis on the substantive testing of account balance, due to the inability to rely on the internal control system, and if the particular test in substantive testing is extremely important when performing a final conclusion about the nature of the financial statements the auditor shall assess the risk of incorrect acceptance at a lower level, which implies larger sample. The risk of incorrect rejection is estimated at 0.10. In assessing the risk of incorrect acceptance we shall be more rigorous and accept the level of 0.05.

The auditor should determine the unit of population and sample as well as the population from which the sample units would be selected. An interesting feature is the monetary misstatement in the bookkeeping coverage of premium income. The population features that are relevant for the substantive testing of account balance are the expected error, deviation,
and population size whose growth affects the increase of the required sample. The sample consists of the selected population units being tested. In this sampling the population consists of all policies of the insurance company “Takovo”, of groups 03 and 10 issued in 2009. Sampling unit is the individual policy of VI and TPVI. Number of policies issued in both insurance groups and their book values are given in the following table:

Table no. 1: Premium incomes from vehicle insurance and third-party vehicle insurance (in 000 dinars)

<table>
<thead>
<tr>
<th></th>
<th>Invoiced premium</th>
<th>Outward reinsurance premium</th>
<th>Increase in unearned premiums</th>
<th>Premium income</th>
<th>Number of policies issued</th>
<th>Average value of policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Third party vehicle insurance</td>
<td>1.720.889</td>
<td>(31.832)</td>
<td>(27.629)</td>
<td>1.661.428</td>
<td>192.956</td>
<td>8.916</td>
</tr>
<tr>
<td>Vehicle insurance</td>
<td>221.605</td>
<td>-</td>
<td>(26.164)</td>
<td>195.441</td>
<td>4.365</td>
<td>50.769</td>
</tr>
<tr>
<td>Total</td>
<td>1.942.494</td>
<td>(31.832)</td>
<td>(53.793)</td>
<td>1.856.869</td>
<td>197.321</td>
<td></td>
</tr>
</tbody>
</table>

Source: (1)

3. SAMPLE SELECTION

Sampling in auditing is not used in the implementation of all substantive tests, but only for those tests for which the auditor believes the sample use is suitable. For example, in the performance of audit tests and observations, auditors prefer not to use sampling, but interviews with managers and monitoring of the property handling procedures, as well as the performing of analytical procedures (comparing account balances in financial statements of the current period with the balances from previous periods). Deviation estimation and ratio estimation are two similar techniques of classical variables sampling. Deviation estimation focuses on the monetary difference between the audited value and book value of the sampling units, while the ratio estimation focuses on the relationship of ratios between the audited and book values of the sampling units. The strategy of projecting the amount of monetary misstatements in the population is applied in deviation estimation, based on the misstatements reported in the sample, which represents the estimated audited value for the population. In estimating deviation, the auditor summarizes all the difference between the book, audited value, and the audited sample, which represents the net difference of the sample. Dividing the net difference of the sample by the sample size and multiplying the result by the population size leads to a projected monetary misstatement of the population, which serves the auditor in concluding whether the population is materially misstated or not.
In determining the number of units which comprise the sample (sample size) in variables sampling, the auditor considers the following factors: (11/ p. 294)

- Population variability;
- Acceptable risk of incorrect rejection;
- The risk of incorrect acceptance, and
- Tolerable error.

Auditors demand the examination of population variability, as the sample size varies in direct proportion as the variability in amounts in the population. For example, if the population variability is increasing, greater sample size is necessary. In sampling the variable variables (example based on the method of deviation evaluation), the population variability usually approximately corresponds to the standard deviation of the population calculated for the whole population or approximately, on the basis of a pilot sample. The inclusion of the standard deviation in determining the sample size provides the deviation from the expected value to be compensated by a larger sample which should result in a satisfactory conclusion. The remaining factors have already been explained in the previous section. We shall perform the sample selection of the insurance premiums from VI and TPVI in "Takovo" insurance company.

We shall evaluate the population variability by calculating the standard deviation of the population based on a pilot sample of insurance policies. The pilot sample will be selected by applying the percentage of 0.04% to the number of population units (the total number of policies issued, given in the previous table):

- \(0.04\% \times \frac{197.321}{100} = 78.92\)
- Therefore we shall choose 79 insurance policies in the pilot sample

We shall choose the pilot sample units using a table of random numbers and with the application of random numbers to insurance policies we shall determine which policies comprise the pilot sample. We shall conduct the auditing test of the sample units – selected policies, in accordance with the defined audit objectives and disclosure of the existence of monetary deviation of book and audited values determined on the basis of supporting documents. Standard deviation of the sample (12/ p. 73), on the basis of testing the pilot sample, is:

\[
S = \sqrt{\frac{\sum_{i=1}^{n}(d_i - \bar{d}_i)^2}{n-1}} \quad \text{and} \quad (1)
\]
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Where

\[ S = \sqrt{\frac{(216)^2}{78}} = 24.48 \]  \hspace{1cm} (2)

Where

\( S \) = estimated standard deviation of the population

\( d \) = the difference between the audited values (ai) and book value (bi) of i unit

\( n \) = sample size

\( \bar{d} \) = average difference between the audited value and book value for all pilot sample units.

Sample size calculation also requires the auditor to specify acceptable risk of incorrect rejection, the risk of incorrect acceptance, and tolerable error. In the previous phase of sample planning we chose a certain level of these risks (the risk of incorrect rejection = 0.10 and risk of incorrect acceptance = 0.05), and we evaluated the tolerable error (1.162,640 dinars). The desired sampling precision is defined by calculating the preliminary sampling risk limit using the following formula:

\[ A = R \times TE \]  \hspace{1cm} (3)

Where:

\( A \) = Preliminary sampling risk limit;

\( R \) = Limit rate of the sampling risk (ratio of the sampling risk limit and tolerable error)

\( TE \) = Tolerable error.

Limit rate of the sampling risk is calculated in table 2.

Based on these parameters we shall set the preliminary limit of the variable sampling risk of policy premium.

\[ \begin{align*}
A &= R \times TE \\
A &= 0.5 \times 1.162,640 \\
A &= 581,320 \text{ dinars}
\end{align*} \]  \hspace{1cm} (4)

Audit sample size is obtained using the following formula: (see / 4 / p 94.)

\[ n = \left( \frac{S \times U \times N}{A} \right)^2 \]  \hspace{1cm} (5)

Where:

\( S \) = Assumed standard deviation of the population;

\( U \) = Standard normal deviation for the risk of incorrect rejection;
N = Population size;  
A = Preliminary sampling risk limit, and  
n = Sample size.

### Table no. 2: Limit rate of the sampling risk

<table>
<thead>
<tr>
<th>Risk of incorrect acceptance</th>
<th>Risk of incorrect rejection</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01</td>
<td>0.355 0.413 0.457 0.525</td>
</tr>
<tr>
<td>0.025</td>
<td>0.395 0.456 0.5 0.568</td>
</tr>
<tr>
<td>0.05</td>
<td>0.437 0.5 0.543 0.609</td>
</tr>
<tr>
<td>0.075</td>
<td>0.471 0.532 0.576 0.641</td>
</tr>
<tr>
<td>0.1</td>
<td>0.5 0.561 0.605 0.668</td>
</tr>
<tr>
<td>0.15</td>
<td>0.511 0.612 0.653 0.712</td>
</tr>
<tr>
<td>0.2</td>
<td>0.603 0.661 0.7 0.753</td>
</tr>
<tr>
<td>0.25</td>
<td>0.653 0.708 0.742 0.791</td>
</tr>
<tr>
<td>0.3</td>
<td>0.707 0.756 0.787 0.829</td>
</tr>
<tr>
<td>0.35</td>
<td>0.766 0.808 0.834 0.868</td>
</tr>
<tr>
<td>0.4</td>
<td>0.831 0.863 0.883 0.908</td>
</tr>
<tr>
<td>0.45</td>
<td>0.907 0.926 0.937 0.952</td>
</tr>
<tr>
<td>0.5</td>
<td>1 1 1 1</td>
</tr>
</tbody>
</table>

Source: (3, p. 598)

The standard normal deviation for the desired risk of incorrect rejection (U) is determined with the help of table no. 3.

We have assumed the risk of incorrect rejection of 0.10 and it follows that the standard normal deviation for the risk of incorrect rejection is 1.65. The levels of risk in the above table range from 0.01 to 0.30, which is the risk level range accepted in practice by most of the auditors. If the risk of incorrect rejection increases, e.g. from 0.01 to 0.05 the standard normal deviation declines (from 2.8 to 1.96), and since U is the numerator in the formula for the sample size, the sample size will also decline.
Table no. 3. Standard normal deviation for the desired risk level

<table>
<thead>
<tr>
<th>Risk of incorrect rejection</th>
<th>U, Standard normal deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01</td>
<td>2.58</td>
</tr>
<tr>
<td>0.05</td>
<td>1.96</td>
</tr>
<tr>
<td>0.10</td>
<td>1.65</td>
</tr>
<tr>
<td>0.15</td>
<td>1.44</td>
</tr>
<tr>
<td>0.20</td>
<td>1.28</td>
</tr>
<tr>
<td>0.25</td>
<td>1.15</td>
</tr>
<tr>
<td>0.30</td>
<td>1.04</td>
</tr>
</tbody>
</table>

Source: (14)

Based on these assumptions the sample size required for the testing of the premium income will be:

\[
 n = \left( \frac{24.48 \times 1.65 \times 197.321}{581.320} \right)^2 \approx 188
\]

(6)

In auditing incomes from insurance premiums of vehicle insurance and third-party vehicle insurance it is necessary to select 188 units of the population (insurance policies) which will be tested by applying the appropriate audit procedures. Sample units will be chosen by the method of random selection.

Proportional to the number of policies issued by certain insurance groups we shall perform their selection, i.e. we shall select 183 VI policies and 5 TPVI policies. We test the selected insurance policies: the existence of supporting documentation, evaluation accuracy of the invoiced amount, the delineation of income according to the type of insurance, calculation of the unearned premium in accordance with the duration of insurance, the application of the tariff system according to the risk degree, and the like. The auditor determines the audited value for each policy and compares it with its book value. If there is inequality between the book and audited value, we can notice the deviation which is recorded as the difference between the book value – the value entered in the books, and the audited value – the value that should have been entered in the books.
4. SAMPLE RESULT EVALUATION

After selecting the sample, the auditor applies audit procedures on each selected unit, summarizes and evaluates the sample results. Auditors use the sample results to project detected monetary misstatements on the population as a whole, by generalizing the sample results. However, the projected misstatement can incorrectly represent the true monetary misstatement in the population, requiring from the auditor to reconsider the sampling risk. By testing the selected insurance policies in the sample, we came to the findings that are presented in the following table:

Table no. 4: Sampling data for the incomes from insurance premiums from VI and TPVI

<table>
<thead>
<tr>
<th>Sample units</th>
<th>Policy book value (bi)</th>
<th>Audited value (ai)</th>
<th>Difference (di=ai-bi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7.300</td>
<td>7300</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>6.250</td>
<td>6.250</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>8.800</td>
<td>8.720</td>
<td>-80</td>
</tr>
<tr>
<td>4</td>
<td>9.350</td>
<td>9.350</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>8.900</td>
<td>8.900</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>8.887</td>
<td>8.887</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>7.995</td>
<td>7.895</td>
<td>-100</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>SUM FOR 183 POLICIES</td>
<td>1.631.628</td>
<td>1.631.238</td>
<td>-390</td>
</tr>
<tr>
<td>1</td>
<td>50.300</td>
<td>50.300</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>44.850</td>
<td>44.660</td>
<td>-190</td>
</tr>
<tr>
<td>3</td>
<td>51.930</td>
<td>51.930</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>48.688</td>
<td>48.347</td>
<td>-341</td>
</tr>
<tr>
<td>5</td>
<td>54.804</td>
<td>54.804</td>
<td>0</td>
</tr>
<tr>
<td>SUM FOR 5 POLICIES</td>
<td>250.572</td>
<td>250.041</td>
<td>-531</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1.882.200</td>
<td>1.881.279</td>
<td>-921</td>
</tr>
</tbody>
</table>

As can be seen from the table above, the total book value for 188 policies is 1.882.200 dinars, the total audited value is 1.881.279 dinars, from which we can conclude that there is the net difference overstatement of 921 dinars. The difference in the amount of premium to policyholders was created by applying higher insurance tariffs to certain policyholders than those insurance tariffs which, according to the degree of risk, are appropriate. In
order to assess the population, the auditor shall first project detected misstatements in the sample to the population from which the sample was selected. Total projected difference for the population value \( (D) \) is calculated based on the following formula (3/ p. 600):

\[
D = N \ast \bar{d}
\]  

(7)

where:

\( N \) = population size; \( \bar{d} \) = average deviation calculated by dividing the sum of deviations by sample size.

The average deviation in this example is 4.9 dinars \((921/188)\), and population size \((N)\) is 197.321 policies. Thus, the total projected monetary difference is:

\[
D = 197.321 \ast 4.9 = 966.873 \text{ dinars}
\]

Based on projected monetary difference for the population and the book value of the account balance \((B)\), the auditor performs the estimation of the population value \((X)\) as follows:

\[
X = D + B
\]  

(8)

The estimated population value was calculated by adding the total projected difference for the population to the book value of income:

\[
X = 966.873 + 1,856,869.000
\]

\[
X = 1,857,835.872
\]

The estimated population value should be found in the confidence interval, so that the population would be accepted as true. To determine the accuracy interval it is necessary to determine the actual limit of audit risk, by calculating the standard deviation of the sample through the formula previously used to calculate the standard deviation of the pilot sample. The actual limit of the audit risk will be (4/ p. 107):

\[
A' = \left( \frac{S \ast U \ast N}{\sqrt{n}} \right)
\]  

(9)

\[
A' = \left( \frac{23 \ast 1.65 \ast 197.321}{\sqrt{188}} \right) = 547.793,12
\]

Based on previous data we obtain the confidence interval:

Confidence interval (3/ p. 332):

\[
= X \pm A'
\]  

(10)
Sample results lead us to the following conclusion:

Based on the procedures applied, the assessed income value is 1,857,835,872 dinars and there is a 95% probability (1 - risk of incorrect acceptance) that it is true but unknown value of income value from the insurance premiums from VI and TPVI included in the confidence interval, 1,857,288,078 to 1,858,383,665 dinars. Conversely, there is a 5% risk that plausible but unknown population value falls outside the confidence interval.

The estimated value of the population is in the range of confidence interval; however, the book value of the population is not in the confidence interval. What conclusion will the auditor perform if the account balance falls outside the confidence interval?

If the book value of income falls outside the confidence interval, incomes can still be accepted as truly emphasized, if the following conditions are met:

- Tolerable error is greater than the difference between the book value of account balances and lower limits of the confidence interval, and
- Actual risk limit of the sampling (A') is lower than the limit of the preliminary level of the sampling risk (A).

Tolerable error is 1,162,640 dinars, the book value of income is 1,856,869,000 dinars, and the lower limit of confidence interval is 1,857,288,078 dinars. The difference between the book value of income and lower limit of confidence interval is 419,078 dinars, which is much less than the tolerable error. The book value of the premium income in this case is acceptable as a really emphasized, given that the amount of error that the auditor is willing to tolerate exceeds the maximum probable error in the population.

The actual limit of the sampling risk (A') is 547,793,12 dinars and it is lower than the preliminary limit of the sampling risk (A) of 581,320 dinars. The confidence interval is smaller, so there is less chance of accepting the materially misstated account balance. Given that the estimated value of the income would be in this smaller scale of confidence interval, we believe that the book value of reported incomes can be taken as true and the detected misstatement can be considered immaterial. The following figure shows the results obtained and their interrelationship.

We can see in the fig. above that the difference between book amount of premium income from VI and TPVI (1,856,869,000 dinars) and lower limit of confidence interval (in this case 1,857,288,078 dinars) is 419,078 dinars and it is smaller than the tolerable error (1,162,640 dinars). Therefore, the book value of the account balance is acceptable as truly emphasized,
considering that the amount of error that the auditor is willing to tolerate (tolerable error) exceeds the maximum probable error in the population.

However, if tolerable error does not exceed the maximum probable error, the auditor can: 1) increase the size of the sample and re-evaluate all of the sampling units, 2) require the client to re-evaluate the population – income, or 3) propose an audit income adjustment. When the actual limit of the sampling risk (A') is greater than the preliminary limit of the sampling risk (A), the risk of incorrect acceptance is greater, since the confidence interval (X ± A') is greater than X ± A. Thus, for the greater X ± A' there is a greater chance of accepting the materially misstated amount of income. In this case, the auditor may propose one of the above three options.

In variable sampling, auditors do not only consider the amount of misstatements. Qualitative characteristics of the misstatements, such as their nature, cause, and interconnection effect the formation of a global conclusion about the nature of financial statements. For example, in analyzing the nature and cause of misstatements, the auditor considers whether they are the result of deliberate action (fraud), and if this is the case he requires special and thorough investigation, or the result of negligence and lack of understanding. In forming general conclusions based on the sampling plan, we consider both qualitative and quantitative information. Sometimes, the results of the sample suggest that auditor’s assumptions in planning the sampling were wrong. For example, if the number of misstatements detected in the substantive tests exceeds the
number of expected misstatements based on the assumed effectiveness of internal controls, the auditor will reconsider the control risk and judge whether or not to modify the tests for the relational calculus. In order to make a conclusion about the truth of reported incomes from premiums it would be useful to use analytical indicators to examine the general acceptability and logic of the reported amount. Premium amount reported in the previous year and premium trends in the insurance can serve us as a benchmark. Comparing the amount of income from insurance premiums in relation to the previous year for all types of insurances we get the index of their movement:

Table no. 5: Income from insurance premium from "Takovo" insurance company (in 000 dinars)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculated premium</td>
<td>1.769.587</td>
<td>2.108.826</td>
<td>119.17</td>
</tr>
<tr>
<td></td>
<td>invoiced premium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outward reinsurance</td>
<td>(21.358)</td>
<td>(31.841)</td>
<td>149.08</td>
</tr>
<tr>
<td>premium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in unearned</td>
<td>(248.888)</td>
<td>(84.338)</td>
<td>33.89</td>
</tr>
<tr>
<td>premiums</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (income from</td>
<td>1.499.341</td>
<td>1.992.647</td>
<td>132.90</td>
</tr>
<tr>
<td>insurance premiums)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: (5)

The company reported an income growth of insurance premiums of 32.9% compared to the previous year.

Income trend from insurance premiums in the insurance sector concerning the previous period is shown in the graph below. Auditors consider audit findings, obtained in tests, in the context of the situation that exists in client’s business. We can see that there is a continuous increase in premiums and last year the increase was 2.6%. Given that significantly higher income growth than is typical of the insurance sector was reported to an audit client in the insurance company, the obtained audit findings and conclusions on the character of income should be approached with special professional skepticism. Since we estimated the tolerable error by implementing the most rigorous criteria (2% of net profit rather than 5%, which is more common practice), and considering that the maximum possible misstatement in the population income is significantly lower than the tolerable error, the incomes from insurance premiums of VI and TPVI can be accepted as truthfully reported. Observed deviation in the income record should be taken into consideration when assessing the cumulative amount of misstatement at the level of financial statements.
Therefore, based on the evidence obtained in the audit tests and analyses of the incomes, access to documentation and records, the reported value of income can be regarded as acceptable in terms of the audit.

5. THE APPLICATION OF VARIABLE SAMPLING IN THE LARGEST INSURANCE COMPANIES

Insurance is a global sector of extreme importance in developing countries. In 2009 the total global premium amounted to 4066 billion dollars. (9/ p. 296) In the Serbian insurance market in 2009, a total of 26 insurance companies operated. A total insurance premium in the amount of 53,534,644 thousand dinars was achieved. Insurance companies that have achieved the most incomes from insurance premiums are shown in the table below. Takovo, according to the type of premium, is in the sixth place with a market share of 3.94%.

According to the incomes from insurance premiums the insurance company "Dunav" has the major market share, which in the total premium of the insurance sector has a share of 27.42%. The second company according to the market share is "DDOR" Novi Sad, with a market share of 20.86%, and in the third place on the Serbian market is the company "Delta Generali" with the share of 17.52%. The first three insurance companies have implemented 65.8% of the total premium of the insurance sector. In 2009 the insurance company "Dunav" alone had the premium income as all other insurance companies in Serbia together, excluding besides the first three
leading insurance companies the fourth insurance company "Wiener Stadtische" according to the premiums achieved.

Table no. 6: Income from insurance premiums of the first six insurance companies (in 000 dinars)

<table>
<thead>
<tr>
<th>INSURANCE COMPANY</th>
<th>Premium incomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>„DUNAV“ insurance</td>
<td>14,678,007</td>
</tr>
<tr>
<td>„DDOR“ insurance</td>
<td>11,169,736</td>
</tr>
<tr>
<td>„DELTA GENERALI“ insurance</td>
<td>9,380,260</td>
</tr>
<tr>
<td>„WIENER STADTISCHE“ insurance</td>
<td>4,497,172</td>
</tr>
<tr>
<td>„UNIQA“ Non-life insurance</td>
<td>2,319,315</td>
</tr>
<tr>
<td>„TAKOVO“ insurance</td>
<td>2,108,826</td>
</tr>
<tr>
<td>TOTAL SECTOR PREMIUM</td>
<td>53,534,644</td>
</tr>
</tbody>
</table>

Source: (7)

We shall apply the method of variable sampling in the audit testing of premium income in the three largest insurance companies in Serbia. In order to implement the substantive test of the truth of recorded premium income it is necessary to define the test objective, to define the population, sample units, and sampling techniques. Based on the auditor's beliefs about the quality of internal control system the input parameters will be determined, which are required for defining the optimal sample size which will be the subject of audit testing. The objective of testing the premium income is the assurance in the absence of deviant phenomena, i.e. deviations between the book value and the audited value of the income. Premium incomes from vehicle insurance and third-party vehicle insurance, achieved in 2009 in the leading insurance companies are given in the table below.

Table no. 7: Income from insurance premiums from VI and TPVI of the three largest insurance companies in Serbia (income in 000 dinars)

<table>
<thead>
<tr>
<th>Insurance company</th>
<th>Incomes 03-MV</th>
<th>Number of policies issued VI</th>
<th>Average value of the policy VI</th>
<th>Incomes from 10-TPVI</th>
<th>Number of policies issued TPVI</th>
<th>Average value of the policy TPVI</th>
</tr>
</thead>
<tbody>
<tr>
<td>„DUNAV“ insurance</td>
<td>2,094,575</td>
<td>40,723</td>
<td>51,435</td>
<td>4,468,957</td>
<td>503,828</td>
<td>8,870</td>
</tr>
<tr>
<td>„DDOR“ insurance</td>
<td>1,882,843</td>
<td>38,099</td>
<td>49,420</td>
<td>3,318,662</td>
<td>362,299</td>
<td>9,160</td>
</tr>
<tr>
<td>„DELTA GENERALI“ insurance</td>
<td>1,032,676</td>
<td>19,703</td>
<td>52,412</td>
<td>2,867,909</td>
<td>296,149</td>
<td>9,684</td>
</tr>
</tbody>
</table>

Source: (10)
After defining the objective of the test, population, and sample units – insurance policies, the auditor must decide what amount of misstatement in the book value can be accepted provided that the population is considered to be true. Tolerable error can be determined at the level of 2% of company’s net profit. The tolerable error level of the leading insurance companies, on the basis of business results, is shown in the following table.

Table no. 8: Net profit of the three largest insurance companies in Serbia and tolerable error level (in 000 dinars)

<table>
<thead>
<tr>
<th>No.</th>
<th>Company name</th>
<th>Net profit</th>
<th>Tolerable error</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>„DUNAV“ insurance</td>
<td>146,600</td>
<td>2,932</td>
</tr>
<tr>
<td>2</td>
<td>„DDOR“ insurance</td>
<td>260,663</td>
<td>5,213</td>
</tr>
<tr>
<td>3</td>
<td>„DELTA generali“ insurance</td>
<td>121,449</td>
<td>2,428</td>
</tr>
</tbody>
</table>

Source: (2)

In accordance with the size and market share in the premium realized, the three most successful insurance companies in Serbia achieved significantly higher net profit than the insurance company "Takovo". Since the tolerable error amount is determined in relation to the result achieved, the error level that we will tolerate in the audit of premium income in these companies is significantly higher than the tolerable error level in the "Takovo" insurance. In order to compare the testing of the three largest companies and "Takovo" insurance, we shall evaluate the risk of incorrect rejection and incorrect acceptance of the population at the same level: 0.1 for the risk of incorrect rejection and 0.05 for the risk of incorrect acceptance.

To carry out sample selection and conduct an audit testing we must determine the size of the sample. First, we determine the variability of the population by calculating the standard deviation of the population based on the testing of insurance policy sample pilot. The number of policies that make up the pilot sample is different in the three insurance companies. As shown in the table. No. 7., "Dunav" Insurance records the most insurances, 544 551 insurance policies of VI and TPVI. Using the criteria of 0.04% on the number of population units we obtain the pilot sample size. In the case of "Dunav" insurance, 16 policies of VI and 201 of TPVI make up the pilot sample. In a similar way we determine the pilot sample in two other insurance companies: "DDOR" insurance, 15 policies of VI and 145 of TPVI (400 398 policies 0.04% of the population), and "DELTA generali" insurance 8 policies of VI and 119 of TPVI (315 852 policies 0.04% of the population). We choose the policies that make a pilot sample using a table of random numbers, and the population scope consists of the numbering of the first policy issued and the number of the last policy issued in the year for which we are testing the premium income of VI and TPVI. For all selected units of pilot sample the auditor examines the existence of differences between the book value of premium income and audited value, i.e. the values that should have been entered in the books. All deviant phenomena are
reported separately for each testing unit and are used to calculate the standard deviation of the sample. By testing the pilot sample units in the three leading insurance companies, we came to the standard deviation of the sample:

- „DUNAV“ insurance
  \[ S = \sqrt{\frac{(623)^2}{216}} = 42.39 \]  
  \[ (11) \]

- „DDOR“ insurance
  \[ S = \sqrt{\frac{(434)^2}{159}} = 34.42 \]  
  \[ (12) \]

- „DELTA generali“ insurance
  \[ S = \sqrt{\frac{(361)^2}{126}} = 32.16 \]  
  \[ (13) \]

Preliminary sampling risk limit determines the sample size, and it is determined as the product of sampling risk limit and tolerable error. The sampling risk limit for the risk of incorrect rejection of 0.1 and incorrect acceptance of 0.05 (table no. 2.) is 0.5. Tolerable error for the three leading companies was determined as given in table. no. 7., therefore by applying the above parameters we shall have a preliminary sampling risk limit as given in the following table:

<table>
<thead>
<tr>
<th>No.</th>
<th>Company name</th>
<th>Net profit</th>
<th>S</th>
<th>Tolerable error TE</th>
<th>Risk limit rate (R)</th>
<th>A = (TE*R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>„DUNAV“ insurance</td>
<td>146,600</td>
<td>42.39</td>
<td>2,932,000</td>
<td>0.5</td>
<td>1,466,000</td>
</tr>
<tr>
<td>2</td>
<td>„DDOR“ insurance</td>
<td>260,663</td>
<td>34.42</td>
<td>5,213,260</td>
<td>0.5</td>
<td>2,606,630</td>
</tr>
<tr>
<td>3</td>
<td>„DELTA GENERALI“ insurance</td>
<td>121,449</td>
<td>32.16</td>
<td>2,428,980</td>
<td>0.5</td>
<td>1,214,490</td>
</tr>
</tbody>
</table>

Sample size in the variable sampling is determined using the following formula:

\[ n = \left( \frac{S * U * N}{A} \right)^2 \]  
\[ (14) \]
The standard normal deviation for the selected level of the risk of incorrect rejection of 0.1 is 1.65 (table no. 3.). Now, we have all the information necessary to define the variable sample size for testing the reality of premium income of VI and TPVI of the three largest insurance companies in Serbia.

- „DUNAV“ insurance:
  \[ n = \frac{(42.39 \times 1.65 \times 544551)^2}{2932000} \approx 675 \]  
  (15)

- „DDOR“ insurance:
  \[ n = \frac{(34.42 \times 1.65 \times 400398)^2}{5213260} \approx 76 \]  
  (16)

- „DELTA generali“ insurance:
  \[ n = \frac{(32.16 \times 1.65 \times 315852)^2}{2428980} \approx 191 \]  
  (17)

The auditor shall select and test 675 insurance policies in "Dunav" insurance, 76 policies in "DDOR" insurance, and 191 in "Delta Generali" insurance, in order to conclude whether the premium incomes from VI and TPVI are fairly and objectively expressed in these insurance companies. The selection of individual policies that make up the sample must be made randomly in order to achieve a representative sample in relation to the population. The most commonly used is the table of random numbers, and random numbers indicate the number of policy that will be selected. Sampling units are tested and deviations between the book and the audited value are recorded. The sum of all deviations recorded serves auditor in further analysis of the acceptance of the population as truthfully reported in the financial statements.

If deviations between the book and audited value for the policies selected for the sample are detected, in testing the reality of bookkeeping coverage of the premium incomes, the auditor will start calculating the estimated value of the premium income population. Estimated value of the income from insurance premiums from VI and TPVI are presented in the following table.
### Table no. 10: Estimated value of premium income from VI and TPVI in the leading insurance companies

<table>
<thead>
<tr>
<th>Company name</th>
<th>Book value of the sample</th>
<th>Audited value of the sample</th>
<th>Deviation</th>
<th>Number of units in the sample</th>
<th>Average sample deviation</th>
<th>Overall projected monetary difference</th>
<th>Book value of the population</th>
<th>Estimated value of the population</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;DUNAV&quot;</td>
<td>8,115,500,000</td>
<td>8,115,500,050</td>
<td>4</td>
<td>3</td>
<td>(3-2)</td>
<td></td>
<td>8</td>
<td>6,563,572.3</td>
</tr>
<tr>
<td>&quot;DDOR&quot;</td>
<td>2,362,380,000</td>
<td>2,362,379,982</td>
<td>12</td>
<td>191</td>
<td>-0.09</td>
<td>-29,766.16</td>
<td>5,201,505.0</td>
<td>5,201,568.2</td>
</tr>
<tr>
<td>&quot;DELTA generali&quot;</td>
<td>2,362,379,982</td>
<td>2,362,379,982</td>
<td>(18)</td>
<td>191</td>
<td>-0.09</td>
<td>-29,766.16</td>
<td>3,900,585.0</td>
<td>3,900,555.2</td>
</tr>
</tbody>
</table>

The estimated value of the population premium income from VI and TPVI should be within the confidence interval so that the population would be accepted as true by the auditors. To calculate the confidence interval it is necessary to determine the actual limit of audit risk for the sampled units. The lower and upper limits of the confidence interval are obtained by adding and subtracting the actual sampling risk limit to or from the estimated population value. The actual limit of audit risk in the three insurance companies is as follows:

\[
A' = \left( \frac{43.76 \times 1.65 \times 544551}{\sqrt{675}} \right) = 1,513,424
\]  

(18)
Confidence interval and estimated value of the premium income population from VI and TPVI for the three leading insurance companies are given in the following table.

<table>
<thead>
<tr>
<th>Company name</th>
<th>Estimated value of the population X</th>
<th>Actual limit of the audit risk A'</th>
<th>Lower limit X-A'</th>
<th>Upper limit X+A'</th>
</tr>
</thead>
<tbody>
<tr>
<td>„DUNAV“ insurance</td>
<td>6,563,572,337</td>
<td>1,513,424</td>
<td>6,562,058,913</td>
<td>6,565,085,761</td>
</tr>
<tr>
<td>„DDOR“ insurance</td>
<td>5,201,568,221</td>
<td>2,209,521</td>
<td>5,199,358,700</td>
<td>5,203,777,742</td>
</tr>
<tr>
<td>„DELTA generali“</td>
<td>3,900,555,234</td>
<td>1,162,230</td>
<td>3,899,393,004</td>
<td>3,901,717,464</td>
</tr>
</tbody>
</table>

On the basis of the variable sampling and the results given in the above table we can draw the following conclusions:

Based on the procedures applied in “Dunav” insurance, the estimated income value is 6,563,572,337 dinars and there is a 95% probability (1 - risk of incorrect acceptance) that it is true but unknown income value from insurance premiums from VI and TPVI included in the confidence interval from 6,562,058,913 to 6,565,085,761 dinars. Conversely, there is a 5% risk that plausible but unknown population value falls outside the confidence interval.

Based on the procedures applied in “DDOR” insurance, the estimated income value is 5,201,568,221 dinars and there is a 95% probability (1 - risk of incorrect acceptance) that it is true but unknown income value from insurance premiums from VI and TPVI included in the confidence interval from 5,199,358,700 to 5,203,777,742 to dinars. Conversely, there is a 5% risk that plausible but unknown population value falls outside the confidence interval.

Based on the procedures applied in “Delta Generali” insurance, the estimated income value is 3,900,555,234 dinars and there is a 95%
probability (1 - risk of incorrect acceptance) that it is true but unknown income value from insurance premiums from VI and TPVI included in the confidence interval from 3,899,393,004 to 3,901,717,464 dinars. Conversely, there is a 5% risk that plausible but unknown population value falls outside the confidence interval.

On the basis of the sampling and auditor's testing, incomes from insurance premiums from VI and TPVI in the three leading insurance companies in the Republic of Serbia may be accepted as true and objectively reported.

6. CONCLUSION

Forming and expressing an opinion on the truth and objectiveness of insurance company's financial statements, auditors perform based on the quality of the evidence collected. Auditors first discuss the existence and adequacy of the internal control system, and if it is satisfactory and efficient an independent auditor's work is facilitated through the reduction of the volume and time of independent testing to be undertaken. Evidence is formed by testing the population unit selected for the sample and concluding on the nature of financial statements on the basis of the results obtained by testing the sample of business transactions and balances in the accounts. Sampling is a method of selecting the observation units that represent the features of the population they make up.

For the purposes of direct testing of the premium income from VI and TPVI auditors perform sampling of numeric or variable values. Based on the sample results it can be concluded whether there is an unacceptably high risk of material misstatement in the incomes. The tests are designed to detect error or fraud that may exist in the accounting coverage of incomes. For the need of their testing we perform the sampling by determining the test objectives, defining the population and sample units, choosing the sampling techniques, determining the sample size, selecting the sample, testing the units, evaluating the results, and documenting the sampling procedures. Auditors use the sample results to project detected monetary misstatements to the population in general, by generalizing the sample results. If the estimated value of the income from insurance premium, which is calculated by adding the overall projected difference for the population to the book value of premium income, is in the range of confidence interval (calculated by adding and subtracting sampling risk limit to and from the book value of incomes so as to obtain the lower and upper threshold values of premium income) the population - income from insurance premiums from VI and TPVI is accepted as true. The paper describes the use of variable sampling in testing of these incomes in "Takovo" insurance and the use of the method in the testing of the premium income of the three leading insurance companies in the Republic of Serbia, "Dunav" insurance, "DDOR"
insurance, and "Delta Generali" insurance. On the basis of testing the implementation of these methods we can derive the following conclusions:

- The tolerant error level in the three leading companies the auditor accepts is at considerably higher level than in "Takovo" insurance;
- In order to assess the premiums income variability it is necessary to sample a larger pilot sample of the largest insurance companies;
- Given that the population being tested in the three leading insurance companies is larger, the auditor performs more extensive tests by selecting the sample;
- The insurance company "Dunav" has the largest number of policies issued, therefore it is necessary to perform more extensive audit testing than in the other two companies;
- Given that the insurance company "DDOR" achieved the highest result, the tolerable level of error is higher and the optimal sample size is smaller compared to the other two major insurance companies;
- Deviations detected in the sample selected in large insurance companies has more sensitive influence on the conclusion on the population quality than in "Takovo" insurance company, because the extrapolation of results is done in a larger population, and
- In the process of drawing conclusions about the acceptability of reported incomes from insurance premiums, auditor’s greater professional skepticism is required when it comes to assessing the results of leading insurance companies.

In the process of direct testing of balance positions auditors form the corresponding tests to test the existence, completeness, rights and obligations, valuation, presentation, and disclosure of each balance position individually. What tests will be used and to what extent they will be implemented in specific audit engagement is conditional on the individual characteristics of each customer, and it is not possible to apply uniform and universal approach in all cases.

Every day practice produces new cases and lessons for auditors who need to keep them in mind and on a daily basis adjust and adapt them to new engagements. One thing is certain, changes are ever present and we must adapt to them inevitably.

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