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Sales and Use Tax Audit Sampling Procedures

Sampling Methods, Techniques and Evaluation of Results

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On June 22, 2009, the Michigan Department of Treasury (Department) issued INTERNAL POLICY DIRECTIVE 2009 – 2 (IPD-2009-2) titled SALES AND USE TAX – AUDIT SAMPLING PROCEDURES. An IPD is an internal document to be used by Department personnel in the administration of the tax laws. An IPD does not have the force and effect of law and is not binding on taxpayers. The Department provides and makes the IPDs available to taxpayers and others in the spirit of greater understanding in the administration of tax laws.

In a perfect world, all sales and use tax audits would result in a detail examination of every transaction that occurred during the audit period. However, in the real world, the large volume of transactions may preclude a detail examination of all transactions. Therefore, some sort of sampling method must be used in the examination of the transactions.

Sampling carries with it a degree of risk. There is a risk that the sampling projection overstates the tax liability. This risk shall be called the alpha risk. There is a risk that the sampling projection understates the tax liability. This risk shall be called the beta risk. For these reasons it is very important that due care be taken in selecting the method used and sampling techniques employed.

Extremely important is how the sample results are projected against the entire population. The auditor and the taxpayer must evaluate the results of the sample and sample projection.

The Department should be commended for adopting scientifically acceptable sampling methods and training their auditors on implementation procedures. Making the methods and techniques available to taxpayers will result in greater understanding and consequently better, more efficient, and accurate sales and use tax audits.

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IPD-2009-2 states that electronic statistical sampling, manual random sampling, and judgmental block sampling are the sampling methods that conform with generally recognized sampling techniques and auditing standards which will yield accurate and defensible results and consequently may be used in the Department's sales and use tax audits. The Department states that one of the three sampling methods listed above and discussed below may be used to conduct a sales or use tax audit. [IPD 2009-02, P-1]

Of the three methods identified by the Department, electronic statistical sampling is the preferred method. Electronic statistical sampling, when properly employed, will result in the most efficient and accurate result. An additional benefit is the sample results can be statistically evaluated.

Manual random sampling should be used only when electronic statistical sampling absolutely cannot be done. If electronic records are not maintained or are not available, manual random sampling provides an efficient alternative.

Both electronic statistical sampling and manual random sampling are predicated on the statistical and mathematical theory of random numbers. Specifically, if a series of numbers, a sample, are selected at random from the entire population, then, a projection of the sample results should represent the entire population.

There are two important requirements which must exist in order to make the sample projection valid. First, the sample must be selected at random. Second, the sample must be selected from the entire population. Every item in the population must have an equal chance or probability of being selected.

Statistical sampling is based on scientific number theory and the theory of probability. It is only valid if done properly. The auditor should first perform a diagnostic investigation of the business and a complete evaluation of the taxpayer's sales and use tax compliance system.

If the taxpayer is attentive to their sales and use tax obligations and responsibility and has in place a compliance system that, if operable, would result in the correct amount of tax paid, then the auditor may perform a random test of transactions to determine compliance with the taxpayer's tax system. However, if the taxpayer does not have a tax compliance system, or if the taxpayer has a tax compliance system but it is not operable, then the auditor should prepare a sample plan for monetary errors.

The auditor should study and become familiar with the specific characteristics of the population. Ordinarily this would include the size of the population in number of items as well as total dollar amount. A test of variability is the calculation of the standard deviation. If records are available electronically, this calculation can be done electronically. In manual random sampling, a test sample may be pulled to determine the standard deviation. The next step is to determine the desired reliability level and the desired precision level.

Reliability is a measure of confidence; the higher the reliability, the greater the level of confidence. A reliability level of 90% means that if 100 samples were randomly drawn and evaluated, 90 of the samples would fall within the precision intervals.

In IPD 2009-2, the Department stated: "The confidence level will be 90% in most cases, which will result in a sample that is both accurate and efficient. If the general characteristics of the population cannot, in the auditor's judgment, reasonably be determined, a higher confidence level may be necessary." [IPD 2009-02, P-2]

Uncertainty in the population or of the population will normally require a higher confidence level and a higher reliability level.

Precision is a measure of accuracy; the lower the precision, the greater the level of accuracy. A precision level of ± 10% means that the monetary amount determined from the random sample is within 10%, above or below, the actual result.

In IPD 2009-2, the Department stated: "The precision level will be 10% in most cases, which will result in a sample that is both accurate and efficient. If the general characteristics of the population cannot, in the auditor's judgment, reasonably be determined, a lower precision level may be necessary." [IPD 2009-02, P-2]

If the sample projection may result in a substantial tax deficiency, a tighter precision interval may be required.

The determination of the reliability level and precision interval are very important because they, along with the standard deviation, will determine the sample size. The determination of the reliability level and precision interval are a function of the taxpayer's system of tax compliance. If the taxpayer's tax compliance system is operable, then a reliability level of 90% and precision level of ± 10% may be sufficient. However, if the taxpayer has no tax compliance system and the audit is expected to result in a substantial tax deficiency, then a higher reliability level (95%) and tighter precision interval (±5%) may be appropriate.

The higher reliability level (95%) and tighter precision interval (±5%) will result in a larger sample. A very large sample size could impose an administrative burden on the taxpayer and require the auditor to spend more time in the examination and review of transactions. IPD 2009-2 states: "It is recommended that the taxpayer retrieve all documentation needed to support the review of individual sample items." [IPD 2009-02, P-4] All of the above factors must be considered.

IPD 2009-2 specifies that "Ratio estimation is the preferred method of projection for both electronic and manual sampling audits. The ratio is the total error divided by the sample base. The error ratio is then multiplied by the projection base to arrive at the estimated audit adjustment." [IPD 2009-02, P-5]

Electronic Statistical Sampling

IPD 2009-2 stated, "When electronic records are available, statistical sampling procedures may be applied through use of the Department's statistical sampling software. (The auditor may use detail audit procedures and review all electronic records for the entire audit period, if the auditor determines this to be more efficient than using electronic statistical sampling.)" [IPD 2009-02, P-1]

Normally, the only time a detail review of all transactions would be appropriate is when the number of transactions is small and the auditor can complete the audit in a minimum amount of time; for example, a sales tax audit of an aircraft retailer where the number of sales in a year does not exceed 100. In such a case, a random sample would not be appropriate.

A detail review of a large number of transactions can result in an inaccurate determination since both the taxpayer and the auditor would be subject to the potential of a high degree of human error in the retrieval of the transaction to review and the actual review of all the transactions. Therefore, if electronic records are available, electronic statistical sampling is the preferred method of audit.

Standard deviation is a function in the determination of sample size. Standard deviation is a measure of dispersion of the monetary values in a population. The larger the range of number values in a population, the higher the standard deviation and the larger the required sample size needed to achieve the desired reliability level and precision interval.

Stratification of the Population

The auditor can effectively reduce the sample size without sacrificing reliability or precision through stratification of the population. Stratification is a process of slicing the population into strata that individually have a lower rate of dispersion and consequently a lower standard deviation.

The Department has provided its auditors the following guidance in stratifying a population: [IPD 2009-02, P-1and 2]

> **Stratification of the Population.** The population will be stratified into dollar ranges, the results of which will give a more accurate sample. In addition, stratification by accounts, locations, time periods, etc. prior to stratifying by dollars may be required to produce a more accurate result, depending on the taxpayer's business activities.

> **Determining the Dollar Range Breaks**

> **Low Dollar Range.** This dollar range will be established, and should be agreed to by the taxpayer, prior to determining the ranges to be sampled.

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1. Auditor judgment will be used to set the boundaries for this dollar range.

2. If, in the auditor's judgment, the dollar range is not cost-effective to review, but material in amount, then projection of the error ratio determined from the adjacent stratum will be applied.

High Dollar Range. This dollar range will be established, and should be agreed to by the taxpayer, prior to determining the ranges to be sampled.

1. Auditor judgment will be used to determine this dollar range. All transactions in this dollar range will be examined in detail.

2. For cost efficiency, a balance of the top dollar range and the number of transactions should be considered.

Dollar Ranges to be sampled. Between the low and high dollar ranges, the number of stratified ranges to be sampled will depend on several factors.

1. The primary factor is the sample size as it relates to time efficiency and accuracy of the sample.

2. Other factors include the number of dollar ranges to sample, and the optimum strata breaks between the dollar ranges.

Please note that the guidance above mandates that the auditor obtain agreement from the taxpayer as to the dollar ranges and strata to be used in the audit. Usually this approval is obtained in writing. The auditor will ask the taxpayer to agree to the sampling plan. The taxpayer, or the taxpayer representative, should invest the time and effort to work with the auditor to determine a fair and efficient sampling plan. I recommend the taxpayer grant only tentative approval of a sample plan depending on the results of the examination and review of transactions. If the review results in a large incidence of exceptions, the taxpayer may ask for an increase in the sample size which would result in a higher precision level or confidence.

Sample Size

IPD 2009-2 states: "The Department's statistical sampling software program will be used to determine both the overall sample size and the size of each stratified dollar range. A minimum of 30 sample items is required in each stratified dollar range, except there is no minimum number of sample items required in the high dollar range." [IPD 2009-02, P-2]

The determination of sample size is a very important decision. Three factors go into the sample size determination: reliability, precision and standard deviation. The sample size must be sufficient in size to achieve the desired reliability level and precision intervals. As a measure of safety, many auditors will add 10% to the statistically-determined sample

size to account for missing or lost invoices or other factors that will reduce the sample. The Department will continue to use a statistical sampling software program to determine the sample data for all electronic audits. [IPD 2009-02, P-4]

Audit Projection

IPD 2009-2 states: "The ratio estimation method will be used to project the results of each statistical sample. A separate percentage of error will be determined for each of the stratified dollar ranges and projected." [IPD 2009-02, P-2]

Ratio estimation is the calculation of an error factor percentage. An error factor is the percentage of audit exceptions to the total sample size. This calculation is done within each stratum if the population is stratified.

The audit exceptions are a list of individual transactions, sales transactions in a sales tax audit, and purchase transactions in a use tax audit, where the auditor determined tax was due and tax was not paid. The auditor will normally provide the taxpayer with a preliminary list of such audit exceptions. It is the responsibility of the taxpayer to review each exception to determine if the transaction is taxable and, if taxable, if the tax has been paid. The auditor will adjust the exception schedules accordingly.

This process of reviewing the audit exceptions is very important because the final unresolved audit exceptions will be used in computing the error factor percentage and applied across the entire population.

The total dollar amount of taxable exceptions divided by the total dollar amount in the sample is multiplied times the total dollar amount in the entire population being sampled to determine the total untaxed sales or purchases. The total amount of unreported sales or unreported purchases is multiplied times the statutory tax rate to determine the tax due. Interest and penalty may be applied.

Post Audit Evaluation of Sample Projection

One of the unique and most advantageous factors associated with statistical sampling is that risk, both alpha risk and beta risk, can be controlled by specifying the appropriate reliability levels and precision intervals in conjunction with sample size. Also, after the audit is completed, the auditor and the taxpayer should recalculate the achieved precision level and precision interval and compare it to the desired levels.

Any substantial under achievement of the desired reliability and precision should be addressed before the audit is closed. It may result in additional auditing by increasing the sample size or it may result in the extraction of an item or items that cause the standard deviation to be higher than expected.

The error factor percentage should also be evaluated after the completion of the audit. If the error factor percentage is substantially lower than the desired precision levels, then it would be inappropriate to project that error factor percentage.

At this point the taxpayer would like the auditor to close the audit without any adjustment. That will never happen. At a minimum, the taxpayer owes tax on the identified taxable exceptions. The taxpayer may propose paying tax on an actual basis on the vendors whose names appeared on the taxable exception list.

If the auditor truly believes a tax deficiency exists and it warrants additional auditing, then adjustments must be made to bring the error factor outside of the precision interval. This can be done by expanding the sample size or it may result in the extraction of an item or items that cause the standard deviation to be higher than expected.

IPD 2009-2 provides the auditor with guidance in evaluating and establishing the integrity of the population. The sample must be representative of the population. When an item or items in the sample are not representative of the population, they should be removed.

The following factors, if relevant, must be considered when evaluating whether a sample is representative of the population, and when reviewing either an electronic or a manual sample, when identifiable, should be removed from the population prior to pulling the sample and reviewed separately: [IPD 2009-02, P-4]

- Credit and Debit Memos
- Extraordinary Items
- Bad Debts
- Missing Invoices
- Voids and Duplicates
- Installment Sales or Purchases
- Reclassifications

The auditor should cover all bases before an audit is submitted based on a statistical audit sample projection. The taxpayer should not sign a Preliminary Audit Determination Letter nor the Final Audit Determination Letter until they are satisfied that the audit sample is representative, that all exceptions are taxable and tax has not been paid, and the sample projection is fair.

Manual Random Sampling

As stated previously, if electronic records are available, electronic statistical sampling is the preferred method of audit. However, if sales transactions and purchase transactions are not maintained electronically, the auditor should use a manual random sampling audit program. The statistical principals and probability theory discussed earlier in this document are applicable to manual random sampling.

In IPD 2009-2, the Department states: "When electronic records are not available, manual random sampling may be used. A manual sampling universe will typically consist of individual transactions or clusters of transactions. If the auditor determines that manual random sampling cannot be used effectively, a detailed review of the records can be made with supervisory approval." [IPD 2009-02, P-3]

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In IPD 2009-2, the Department mandates that "Utilities and Fixed Assets must be reviewed separately." [IPD 2009-02, P-4]

The same principles apply to a manual random sample projection as with electronic statistical sampling. Specifically, every item in the population must have an equal chance of being selected before any error factor percentage can be applied to that population. In manual sampling, without the use of electronic database analysis software, the auditor must examine the transactions in the manner which they are available. Sales transactions might be filed and available in chronological order by month, by year. Purchase transactions might be filed and available in alphabetical order by vendor, by year. The guiding principal is that the smaller the unit the better the audit sample. Whatever the sample unit and method of sample selection, the sample must be selected at random and all items in the population must have an equal probability of being selected.

IPD 2009-2 provides the auditor with three approaches to manual random sampling: transactional sampling, cluster sampling, and time period sampling. IPD 2009-2 provides procedures that may be applied using the three approaches.

Transactional Sampling

In transactional sampling, the auditor has the opportunity to telescope the audit sampling on areas of interest. These items of interest may be tax exempt sales in a sales tax audit or taxable general ledger accounts in a use tax audit.

The Department has provided the auditors with specific guidance for sample size determination and other guidance in performing transactional sampling in IPD 2009-2 as follows:

Sample sizes are based on the following formula:

$$\text{Sample size} = \frac{250}{\%\text{ of items of interest in the population}}$$

There shall be a minimum of 250 transactions for the audit or 250 minimum per stratification range. The minimum sample size is only a guide. If the taxpayer's records are voluminous, auditor judgment should be used to determine if the minimum sample size should be increased.

Note: When the number of transactions exceeds 1,000, cluster sampling is more efficient. If the items of interest are 25% or less of the total population, cluster sampling will be used. [IPD 2009-02, P-3]

When the manual random sampling method is used, a Department authorized software program will be used to determine sample sizes and the random selection of the sample. [IPD 2009-02, P-4]

Cluster Sampling

> Cluster sampling will be used when the minimum sample size exceeds 1,000 transactions. [IPD 2009-02, P-3]

In some forms of transactional sampling and cluster sampling, the auditor may focus the audit activity on non-taxed transactions that may be taxable. Taxable transactions that may be exempt are often overlooked. Therefore, frequently the taxpayer may perform their own reverse audit designed to identify overpayment of tax. These audits can run in conjunction with the Department's audit.

Time Period Sampling

> Based on the taxpayer's method of record retention, the time period sampled for one taxpayer may not be the same for another. Auditor judgment will be used to determine the appropriate period. [IPD 2009-02, P-3]

> The acceptable time periods are one of the following: [IPD 2009-02, P-3]

> 1. Days
> 2. Weeks
> 3. Months

The guiding principal in time period sampling, as well as other sampling methods, is that the smaller the unit the better the audit sample. Whatever the sample unit and method of sample selection, the sample must be selected at random and all items in the population must have an equal probability of being selected. For example, if sales records are filed by week, in a four year audit covering 208 weeks, the auditor may sample a predetermined number of weeks selected at random from all of the weeks.

Sometimes the auditor may not select the sample at random in order to achieve a more representative result. For example, in a sales tax audit of a retailer where sales records are filed by month, the auditor may select a four month sample with one month selected from each quarter in each of the four years being audited.

It's the responsibility of the taxpayer to work with the auditor to determine a sample plan that is representative of the total population being sampled. If the sample is not representative, then the sample projection will not be fair. Therefore, a lot of effort must be directed towards the audit planning process and the sample selection.

IPD 2009-02 provides auditors specific direction on the evaluation of the sample and evaluation of the sample results as well as the projection of the sample results for manual random sampling.

> **Sample Testing.** A precision variance test will be performed to ensure that the sample represents the population. The variance between the sample average and the population average should not be more than 15%. If it is

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more than 15%, the auditor must evaluate the sample, and consider alternatives, such as increasing or replacing the sample. [IPD 2009-02, P-3]

Evaluation of Results. The average dollar value of all sampling errors should be compared to each individual error. This may help identify particular classes of errors or items that may indicate an inadequately defined frame. Further refinement of the sampling frame may, in the auditor's judgment, be necessary. [IPD 2009-02, P-3]

Projection of Results. Ratio estimation is the preferred method of projection. The use of an alternative projection method by an auditor requires prior approval. [IPD 2009-02, P-3]

Ratio estimation is a projection of audit sample results achieved by calculating the percentage of taxable error exceptions to the total sample dollar value. This percentage is multiplied by the total dollar value of the entire population being audited. Oftentimes the auditor will allow an alternative calculation. The calculation may be based on gross receipts or similar other relevant number.

Judgment Block Sampling

IPD 2009-2 gives the auditor the option to perform a judgment block sample: "A judgmental block sample is a non-random selection from a population from which a conclusion is drawn. This type of sample may be representative of the population to be audited. A block sample may be used where the auditor determines it to be the most efficient and cost effective." [IPD 2009-02, P-3]

A judgment block sample is the least appropriate form of sampling because it violates the primary guiding principles of sampling. Normally the block of transactions being audited is not selected at random. Usually the transactions being audited are those most readily available. When a block sample is selected it eliminates all the other transactions outside of the block. An invalid projection occurs if the intent is to project the results of the audit of the transactions in the block against the entire population including those transactions outside of the block. The taxpayer should be very careful before accepting any judgment block sampling.

Sales Tax and Use Tax Paid in Error

If the taxpayer compliance system is not operable or if the taxpayer has no tax compliance system, then errors will be made. These errors most likely will result in an underpayment of tax as well as an overpayment of tax. The Department has provided specific guidance to auditors on how to handle situations when a sample discloses an overpayment of sales tax or an overpayment of use tax.

1. Sales Tax and Seller's Use Tax Paid in Error. [IPD 2009-02, P-4]

      a. If the overpayment to a single vendor is based on $5,000 or less in purchases per year, the sample item will be listed as a credit and left in the sample.

      b. If the overpayment is based on more than $5,000 in purchases per year from a single vendor, those purchases must remain in the sample population as a non-exception, however detailed separately. It is the taxpayer's responsibility to detail such overpayments relating to each individual vendor for the audit period and to request credit directly from the vendor.

2. Use Tax Self-accrued and Direct Pay Accounts in Error. When use tax is paid in error to the state, credit will be given in the audit. [IPD 2009-02, P-5]

      a. If the overpayment is based on $5,000 or less in purchases per year from a single vendor, the sample item will be listed as a credit and left in the sample.

      b. If the overpayment is based on more than $5,000 in purchases per year from a single vendor, those purchases will remain in the sample and the population. If, in the auditor's judgment, these errors cannot be proven to be consistently occurring throughout the audit period, or the dollar amount of these errors are, in the auditor's judgment, substantial, these items will be shown as a non-exception and the taxpayer will be required to support the overpayment on an actual basis. If these overpayments can be proven to be consistently occurring throughout the audit period, the credits will be left in the sample and projected.

Conclusion

Scientific statistical sampling is an effective tool for both the auditor and taxpayer in completing a sales tax audit or a use tax audit in the most efficient and accurate manner. The fundamentals are based on scientific number theory and probability theory. The greatest advantage in using a statistical technique is the ability to measure the reliability and degree of assurance which can be placed on the results.

Care must be taken to assure the procedures are followed and adhered to. The samples must be selected at random and every item in the population must have an equal chance of being selected. A post audit evaluation of the sample must be done to assure the integrity of the sample and the resulting sample projection.

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