Why Do Long Distance Truck Drivers Work Extremely Long Hours?

Trucking Industry Research Committee
Truck and Bus Safety Committee
Transportation Research Board
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Research Suggests Link between Pay and Safety

- **Belzer, Michael H.; Daniel A. Rodriguez and Stanley A. Sedo.** 2002. "Paying for Safety: An Economic Analysis of the Effect of Compensation on Truck Driver Safety," Washington, DC: United States Department of Transportation, Federal Motor Carrier Safety Administration, 111; appendices.

Two Early Papers from This Study

- **Rodriguez, Daniel A.; Marta Rocha; Asad J. Khattak and Michael H. Belzer.** 2003. "Effects of Truck Driver Wages and Working Conditions on Highway Safety: Case Study." *Transportation Research Record*, Freight Policy, Economics, and Logistics; Truck Transportation(1833), 95-102.
- **Rodriguez, Daniel A.; Felipe Targa and Michael H. Belzer.** 2006. "Pay Incentives and Truck Driver Safety: A Case Study." *Industrial and Labor Relations Review*, 59(2), 205-25.

Long Hours and Crashes

- Pay structures in trucking mainly piecework.
- Lower pay leads drivers to work excessive hours, creating risk of fatigue.
  - **Panel on Research Methodologies and Statistical Approaches to Understanding Driver Fatigue Factors in Motor Carrier Safety and Driver Health; Committee on National Statistics; Board on Human-Systems Integration; Division of Behavioral and Social Sciences and Education; Transportation Research Board and Engineering National Academies of Sciences, and Medicine,.** 2016. *Commercial Motor Vehicle Driver Fatigue, Long-Term Health, and Highway Safety: Research Needs*. Washington: National Academies of Science. http://www.nap.edu/24818

This Paper Links Working Hours to Pay

- **Belzer, Michael H. and Stanley A. Sedo.** 2017. "Why Do Long Distance Truck Drivers Work Extremely Long Hours?" *The Economic and Labour Relations Review*, (OnlineFirst).https://goo.gl/M5Xx47

Pay-Level Incentives

- Efficiency wage hypothesis
  - Workers have incentive to work safely to retain a higher than market-clearing wage
  - Attracts other workers who want to make higher wages
- Target earnings hypothesis
  - If drivers have target earnings, paying for all labor time reduces incentive to log work time off duty
  - This time currently not paid at least in full
  - Higher pay rates and pay for all time reduces drivers' incentives to work illegal hours, thus improving safety

Labor Supply Curve OLS Estimation

$$Rate_i = \beta_1 + \beta_2 X_{i2} + \beta_3 X_{i3} + \ldots \beta_K X_{iK} + \varepsilon_i$$

- $Rate_i$ is the mileage rate for the i^{th} driver
- X's represent characteristics of the driver and job that are relevant to determining the mileage rate
- β's are the parameters to estimate
- ε summarizes the random components and unobserved characteristics of the individual driver and job.

OLS Weekly Hours Estimation

$$Hours_i = \gamma_1 + \gamma_2 * W_i + \gamma_3 W_i^2 + \gamma_4 Z_{i4} + \ldots \gamma_K Z_{iK} + \varepsilon_i$$

- $Hours_i$ are the weekly hours of the i^{th} driver
- W_i is the fitted wage of the i^{th} driver from the wage estimation
- Z's represent characteristics of the driver and job that influence the number of hours worked
- ε_i captures the random components of the hours worked not included in the explanatory variables

Data: UMTIP Driver Survey

- 233 employee-drivers
- These drivers work an average of 64.49 hours per week with a minimum of 25 and a maximum of 126
- Drivers earned an average of $0.286 [$0.44] per mile
- Averaged 13.66 years of experience
- Average company tenure of 3.46 years

Mileage Rate Equation

Variable	Estimate	Standard Error	t-value
Constant	0.241***	0.016	14.918
Experience	0.002**	0.001	2.133
Experience^2	-4.1E-05	0.000029	-1.437
Tenure	0.004**	0.0017	2.049
Tenure^2	-0.00011**	0.000054	-1.972
HS Degree	0.000574	0.008	0.076
Union	0.097**	0.057	1.726
White	0.016**	0.008	1.858
Union by White	-0.04	0.058	-0.695
Previous Moving Violation	0.007	0.007	1.051
Medium Firm	0.013**	0.006	2.065
Large Firm	0.026***	0.009	3.164
Private Carriage	-0.020	0.010	-1.900
Dry van	-0.008	0.007	-1.221
Miles per Dispatch	-0.00002***	0.000006	-3.276
Unpaid Time	-0.010	0.008	-1.192
Paid Days Off	0.001**	0.0004	2.071

Sample Size	233	Dependent variable:	Mileage Rate
R-squared:	0.385	Rbar-squared:	0.340
Residual SS:	0.431	Std error of est:	0.045
F(16,216):	8.457	Probability of F:	0.000

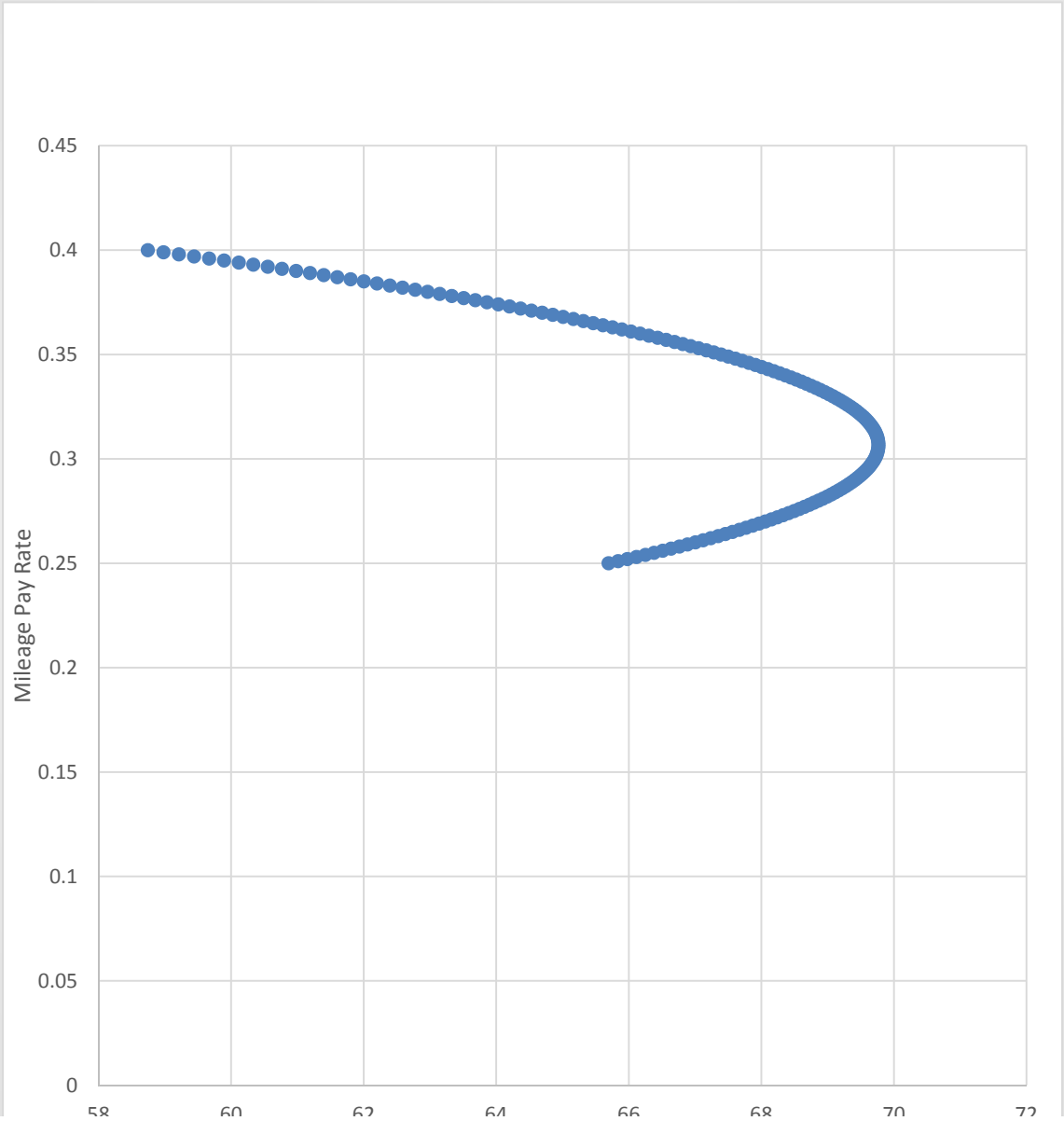
WAYNE STATE

Weekly Hours of Work Equation

Variable	Estimate	Standard Error	t-value
Constant	-116.29**	52.88	-2.199
Fitted Rate	776.75**	370.8	2.095
Fitted Rate^2	-1266.30**	637.3	-1.987
Age	3.119***	0.849	3.674
Age^2	-0.035***	0.001	-3.578
Married	-4.853*	2.548	-1.905
Other Income ($1,000)	0.021	0.067	0.348
% Night Driving	9.241	5.598	1.651
% Non-Driving Time	-21.820**	9.788	-2.229
Unpaid Time	11.066***	3.441	3.216
Union	10.842	9.372	1.157
Miles per Dispatch	0.0007	0.002	0.313
Private Carriage	-4.082	3.464	-1.178
Tenure	-0.365*	0.201	-1.820
Last Home	-0.006	0.125	-0.045

Sample Size:	233	Dependent variable:	Hours per Week
R-squared:	0.164	Rbar-squared:	0.111
Residual SS:	63611.8	Std error of est:	17.082
F (14,218):	3.061	Probability of F:	0.000

Labor Supply Curve for Long-Distance Truck Drivers



Interpretations

Rate	Hours	
$0.286	69.2245482	Sample Mean
$0.307	69.7670643	Max Hours at .3075
$0.308	69.7650398	Tipping point for reduced work hours
$0.370	64.693353	Rate set by J.B. Hunt to reduce turnover & crashes
$0.394	60.1164762	60 hours of work
$0.395	59.8941155	Rate required to reduce hours of work below legal limit

- Assume 60 hours per week is optimal tradeoff between efficiency and safety.
- The "safe rate" is the rate of pay needed to give drivers incentive to work 60 hours/week.
- **Using the DOL's CPI calculator, the 2017 "safe rate" is $0.60/mile.**