Oregon
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Director's Office
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DATE: March 2, 2011

TO: House Revenue Committee

FROM: Gregg Dal Ponte, Administrator
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SUBJECT: Testing for Revenue Neutrality of Flat Fee Firms in Oregon

MEASURE: INFORMATIONAL
EXHIBIT: E
HOUSE REVENUE COMMITTEE
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SUBMITTED BY: GREGG DAL PONTE

Introduction

Oregon law requires that the Oregon Department of Transportation review flat fees paid by commercial motor carriers. The department is required to review those rates each even-numbered year and make a recommendation for any adjustments needed to each regular session of the Legislative Assembly.

Background

Commercial motor carriers generally pay a weight-mile tax (based on the miles driven and the weight of the load) to operate on public roads in Oregon. Oregon law allows for the use of an annual flat fee in lieu of the weight-mile tax for commercial motor carriers carrying certain qualifying commodities – namely logs, sand and gravel and wood chips or similar material. The flat fee option provides a more convenient method of reporting for motor carriers who use non-public or lesser-traveled public roads.

Oregon law requires the department to review flat fee rates each even-numbered year to determine if flat fee filers are paying what they would have paid had they reported and paid on a mileage and weight basis. In addition, the department is required by statute to report to the legislature and recommend any adjustments to the flat fee rates established in Oregon law to achieve revenue neutrality between the flat fee rates and weight-mile tax rates.

Findings/Recommendations

The flat fee study found that some carriers choosing to pay the flat fee paid more and some paid less than they would have by choosing to pay the weight-mile tax.

WOOD CHIPS: The 2009 data, with the 2009 rates with axles across the declared weight groups of the vehicles, shows that firms using the flat fee method paid $22,512.32 more than they would have paid on a mileage basis. This represents a 34.94 % overpayment.

SAND & GRAVEL: The 2009 data, with the 2009 rates with axle adjustments across the declared weight groups of the vehicles, shows that firms under the flat fee method paid $140,662.39 less than if they had used the mileage tax method. This represents a 20.45% underpayment. Vehicles with a declared weight of over 104,000 lbs. underpaid by $159,657.32.

LOGS: Using the 2009 rates, with axle adjustments and a combination of 2009 Oregon taxable miles based on a reporting practices analysis, and the assumption of 50% loaded/50% empty operating practices, results in an overpayment of $422,013.02, approximately 8.07%. Using the 2009 rates with axle adjustments and a combination of 2009 Oregon taxable miles based on a reporting practices analysis, and the assumption of 45% loaded/55% empty operating practices, results in an overpayment of $629,150.66, approximately 12.52%.

The whole idea of a flat fee involves estimation so it is unlikely we will ever see absolute parity. Rather, it is necessary to consider revision of tax rates as the study results trend over time. In this regard, comparing the 2007 data to the 2009 data it can be observed that the sand and gravel underpayment was reduced from $264,333.37 to $140,622.39 and the log flat fee results moved from a 2007 underpayment of $918,127.74 to a current overpayment of $422,013.02. The wood chips rate is very volatile since it involves a population of only twelve motor carriers; nevertheless, the gap was narrowed moving from a 2007 overpayment of $65,873.63 to a 2009 overpayment of only $22,512.32. Since flat fee tax rates along with weight mile tax rates were adjusted upwards effective October 2010 as a result of the 2009 Jobs and Transportation Act, and because of the uncertainty in motor carrier operations created by the economic downturn, it seems to make sense to continue with the current rates and monitor future changes since the current study indicates we're moving in the right direction and getting closer to parity.

Summary

The flat fee rates in Oregon law provide a convenient method of taxing those commodities that use lesser-traveled or non-public roads. In offering this convenience, the legislature has put in place assurances that revenue neutrality is maintained between the flat fee rates and weight-mile tax rates. ODOT does not recommend any changes to the flat fee rates as a result of the 2010 study.

Attachment: Testing for Revenue Neutrality of Flat Fee Firms in Oregon Report

TESTING FOR REVENUE NEUTRALITY OF FLAT FEE FIRMS IN OREGON (2009)

Final Report

Prepared by

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For the Oregon Department of Transportation
September 2010

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INTRODUCTION

Oregon generally imposes a mileage-based tax on heavy vehicles operating on public roads in the state. Within specific limitations, carriers of wood chips, sand and gravel and logs, may instead, elect to pay a "flat fee." Separate flat fee rates are provided for each of these commodity-types.

This analysis compares the amount of highway use tax paid by each group of flat fee taxpayers to the amount this group would have paid on a mileage basis to determine revenue neutrality across payment methods. The comparisons are made using current mileage rates applied to the 2009 reported data. The mileage rates have not changed since 2004.

EXECUTIVE SUMMARY

The comparisons yielded the following commodity-specific results:

WOOD CHIPS

- The 2009 data, with the 2009 rates with axles across the declared weight groups of the vehicles, shows that firms using the flat fee method paid $22,512.32 more than they would have paid on a mileage basis. This represents a 34.94 % overpayment.

SAND & GRAVEL

- The 2009 data, with the 2009 rates with axle adjustments across the declared weight groups of the vehicles, shows that firms under the flat fee method paid $140,662.39 less than if they had used the mileage tax method. This represents a 20.45% underpayment.

- Vehicles with a declared weight of over 104,000 lbs. underpaid by $159,657.32.

LOGS

- Using the 2009 rates, with axle adjustments and a combination of 2009 Oregon taxable miles based on a reporting practices analysis, and the assumption of 50% loaded/50% empty operating practices, results in an overpayment of $422,013.02, approximately 8.07%.

- Using the 2009 rates with axle adjustments and a combination of 2009 Oregon taxable miles based on a reporting practices analysis, and the assumption of 45% loaded/55% empty operating practices, results in an overpayment of $629,150.66, approximately 12.52%.

DATA ANALYSIS

Original Data Collection As part of its administrative function, the Oregon Department of Transportation (ODOT) staff collects and retains copies of Form 735-9189 (3-02), used by eligible motor carrier firms to report and submit their highway use taxes, using the flat fee method. Staff also makes an unaudited electronic entry of some of the information provided on these forms, including:

- the Motor Carrier Authority Number;
- the reporting period;
- the plate number from the vehicle used to haul flat fee commodities;
- the weight declared for each vehicle;
- the axle configuration;
- the commodity designated;
- Oregon miles reported;[1] and
- tax liability for the reporting period.

Staff has developed a data retrieval process that allows the assembly of the accumulated entries into a spreadsheet. This process was used to prepare the dataset for this study. Each entry is a line of information that comes from the Form 735-9189(3-02) or is appended from existing ODOT databases.

After extracting the flat fee entries, staff audited the spreadsheet for any apparent data entry errors. Questionable entries were verified against the original hardcopy documents. In some cases, information was missing from the entries and/or hardcopy documentation was incomplete. Staff logged these entries separately and set them aside with explanations. Staff then sorted the remaining entries that were adequate for analysis by qualifying commodity (Wood Chips, Sand & Gravel, or Logs) and saved them in an EXCEL file - "FF_for Consultant_2.xlsx" with worksheets labeled "HUS_FF_Chips", "HUS_FF_Sand" and "HUS_FF_Logs".

During the analysis phase of this study, multiple duplicate records were found in the spreadsheet records. Upon further investigation, it was determined that the duplicates had been generated during the downloading procedures from the "trucking on-line" application by staff. All of these duplicate records were removed from the files prior to the completion of the analysis.

Methodology for Analysis This analysis is derived from state's dataset. All of the available documentation for the dataset was reviewed, including the log of exceptions. From this dataset, commodity-specific files for 2009 were generated for Wood Chips, Sand and Gravel, and Logs.

The Mileage Tax Rates[2] tables provide the current rate schedule for each weight group used to calculate mileage taxes. Table 1 replicates the rate schedules necessary for this

[1] The only miles that are taxable are those that are run on the public roadways within Oregon.

analysis. The tax rates for the highest weight groups are sensitive to the number of axles reported, providing weight and axle configuration-specific rates.

TABLE 1 Mileage Rates by Weight Group

WEIGHT GROUPS		2009 rates	5 axles	6 axles	7 axles	8 axles	9 axles or more
26001	28000	0.0400					
28001	30000	0.0424					
30001	32000	0.0443					
32001	34000	0.0463					
34001	36000	0.0481					
36001	38000	0.0506					
38001	40000	0.0525					
40001	42000	0.0544					
42001	44000	0.0564					
44001	46000	0.0583					
46001	48000	0.0602					
48001	50000	0.0622					
50001	52000	0.0645					
52001	54000	0.0669					
54001	56000	0.0694					
56001	58000	0.0723					
58001	60000	0.0756					
60001	62000	0.0795					
62001	64000	0.0839					
64001	66000	0.0887					
66001	68000	0.0950					
68001	70000	0.1017					
70001	72000	0.1084					
72001	74000	0.1146					
74001	76000	0.1205					
76001	78000	0.1263					
78001	80000	0.1316					
80001	82000		0.1359	0.1243	0.1162	0.1104	0.1041
82001	84000		0.1403	0.1263	0.1181	0.1118	0.1055
84001	86000		0.1445	0.1292	0.1200	0.1132	0.1070
86001	88000		0.1494	0.1320	0.1219	0.1152	0.1084
88001	90000		0.1552	0.1354	0.1239	0.1171	0.1104
90001	92000		0.1619	0.1393	0.1257	0.1190	0.1123
92001	94000		0.1692	0.1431	0.1277	0.1209	0.1138
94001	96000		0.1769	0.1475	0.1301	0.1229	0.1156
96001	98000		0.1851	0.1528	0.1330	0.1249	0.1176
98001	100000			0.1585	0.1359	0.1272	0.1195
100001	102000				0.1388	0.1301	0.1215
102001	104000				0.1417	0.1330	0.1239
104001	105500				0.1455	0.1359	0.1263

[2] http://www.odot.state.or.us/forms/motcarr/reg/9225.pdf

The rates in Table 1 were used to conduct a series of explicit systematic simulations, using the verified data from 2009, to compare the effect of the flat fee payment method to the mileage payment method.

WOOD CHIPS ANALYSIS

Data In the "HUS_FF_Chips.xlsx" dataset, 44 lines of data pertain to firms eligible to haul chips under the flat fee payment method. The data assigns each firm a unique carrier number, the authority number. This number is associated with the carrier firm name. The dataset also includes the reporting period, the declared weight and the axle configuration for each vehicle reported on the forms.

According to the database of verified entries for 2009, firms hauling wood chips, using the flat fee method, reported a total of 494,065 miles. These eligible firms reported a total tax liability of $86,949.63, under the flat fee payment method.

WOOD CHIPS SIMULATION

The simulations are constructed as follows using "CHIPS_2009.xlsx".

The reported mileage for 2009 was multiplied by the current weight group rates, incorporating axle rate adjustments, to calculate the mileage tax owed in lieu of a flat fee payment. The total calculated amount is $64,437.31. Subtracting this amount from the total flat fee payment yields a $22,512.32 overpayment. This represents a 34.94% overpayment.

TABLE 2 Wood Chips Simulation Using 2009 Data

		Simulated Tax Paid	Difference	% over/(under)
Total Miles Reported	494,065			
Total Tax Liability	$86,949.63			
2009 rates w/axles		$64,437.31	$22,512.32	34.94%

FINDINGS:

Using 2009 data and the 2009 rates with the axle adjustments, firms hauling wood chips under the flat fee method paid $22,512.32 more than they would have paid on a mileage basis. This represents a 34.94% overpayment.

SAND and GRAVEL ANALYSIS

Data In the "HUS_FF_Sand.xlsx" dataset, 1157 lines of data pertained to the firms eligible to haul sand and gravel, using a flat fee payment method. The data assigns each firm a unique carrier number, the authority number. This number is associated with the carrier firm name. The dataset also includes the reporting period and the declared weight and axle configuration for each vehicle reported on the forms.

According to the database of verified entries, firms hauling sand & gravel, under the flat fee method, reported a total of 5,054,872 miles. These firms reported transmitting $547,009.87, under the flat fee payment method.

SAND and GRAVEL SIMULATION

The simulations are constructed as follows using "SAND&GRAVEL_2009.xls".

The reported mileage for 2009 was multiplied by the weight group rates for 2009 to calculate the mileage tax owed in lieu of a flat fee payment. The total calculated amount is $687,672.24. Subtracting this amount from the flat fee payment yields an underpayment of $140,662.39. This represents an underpayment of 20.45%.

Table 3 reports Sand and Gravel operations by weight group. There is a large variation in operating characteristics across the weight groups. As a result, some weight groups using the flat fee method are paying substantially more than they would have paid using the mileage method, while others are paying less. Those weight groups including 104,000 and less actually have an overpayment of $18,994.93, while the single group, over 104,000, has an underpayment of $159,657.32.

If the reported mileage used in the simulation includes off-road and/or out-of-state miles, there is a potential to over-state highway mileage. Table 4 is a sensitivity analysis to illustrate the effect of over-stated highway miles by the firms hauling sand & gravel and using the flat fee method. Two adjustments were made: 3% (97% of reported miles) and a 5% (95% of reported miles), based on professional judgment. Using the 2009 rate schedule and the identified 97% of the reported miles, flat fee firms paid $120,032.20 less than if they had paid using the mileage method. This represents a 17.99% underpayment.

TABLE 3 Sand & Gravel Operations by Weight Group for 2009*

Weight	Miles	Flat Fees Paid	Tax if Paid on Mileage	Difference	% Difference
28001_30	1,932	$907.50	$81.92	$825.58	1007.79%
46001_48	41,515	$6,246.64	$2,499.20	$3,747.44	149.95%
48001_50	35,088	$9,069.75	$2,182.47	$6,887.28	315.57%
50001_52	18,673	$2,828.32	$1,204.41	$1,623.91	134.83%
52001_54	5,061	$1,361.25	$338.58	$1,022.67	302.05%
54001_56	38,779	$11,202.95	$2,691.26	$8,511.69	316.27%
56001_58	24,685	$5,132.36	$1,784.73	$3,347.63	187.57%
58001_60	13,835	$3,327.50	$1,045.93	$2,281.57	218.14%
78001_80	292,861	$33,124.31	$38,540.51	($5,416.20)	(14.05%)
80001_82	1,720	$416.88	$233.75	$183.13	78.34%
82001_84	22,450	$1,694.00	$3,093.54	($1,399.54)	(45.24%)
84001_86	41,811	$9,039.65	$5,955.05	$3,084.60	51.80%
86001_88	132,685	$25,993.70	$18,184.20	$7,809.50	42.95%
88001_90	201,104	$24,347.33	$28,538.66	($4,191.33)	(14.69%)
94001_96	60,151	$4,844.00	$7,614.09	($2,770.09)	(36.38%)
96001_98	227911	$26,584.12	$30,438.61	($3,854.49)	(12.66%)
98001_100	136,482	$17,645.75	$18,482.63	($836.88)	(4.53%)
10001_102	58,274	$6,150.84	$8,012.38	($1,861.54)	(23.23%)
104+	3,699,855	$357,093.02	$516,750.34	($159,657.32)	(30.90%)
Total	5,054,872	$547,009.87	$687,672.26	($140,662.39)	(20.45%)

*Rounded

TABLE 4 Sensitivity Analysis for Sand & Gravel for 2009

	Miles	Flat Fees Paid	Tax if Paid on Mileage	Difference	% over/(under)
100% of Miles	5,054,872	$547,009.87	$687,672.26	($140,662.39)	(20.45%)
97% of Miles	4,903,226	$547,009.87	$667,042.09	($120,032.22)	(17.99%)
95% of Miles	4,802,128	$547,009.87	$653,288.65	($106,278.78)	(16.27%)

FINDINGS: Using 2009 data and applying 2009 rates, with axle adjustment, firms hauling sand and gravel under the flat fee paid $140,662.39 less than if they had paid using the mileage basis. This represents a 20.45% underpayment. Vehicles with a declared weight of over 104,000 lbs. had a calculated underpayment of $159,657.32.

LOGS ANALYSIS

Data In the "HUS_FF_Logs.xlsx" dataset, 12,958 lines of data pertain to firms eligible to haul logs using the flat fee method of taxation. The data assigns each firm a unique carrier number, the authority number. This number is associated with the carrier firm name. The dataset also includes the reporting period and the declared weight and axle configuration for each vehicle reported on the forms.

According to the database of verified entries for 2009, firms hauling logs, using the flat fee method, reported a total of 56,584,569 miles. These firms reported transmitting $5,653,702.60 under the flat fee payment method.

LOGS SIMULATION

The simulations are constructed as follows using "LOGS_100%_2009; LOGS_95%_2009; LOGS_90%_2009; LOGS_85%_2009; and LOGS_80%_2009":

Table 5 is a sensitivity analysis using three adjustments to illustrate the effect of over-stating highway miles: 5% (95% of reported miles); 10% (90% of reported miles); 15% (85% of reported miles); and 20% (80% of reported miles). Professional judgment expects the difference between off-road/out-of-state miles and total mileage to be approximately 15%.

The sensitivity analysis also quantifies the effect of loaded and empty mileage: 50% loaded and 50% empty; 45% loaded and 55% empty; 40% loaded and 60% empty; and 30% loaded and 70% empty.

It was necessary to quantify the effect of loaded and empty mileage because mileage based rates for loaded trucks are higher than they are for unloaded trucks. The 46,000 lbs. rate applies to "decked miles", while loaded trucks have higher declared weights. The sensitivity analysis illustrates the results of the different operating assumptions made in the paragraph above.

TABLE 5 Sensitivity Analysis for Logs for 2009*

	100% of miles	95% of miles	90% of miles	85% of miles	80% of miles
Miles	56,584,569	53,755,341	50,926,112	48,096,884	45,267,655
Flat Fee Liability	$5,653,702.60	$5,653,702.60	$5,653,702.60	$5,653,702.60	$5,653,702.60
50% loaded	$3,811,899.61	$3,621,304.63	$3,430,709.65	$3,240,114.67	$3,049,519.69
50% empty	$1,649,440.19	$1,566,968.18	$1,484,496.17	$1,402,024.16	$1,319,552.15
Total	$5,461,339.80	$5,188,272.81	$4,915,205.82	$4,642,138.83	$4,369,071.84
Difference	$192,362.80	$465,429.79	$738,496.78	$1,011,563.77	$1,284,630.76
% over/(under)	3.52%	8.97%	15.02%	21.79%	29.40%
45% loaded	$3,430,709.65	$3,259,174.17	$3,087,638.68	$2,916,103.20	$2,744,567.72
55% empty	$1,814,384.20	$1,723,664.99	$1,632,945.78	$1,542,226.57	$1,451,507.36
Total	$5,245,093.85	$4,982,839.16	$4,720,584.46	$4,458,329.77	$4,196,075.08
Difference	$408,608.75	$670,863.44	$933,118.14	$1,195,372.83	$1,457,627.52
% over/(under)	7.79%	13.46%	19.77%	26.81%	34.74%
40% loaded	$3,049,519.69	$2,897,043.70	$2,744,567.72	$2,592,091.73	$2,439,615.75
60% empty	$1,979,328.22	$1,880,361.81	$1,781,395.40	$1,682,428.99	$1,583,462.58
Total	$5,028,847.91	$4,777,405.51	$4,525,963.12	$4,274,520.72	$4,023,078.33
Difference	$624,854.69	$876,297.09	$1,127,739.48	$1,379,181.88	$1,630,624.27
% over/(under)	12.43%	18.34%	24.92%	32.27%	40.53%
30% loaded	$2,287,139.77	$2,172,782.78	$2,058,425.79	$1,944,068.80	$1,829,711.81
70% empty	$2,309,216.26	$2,193,755.45	$2,078,294.63	$1,962,833.82	$1,847,373.01
Total	$4,596,356.03	$4,366,538.23	$4,136,720.42	$3,906,902.62	$3,677,084.82
Difference	$1,057,346.57	$1,287,164.37	$1,516,982.18	$1,746,799.98	$1,976,617.78
% over/(under)	23.00%	29.48%	36.67%	44.71%	53.76%

*Rounded

Using the 2009 rate schedule, based on 100% of reported miles as taxable and an operating scenario of 45% loaded and 55% empty, flat fee firms paid $408,608.75 more than if they used the mileage basis. This represents a 7.79% overpayment.

REPORTING PRACTICES ANALYSIS

There are concerns regarding the reporting practices of the firms using the flat fee method. As mentioned previously, the reported miles are assumed to be the Oregon taxable miles. This assumption requires an eligible firm to calculate their total miles and then subtract all the off-road and out-of-state miles from their total miles. Professional judgment suggests it is unlikely that firms hauling logs would run 100% of their miles on road, given the nature of the business practices of hauling logs from the forest to the mill. The flat fee reports for logs should therefore show a difference between the total miles and the reported Oregon taxable miles over a year's worth of activity.

An audit of the actual reports (Form 735-9189(3-02)) was conducted to determine if firms hauling logs were reporting their Oregon taxable miles correctly. Incorrectly filled-in forms may contain the following errors: firm reports no miles (simply indicating their flat fee tax liability only); firm indicates the difference in the odometer readings and does not fill-in the total miles or the Oregon taxable miles; firm calculates and reports total miles and does not fill-in anything for the Oregon taxable miles; firm calculates the total miles but does not report total miles and reports their total miles as their Oregon taxable miles; or a firm calculates the total miles only and fill-ins both the total miles and the Oregon taxable miles with this same number. The correct procedure is to calculate the total miles from the difference in the odometer or hub meter readings (subtracting the ending readings from the beginning readings) and then subtract all off-road and out-of-state miles and report this number for their Oregon taxable miles.

Hard copies of the original filed reports were provided by ODOT staff and were reviewed to determine whether the forms used for reporting flat fee log activities were properly completed. The reporting practices analysis found that of the 12,958 lines in the database, 9,470 lines were correctly completed, approximately 73.08%.

The simulations were then rerun, using 100% of the taxable miles for those firms who filed correctly, and 85% (representing a 15% difference between total miles and Oregon taxable miles) of the taxable miles for the remaining firms. Firms providing no mileage information were noted as exceptions and set aside. Table 6 indicates the results using a combination of the correctly reported miles and 85% of the total miles of the remaining firms. Thus, in the analysis, firms reporting correctly are calculated at 100% of their reported Oregon miles, while firms reporting incorrectly are calculated at 85% of their total reported miles. The sum of these two calculations is intended to provide the most realistic set of findings for analyzing revenue neutrality for logs.

TABLE 6 Sensitivity Analysis Using Combined Miles for Logs for 2009

	Combination Miles
Miles	54,207,772
Taxes Liability	$5,653,702.60
50% loaded	$3,651,533.03
50% empty	$1,580,156.55
Total	$5,231,689.58
Difference	$422,013.02
% over/(under)	8.07%
45% loaded	$3,286,379.73
55% empty	$1,738,172.21
Total	$5,024,551.94
Difference	$629,150.66
% over/(under)	12.52%
40% loaded	$2,921,226.42
60% empty	$1,896,187.86
Total	$4,817,414.28
Difference	$836,288.32
% over/(under)	17.36%
30% loaded	$2,190,919.82
70% empty	$2,212,219.17
Total	$4,403,138.99
Difference	$1,250,563.61
% over/(under)	28.40%

FINDINGS:

Using the 2009 rates, with axle adjustments and a combination of 2009 Oregon taxable miles based on a reporting practices analysis, and the assumption of 50% loaded/50% empty operating practices, results in an overpayment of $422,013.02, approximately 8.07%. Changing the operating assumptions to 45% loaded/55% empty, results in an overpayment of $629,150.66, approximately 12.52%.

APPENDICES

APPENDIX A: Variables Used in Wood Chips Simulation

Variable Name	Source	Description
ID	ODOT	Unique number for record line
Authority Number	ODOT	Unique identification number for carrier
Reporting Period	ODOT	Month of operation tax is being reported
Plate	ODOT	License plate of truck, blank if trucks reported together as fleet
Axle Count	ODOT	Number of axles reported
Units	ODOT	If trucks reported as fleet, the number of trucks should be listed here (not always)
Declared Weight	ODOT	Weight category tax is declared
WMT_rate_axles	Report	Rate from Table 1 Mileage Rates by Weight Group
Tax Liability	ODOT	Tax paid, number field
Commodity	ODOT	Wood Chips
Oregon miles	ODOT	Miles driven in Oregon during reporting period
Checked	ODOT	True is record was looked up on original hard-copy report; False if not.
Implicit rate	ODOT	Calculated field to reveal base tax rate. $0.5083 for logs, $0.5042 for S&G, $2.0516 for chips for each 100lbs of declared weight. When base tax rate is incorrect, the tax report and record was looked up in the imaging system.
recalc	Report	Recalculated implicit rate as check
WMT_SIM	Calculation	WMT_rate * **Oregon miles**
DIFF	Calculation	**Tax Liability** – WMT_SIM
Comment	ODOT	Information provided by ODOT staff

Characteristics of data based on 44 lines of data

	Reported Miles	Reported Weight	Tax Liability
Total	494,065	*	$86,949.63
Average	11,229	96,200	$1,976.13
Median	11,844	96,000	$1,969.60
Standard Deviation	3,252	500	$26.09

* Not applicable

APPENDIX B: Variables Used in Sand and Gravel Simulation

Variable Name	Source	Description
ID	ODOT	Unique number for record line
Authority Number	ODOT	Unique identification number for carrier
Reporting Period	ODOT	Month of operation tax is being reported
Plate	ODOT	License plate of truck, blank if trucks reported together as fleet
Axle Count	ODOT	Number of axles reported
Units	ODOT	If trucks reported as fleet, the number of trucks should be listed here (not always)
Declared Weight	ODOT	Weight category tax is declared
WMT_rate_axles	Report	Rate from Table 1 Mileage Rates by Weight Group
Tax Liability	ODOT	Tax paid, number field
Commodity	ODOT	Sand & Gravel
Oregon miles	ODOT	Miles driven in Oregon during reporting period
Checked	ODOT	True is record was looked up on original hard-copy report; False if not.
Implicit rate	ODOT	Calculated field to reveal base tax rate. $0.5083 for logs, $0.5042 for S&G, $2.0516 for chips for each 100lbs of declared weight. When base tax rate is incorrect, the tax report and record was looked up in the imaging system.
recalc	Report	Recalculated implicit rate as check
WMT_SIM	Calculation	WMT_rate * **Oregon miles**
DIFF	Calculation	**Tax Liability** – WMT_SIM
97%_M	Calculation	(**Oregon miles** * .97)*WMT_rate
97%_D	Calculation	**Tax Liability** – 97%_M
95%_M	Calculation	(**Oregon miles** * .95)*WMT_rate
95%_D	Calculation	**Tax Liability** – 95%_M
Comment	ODOT	Information provided by ODOT staff

Characteristics of data based on 1,157 lines of data

	Reported Miles	Reported Weight	Tax Liability
Total	5,054,872	*	$547,009.87
Average	4,369	93,800	$472.78
Median	3,350	105,500	$531.89
Standard Deviation	3,744	18,400	$93.05

* Not applicable

APPENDIX C: Variables Used in Logs Simulation
100% of Reported Miles

Variable Name	Source	Description
ID	ODOT	Unique number for record line
Authority Number	ODOT	Unique identification number for carrier
Reporting Practice	Report	Recorded Oregon miles properly = 1; all else blank
Reporting Period	ODOT	Month of operation tax is being reported
Plate	ODOT	License plate of truck, blank if trucks reported together as fleet
Axle Count	ODOT	Number of axles reported
Units	ODOT	If trucks reported as fleet, the number of trucks should be listed here (not always)
Declared Weight	ODOT	Weight category tax is declared
rate_load	Report	Rate from Table 1 Mileage Rates by Weight Group
rate_empty	Report	Rate from Table 1 Mileage Rates for 46,000
Tax Liability	ODOT	Tax paid, number field
Commodity	ODOT	Logs
Oregon miles	ODOT	Miles driven in Oregon during reporting period
Checked	ODOT	True is record was looked up on original hard-copy report; False if not.
Implicit rate	ODOT	Calculated field to reveal base tax rate. $0.5083 for logs, checked in the imaging system.
recalc	Report	Recalculated implicit rate as check
load_sim	Calculation	(rate_load) *.5 * **Oregon miles**
empty_sim	Calculation	(rate_empty) * .5 * **Oregon miles**
total_sim	Calculation	(load_sim) + (empty_sim)
Diff	Calculation	**Tax Liability** – total_sim
load_45	Calculation	(rate_load) *.45 * **Oregon miles**
empty_55	Calculation	(rate_empty) * .55 * **Oregon miles**
total_45	Calculation	(load_45) + (empty_55)
Diff_45	Calculation	**Tax Liability** – total_45
load_4	Calculation	(rate_load) *.4 * **Oregon miles**
empty_6	Calculation	(rate_empty) * .6 * **Oregon miles**
total_4	Calculation	(load_4) + (empty_6)
Diff_4	Calculation	**Tax Liability** – total_4
load_3	Calculation	(rate_load) *.3 * **Oregon miles**
empty_7	Calculation	(rate_empty) * .7 * **Oregon miles**
total_3	Calculation	(load_3) + (empty_7)
Diff_3	Calculation	**Tax Liability** – total_3
Comment	ODOT	Information provided by ODOT staff

95% of Reported Miles

Variable Name	Source	Description
ID	ODOT	Unique number for record line
Authority Number	ODOT	Unique identification number for carrier
Reporting Practice	Report	Recorded Oregon miles properly = 1; all else blank
Reporting Period	ODOT	Month of operation tax is being reported
Plate	ODOT	License plate of truck, blank if trucks reported together as fleet
Axle Count	ODOT	Number of axles reported
Units	ODOT	If trucks reported as fleet, the number of trucks should be listed here (not always)
Declared Weight	ODOT	Weight category tax is declared
rate_load	Report	Rate from Table 1 Mileage Rates by Weight Group
rate_empty	Report	Rate from Table 1 Mileage Rates for 46,000
Tax Liability	ODOT	Tax paid, number field
Commodity	ODOT	Logs
95%_Oregon miles	Calculation	Miles driven in Oregon during reporting period * .95
Checked	ODOT	True is record was looked up on original hard-copy report; False if not.
Implicit rate	ODOT	Calculated field to reveal base tax rate. $0.5083 for logs, checked in the imaging system.
recalc	Report	Recalculated implicit rate as check
load_sim	Calculation	(rate_load) *.5 * **95%_Oregon miles**
empty_sim	Calculation	(rate_empty) * .5 * **95%_Oregon miles**
total_sim	Calculation	(load_sim) + (empty_sim)
Diff	Calculation	**Tax Liability** – total_sim
load_45	Calculation	(rate_load) *.45 * **95%_Oregon miles**
empty_55	Calculation	(rate_empty) * .55 * **95%_Oregon miles**
total_45	Calculation	(load_45) + (empty_55)
Diff_45	Calculation	**Tax Liability** – total_45
load_4	Calculation	(rate_load) *.4 * **95%_Oregon miles**
empty_6	Calculation	(rate_empty) * .6 * **95%_Oregon miles**
total_4	Calculation	(load_4) + (empty_6)
Diff_4	Calculation	**Tax Liability** – total_4
load_3	Calculation	(rate_load) *.3 * **95%_Oregon miles**
empty_7	Calculation	(rate_empty) * .7 * **95%_Oregon miles**
total_3	Calculation	(load_3) + (empty_7)
Diff_3	Calculation	**Tax Liability** – total_3
Comment	ODOT	Information provided by ODOT staff

90% of Reported Miles

Variable Name	Source	Description
ID	ODOT	Unique number for record line
Authority Number	ODOT	Unique identification number for carrier
Reporting Practice	Report	Recorded Oregon miles properly = 1; all else blank
Reporting Period	ODOT	Month of operation tax is being reported
Plate	ODOT	License plate of truck, blank if trucks reported together as fleet
Axle Count	ODOT	Number of axles reported
Units	ODOT	If trucks reported as fleet, the number of trucks should be listed here (not always)
Declared Weight	ODOT	Weight category tax is declared
rate_load	Report	Rate from Table 1 Mileage Rates by Weight Group
rate_empty	Report	Rate from Table 1 Mileage Rates for 46,000
Tax Liability	ODOT	Tax paid, number field
Commodity	ODOT	Logs
90%_Oregon miles	Calculation	Miles driven in Oregon during reporting period * .95
Checked	ODOT	True is record was looked up on original hard-copy report; False if not.
Implicit rate	ODOT	Calculated field to reveal base tax rate. $0.5083 for logs, checked in the imaging system.
recalc	Report	Recalculated implicit rate as check
load_sim	Calculation	(rate_load) *.5 * **90%_Oregon miles**
empty_sim	Calculation	(rate_empty) * .5 * **90%_Oregon miles**
total_sim	Calculation	(load_sim) + (empty_sim)
Diff	Calculation	**Tax Liability** – total_sim
load_45	Calculation	(rate_load) *.45 * **90%_Oregon miles**
empty_55	Calculation	(rate_empty) * .55 * **90%_Oregon miles**
total_45	Calculation	(load_45) + (empty_55)
Diff_45	Calculation	**Tax Liability** – total_45
load_4	Calculation	(rate_load) *.4 * **90%_Oregon miles**
empty_6	Calculation	(rate_empty) * .6 * **90%_Oregon miles**
total_4	Calculation	(load_4) + (empty_6)
Diff_4	Calculation	**Tax Liability** – total_4
load_3	Calculation	(rate_load) *.3 * **90%_Oregon miles**
empty_7	Calculation	(rate_empty) * .7 * **90%_Oregon miles**
total_3	Calculation	(load_3) + (empty_7)
Diff_3	Calculation	**Tax Liability** – total_3
Comment	ODOT	Information provided by ODOT staff

85% of Reported Miles

Variable Name	Source	Description
ID	ODOT	Unique number for record line
Authority Number	ODOT	Unique identification number for carrier
Reporting Practice	Report	Recorded Oregon miles properly = 1; all else blank
Reporting Period	ODOT	Month of operation tax is being reported
Plate	ODOT	License plate of truck, blank if trucks reported together as fleet
Axle Count	ODOT	Number of axles reported
Units	ODOT	If trucks reported as fleet, the number of trucks should be listed here (not always)
Declared Weight	ODOT	Weight category tax is declared
rate_load	Report	Rate from Table 1 Mileage Rates by Weight Group
rate_empty	Report	Rate from Table 1 Mileage Rates for 46,000
Tax Liability	ODOT	Tax paid, number field
Commodity	ODOT	Logs
85%_Oregon miles	Calculation	Miles driven in Oregon during reporting period * .95
Checked	ODOT	True is record was looked up on original hard-copy report; False if not.
Implicit rate	ODOT	Calculated field to reveal base tax rate. $0.5083 for logs, checked in the imaging system.
recalc	Report	Recalculated implicit rate as check
load_sim	Calculation	(rate_load) *.5 * **95%_Oregon miles**
empty_sim	Calculation	(rate_empty) * .5 * **95%_Oregon miles**
total_sim	Calculation	(load_sim) + (empty_sim)
Diff	Calculation	**Tax Liability** – total_sim
load_45	Calculation	(rate_load) *.45 * **85%_Oregon miles**
empty_55	Calculation	(rate_empty) * .55 * **85%_Oregon miles**
total_45	Calculation	(load_45) + (empty_55)
Diff_45	Calculation	**Tax Liability** – total_45
load_4	Calculation	(rate_load) *.4 * **85%_Oregon miles**
empty_6	Calculation	(rate_empty) * .6 * **85%_Oregon miles**
total_4	Calculation	(load_4) + (empty_6)
Diff_4	Calculation	**Tax Liability** – total_4
load_3	Calculation	(rate_load) *.3 * **85%_Oregon miles**
empty_7	Calculation	(rate_empty) * .7 * **85%_Oregon miles**
total_3	Calculation	(load_3) + (empty_7)
Diff_3	Calculation	**Tax Liability** – total_3
Comment	ODOT	Information provided by ODOT staff

80% of Reported Miles

Variable Name	Source	Description
ID	ODOT	Unique number for record line
Authority Number	ODOT	Unique identification number for carrier
Reporting Practice	Report	Recorded Oregon miles properly = 1; all else blank
Reporting Period	ODOT	Month of operation tax is being reported
Plate	ODOT	License plate of truck, blank if trucks reported together as fleet
Axle Count	ODOT	Number of axles reported
Units	ODOT	If trucks reported as fleet, the number of trucks should be listed here (not always)
Declared Weight	ODOT	Weight category tax is declared
rate_load	Report	Rate from Table 1Mileage Rates by Weight Group
rate_empty	Report	Rate from Table 1 Mileage Rates for 46,000
Tax Liability	ODOT	Tax paid, number field
Commodity	ODOT	Logs
80%_Oregon miles	Calculation	Miles driven in Oregon during reporting period * .95
Checked	ODOT	True is record was looked up on original hard-copy report; False if not.
Implicit rate	ODOT	Calculated field to reveal base tax rate. $0.5083 for logs, checked in the imaging system.
recalc	Report	Recalculated implicit rate as check
load_sim	Calculation	(rate_load) *.5 * **80%_Oregon miles**
empty_sim	Calculation	(rate_empty) * .5 * **80%_Oregon miles**
total_sim	Calculation	(load_sim) + (empty_sim)
Diff	Calculation	**Tax Liability** – total_sim
load_45	Calculation	(rate_load) *.45 * **80%_Oregon miles**
empty_55	Calculation	(rate_empty) * .55 * **80%_Oregon miles**
total_45	Calculation	(load_45) + (empty_55)
Diff_45	Calculation	**Tax Liability** – total_45
load_4	Calculation	(rate_load) *.4 * **80%_Oregon miles**
empty_6	Calculation	(rate_empty) * .6 * **80%_Oregon miles**
total_4	Calculation	(load_4) + (empty_6)
Diff_4	Calculation	**Tax Liability** – total_4
load_3	Calculation	(rate_load) *.3 * **80%_Oregon miles**
empty_7	Calculation	(rate_empty) * .7 * **80%_Oregon miles**
total_3	Calculation	(load_3) + (empty_7)
Diff_3	Calculation	**Tax Liability** – total_3
Comment	ODOT	Information provided by ODOT staff

Combination of Miles

Variable Name	Source	Description
ID	ODOT	Unique number for record line
Authority Number	ODOT	Unique identification number for carrier
Reporting Practice	Report	Recorded Oregon miles properly = 1; all else blank
Reporting Period	ODOT	Month of operation tax is being reported
Plate	ODOT	License plate of truck, blank if trucks reported together as fleet
Axle Count	ODOT	Number of axles reported
Units	ODOT	If trucks reported as fleet, the number of trucks should be listed here (not always)
Declared Weight	ODOT	Weight category tax is declared
rate_load	Report	Rate from Table 1 Mileage Rates by Weight Group
rate_empty	Report	Rate from Table 1 Mileage Rates for 46,000
Tax Liability	ODOT	Tax paid, number field
Commodity	ODOT	Logs
OM&85%	Calculation	Oregon miles or 85% of total reported miles
Checked	ODOT	True is record was looked up on original hard-copy report; False if not.
Implicit rate	ODOT	Calculated field to reveal base tax rate. $0.5083 for logs, checked in the imaging system.
recalc	Report	Recalculated implicit rate as check
load_sim	Calculation	(rate_load) *.5 * **OM&85% miles**
empty_sim	Calculation	(rate_empty) * .5 * **OM&85% miles**
total_sim	Calculation	(load_sim) + (empty_sim)
Diff	Calculation	**Tax Liabilty** – total_sim
load_45	Calculation	(rate_load) *.45 * **OM&85% miles**
empty_55	Calculation	(rate_empty) * .55 * **OM&85% miles**
total_45	Calculation	(load_45) + (empty_55)
Diff_45	Calculation	**Tax Liabilty** – total_45
load_4	Calculation	(rate_load) *.4 * **OM&85% miles**
empty_6	Calculation	(rate_empty) * .6 * **OM&85% miles**
total_4	Calculation	(load_4) + (empty_6)
Diff_4	Calculation	**Tax Liabilty** – total_4
load_3	Calculation	(rate_load) *.3 * **OM&85% miles**
empty_7	Calculation	(rate_empty) * .7 * **OM&85% miles**
total_3	Calculation	(load_3) + (empty_7)
Diff_3	Calculation	**Tax Liabilty** – total_3
Comment	ODOT	Information provided by ODOT staff

Characteristics of data based on 12,958 lines of combined data

	Reported Miles	Reported Weight	Tax Liability
Total	54,207,772	*	$5,659,355.28
Average	4,183	85,800	$436.31
Median	4,110	80,000	$406.67
Standard Deviation	2,186	7,500	$40.00

* Not applicable