

IMPACTS OF DIESEL AND INSURANCE COSTS ON OWNER-OPERATOR LOG TRUCK DRIVERS IN THE WESTERN GULF

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ABSTRACT

After felling, skidding, delimbing and often topping, and merchandizing of trees, logs must be loaded onto a truck for the hauling of that raw woody resource to a mill. This analysis focuses on owner-operator truck drivers, or self-employed drivers, and looks at the impacts of costs per gallon of diesel (\$3, \$4, \$5, and \$6 per gallon), different log truck annual insurance rates (\$10,000, \$15,000, and \$22,000), along with basic assumptions about hauling conditions and maintenance costs, and varying rates of salary received per load (\$0.13 to \$0.23 per ton per loaded mile, by \$0.02 increments) on the net annual revenue of an average log truck driver. For a common rate of \$0.19 per ton per loaded mile, and two assumed log truck routes, diesel per gallon increases from \$3 to \$4, \$5, and \$6 reduced net annual revenues by up to 16.0, 31.9, and 47.9 percent, respectively. In all cases, reductions were greatest when annual insurance costs were \$22,000.

INTRODUCTION

Forestry is a large business in the Southeastern United States and a vital component is regular harvesting to capture the growth, yield, and value of the trees. Forest harvesting, or logging, is extremely important to the fiber supply chain, allowing landowners to conduct management on their property and to receive financial compensation for their capital investment, while providing fiber to processing facilities that convert the raw woody resource into wood products.

After the felling, skidding, delimbing and often topping, and merchandizing of trees, the logs must be loaded onto a truck for hauling or transport of that raw woody resource to a mill. The hauling and transport component, or the trucking component, is vital to the forest harvesting process (Conrad 2018, 2021). Many loggers believe the costliest component of harvesting operations is trucking, and several studies have also shown this to be true (Conrad 2018, 2023; Conrad and others 2018; McConnell 2020). This is particularly true in recent years as truck insurance and diesel fuel costs have been rising at rapid rates. Additionally, the financial

difficulties associated with trucking can increase with lower value wood products (e.g., hauling pulpwood versus hauling sawlogs) (Grebner and others 2005).

Mills commonly pay a haul rate that is calculated per ton per loaded mile. Typically, there is a minimum haul distance, often 40 miles (TimberMart-South 2022, VanderSchaaf and others 2023), and the log truck owner is paid this rate for deliveries at distances up to the minimum haul distance. The minimum haul distance varies depending on local market conditions; in the Gulf region of the Southern United States, at the current time, common minimum haul distances are 30, 40, or 50 miles.

The minimum haul distance is used to compensate the log truck owner for the disproportionate amount of time spent loading and unloading on short hauls. On longer hauls, the log truck owner receives the minimum haul rate multiplied by the minimum haul distance, plus an incremental haul rate multiplied by the incremental haul distance [equation (1)]. The incremental haul rate may be the same, higher than, or less than the minimum haul rate.

$$P = T_D \times HD_M \times HR_M + T_D \times HD_I \times HR_I \quad (1)$$

where

P = mill payment for timber transportation, dollars per ton per loaded mile

T_D = tons of payload delivered

HD_M = minimum haul distance (loaded miles)

HR_M = minimum haul rate (dollars per ton per loaded mile)

HD_I = incremental haul distance (loaded miles)

HR_I = incremental haul rate (dollars per ton per loaded mile)

This analysis is focused exclusively on owner-operator, or independent contract drivers, and hence drivers that are self-employed. In most cases, these drivers pay for the truck and trailer (and other necessary accessories such as straps or chains), insurance for the truck and trailer, licensing, maintenance, fuel, mandatory professional training, salary, fringe benefits such as health insurance, and retirement.

However, in some cases the owner-operator only owns the truck (or cab or tractor), and thus the contractor (the driver) uses the contractee's (i.e., logger's) trailer. I focused on the situation where the owner-operator owns both the truck and trailer. Additionally, I did not focus on log truck drivers who are employed directly by a logging company (i.e., a fleet truck), and hence are generally not directly financially responsible for the purchase, maintenance, licensing, and fuel of the truck and trailer. Both types of drivers (owner-operator and employed) are common in the Southeastern United States. For instance, Conrad (2023) reported that 36 percent of timber harvested across much of the Southeastern United States was hauled by owner-operator log truck drivers.

VanderSchaaf and others (2023) described several ways in which log truck drivers receive compensation. This analysis concentrated on those cases where a driver is paid using the per ton per loaded mile approach (their Approach 2). Basically, this type of compensation only

applies when the trailer is loaded with raw woody unprocessed products and heading to the mill [e.g., loaded miles in equation (1)]; hence, the driver is not directly compensated for the return trip from the mill. With this approach, a driver receives revenue not only for the weight (tons), but also the distance (miles). Thus, more revenue is received for heavier loads transported greater distances.

This compensation approach has several advantages for the log truck driver. For instance, the number of daily loads is not a consideration; longer hauls do not penalize the driver. If a driver is paid exclusively by the number of daily loads, longer hauls will reduce payment to the driver unless the pay rate is adjusted accordingly. For the most part, the value of the timber (e.g., pulpwood versus sawtimber) doesn't impact driver compensation. Owner-operators typically receive the entire haul rate paid by the mill and must use the haul rate to cover fuel, maintenance, truck payments, in addition to a personal salary and fringe.

When using the dollars-per-ton-per-loaded-mile payment approach, the driver is paid for driving the minimum haul distance even if the actual distance is less. If the actual haul distance exceeds the minimum haul distance, then the driver is paid an additional incremental haul rate for the distance traveled beyond that minimum haul distance (Conrad 2021). For owner-operators, rates near the end of 2022 varied from around \$0.16 to \$0.22 per ton per loaded mile.

This analysis looked at the impacts of different costs of diesel per gallon (\$3, \$4, \$5, and \$6 per gallon), different log truck annual insurance rates (\$10,000, \$15,000, and \$22,000), and two haul distances (40 and 60 miles, given a 50-mile minimum haul distance), along with basic assumptions about hauling conditions and maintenance costs, and varying rates of salary received per load (\$0.13 to \$0.23 per ton per loaded mile, by \$0.02 increments) on the average net annual revenues of a log truck driver. Conrad (2023) reports that log truck insurance costs and fuel costs were the two most important hauling factors of logging businesses across the Southeastern United States.

METHODS

Hauling Conditions

Many factors beyond those examined (cost of diesel and insurance, haul distance, and pay rate) can impact net annual revenues of owner-operators. These factors include legal gross vehicle weight (GVW) and tare weight of the truck and trailer (the weight of the trailer when empty). Load height and even load length restrictions can occasionally impact payloads and log truck routing (e.g., underpass heights may limit the ability of a truck to pass under when loaded). Other factors include type of trailer (four-bolster versus pole trailer), whether payments are still being made on the truck and trailer, mechanic hourly rates, type of road condition and maintenance (unpaved woods roads, county or parish roads, four-lane State roads, interstates). Additional concerns are title and licensing fees, and number of weeks, days, and hours per day worked. Weather is another important factor in terms of travel speed, but also weather frequently limits access to logging sites; however, this analysis did not address the impacts of weather directly.

For this analysis, it was assumed the owner-operator owned both the truck and trailer outright and hence no payments were made for these vehicles. However, licensing and taxes were assumed to cost \$5,550 annually. Further, it was assumed the driver had purchased a harvest permit and thus a constant maximum GVW of 88,000 pounds was assumed [the legal GVW for a truck and trailer in Mississippi beginning in July of 2023 (Section 63-5-33)]. I assumed a day cab truck and thus a weight of 19,000 pounds, and the use of a drop-center four-bolster trailer that weighed 10,000 pounds. Hence, the tare weight of the truck and trailer was 29,000 pounds and for simplicity I assumed each haul contained a payload of 59,000 pounds (29.5 tons). It was assumed no overloading or underloading at the logging site occurred.

Loading, Unloading, In Route Delays, and Daily Routine Service

The amount of time required to be loaded at the logging site (woods wait) and the amount of time required to be unloaded at the wood processing facility (mill wait) were other factors (Conrad 2023). The woods wait and mill wait were both assumed to be 30 minutes, thus 60 minutes in total per haul trip. Delays for various reasons are another consideration; 30 minutes in total per haul trip was assumed for both in-route delays and daily routine service. Thus, in total, 90 minutes were needed per haul trip for loading, unloading, delays, and daily service.

Log Truck Routes, Fuel Costs, Repair and Maintenance Costs, Insurance Costs, and Licensing and Taxes

Table 1 contains the amount of time spent on each category of road type; the time required depends on the average miles per hour (mph) and distance traveled per category of road type. Based on a combination of personal observation and Conrad (2023), the haul distances used in this analysis of 40 and 60 miles are reasonable for Mississippi. Miles per gallon differs by road condition. An approach described in Grebner and others (2005) was used to estimate annual repair and maintenance costs; however, costs and rates have been updated for the current economic situation and inflation. A constant rate per mile was assumed for four categories on the truck and trailer: brakes, tires, normal maintenance, and minor repairs (table 2). Relative rates of damage and need for repair were assigned to each category of road type. Then, a final estimate of repair and maintenance costs per haul trip was obtained by taking into account the number of miles a truck traveled in each category of road type (table 1) and the associated repair and maintenance costs per mile per trip (tables 2 and 3). Additional maintenance costs included such things as diesel exhaust fluid.

Table 1—Number of miles per road type, average travel speed (miles per hour), number of minutes spent traveling on each road type, and miles per gallon of diesel when fully loaded and unloaded

Load	Road type	Log truck route 1				Log truck route 2			
		Miles	Speed	Travel	Fuel	Miles	Speed	Travel	Fuel
Fully loaded	Forest	0.5	8.0	3.8	2.0	0.5	8.0	3.8	2.0
	Gravel county road	0.0	30.0	0.0	2.8	3.5	30.0	7.0	2.8
	Paved county road	0.0	40.0	0.0	3.6	1.0	40.0	1.5	3.6
	Two-lane highway	31.5	50.0	37.8	5.0	0.0	50.0	0.0	5.0
	Limited access highway	5.0	60.0	5.0	5.0	46.0	60.0	46.0	5.0
	Federal interstate	0.0	65.0	0.0	6.0	0.0	65.0	0.0	6.0
	Urban street	3.0	20.0	9.0	2.3	9.0	20.0	27.0	2.3
Total		40.0	48.5	55.6	4.5	60.0	51.5	85.3	4.0
Unloaded	Forest	0.5	8.8	3.4	2.2	0.5	8.8	3.4	2.2
	Gravel county road	0.0	33.0	0.0	3.0	3.5	33.0	6.4	3.0
	Paved county road	2.0	44.0	2.7	3.6	1.0	44.0	1.4	3.6
	Two-lane highway	1.0	55.0	1.1	6.0	0.0	55.0	0.0	6.0
	Limited access highway	3.0	66.0	2.7	6.0	46.0	66.0	41.8	6.0
	Federal interstate	30.5	70.0	26.1	6.0	0.0	70.0	0.0	6.0
	Urban street	3.0	22.0	8.2	2.5	9.0	22.0	24.5	2.5
Total		40.0	63.7	44.3	5.2	60.0	56.6	77.5	4.6

Two-lane highway = State or Federal two-lane highway; Limited access highway = four lanes, noninterstate; Federal interstate = 80,000 pounds gross vehicle weight restriction.

Table 2—Maintenance costs per mile by category and road type

Category	Per mile	Limited access	Forest road	Graveled county	Paved county	State/Fed two lane	Urban streets	Federal interstate
	<i>Dollars</i>	<i>Percentage</i>						
Brakes	0.06	100	200	150	150	125	150	100
Tires	0.17	100	200	150	175	100	100	100
Normal maintenance	0.02	100	200	175	150	125	125	125
Minor repairs	0.03	100	200	150	150	100	125	100

Limited access = limited access highway (four lanes, noninterstate); State/Fed two lanes = State or Federal two-lane highway; Federal interstate = Federal interstate (80,000 pounds gross vehicle weight restriction).

Table 3 contains various estimates of driver performance, total fuel cost, and maintenance costs for each truckload and annually for each of the two log truck routes. The total maintenance costs (when loaded and unloaded) given market conditions in 2022, were higher than those reported in Leslie and Murray (2022). However, their reported costs may not be overly indicative of maintenance costs for log trucks. Three rates of annual insurance costs were assumed (\$10,000,

\$15,000, and \$22,000). The \$10,000 annual cost could be considered representative for drivers with 3 or more years of experience while the \$22,000 annual cost could be considered representative of a new authority, or a new driver with limited or no experience. These costs are comparable to those reported in Conrad (2023) for trucks within fleets of logging businesses. However, often insurance premiums are higher for owner-operators. Thus, currently,

depending on the situation, annual tractor-trailer insurance costs for owner-operators may actually exceed \$22,000. As mentioned, costs of \$1,600, \$3,500, and \$450 were assumed annually for licensing, ad valorem taxes, and heavy use tax, respectively (Grebner and others 2005); these costs are likely conservative.

Hours Worked Annually and Minimum Haul Distance

It was assumed the driver worked 51 weeks per year, 5 days per week, and 10 hours per day. A minimum haul distance of 50 miles was assumed [HD_M in equation (1)], and two haul distances were examined: 40 (log truck route 1) and 60 (log truck route 2) miles. Thus, 40 miles was less than the minimum haul distance and 60 miles was greater than the minimum haul distance. For the haul distance of 60 miles, the incremental haul rate was \$0.01 more than the minimum haul rate [HR_M in equation (1)]. Table 3 contains estimates

of the number of haul trips per day and annually for each of the two log truck routes. Table 4 presents total costs per load and annually for each log truck route.

Salary Rate

For the 50-mile minimum haul distance, compensation to the log truck driver ranged from \$0.13 to \$0.23 per ton per loaded mile, by \$0.02 increments. For the 60-mile route, each additional mile beyond the minimum haul distance of 50 miles received an additional cent, \$0.01, per ton per loaded mile. Hence, the incremental haul rate ranged from \$0.14 to \$0.24 per ton per loaded mile, by \$0.02 increments.

RESULTS AND DISCUSSION

Figures 1 and 2 provide relative comparisons of net annual revenues that could be received given assumptions utilized during this assessment. The

Table 3—Individual load and annual summary values by log truck route

Factor	Per load		Annual	
	Route 1	Route 2	Route 1	Route 2
Miles	40	60	32,240	36,320
Hours driving loaded	0.93	1.42	746	860
Hours driving unloaded	0.74	1.29	595	782
Average speed loaded (miles per hour)	48.48	51.48	—	—
Average speed unloaded (miles per hour)	63.66	56.63	—	—
Hours spent not driving	1.50	1.50	1,209	908
Hours spent driving	1.66	2.71	1,341	1,642
Total time per trip	3.16	4.21	2,550	2,550
Trips per day worked	3.16	2.37	806	605
Trips per week worked	15.80	11.87	—	—
Maintenance costs loaded	\$12.10	\$18.01	\$9,750.44	\$10,903.71
Maintenance costs empty	\$12.01	\$18.01	\$9,675.88	\$10,903.71
Diesel at \$3 per gallon	\$49.76	\$83.49	\$40,107.18	\$50,538.50
Diesel at \$4 per gallon	\$66.35	\$111.32	\$53,476.23	\$67,384.66
Diesel at \$5 per gallon	\$82.94	\$139.15	\$66,845.29	\$84,230.83
Diesel at \$6 per gallon	\$99.52	\$166.98	\$80,214.35	\$101,076.99
Percentage miles on woods roads	1.25	0.83	—	—

Log truck route 1 = 40-mile haul; log truck route 2 = 60-mile haul.

Table 4—Total cost per load and annually for each route (40 or 60 miles) by cost of diesel per gallon and annual insurance cost (\$10,000, \$15,000, and \$22,000)

			Annual insurance cost		
Rate	Route	Diesel cost per gallon	\$10,000	\$15,000	\$22,000
~~~~~Dollars~~~~~					
Per load	1 (40 miles)	3	93.16	99.36	108.05
		4	109.74	115.95	124.63
		5	126.33	132.54	141.22
		6	142.92	149.12	157.81
	2 (60 miles)	3	145.20	153.46	165.02
		4	173.03	181.29	192.85
		5	200.86	209.12	220.68
		6	228.69	236.95	248.51
Annual	1 (40 miles)	3	75,083.49	80,083.49	87,083.49
		4	88,452.55	93,452.55	100,452.55
		5	101,821.61	106,821.61	113,821.61
		6	115,190.67	120,190.67	127,190.67
	2 (60 miles)	3	87,895.92	92,895.92	99,895.92
		4	104,742.08	109,742.08	116,742.08
		5	121,588.25	126,588.25	133,588.25
		6	138,434.41	143,434.41	150,434.41

net annual revenues assumed the truck (tractor or cab) and trailer were owned free and clear. These net revenues would be greatly reduced if the price of a new truck and trailer were included. The impact would depend on the manufacturer, whether a day cab or sleeper cab

was purchased, financing, down payment, time since purchase, and tax depreciation provisions. Net annual revenues would also be reduced if the purchase price of used vehicles were included, but of course, to a lesser extent. Similarly, the costs for the used truck and trailer would depend

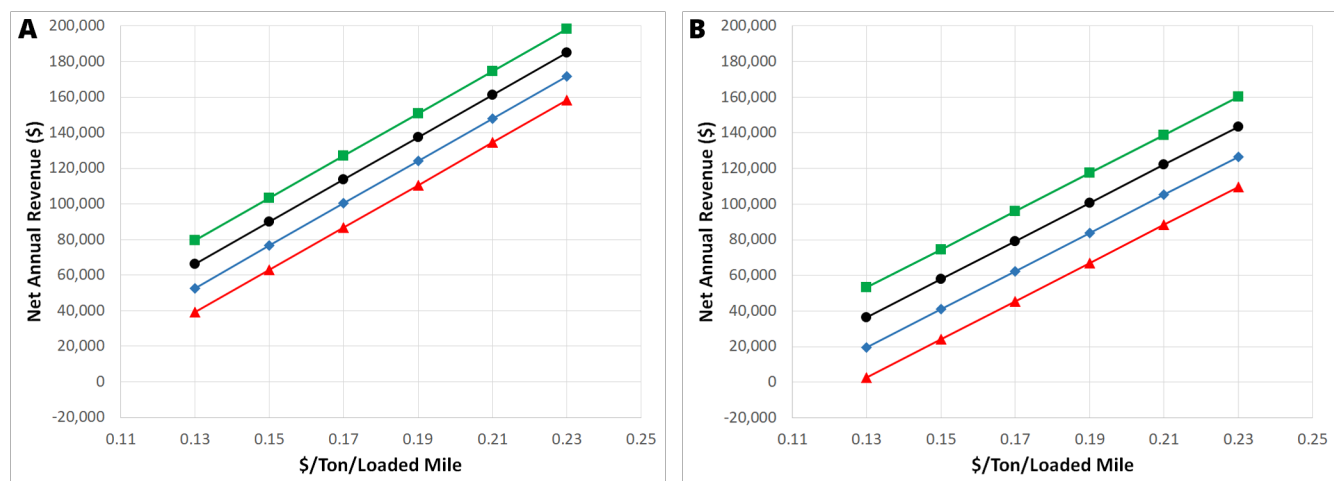


Figure 1—Log truck driver net annual revenue by dollars per ton per loaded mile revenue and cost of diesel per gallon [green line (squares) = \$3; black line (circles) = \$4; blue line (diamonds) = \$5; and red line (triangles) = \$6]. (A) is for log truck route 1 (40-mile haul, payment is based on the minimum haul distance of 50 miles) and (B) is for log truck route 2 (60-mile haul). Assumed annual insurance cost of \$10,000.

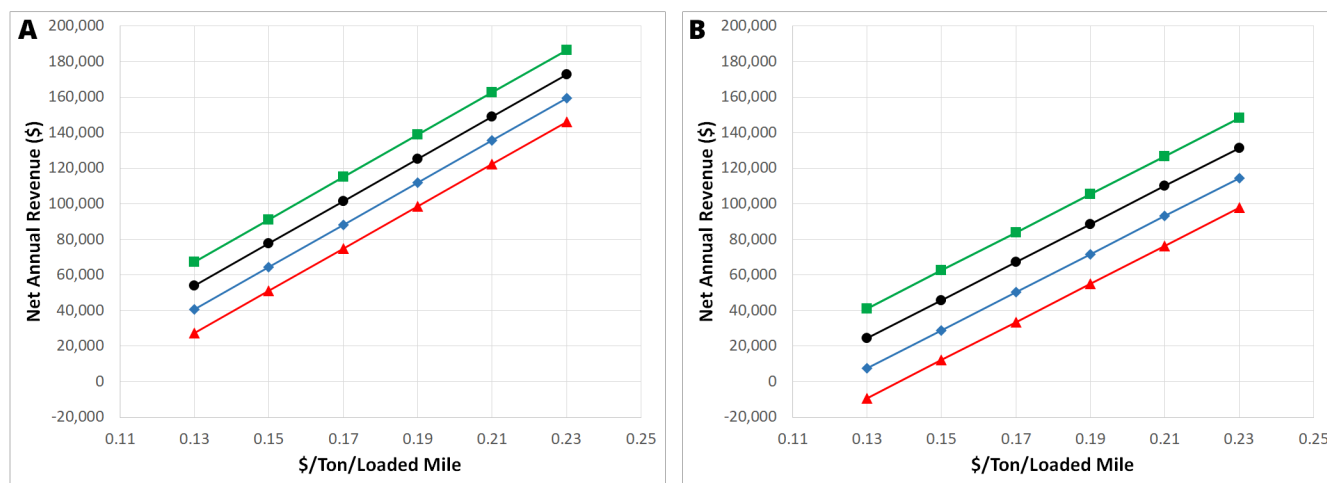


Figure 2. Log truck driver net annual revenue by dollars per ton per loaded mile revenue and cost of diesel per gallon [green line (squares) = \$3; black line (circles) = \$4; blue line (diamonds) = \$5; and red line (triangles) = \$6]. (A) is for log truck route 1 (40-mile haul, payment is based on the minimum haul distance of 50 miles) and (B) is for log truck route 2 (60-mile haul). Assumed annual insurance cost of \$22,000.

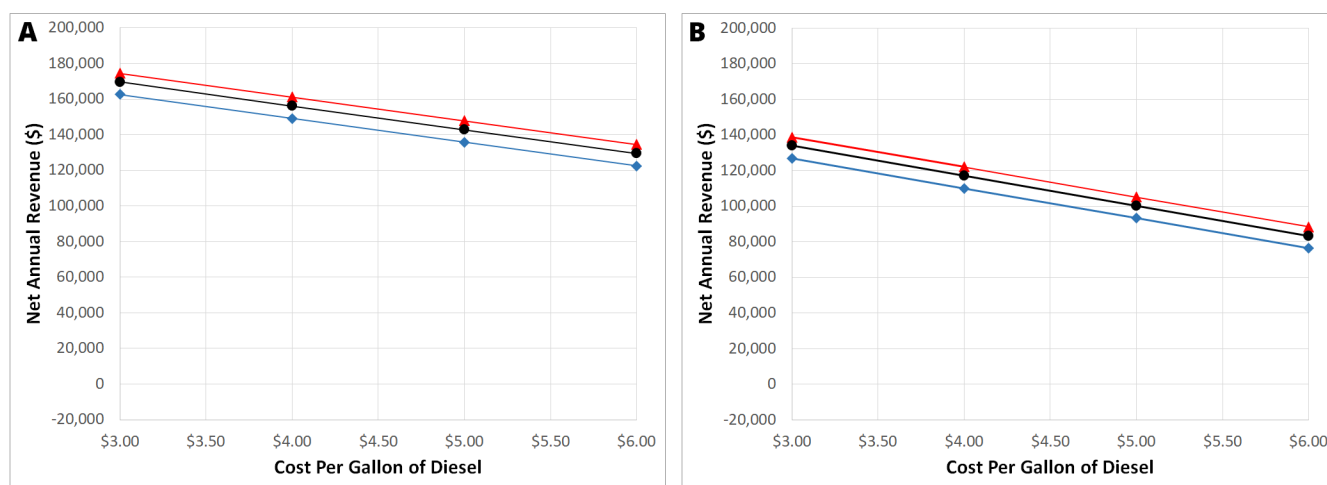


Figure 3— Log truck driver net annual revenue by cost of diesel per gallon for three rates of annual insurance cost [red line (triangles) = \$10,000; black line (circles) = \$15,000; and blue line (diamonds) = \$22,000] for dollars per ton per loaded mile revenue = \$0.21]. (A) is for log truck route 1 (40-mile haul, payment is based on the minimum haul distance of 50 miles) and (B) is for log truck route 2 (60-mile haul).

on the manufacturer, age, miles driven, condition of the vehicle, time since purchase, and any down payment.

When using the dollars-per-ton-per-loaded-mile compensation approach, an important consideration is the loading time and waiting time at the mill, or turn-times (Conrad 2021, 2023). Notice in equation (1) that there was no direct consideration for time. If a driver perpetually waits for extended times at the harvesting site or at the mill, net annual revenues can be reduced by meaningful amounts. For instance, for the 40-mile haul, if a driver waits an extra 30 minutes both at the harvesting site and the mill (one more hour in total per load), and they still only want to work 10 hours per day, essentially one trip is

lost per day (2.40 rather than 3.16 loads per day as in table 3). The time per load is then increased from 3.16 to 4.16 hours. In order to reach 3.16 trips per day, the driver would need to work 13 hours per day. Activities that can reduce waiting times are very beneficial to owner-operator drivers when they are paid using the dollars-per-ton-per-loaded-mile approach; more driving time means more revenue.

For a common rate of \$0.19 per ton per loaded mile, when assuming no direct payments for the vehicles, and for the 60-mile haul (log truck route 2), diesel per gallon increases from \$3 per gallon to \$4, \$5, and \$6 reduced net annual revenues by up to 16.0, 31.9, and 47.9 percent, respectively (figs. 1 and 2). For the 40-mile haul (log truck route 1),

diesel per gallon increases from \$3 per gallon to \$4, \$5, and \$6 reduced net annual revenues by up to 9.6, 19.3, and 28.9 percent, respectively. When using a rate of \$0.21 per ton per loaded mile (figs. 1–3), when assuming no direct payments for the vehicles themselves, for the 60-mile haul, diesel per gallon increases from \$3 per gallon to \$4, \$5, and \$6 reduced salaries by up to 13.3, 26.6, and 39.8 percent, respectively. For the 40-mile haul, diesel per gallon increases from \$3 per gallon to \$4, \$5, and \$6 reduced salaries by up to 8.2, 16.4, and 24.7 percent, respectively. In all cases the greatest reductions were seen when annual insurance costs were \$22,000. Higher insurance rates exacerbate the problem of higher diesel prices by increasing overall costs.

It should be realized that net annual revenue estimates must also pay for fringe benefits such as health and dental insurance, retirement, and social security payments. Hence, the net annual revenues could be reduced by 33 percent or more to account for such factors.

This assessment is an initial attempt to gain knowledge about optimal haul rates for log truck owner-operators in Mississippi given current market conditions. At the current time, common rates of dollars per ton per loaded mile are probably \$0.19 and \$0.20. An important caveat for future analyses is that more realistic reductions in loads per day should be considered. For instance, a driver can't drive 3.16 trips per day; this should be rounded down to 3 trips per day. When fuel costs increase, in particular, but other expenses as well, often logging businesses and mills will temporarily adjust their contract owner-operator haul rates. However, adjustment response times often vary across the businesses and mills, and hence this can be detrimental to owner-operator log truck drivers, perhaps leading them to or causing them to find employment elsewhere. Given the fairly strong reliance on owner-operator log truck drivers to haul wood in the Southeastern United States (Conrad 2023), temporary haul rate adjustments can be extremely important.

## CONCLUSIONS

The cost of diesel can have substantial impacts on log truck driver net annual revenue, and the

problem is exacerbated by increasing annual vehicle insurance costs as well as the impact of inflation on all aspects of operating a log truck. It is important that legislation is passed and that policies are implemented that maintain reasonable diesel costs. As diesel increases to \$5 or \$6 a gallon, revenues become extremely marginal and this will likely lead to the use of older vehicles, less routine maintenance, and potentially for the hauling of payloads in excess of what would be legal given the 88,000 GVW maximum. These situations are not only dangerous for the drivers themselves, but also for the general public. In addition to safety concerns, we should all be concerned about log truck driver net annual revenues because without the log truck component of the wood supply chain, landowners will likely have very limited forest management options and abilities to generate revenues from their capital investments. Further yet, the wood supply for mills that produce wood products demanded by society will be substantially decreased or even eliminated.

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