

Memo

From: Ed Phillips, Assistant Administrator, Computer Audit Group

Date: 12/01/03

Re: Determination of Sample Size and Handling Credits in Statistical Sampling

Treatment of Credit Items in a Sample:

There are various approaches for handling credit reversals in a sample, none of which is perfect. However, of the three most popular alternative ways of handling credits (absolute value, negative strata, and segregating credits), this memo explains why I contend that our current policy method (segregating credits) is the best.

- A) Using either the absolute value or negative strata approach, the outcome could result in conceivably taxing more than the net amount that was actually purchased after returned items are considered. Although all credits have an opportunity of being drawn using either of these two credit procedures, the resolution of the overall transaction is somewhat ignored. In other words, if a taxable debit is chosen and the taxpayer can prove that the transaction was returned and a reversing credit was issued, the transaction is not negated unless a corresponding credit is also randomly chosen. What are the odds of both the debit and reversing credit being chosen? If the transaction reversal is not selected, this adversely affects the taxpayer since the percentage of error is somewhat inflated because the chosen debit is categorized as a taxable error, but no adjustment is made for the non-selected reversal.
- B) Sometimes we encounter situations wherein a debit, a credit, and then another debit is issued involving the same taxable transaction. Although remote, there exists the possibility that the two debits could be drawn, but not the credit, using either the absolute value or negative strata procedure. However, if that would occur, then the taxpayer could be taxed twice on the debit portions with no adjustment for the credit since it was not drawn in the sample.
- C) Another problem that can exist when either the absolute value or negative strata approach is utilized, is the possibility of crediting tax that was never paid. The credit could relate to a taxable transaction; however, there is no guarantee that the original debit was taxed appropriately.
- D) There is a risk that a credit could be chosen for a debit that occurred prior to the audit period or a debit chosen for a credit that occurs after the audit period. Under either the absolute value or negative strata method, there is no chance

that these reversing transactions could be chosen or even evaluated for the current audit period since they were not included in the audit period data download.

- E) Poor precision can also result from the absolute value method. For example: assume a \$5,000 purchase had been taxed and \$500 of it is subsequently credited. If the \$500 credit is selected for a sampling unit, and it comes from stratum 2, this results in a credit being issued to a different range than stratum 5 wherein the original purchase may have appeared. If the \$500 credit selected in the sample was determined to be taxable, this is not an "apples to apples" type of offset since the debit and credit amounts are not even in the same stratum. This could adversely affect the overall precision of the statistical sample.

For these reasons, we came to the conclusion that the absolute value and negative strata methods of handling credits are statistically flawed as evidenced in the scenarios cited above. Therefore, our Computer Assisted Audit Group (CAAG) within the Audit Division adopted an alternative procedure for handling credit reversal transactions within random and statistical sampling methodology. Our current statistical sampling procedural and parameter letter describes our preferred technique for handling these credits. We now separate the negatives from the positives and only sample from the debits; however, the negatives are not ignored. This approach allows the associated negatives to be offset against the positive sampling units. Consequently, if the original transaction was reversed with a credit, the entire transaction will be reviewed. If there is a subsequent credit for the original taxable transaction debited, we intend to evaluate both the identified debit and credit, even if the credit falls outside the audit period. The end result is that a taxable debit will be treated as a non-error for any portion that was reversed by an identified related credit. Partial reversals should reduce the taxable debit by the amount of the corresponding credit. Furthermore, the only credit reversals that need to be researched are those that apply to taxable debits since a nontaxable debit is already a zero error. However, the credits associated with internal allocations of expenses will not be considered reversals or offsets. For example, taxable items bought in bulk and shipped to Ohio remain taxable even if they were reallocated to locations outside of Ohio. In conclusion, as long as this evaluation is done in a consistent and thorough manner, it has statistical validity. Additionally, it should be noted that we are not the only state that has adopted this method of handling credits. The states of Michigan, Kansas, Minnesota, and Wisconsin (to name a few) also subscribe to this approach.

Determination of Sample Size:

The Ohio Department of Taxation, taxpayers, and practitioners all should be striving to achieve the same goal in the audit process. Simply stated, we should be seeking to determine the true amount of tax liability by relying on a sample that accurately arrives at this result. Furthermore, we both desire as low a precision percentage

(which results in the best accuracy) and as high a confidence level (that mirrors a comprehensive review) that is feasible without drawing too large a sample to accomplish this task. This happy medium of a utopian sample size is not always easy to pinpoint. However, one thing is certain, you can never hurt precision by choosing a larger sample size. The reliability of the point estimate also is not adversely affected by a larger sample. This is not to imply that it is our intent to sample more transactions than necessary. Instead, we prefer to ensure that our sample size is at least large enough to be conservative in our estimate rather than understate a sample size that could require that additional items need to be drawn at a later date. Besides, the minimum sample size of 250 transactions per stratum range that our CAAG has established is not unreasonable. In fact, our sample size recommendation is far less than the number of transactions that we previously reviewed in audits using block sample methodology. In justifiable situations, we have even reduced the number of stratum ranges rather than reduce our minimum sample per range, provided that precision is not compromised.

We determine sample size using a variable calculator because the nature of Sales and Use Tax audits has traditionally required a calculation of percentages of taxability (or error) as well as the need to quantify the amount of tax liability due. Whereas, attribute sampling in auditing usually requires a smaller sample size since its objective normally requires a "yes" or "no" type of response instead of attempting to quantify a tax liability or refund amount. Therefore, attribute sampling is not appropriate for our typical Sales and Use Tax type audits.

The other concern we have of possibly choosing too small a sample is the reality that if we do not achieve our desired precision, the sample size may need to be increased. This does not reflect well on the audit process when auditors need to revisit boxes of files that were previously retrieved by taxpayers to locate invoices that pertain to additional sampled items. Furthermore, this may also give taxpayers the false impression that increasing the sample size will necessarily result in a greater tax liability, when all we are trying to achieve is increased precision or accuracy.

In conclusion, I have attended several national workshops and conferences wherein these and similar topics were covered more extensively. Therefore, I have had the opportunity to discuss these topics with Sales and Use Tax personnel from numerous states. From the feedback that I have received from other states, our policy on credits and sample size is in line with what many states have adopted. Lastly, a great deal of thought went into our decision to adopt our current policy on these two issues and we intend to stand firm and consistently uphold our position on these issues.