Research Report
KTC-04-06/RSF 7-99-2F

KENTUCKY TRANSPORTATION CENTER

College of Engineering

THE FUEL TAX COMPLIANCE UNIT: AN EVALUATION AND ANALYSIS OF RESULTS

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The Fuel Tax Compliance Unit: An Evaluation and Analysis of Results

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in Cooperation with
Transportation Cabinet
Commonwealth of Kentucky

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January, 2004

-EXECUTIVE SUMMARY-

The construction and maintenance of our nation's system of roads and highways is a major financial challenge for all levels of government. In 2001, approximately $130 billion was spent by federal, state and local governments on our national highway and road system. A majority of the responsibility for financing public roads and highways lies with state governments, and paying for highway construction and maintenance costs becomes difficult for states that face rapidly rising construction costs and limited revenues. Because of these fiscal challenges, it is important that states find new and innovative ways of enhancing their transportation system revenues if they are to meet their challenge as the principal player in the intergovernmental partnership responsible for maintaining a high quality system of public roads and highways.

Almost all states have special funds called Road Funds into which user fees and taxes associated with highway use are deposited and later used for transportation related expenditures. Unfortunately, Road Fund revenue growth has been slow due to the relative inelasticity of its revenue sources. At the same time, states face resistance to tax increases designed to enhance Road Fund revenues. One method of increasing such revenues, without increasing taxes, is to reduce evasion. Increased auditing is the primary means available to the states to reduce evasion.

Kentucky utilized TEA-21 federal funds to create an innovative pilot program to identify the best practices and methods for auditing taxpayers of transportation related taxes. This program involved a four-year experimental program called the Fuel Tax Compliance Unit (FTCU) program and was established through a cooperative relationship between the University of Kentucky Transportation Research Center and the Kentucky Transportation Cabinet. This study analyzes the overall effectiveness of the FTCU as well as specific auditing strategies employed by the FTCU staff.

The FTCU initiative benefited Kentucky's Road Fund in two ways. First, enhanced auditing increased Kentucky Road Fund revenue collections as a result of assessments and subsequent collections generated by FTCU auditors. Second, and perhaps more importantly, taxpayer behavior was probably affected by the perceived increased likelihood of an audit as information regarding the enhanced audit initiative spread among commercial carriers. As a consequence, voluntary tax payments and Road Fund revenue was probably increased as a result of this initiative. The assessment of these indirect audit impacts was beyond the scope of this study.

The state of Kentucky is bound by International Fuel Tax Agreement (IFTA) regulations concerning the composition of firms selected for audits. For example, under IFTA guidelines, at least 15 percent of IFTA audits must be allocated to low-distance accounts while at least 25 percent of such audits must be reserved for high-distance accounts. However, because the FTCU auditors provided supplemental audits and because the FTCU was not Kentucky's primary IFTA participant, the new auditing unit

had flexibility to pursue strategies that enhanced assessment results. The flexibility of the IFTA audits, beyond the minimum requirements and the flexibility existent regarding other revenue sources permitted the staff to pursue assessment maximizing strategies. As a consequence, the staff was able to identify audit strategies and audit selection strategies that enhanced the effectiveness of their audits.

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Americans depend on a safe, accessible, and properly maintained highway and road system in order to meet their family and work obligations everyday. The construction and maintenance of the highways and roads in the United States is a substantial expense for the taxpayer's dollars. In 2001, all levels of government combined spent approximately $130 billion on our highway and road systems[1]. The cost of road maintenance and construction rises every year and governments are finding it increasingly harder to pay these costs, especially in times of financial stress such as the present (Figure 1 on the following page illustrates the rapidly rising costs of maintenance and construction). The responsibility of paying for our roads has been increasingly passed down from the federal government to state and local governments.

Highways and roads have historically been viewed as an expense that should be paid for by 'user fees' meaning those who use the roads should pay for them. Therefore, taxes and revenues associated with the transportation system use are utilized to fund transportation construction and maintenance. These revenue sources have been shown to be inelastic, meaning that they do not grow at the same rate as the expansion of the economy. This fact adds to the difficulty that state and local governments are encountering as they strive to provide an adequate transportation system. Therefore, state and local governments are continually searching for new and innovative ways to fund road construction and maintenance. Unfortunately, it is estimated that perhaps billions of state and federal transportation tax dollars are never collected due to evasion. A recent

[1] Federal Highway Administration: www.fhwa.dot.gov/ohim/hs01/discht.htm

study estimated that up to $1.5 billion in evaded tax liability occurs within the motor fuels tax alone.[2]

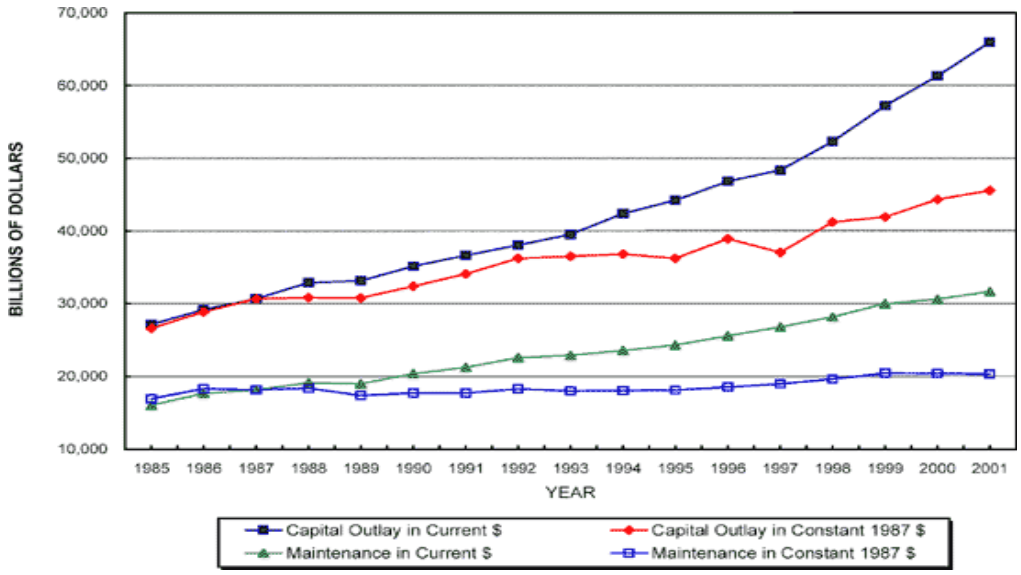
Obviously, recouping lost revenues and increasing tax liability compliance is vital if our governments are to meet our transportation demands. The audit is the primary means of identifying lost tax dollars and, hopefully, encouraging tax compliance. This study analyzes the overall effectiveness as well as the effectiveness of individual audit strategies utilized in a pilot Road Fund auditing program undertaken in 1999. The enhanced auditing initiative was meant to increase the effectiveness of audits and increase Road Fund taxpayer compliance. The program is the Fuel Tax Compliance Unit (FTCU) auditing initiative that was developed through a cooperative agreement between the Kentucky Transportation Cabinet and the Kentucky Transportation Research Center of the University of Kentucky. The four-year pilot program was funded by research dollars made available by the Transportation Equity Act for the 21st Century (TEA-21) enacted in June of 1998. This special funding enabled the FTCU to utilize innovative audit selection strategies that may provide insights for future audit strategy designs.

Transportation Funding and Expenditures Overview

As noted earlier, over $130 billion was spent on highway and road related expenditures in 2001. As shown in Figure 1, the majority of highway related expenditures are for construction and maintenance. For example in 2001, almost $100 billion of total expenditures of approximately $130 billion was spent on these two categories of expenditures. The other $30 billion was spent on debt retirement, administration, law enforcement and debt interest.

[2] Hackbart, Merl and James Ramsey. "Estimating Tax Evasion Losses: The Road Fund Case." *Public Budgeting and Finance.* Vol. 21, Issue 1. March 2001. Page 72.

Figure 1: HIGHWAY EXPENDITURES BY ALL UNITS OF GOVERNMENT – in both constant 1987 dollars and current dollars:[3]



The taxes that generate revenue for transportation will be discussed in detail in the following section, but in general the sources are fuel taxes, registration fees, and taxes levied on vehicle purchases. The revenues generated from these sources are remitted to various governments depending on the specific tax. Figure 2 depicts the receipts collected by each level of government over the past fifty plus years. State governments collect the majority of the highway related taxes followed by local governments and the federal government, respectively. State motor fuel taxes (which are initially collected by the state where the motor carrier is registered) are distributed to the states according to the provisions set forth in the International Fuel Tax Agreement (IFTA) which will be discussed later.

There are four main categories of highway related expenditures including: debt retirement, administration, maintenance, and capital outlays. All categories of

[3] www.fwha.dot.gov

expenditures have increased over the past fifty years. These increases are depicted in Figure 3.

Figure 2: Total Highway Receipts for all Governments 1945-2001[4]

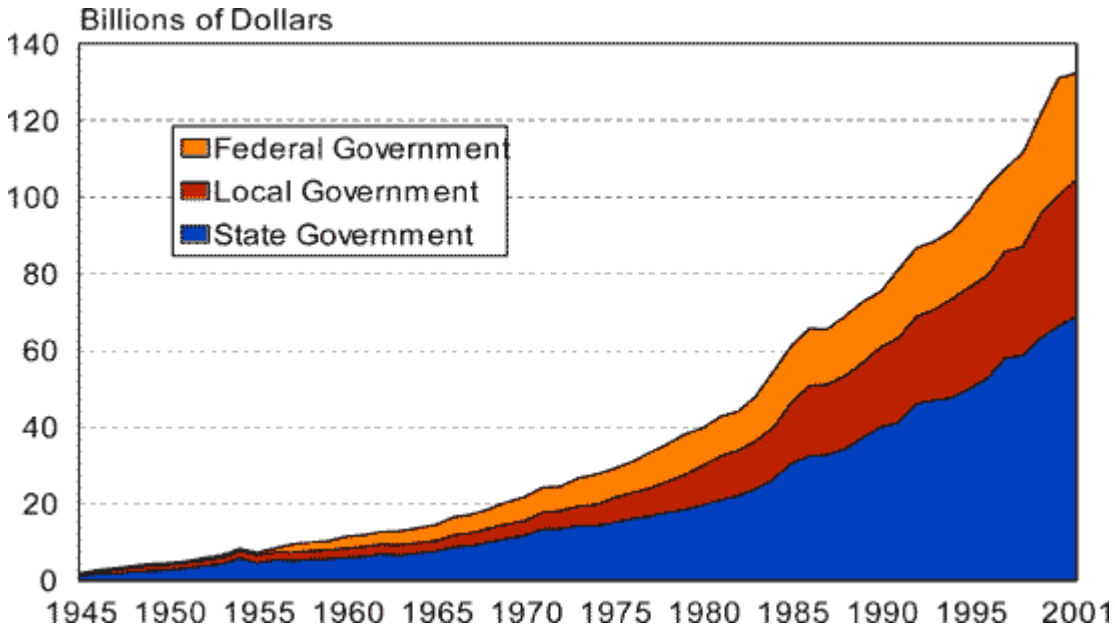
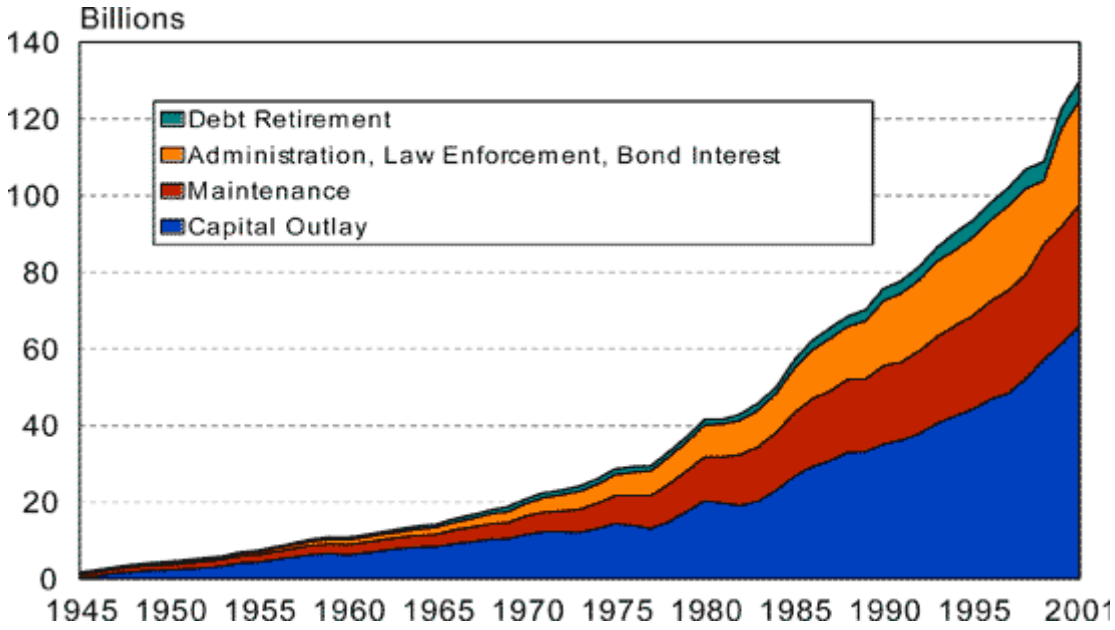


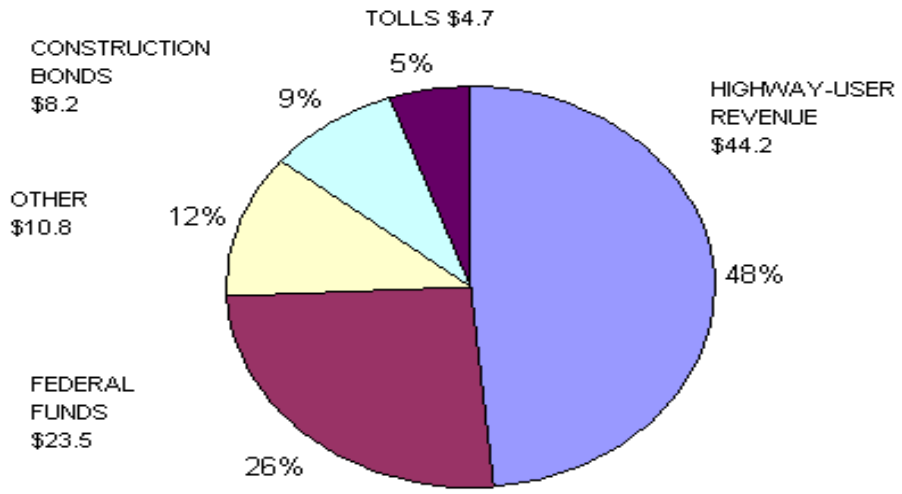
Figure 3: Total Highway Expenditures for all Governments 1945-2001[5]



[4] http://www.fhwa.dot.gov/ohim/hs01/reccht.htm
[5] http://www.fhwa.dot.gov/ohim/hs01/discht.htm

As noted earlier, state governments provide the majority of highway and road construction funds. Most state governments earmark money collected from transportation related taxes for special funds called Road Funds and any money received from the Federal Highway Trust Fund supplements state Road Funds. The largest state Road Fund source is the highway user fee, or taxes and fees associated with transportation such as fuel taxes, registration fees, and the like. Federal funds provide the second largest source of state highway funds, but are only half that of user fees (see Figure 4).

Figure 4: Total Receipts of State Governments 2000, in billions:[6]



Transportation Taxes in Kentucky

Kentucky has a myriad of sources of transportation related taxes. The major revenue source is motor fuels taxes. All drivers that purchase unleaded gasoline in Kentucky pay a motor fuel tax at a rate of $0.164 per gallon purchased, and this tax is incorporated into the purchase price of gasoline at the pump. Owners of cars and light

[6] www.fhwa.dot.gov/ohim/hs00

trucks also pay a registration fee of $15 of which $11.50 goes to the Road Fund. In addition, Kentucky has a motor vehicle usage tax of 6% which is applied to vehicle purchases.

The vast majority of commercial trucks are fueled by diesel fuel. The federal government applied a $0.244 per gallon tax on diesel fuel in 1998. Kentucky levies a $0.12 tax on each gallon of diesel fuel purchased within its borders. Diesel fuel tax revenues comprise slightly over 20% of all fuel tax revenues with gasoline tax revenues accounting for the other 80%.[7] A fairly elaborate international cooperation system exists to ensure each state (or Canadian Province) receives its fair and correct amount of diesel fuel tax revenues. The interstate nature of the trucking industry historically presented many difficulties for accurately dispersing fuel tax revenues, but the International Fuel Tax Agreement (IFTA) provided an effective revenue sharing method to ensure each state received the funds it was due from trucks that passed over its borders.

In addition to the $0.12 tax Kentucky levies on each gallon of tax purchased, Kentucky also developed a system to assign more of the cost of its highway system to larger trucks because of the wear they impose upon our state's roadways. A diesel fuel surtax was created that applies an additional $0.052 per gallon purchase for use in trucks weighing over 26,000 pounds. The surtax is called the heavy vehicle surtax. This weight restriction exempts cars, pick-up trucks, and light commercial trucks that use diesel fuel.

The diesel fuel surtax is not collected at the pump but rather collected post purchase on a quarterly basis. For trucks that routinely transport goods across state borders, the drivers must record the gallons of fuel purchased in Kentucky and the miles

[7] Eger, Robert J, and Merl Hackbart. "State Road Fund Revenue Collection Processes: Differences and Opportunities of Improved Efficiency." KTC Research Report, KTC-01-17/SPR-99-192-1F. July 2001.

traveled within the state. The amount of surtax owed is calculated from the record of gallons purchased in the state and remitted along with records submitted by the truck owners. The Kentucky Intrastate Reporting System (KIT) facilitates the collection of the surtax on diesel fuel purchased by intrastate trucks. KIT returns require the recording of diesel gallons purchased and must be filled out and returned quarterly, along with the monies owed to the state from the surtax.

Commercial trucks are responsible for registration fees as well, and a plan similar in function to IFTA was established for registration fees called the International Registration Plan (IRP). It ensures that states acquire their fair share of revenues from truck registrations. Finally, trucks that travel in Kentucky must also pay a weight-distance tax. The weight-distance tax assigns a tax of $2.85 cents per mile traveled within Kentucky by trucks weighing over 59,999 pounds. This tax is collected quarterly from a KYU report. Any heavy truck must have a KYU permit before traveling in the state.

Research Focus

As discussed so far, the transportation related tax system is fairly complex and there is ample room for evasion since some taxes are self-reported or are collected and reported at different points in the fuel distribution chain. The FTCU was developed to investigate evasion and perform supplementary audits of the motor fuels tax that applies to the trucking industry. In order to gauge the worth of the program, two concepts were explored. First, the FTCU was evaluated according to the costs and revenue benefits to the state of Kentucky. Secondly, and perhaps more importantly, the pilot programs

innovations were evaluated. The specific research questions addressed in the analysis are as follows:

1. Was the FTCU an effective audit enhancement initiative?

2. Were the strategies employed by the FTCU appropriate for future Road Fund audit strategies?

This study investigates each of these questions and provides observations regarding these research questions based on the data available to the research team. Recommendations regarding future research and the use of audit strategies employed by the FTCU are also provided.

Tax Evasion Issues – Incentives and Disincentives

Tax evasion is a serious issue for two main reasons. First, it creates an unfair divide between taxpayers who pay their fair share of taxes and those who do not. Secondly, it reduces a state's tax base and limits the ability of the state government to meet its' responsibility to provide an efficient system of public roads and highways. Evaders attempt to 'free ride' on the behavior of compliant taxpayers, and there is a strong incentive to free ride. These evaders create horizontal inequities in the tax system. As explained by Slemrod and Bakija, "Evasion creates horizontal inequity because people with equal abilities-to-pay end up paying different amounts of tax."[8] Therefore, reducing evasion reduces the horizontal inequity among taxpayers.

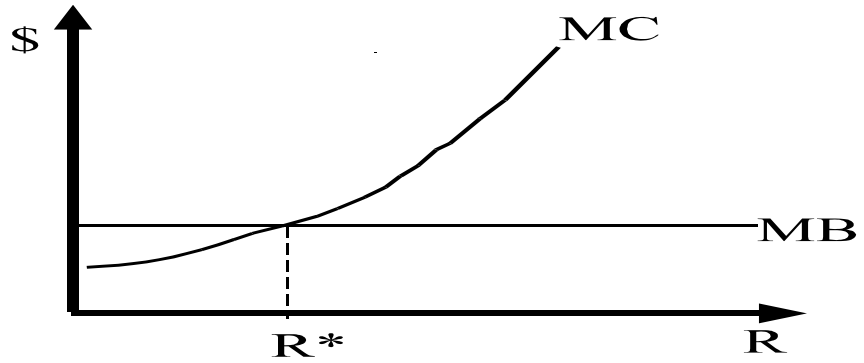
Tax evasion results from the principal-agent problem that exists between a tax collecting agency (principal) and the taxpayer (agent). This is especially evident in indirect taxes, such as excise and sales taxes. There are many parties and levels of a

[8] Slemrod, Joel and Jon Bakija. *Taxing Ourselves: A Citizen's Guide to the Great Debate over Tax Reform, 2nd Edition.* MIT Press, 2001. Pg 153.

hierarchy involved in the collection and administration of taxes. The motor fuel tax is an indirect tax that is collected by third party vendor or dealer. Not only does a principal-agent problem occur between the government and the taxpayer, but in another area as well. As Denison and Eger point out, "There is a principle agent problem between the government collection agency and the vendor responsible for remitting the tax to the state. In this regard, the fuel tax is similar to other excise taxes . . . with similar incentives and methods of fraud."[9]

There are clear incentives to evade taxes from an economic perspective under certain situations where an optimum level of tax evasion exists. Rosen depicted that theoretically there is an optimal level of tax evasion in Figure 5. The marginal cost curve (MC) represents the marginal penalty times the probability of audit. The marginal benefit curve (MB) represents each dollar of revenue not reported (R) or tax dollars saved by the evader.

Figure 5: Optimal Tax Evasion at Point R*:[10]



[9] Denison, Dwight and Robert Eger. "Tax Evasion from a Policy Perspective: The Case of the Motor Fuel Tax." *Public Administration Review.* Vol. 60, Issue 2. March 2000. Pg. 164.
[10] Rosen, Harvey S. *Public Finance.* Boston: Irwin, Inc. 1998. Pg.329

At point R*, the taxpayers marginal cost of not paying equals the marginal benefits of not paying taxes due. In order to remove the incentive to evade, the marginal cost curve must be adjusted upward by increasing fines and fees for evasion when evasion activities are identified or by increasing the probability of the evader being audited.

The overall complexity of the fuel tax structure and the numerous exemptions associated with it increase the opportunity to evade. Moreover, the complexity of sales and excise taxes creates ambiguities that foster both intentional and inadvertent evasion. One author goes as far to assert that when dealing with sales and excise taxes, "The problem has less to do with reporting procedures, tax returns, and cross verification than with ambiguities in tax laws themselves."[11] Building an efficient system of penalties and incentives that persuades the agent to act according to the principle's wishes is extremely difficult in this situation. The possibility of audit and resulting penalties is possibly the most effective method of inducing the taxpayer to pay his or her share of the tax burden.

Audits and Audit Impacts

There are two generally accepted effects of audits. First, audits increase the revenues collected by assessing tax dollars owed to the government by firms that are audited. In order to gauge the FTCU's effectiveness in raising assessments owed the state by noncompliant firms, the assessments generated by the FTCU will be presented later in this report.

Secondly, audits affect the behavior of taxpayers. Once a firm is audited it is more likely to comply with tax laws in the future because it assumes it is a prime candidate for re-audits. Perhaps even more importantly, taxpayers in general are affected

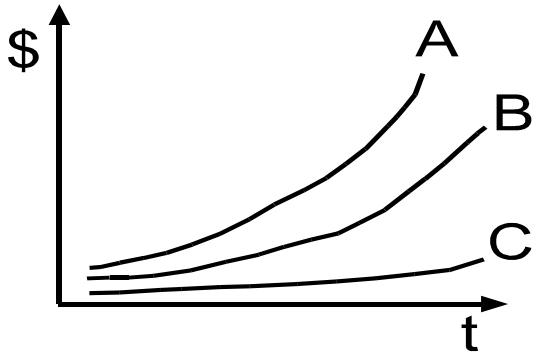
[11] Murray, Matthew. "Sales Tax Compliance and Audit Selection." *National Tax Journal*. Vol. 48, No. 4. December 1995. Pg. 527.

by increased auditing. Audits are an event that is strongly avoided among taxpayers, and the event is vetted among firms in the industry. The increased prevalence of audits associated with these taxes is understood by firms in the trucking industry, and information regarding change in the prevalence of audits is easily and quickly disseminated throughout the industry. The increased auditing, and differing audit selection procedures utilized by the FTCU would become known by trucking firms and their propensity to comply would be enhanced. Consequently, even if a firm is not audited by the FTCU, the firms' knowledge of the programs increased auditing would make the firm more likely to comply.

IFTA groups trucking firms into three categories that are long distance carriers, middle distance carriers, and low distance carriers. Based on the experience of state auditors, it is assumed that middle and low distance carriers are far more likely to avoid or evade taxes than the long distance carriers. This is because long distance carriers must submit to multiple compliance checks by the states. These multiple checks include IFTA, IRP, state auditing activities, and Global Positioning Systems (GPS) programs used by carriers. Therefore, minimal behavioral compliance change effects are expected from the long distance or "national" class of carriers. Meanwhile, it is anticipated that increased auditing would have a more substantial effect on the middle and low distance carriers. This is shown in Figure 6 where the vertical axis represents voluntary compliance dollars generated as audits increase over time. As shown, it is assumed increased audits are unlikely to produce significant "behavior response" revenue from the long distance carrier group while greater compliance responses are anticipated from the low distance

carrier category. These assumptions were used in the development of audit strategies by the FTCU.

Figure 6: **Effect of Increased Auditing on Compliance by Different Carriers Classes**



A: Low Distance Carriers
B: Middle Distance Carriers
C: Long Distance Carriers

The FTCU Program – Activities and Results

The Fuel Tax Compliance unit was established within the Kentucky Transportation Center at the University of Kentucky. The unit was established in December 1999 with the purpose of assisting the Kentucky Transportation Cabinet and Revenue Cabinet with their auditing responsibilities. Section 1114 of the Transportation Equity Act for the 21st Century (TEA-21) provided federal funding for states wishing to enact measures or study to combat fuel tax evasion. The project was initially authorized to spend approximately $350,000 annually. It was assumed that funding would be provided for up to a five-year period. At the end of the period, a decision regarding continuance of the program would depend on the program's effectiveness and availability of alternative funds.

The Fuel Tax Compliance unit was primarily created to aid the two Cabinets responsible for transportation related audits. The unit itself had no legal authority to

impose penalties or to seek legal action for audits where tax evasion was discovered and assessments were contested. Consequently, the unit passed all assessments to the proper Cabinet for follow-up action. While pursuing its' primary goal of maximizing tax assessments, the unit had several secondary goals including the development of more efficient databases, researching and developing new audit techniques, investigating statistical modeling and sampling, and performing additional research to improve Road Fund auditing.

The Audit Procedures and Practices of the FTCU

The FTCU assisted with and completed several types of audits. It conducted audits of IFTA returns, KIT returns (heavy vehicle surtax), KYU returns (weight-distance tax), IRP returns (vehicle registration), and for dealer sales which are handled by the Revenue Cabinet.

Since the IFTA system is based on a multi-jurisdictional agreement, a set of standardized auditing practices is followed by participating jurisdictions to ensure that taxpayers are treated equitably regardless of which jurisdiction performs the audit. First, IFTA member jurisdiction must audit an average of 3 percent per year of all the IFTA accounts reported by the jurisdiction. Secondly, this requirement of 3% must be selected according to precise guidelines set forth by the agreement. These provisions are as follows:[12]

> *Low-Distance/High-Distance Accounts Requirements:*
>
> *At least 15% of each member's jurisdiction's audit requirement shall involve low-distance accounts. (Low distance accounts are considered to be the 25% of the previous year's licensees who had the lowest number of miles/kilometers reported in all member jurisdictions). At least 25% of each member jurisdiction's audit*

[12] Guidelines from the IFTA Audit Manual, Revised July 1999. Available from www.ifta.org

requirement shall involve high distance accounts. (High distance accounts are considered to be the 25% of the previous year's licensees who had the highest number of miles/kilometers reported in all member jurisdictions.)

These guidelines apply to any auditing staff principally associated with IFTA returns of member jurisdictions, hence the staff employed by governmental agencies of the member jurisdiction are bound to audit at least 15% of the lowest distance returns and at least 25% of the highest distance returns. The remaining three percent of the total number of licensees (if applicable) may be chosen at the jurisdiction's discretion and may be chosen from high distance, low distance, or the so-called middle distance accounts. However, since the FTCU was organized under the University of Kentucky rather than under the Kentucky Transportation Cabinet, the unit was not specifically bound by these guidelines. For example during FY 2000, the FTCU performed 36 audits (22 low, 12 medium, and 2 high-distance). Table 1 summarizes the number of audits in each IFTA category audited by the FTCU over the program's four-year time span. While not required, the audit selections generally complied with the IFTA guidelines regarding percentages by carriers. It is noted that the audit unit had similar flexibility regarding audit activities for the other auditing categories (IRP, KYU, and KIT) as auditing procedures for these revenue sources are not tied to institutional agreement standards.

TABLE 1: Fuel Tax Audits Performed by FTCU According to IFTA Category: 1998 to 2002

Audit Category	Number Performed	Assessment in Dollars
LOW	45	$332,631.88
MEDIUM	62	$249,082.44
HIGH	38	$258,799.44
TOTAL	**145**	**$840,513.76**

FTCU Audit Impacts

The assessments generated by the FTCU were almost exclusively created from audits of IFTA accounts, meaning that it was motor fuel tax evasion that spawned most audits and assessments. In the last year analyzed, there were also audits performed on weight-distance accounts. The following chart depicts the cost and assessment comparison per year of FTCU operation. The chart only reflects costs and assessments spanning the period from the program's inception to the close of the fiscal year ending in September 2002. Costs and assessments of fiscal year 2003 operations were not included because the records were incomplete for the last year of the program. During the last year of funding, staff transitions were underway; meaning the staff members of the FTCU were either absorbed into the Transportation or Revenue Cabinets or released because positions were unavailable. The results of the audits performed after these transitions were therefore not uniformly reported as FTCU audits but rather state audits. Consequently, in order to fairly represent the effectiveness of the FTCU, the last year of the FTCU program was omitted from the cost and assessment comparisons (see Table 2).

TABLE 2: Cost and Assessment Comparisons per Year:

YEAR	AUTHORIZED FUNDING:	ASSESSMENTS MADE:	DIFFERENCE:
10/99 – 9/00	$325,000.00	$175,929.60	**($149,070.40)**
10/00 – 9/01	$325,000.00	$194,712.93	**($130,287.07)**
10/01 – 9/02	$350,000.00	$625,869.21	**$275,869.21**
10/02 – 9/03	$350,000.00	N/A*	N/A*

*Assessments made during this transitional year were transferred to the respective state Cabinet; assessments therefore could not be separated from other assessments.

It appears from Table 1 that based on the data available, the FTCU program was marginally self-supporting in terms of assessments made. However, because assessments

generally exceed collections the program costs exceeded direct revenues produced. This may be an oversimplified view of the financial statistics associated with the program. From these figures, it is obvious that the assessments generated by the program were increasing as the program matured. It could be reasonably assumed that the assessments generated would continue to increase for several years and then stabilize sometime in the future if the program were continued. To fully understand the financial implications of the program, more data in the form of future direct assessments and indirect behavioral effects are needed. The estimation of indirect behavioral effects were, however, beyond the scope of this study.

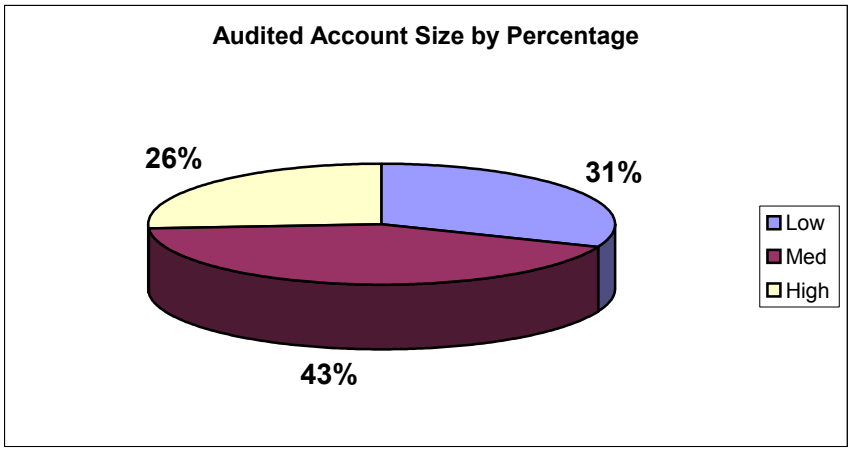
Audit Strategy and Analysis

While the FTCU generated assessments during its' first three years of operation approximately equal to the programs expenditures and probably fostered greater compliance with transportation tax laws, more can be learned from the FTCU experience. An intriguing aspect of the FTCU program is the fact that it was not bound by the same auditing regulations that bind state government agencies. Transportation Cabinets or Departments which are formally involved in IFTA have specific IFTA audit responsibilities and must comply with IFTA audit guidelines. As noted previously, the FTCU, because of its organizational location, had more discretion in choosing the mix of accounts it audited in any given year. The assessments generated by the FTCU were analyzed to uncover any trends that might benefit future state government auditing activities. Their assessments were analyzed for effectiveness according to IFTA carrier categories, meaning that the results of the low, medium, and high distance category audits were examined. For this analysis, actual program assessments were compared with

hypothetical assessments in line with IFTA auditing guidelines. From the comparison, observations are drawn regarding the effectiveness of the FTCU audit selection strategy. In addition, the hypothetical IFTA results were compared to other possible selection scenarios. Conclusions will be made concerning the effectiveness of the FTCU audit selection and assessment strategies, and recommendations for state governments will be made at the close of this report.

As noted, the IFTA requires that 3% of IFTA accounts be audited, and of that 3% at least 15% should be low distance accounts while 25% should be high distance accounts. Therefore, at least 40% of the audits should be low and high distance accounts, and no more than 60% should be so called 'middle' distance accounts. Kentucky's published methods of audit selection mirror these recommendations exactly. The following graph depicts the actual composition of total FTCU audit selections:

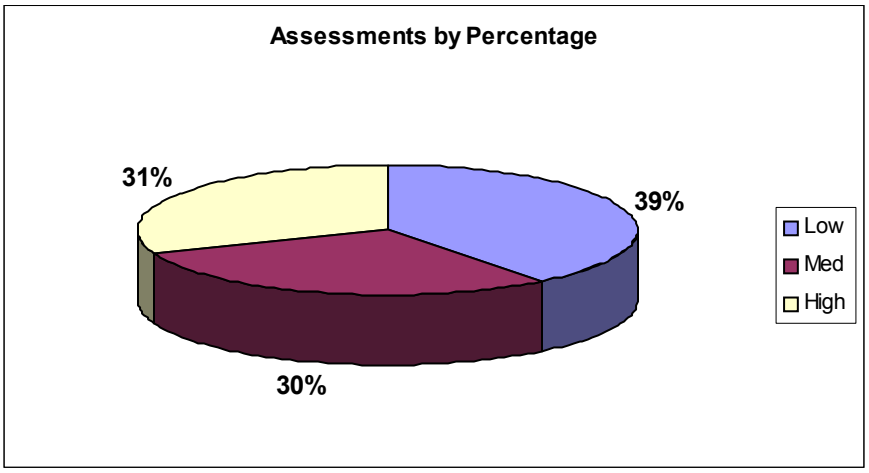
Figure 7: Composition of Account Selection by the FTCU:



The FTCU audited 26% high distance accounts, which is nearly identical to the minimum 25% standard of IFTA. Of stark contrast, however, was the 31% of audits comprised of low distance accounts. This is twice the recommended standard of 15%. This leaves a

remaining 43% of the total as middle distance accounts. The following graph depicts the resulting assessments according to account size:

Figure 8: FTCU Assessments According to Account Size:



To summarize, both low and high distance account audits produced a higher percentage of total assessments than their percentage of total audits performed. As expected, audits of low distance accounts revealed ample evasion. It is interesting to note that state auditors agree that high distance carriers have less opportunity to evade, but these findings reveal that this category had more evasion that expected.

From the total assessments generated by the FTCU, the average assessment per audit for each distance category can be determined. The average assessment for each category of account distance is as follows:

Low-distance audit assessment average–	$7391.82
Medium-distance audit assessment average –	$4017.46
High-distance audit assessment average -	$6810.51

It is interesting to note that the low distance category had the highest assessments, especially since according to IFTA standards this category of carriers is to be the focus of the fewest audits.

Using these average assessment figures, it is possible to estimate the total assessments of the FTCU or any agency had they used the recommendations of IFTA. It is also possible to estimate the total assessments based on different selection mix scenarios. Table 4 depicts the results of the FTCU audits, estimated IFTA audits, and three other possible scenarios.

Table 3: Different Audit Selection Scenarios:

	IFTA (15%-60%-25%)	FTCU (31%-43%-26%)	33%-33%-33%	40%-20%-40%	50%-0%-50%
LOW	$ 160,772.08	$ 332,631.88	$ 357,024.91	$ 428,725.56	$ 535,906.95
MED	$ 349,519.02	$ 249,082.44	$ 194,043.32	$ 116,506.34	$ 0
HIGH	$ 246,880.98	$ 258,799.44	$ 328,947.64	$ 395,009.58	$ 493,761.98
TOTAL	**$ 757,172.08**	**$ 840,513.76**	**$ 880,015.87**	**$ 940,241.48**	**$ 1,029,668.93**

An interesting trend is apparent when the total assessments from each category are inspected. The FTCU audit selection mix produced more assessments than the minimum standards of the IFTA regulations, nearly $100,000 in additional assessments to be specific. Since the low and high distance categories had higher average assessment figures, the more these two categories comprise the mix of accounts selected, the higher the possible assessment. Therefore, the highest assessment estimated by this method is derived from the selection mix in which 50% of audits are performed on low-distance accounts while the other 50% of audits are on high-distance accounts, with no middle distance audits. While any combination of a mix among low, middle, and high distance accounts could have been chosen for analysis, the representative scenarios depict the general trend. Although the minimum percentage for audits of low and high distance

accounts is regulated, the mix selected in addition to these minimum figures are devised by the agencies.

The major limitation of this analysis is that it is based on the FTCU audit database rather than the database of the Division of Road Fund Audits of the Kentucky Transportation Cabinet (KTC). The larger Kentucky Transportation Cabinet database and the databases from the Revenue Cabinet would produce a more accurate measure since they would span a much longer time span and a much broader data set. This would generate more reliable averages. Only the database from the FTCU was available for use in this study, but it is derived from the larger database and is therefore hopefully a representative sample. A reassuring factor is that the number of audits performed by the FTCU over its history is similar to a yearly amount of audits performed by Kentucky. The FTCU performed 145 fuel tax audits over its history while the Commonwealth of Kentucky performed 128 fuel tax audits in 2002. Hopefully, the FTCU averages can serve as a reasonably accurate measure of the statewide trends.

Conclusions and Recommendations

CONCLUSION: The FTCU was an effective audit enhancement initiative that has benefited the state with increased assessments and a greater knowledge concerning audit selection methods.

For the period studied, assessments produced by the FTCU were approximately equal to the costs of the program. However, because the major source of funding was federal TEA-21 funding, state Road Fund collections benefited from the existence of the program. Additionally, this program presented a unique opportunity to gain a better understanding of the entire auditing process associated with the transportation taxes of Kentucky. Also, because this was a supplemental auditing effort, audits could be

performed outside of the standards that bind the state Transportation and Revenue Cabinets and therefore additional insights regarding effective auditing procedures resulted.

RECOMMENDATION: The total audit selection mix employed by the FTCU, or other possible scenarios, should be considered by the state agencies that perform Road Fund audits and the International Fuel Tax Association.

State Road Fund auditors should perform analyses to ensure that the method of selecting a mix of low, middle, and high distance IFTA accounts is the most efficient. The Kentucky Transportation Cabinet reports that audit selection occurs according to the IFTA regulations (15% low-distance accounts, at least 25% high distance accounts). Although this analysis demonstrated that a 50 / 50 mix of low and high distance accounts would be the most profitable, this may not be the case from an analysis based on the statewide database and the exclusion of middle distance accounts is not feasible since evasion would most certainly increase in that category. The broader database of the Division of Road Fund Audits should undergo analysis to determine the optimal mix of account distance. If Kentucky, or other states, should find that other audit selection mix recommendations are more effective at producing assessments, the requirements of IFTA should be revisited and altered and periodically analyzed for their continued effectiveness.

RECOMMENDATION: Additional studies regarding indirect impacts of Road Fund related audits should be undertaken.

As noted in the study, it is assumed that there are indirect revenue benefits associated with increased auditing activities. As estimating such impacts was beyond the scope of this study, the estimated benefits of the program were probably underestimated. Future

research regarding such benefits would enhance efforts to determine optimum levels of audit selection.