

Michael H. Belzer, Ph.D.
Sound Science, Inc.
2281 Traver Road
Ann Arbor, MI 48105
Sound-Science@sbcglobal.net

Docket No. FMCSA-2004-19608
U.S. Department of Transportation
Docket Management Facility M-30
West Bldg., Ground Floor, Rm. W12-140
1200 New Jersey Ave., SE
Washington, DC 20590
<http://www.regulations.gov>

Truck Driver Hours of Service, Interim Final Rule
72 FR 71247, December 17, 2007

I. The Hours of Service Interim Final Rule Regulatory Impact Analysis Is Incomplete and Inadequate.

The core task of a regulatory evaluation must be to determine whether the benefits of public policy outweigh the costs. Before prescribing any regulations, the Federal Motor Carrier Safety Administration (FMCSA) must also consider their “costs and benefits.” 49U.S.C. 31136(c)(2)(A), 31502(d); 72 FR 71248, 71251, 71252 (Dec. 17, 2008). By law, the benefit/cost analysis (BCA) must include all of the benefits and costs, including, but not limited to, the costs and benefits to firms, to workers, and to all other participants in the economy. While BCA has an established history in U.S. policy analysis, an applicable Executive Order, No. 15899 (October 29, 1992) can be found at <http://www.whitehouse.gov/omb/circulars/a094/a094.html>. More specifically, BCAs should incorporate estimated marginal social costs, including external costs or “externalities,” because they are costs generated by various economic activities, especially transportation, that often become external (*i.e.*, externalized) to the market. These externalities can lead to inefficient allocation of resources because external costs such as air pollution, crash risk, congestion, and commercial motor vehicle (CMV) operator health, including premature mortality, are not incorporated in price, signaling consumers to prefer a greater amount of the resource (in this case, freight transportation) than is efficient (Committee for Study of Public Policy for Surface Freight Transportation 1996). Finally, the technical term is “benefit/cost”, not “cost-benefit” (*ibid.* pg. 71252), and the actual measure is a ratio of benefits to costs where total social benefits are greater than total social costs, giving a ratio of 1:1 or better (1992; Gramlich 1981; Portney 2002).

The most common mistake in undertaking BCA is to tally the costs or benefits for particular parties and to compare those to costs or benefits of other parties in the economy, thereby limiting the analysis to those parties and not extending the analysis to

the entire society. The FMCSA made this baseline mistake in their regulatory justification for the Interim Final Rule (IFR) on truck driver hours-of-service (HOS).

We estimated that the loss of the 11-hour driving limit and the 34-hour restart would *cost the industry* about \$2.1 billion per year, of which \$1.6 billion would be attributable to the 34-hour restart and \$500 million to the 11th hour of driving. See the RIA in the docket for more details. By subtracting the estimated \$125 million of safety benefits, the net annual *cost to the industry* would be approximately \$2 billion.

72 FR 71267 (emphasis added).

As this excerpt implies, the FMCSA went through a great deal of effort to weigh the cost to the industry of reverting to the previous standards of 10 hours driving and a firm 60-hour workweek (in seven days) or a 70-hour workweek (in eight days) against the benefits to the public of reduced crashes. Not only did the FMCSA misconstrue the trucking industry as the sole consumer and thus misuse economic theory, but it limited its analysis only to the direct effect on this particular intermediate player in the supply chain. The agency disregarded shippers and consignees, which are the trucking industry's customers and consumers representing the final party to whom goods are sold; the primary objective of the utilitarian neoclassical economic model applicable for BCA is maximization of consumer welfare.

A Regulatory Impact Analysis (RIA) should also include an analysis of the likely macroeconomic effects, which would include spillovers to other labor markets from which trucking companies would draw potential drivers as well as spillovers to other parts of the economy as those who make money, spend it. To the extent that a policy may create a need for more drivers and equipment, for example, that need must be analyzed and the cost of additional drivers and trucks should be evaluated. If new trucks are needed, for example, the benefits of added new truck sales (more workers employed and new business opportunities created in manufacturing) should also be calculated. If more pollution is created or more fuel is used for some reason, the cost of the additional fuel and the cost of the additional pollution should be factored into the evaluation. If employment is lower, fuel usage is lower, environmental damage is lower, and fewer trucks are needed because of the policy, these effects also should be incorporated in an analysis. For examples of the use of macroeconomic analysis of truck driver hours of service, *see* these draft reports (Belzer *et al.* 1999; Belzer *et al.* 2002)¹.

While the Regulatory Impact Analysis for Hours of Service Options, FMCSA, October 2007 (IFR RIA) on truck driver HOS regulations appear exhaustive, an estimate of the macroeconomic effects of the policy based on a proper macroeconomic model does not seem to have factored significantly in FMCSA's analysis. One of the important errors of faulty benefit/cost analysis, in fact, is the failure to incorporate relevant costs and benefits within the equation balancing the two. In the Executive Summary of the IFR RIA, for example, there is a table that summarizes the cost to industry of reducing daily

¹ The FMCSA terminated the contract while macroeconomic analysis was in process.

driving time to the pre-2003 10 hours maximum per shift as well as the cost to industry of reducing actual legal labor time to the 60-hours-per-week that prevailed until January of 2004. IFR RIA at ES-6, also *see* at 69. This table also includes a figure representing an estimate of the safety “savings” that would offset the cost to industry. This, however, is merely an operational calculation, not an economic one. Not only does this analysis underestimate the safety effects because it ignores spillovers, but it completely ignores the costs associated with negative health effects on drivers and an estimate of the cost of early truck driver mortality caused by chronic long hours of work and driving. Without an analysis either of the health effects or of those macroeconomic effects, it is impossible to determine the true economic impact of the proposed regulation. The IFR RIA actually only leaves us with a one-sided operational cost analysis calculated only from the perspective of the motor carrier, and a limited and incomplete analysis of the safety cost of the longer work schedules in the current rules.

To the extent that the FMCSA has attempted any macroeconomic analysis of the effects of its HOS policy, it appears only in Chapter 11 of the 2002 RIA (2002 IFR RIA at 11-1). This analysis, however, finds that the original proposed regulatory change would have a very small effect on the economy. This analysis proceeds on the assumption that at the time of the analysis, truck drivers were in full compliance with the existing rules, yet ample evidence available at that time demonstrated that they were not (Braver et al. 1992; Beilock 1995; Belman, Monaco, and Brooks 1997; Freund 1999; Belzer et al. 2002; Belzer 2000).

11.1 SUMMARY OF RESULTS

The impact of the policy on the overall economy is relatively small, with the change in output never exceeding +/-0.1% based on the output of the [Regional Economic Models, Inc.] REMI Policy Insight model. Exhibit 11-1 reports the 10-year, average annual differences in employment, Gross Regional Product (GRP) – an output measure similar to GDP, price level, and disposable income by proposed rule option *by level and percentage change from the full compliance scenario*.

2002 IFR RIA at 11-1 (emphasis added).

The assumption of full HOS compliance has no credibility. Instead, the agency's starting point should have been the actual situation at the time of analysis, which is most closely approximated by the University of Michigan Trucking Industry Program (UMTIP) survey, which FMCSA uses elsewhere, showing the median driver to be approximately 10% in violation for intercity transport. For this reason, the current model (“status quo” in table 11-1, 2002 RIA at 11-1) shows a need to hire 17,900 drivers; that is, to achieve the situation current at the time of the analysis, the industry would need to hire almost 17,900 drivers. Alternatively, this suggests that the FMCSA’s proposed extension of working time would reduce the need for drivers by 10,000 as compared with the *status quo*. If, therefore, FMCSA configured the model used by Regional Economic Models, Inc. (REMI) for a theoretical state of affairs, how can the agency then compare

the real world of actual HOS compliance and then the altered world (altered due to rule changes) to this theoretical “full compliance” world? Although technically one may use whatever base one wants, it is disingenuous to base the presentation of the macroeconomic analysis on the “Full Compliance Base Case” (2002 RIA at 11-2) because if the *status quo* matched this Base Case, truck driver HOS might have been a more tractable problem. Given the presentation and the logic of this economic analysis, the noncompliance *status quo* provided the greatest benefit to consumers so it would have been preferable to any regulatory reforms proposed.

The PATT option has a negative impact on the overall economy as this option has the greatest decrease in labor productivity based of all the options, with a net average annual employment loss of 24,900 jobs per year, \$11.92 billion lower GRP, and \$16.16 billion lower disposable income compared to the Full Compliance Base Case. The ATA [American Trucking Association] proposal yields the greatest positive impact on the overall economy due to the policy’s positive impact on labor productivity in the trucking sector. The ATA option leads to 13,600 new jobs per year, with a corresponding increase in GRP of \$5.69 billion and in disposable income of \$7.56 billion/year.²

2002 RIA, page 11-1.

Actually, the greatest labor productivity probably is derived from the *status quo* since it adds the most jobs and is responsible for the greatest rise in the GRP. Indeed, rather than reduce actual hours of work from the “*status quo*,” the FMCSA adjusted the regulation such that it achieves greater compliance without reducing truck driver hours of work. “The distribution of job impacts suggests that the increase in trucking activity-related employment will pull labor predominantly from the construction, retail trade, and services sectors” 2002 RIA at 11-2, Table 11-2.

However, the table does not support the narrative. According to the results of the macroeconomic analysis in the table, FMCSA’s 2003 final rule will cause trucking to pull workers in greater numbers from manufacturing than from services. Since the non-manufacturing sector is four times larger than the manufacturing sector (Herzenberg, Alic, and Wial 1998), the substantial draw from manufacturing is important. Since there is very little difference in the draw from durable and nondurable manufacturing, and since it is much smaller, there is no reason to disaggregate more finely in that sector. Disaggregating the non-manufacturing sector more finely than the manufacturing sector,

² In this and other tables and in other places in the analysis, the agency incorrectly identifies its source as “ICF Analysis,” (ICF International, Inc., the contractor that prepared the IFR RIA under contract to FMCSA). This is not legitimate and amounts to a circular citation; that is, they obtain data from various sources and analyze it, and then claim that the source has now become the ICF RIA. This is like an author who obtains data from various sources and writes a book using those data and claims subsequently that he is the source of the data.

trucking will pull the highest number of workers from services, retail, manufacturing, and construction, in that order.

Fewer (more) truckers will require lower (greater) expenditures on, or demand for, tractor/trailer sets, parking spaces at terminals, truck maintenance, insurance on equipment, and recruiting services. Changes in capital expenditures associated with tractor/trailer sets and parking space construction are financed out of consumption at an assumed cost of capital to accommodate the “lumpy” nature of the changes in investments over time.

2002 RIA at 11-3, 11-4.

The foregoing analysis appears to be an acknowledgement that the REMI model should account for all of these other expenditures, and the detailed explication of these, as appears elsewhere in the document, should be unnecessary. The necessary documentation to determine for sure whether this is true is not available here. It appears that none of the subsequent RIA exercises make any clear reference to or use of the REMI analysis conducted for the 2002 RIA, nor do these subsequent RIAs suggest that they used a REMI model to estimate the economic effects of modifications to the proposed rule.

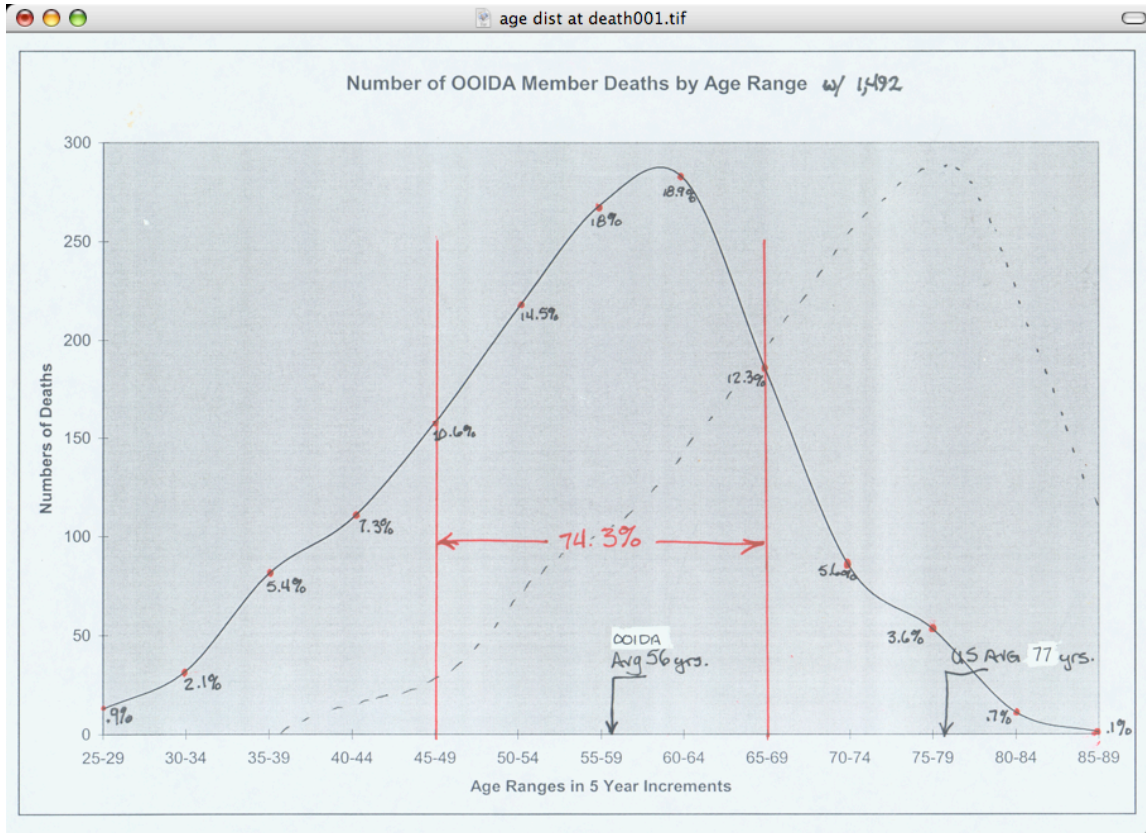
II. FMCSA's IFR Benefit-Cost Analysis Underestimates the Value of Truck Driver Health and Safety.

To the extent that the agency's BCA analysis is dynamic, as suggested by references to the tour, simulation, and time-on-task (TOT) modeling, FMCSA did not provide original spreadsheets in support of the claims made in the IFR RIA that include this elaborate modeling so that interested parties can evaluate the quality and the accuracy of the models or of their consequences for the agency's HOS regulation. The analysis below is unavoidably incomplete because it relies on the inadequate information provided in the IFR RIA.

The IFR RIA must include a good faith effort to evaluate the safety and health benefits and costs of changes in truck driver HOS regulations in addition to an estimated increase in productivity. Such an evaluation, however, requires analysts to include all the relevant variables that might affect the ratio of benefits to costs. Again, while benefits and costs to trucking businesses and workers must be included as part of the analysis, analysts must also use a systematic macroeconomic model, containing thousands of microeconomic equations, to provide a reliable estimate of the impact on the economy. The three regulatory evaluations, the Regulatory Impact and Small Business Analysis for Hours of Service Options, Dec. 2002 (2002 RIA), the Regulatory Impact Analysis and Small Business Impact Analysis for Hours of Service Options, Aug. 15, 2005 (2005 RIA), and the 2007 IFR RIA include a detailed analysis of the impact on trucking companies and motor carrier productivity, but they do not use a macroeconomic model to estimate the effect of the regulation on other dimensions of the economy except to the very limited degree discussed above in Section I of these comments.

For example, while the three RIAs estimated the cost of added fringe benefits, they did not consider the value of the expenditure of those benefit dollars by families who now can afford health care and can go to health care providers, further distributing the economic benefits. The RIAs also did not consider the health value of greater productivity, as workers who would otherwise be too sick to work or perform up to expectations would be well enough to be more productive members of society. Further, the RIAs did not use available data to estimate the value of additional years of working lives for those drivers likely to live longer because they are working fewer hours.

Considerable evidence suggests that truck drivers die prematurely as a result of the stresses and adverse health impacts of their occupation. When premature death occurs during a worker's normal working life, the cost of lost labor must be included – especially when the lost labor diminishes national economic welfare. Indeed, the Owner Operator Independent Drivers Association (OOIDA) estimates, based on its active membership database, that the average working owner-operator truck driver currently dies at about the age of 56 (Siebert 2005), which compares very unfavorably with the average age of death of males, ranging from 73.0 for the most deprived groups to 75.8 years for the least deprived groups in 1980-1982, to 74.7 for the most deprived groups to 79.2 years for the least deprived groups in 1998-2000 (Pear 2008; Singh and Siahpush 2006). The health impact includes, but is not limited to, the added cost of illness, the loss of non-economic value of life to the truck driver, the loss of spousal companionship, and the premature loss of the guidance and companionship to sons and daughters of fathers and grandfathers, in addition to the reduced productivity of drivers working during terminal illnesses and the premature loss of trained labor to the work force.



Source: Siebert, John. Unpublished informal membership information analyzed by OOIDA. Direct communication from John Siebert, Project Manager, to Michael H. Belzer received March 21, 2008.

The premature death of 1,492 OOIDA members (Siebert 2005), who were active members at the time of death, alone represents a loss of approximately 14,920 years of lost labor or 46,774,200 lost working hours (at the legal limit of 60 hours of work weekly³) due to the death of these particular drivers. Using a very conservative estimate of \$25,000 of net earnings for each driver in this group alone (Belzer 2006), the lost annual compensation just for those drivers who died at this average age of 56 while still working (not counting those drivers whose illnesses prevented them from working and caused their memberships to lapse) is \$373,000,000. Using a more realistic average annual compensation of \$37,500 for all truck drivers (union and non-union employee drivers in addition to owner-drivers) and extending this analysis to the 3,080,000 truck drivers in the work force (2002 IFR RIA Ex. 6-6 at 6-8), while assuming that the average of death of other truck drivers is similar to that of, owner-operators, the total cost of lost

³ The use of the legal limit here is somewhat arbitrary. The UMTIP driver survey showed that owner-operators worked 56 hours per week while employee drivers worked an average of 65 hours per week at the time of the survey, so this is a conservative midpoint.

compensation would be \$5,358,488,160.⁴ In addition, owner-operators or owner-drivers who die prematurely not only account for this conservative loss of \$25,000 annually but represent lost productivity of trucking companies with one employee as well as of the motor carriers to whom 75% of owner-operators lease themselves and their trucks. The average owner-driver grosses \$118,798 out of which he pays for all truck expenses, including fuel, and all wages and benefits paid to himself (Belzer 2006). Premature death in the range estimated here, just for these owner-drivers, cost the economy \$1,772,466,160 directly plus the appropriate multiplier for spin-off economic activity (approximately 1.4, as indicated below). Assuming that the average employee driver (again, union and non-union regardless of industry sub-segment) is responsible for a similar amount of revenue (a conservative assumption since almost all owner-drivers are in the more competitive truckload [TL] sector), the total revenue lost is in the range of \$15,952,195,440. Finally, while time and resources do not permit a definitive estimate of the income, output, and jobs multipliers with which a macroeconomist can determine the full cost or benefit to the economy, the output multiplier for the Transportation, Communications and Utilities industry sector in the 17 labor market areas in Indiana is approximately 1.4, the income multipliers average slightly greater than 1.4, and the employment multipliers for these labor market areas average slightly less than two, suggesting that every additional \$1 leads to \$1.40 in overall income and every additional job in trucking leads to nearly two jobs total because trucking is labor intensive (Broomhall 1993). This means that the loss of each truck driver who dies prematurely results in the loss of a job in addition to his own, and every dollar of production lost due to the premature death of a driver causes the loss of an additional \$0.40 in spillover or multiplier dollars.

While the revenue may not be lost overall because carriers continually recruit new drivers, the value of replacement driver will be much lower because experience is a powerful factor predicting operating safety (Belzer, Rodriguez, and Sedo 2002; Rodriguez et al. 2003; Rodriguez, Targa, and Belzer 2006) as well as productivity.

In sum, macroeconomics provides a “big picture” analysis that gives policy-makers a much better idea of the relative benefits and costs of public policy, and the relative cost to society of the regulation evaluated by the RIA is far greater than FMCSA estimates.

⁴ While the superior compensation (wages and benefits) and schedule control of unionized drivers would likely produce better results, the outcomes should be extendable to the population, to a first approximation.

Table 1. Cost of Premature Death Just in Lost Production

1,492	OOIDA member premature deaths over 15 years (1988-2003, with data quality improving each year)⁵
10	Years of lost labor (56-65)
14,920	Total labor years lost
52.25	weeks in year
779,570	Total labor weeks lost
60	Assumed average number of hours worked weekly
46,774,200	Estimated number of hours of work lost
\$25,000	Average net earnings of owner-drivers per TIBP survey
\$35,000	Average net earnings of owner-drivers per UMTIP survey
\$373,000,000	Estimated total value of lost earnings of owner-drivers @ \$25,000 (10% of workforce)
\$522,200,000	Estimated total cost of lost labor of owner-drivers @ \$35,000 (10% of workforce)
3,088,000	2000 Current Population Survey as cited in 2002 RIA
	Scaling up estimated cost of premature death in terms of lost labor (owner-operators representing 10% of total truck driver work force)
9	
13,428	Estimated premature deaths of employee drivers over 15 years due to premature death
10	Years of lost labor (56-65)
134,280	Total labor years lost
52.25	Weeks in year
7,016,130	Total labor weeks lost
60	Assumed average number of hours worked weekly
420,967,800	Estimated number of employee driver hours of work lost due to premature death
\$36,572	Average annual earnings of employee-drivers per UMTIP survey
\$4,910,888,160	Estimated lost employee-driver earnings of due to premature death
\$5,283,888,160	Estimated total lost truck driver labor earnings (lower bound)
\$5,433,088,160	Estimated total lost truck driver labor earnings (upper bound)
\$5,358,488,160	Estimated lost truck driver labor earnings due to premature death, using UMTIP data

⁵ This is the total number of OOIDA members

Table 2. Macroeconomic Analysis of the Value of Trucking Services Lost to Economy Due to Owner-driver and Employee-driver Premature Death

\$118,798	Average total annual revenue per owner-driver (value of trucking services produced by one one truck, on average)
\$1,772,466,160	Total value of trucking services of owner-operators lost
\$15,952,195,440	Total value of trucking services of employee-drivers lost
\$17,724,661,600	Total value of trucking services of owner-operators and employee-drivers (assuming same revenue per truck as for owner-operators)
1.4	Macroeconomic income multiplier
\$2,481,452,624	Total value of trucking services of owner-operators lost to economy due to owner-driver premature death
\$22,333,073,616	Total value of trucking services of employee-drivers lost to economy due to owner-driver premature death
\$24,814,526,240	Total value of trucking services lost to economy due to owner-driver and employee driver premature death

Table 3. Total Cost of Premature Death Attributable to 11th Hour of Driving and 34-hour Restart

\$261,100,000	Total value of owner-operator earnings lost due to premature death at average earnings of \$25,000
\$1,240,726,312	Total lost value of trucking services of owner-drivers
\$3,437,621,712	Total lost value of employee-driver earnings
\$11,166,536,808	Total lost value of trucking services of employee-drivers
\$12,407,263,120	Total lost value of trucking services

Table 4. Annual Cost of Premature Death Attributable to 11th Hour of Driving and 34-hour Restart

\$17,406,667	Annual value of owner-operator earnings lost due to premature death at average earnings of \$25,000
\$82,715,087	Annual lost value of trucking services of owner-drivers
\$229,174,781	Annual lost value of employee-driver earnings due to premature death at average earnings of \$37,500
\$744,435,787	Annual lost value of trucking services of employee-drivers
\$827,150,875	Annual lost value of trucking services

A comprehensive analysis also would require an evaluation of premature withdrawal from trucking due to ill health. Anecdotal evidence suggests that drivers frequently become unable to work by the age of 50 due to diabetes, which not only is an expensive disease to treat but generally disqualifies a driver from working as a truck driver. The macroeconomic cost of this withdrawal would be calculated by subtracting the value of replacement work, if the driver can secure it, from the value the driver would otherwise have earned as a truck driver. However, the productivity lost by the trucking industry from the loss of experienced workers is a dead-weight loss because the trucking industry must replace these drivers with new drivers it has to train and who must gain experience before they become competent, safe, and productive.

Dembe *et al.* cite dozens of review articles, empirical studies, and meta-analyses showing that long working hours lead to “hypertension, cardiovascular disease, fatigue, stress, depression, musculoskeletal disorders, chronic infections, diabetes, general health complaints, and all-cause mortality” (Dembe *et al.* 2005). In an analysis of a large longitudinal dataset of American workers – a dataset comprehensive enough so that the authors can control for age, race, occupation, industry, employer, demographic and both personal and family economic status, health insurance status and other factors – Dembe *et al.* use Cox regression analysis (“survival analysis”) to determine the probability of workplace illness and injury. They find conclusively, as shown in Figure 2, that health and safety risks increase unambiguously as workers exceed the “normal” 40-hour workweek.

Figure 2: Health and Safety Risk Associated with longer work hours

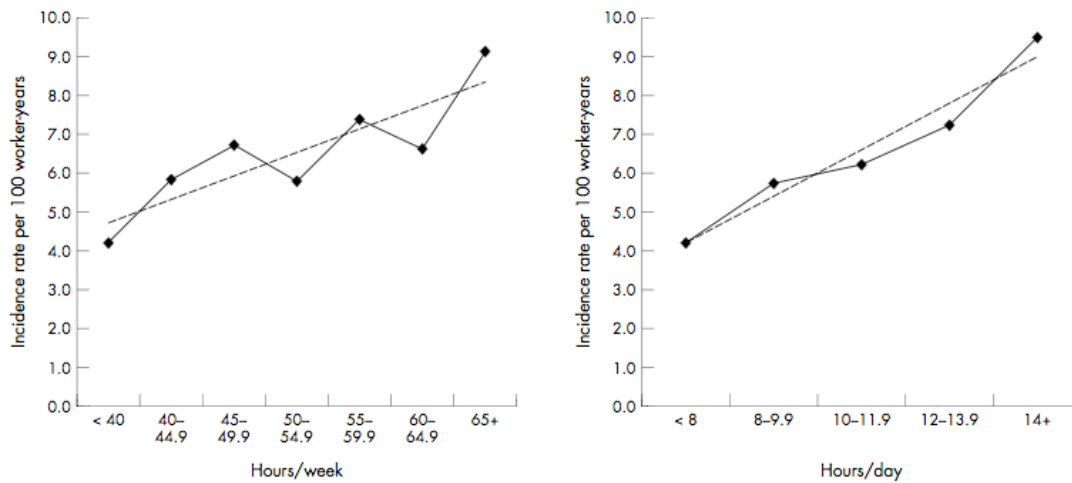


Figure 3 Trends in incidence rates of reported work related injuries and illnesses in jobs with and without exposure, for two exposure categories (hours/week and hours per day), by amount of exposure. NLSY aggregated data covering 1987–2000.

(Dembe *et al.* 2005)

While it is not possible without conducting extensive additional research to determine how much of the costs indicated in Tables 1 through 4 might be saved if the 11th hour of driving and the 34-hour restart were eliminated, it is possible to estimate. Figure 2 shows

a steady increase in safety and health incidents associated with greater working hours. As Dembe *et al.* show, illness and injury probabilities approximately double over the range between eight hours (the typical work day for most workers) and the number of daily working hours permitted by the fourteen-hour feature of the regulations. The number of weekly hours permitted by the regulation – as many as 84 hours (Saltzman and Belzer 2007) – is far outside the range studied by Dembe *et al.* The incidence of workplace injury and illness doubles between the normal 40-hour work week and the 60-hour legal work week of the over-the-road truck driver. If a truck driver works as many hours as he possibly can with the 34-hour restart, he will work twice as many hours as appear in the figure above (Fig. 2), doubling the probability of incidence again to three times the probability of incident at 40 hours per week.

Using the 40-hour work week used by Dembe *et al.* and assuming compliance with the regulations limiting drivers to 84 hours per week, as well as simply assuming that 25% of all drivers work between 65 and 80 hours (the third quartile of drivers as found by the UMTIP driver survey (Belzer 2000)), and finally assuming that 50% of the additional deaths are attributable to the 40-65 hours and an additional 50% of the additional deaths are attributable to the hours that are off the chart in Figure 2 but within the regulations (all assumptions derived from Dembe *et al.*), then it is reasonable to hypothesize that 50% of the cost indicated in Tables 1 through 4 are associated with the extremely long hours of work allowed by the 11th hour of driving and the 34-hour restart, combined. Part of the increased risk simply is associated with longer exposure, and another part of the increased risk would be associated with the physical and psychological stress of extremely long working hours, especially when pay rates are low and target earnings requirements force drivers into complicity with the working time regime in trucking. This suggests that the policy that extends daily driving time to 11 hours and extends weekly labor time to as many as 84 hours may cost the economy more than \$17 billion in premature death alone. This does not even count the additional cost of premature illness.

III. FMCSA Fails to Account for the Cost of Illness and Injury Due to Long Working Hours

Research is beginning to put a dollar value on the cost of illness. In one meta-analysis, investigators found that workplace stress cost the French alone about €1.571 billion Euros, or \$2.475 billion at today's exchange rates, which is 19.3% of total spending for occupational safety and health (what we call "workers' compensation") (Béjean and Sultan-Taïeb 2005). Two other scholars found that alcohol, drug, and mental (ADM) health conditions, at least in part related to work stress, accounted for a \$785 billion loss to the economy (DeLeire and Manning 2004). If truck drivers represent approximately 6% of the workforce (following the Dembe *et al.* analysis above) and if they experience ADM at the same rate as others (evidence suggests it is higher among truckers), and if one-third of truckers' ADM is associated with hours of work in excess of 60 hours per week, then \$15.7 billion in health care costs would be expected due to work-related stress associated with long hours of work. Researchers recently found that those male workers who work more than 60 hours per week (working time well-known among truckers and clearly facilitated by the current 34-hour reset, and substantiated by research

noted above) have twice the risk of non-fatal myocardial infarction (MCI) than those working 40 or fewer hours, and this morbidity is compounded by short sleep generally (defined as 5 hours per day) and frequent (fewer than 5 hours, 2 or more days per week) sleep deprivation which independently is associated with 2-3 times greater likelihood of MCIs (Liu and Tanaka 2002).

What causes this premature illness and death? Recent evidence points strongly to a lethal combination of obesity, sleep disruption and deprivation, and chronic long hours of work as the culprits (2004; Hitt 2006; Lumeng et al. 2007). The U.S. Court of Appeals for the District of Columbia Circuit threw out the FMCSA's original truck driver HOS regulation because the regulatory evaluation failed consider the effects of the rule on truck driver health, an important consideration when implementing a regulation that substantially changed the number of hours during which a truck driver could work legally.

IV FMCSA Mischaracterizes the Trucking Industry and Trucking Operations.

The IFR RIA assumes average length of haul for "local service" to be no more than 150 miles (IFR RIA 2-7, fn. 3) and it claims that "local-regional" is between 150 and 300 miles. A consultant report analyzing the expected productivity effect of the January 2004 HOS regulations separated out the "local" runs as those truckload shipments of 300 miles or less (Norbridge 2003). Those shipments cause no declines in productivity because the driver will have the same amount of driving time as he had before and still have 2 hours each for loading and unloading as well as an hour for fueling and "other" (which might include pre- and post-trip inspections and other duties as assigned) and an hour for meals. The driver running 500 miles, on the other hand, will suffer a 20% decline in driving productivity under the new rules, using the same assumptions for non-driving labor time. If, however, the carrier, shipper, and consignee cooperate to use the driver's time wisely (drivers generally earn nothing or earn only a flat rate for loading and unloading time (Belzer, Rodriguez, and Sedo 2002), cutting loading and unloading time to one hour each, the entire decline in productivity is eliminated (Norbridge 2003). Indeed, by reducing moral hazard, the new rules stimulate shippers and receivers to organize the work process to reduce idle time. This increased productivity reduces the dead-weight economic loss to society (uncompensated and wasted labor and capital resources) by 50%, which the IFR RIA fails to incorporate into the BCA.

The IFR RIA assumes that in over-the-road (OTR) service, driving is the truck driver's "principal task." While regional and inter-regional drivers spend a majority of their time driving, data from the UMTIP driver survey on over-the-road drivers suggests that these drivers average 25% of their work time in unpaid non-driving activity (Belzer 2000; Belzer, Rodriguez, and Sedo 2002). While that means that 75% of work time is driving, the conclusion that this represents a "preponderance" of drivers' working time is vague and may lead to error. In fact, one cannot conclude from data presented in the IFR RIA that "none of the rule-change options will have a noticeable effect on short-haul trucking." IFR RIA 2.1.1 at 8. Indeed, an UMTRI study completed in 1997 shows that more than one-third of all fatal crashes involve trucks operating within a 50-mile radius

of their base; in fact, the fatal crash rate per 100 million miles for local trucks is 1.8 times the rate of over-the-road trucks, and many such cases catch the public eye (1996; Hanley 2007; Massie, Blower, and Campbell 1997; Williams 1996b, 1996a).

Under the IFR, drivers can still work 14 hours a day legally and reach their maximum work hours for a 60 hour week (for companies with 6 day operations) as early as day 5 or work a 56-hour work week through the end of day 4, take a 34-hour restart, and work an additional 14 hours (for the driver who stopped work at 56 hours at the end of day 4) or 10 hours (for the driver who worked the full 60 hours before stopping work) and thereby legally work 70 hours during his six-day work week. For drivers working in local operations for motor carriers operating seven days per week, which is becoming more common as more of the American economy moves to 24/7 operations, local drivers legally can put in an 84-hour work week just as easily as can drivers working in over-the-road operations. The following tables show this pattern (Saltzman and Belzer 2007; pg. 18-20).

Table 2. Maximum Labor, Old Rules [table numbering in original source]

DAY	TIME OF DAY	HOURS	TOTALS
Day 1	12 M – 3 PM	15	15
Day 1 – 2	11 PM – 2 PM	15	30
Day 2 – 3	10 PM – 1 PM	15	45
Day 3 – 4	9 PM – 12 N	15	60*
Day 4 – 5	8 PM – 6 AM	10	70**
Day 6	OFF DUTY		
Day 7	OFF DUTY		

* For those on 7-day week, out of hours until midnight, start of Day 8

** For those on 8-day week, out of hours until midnight, start of Day 9

Table 5. Working Maximum Hours, New Rules, Drivers on 7-day Work Week [table numbering in original source]

DAY	TIME OF DAY	HOURS	TOTALS
Day 1	12 M – 2 PM	14	14
Day 2	12 M – 2 PM	14	28
Day 3	12 M – 2 PM	14	42
Day 4	12 M – 2 PM	14	56
Day 5	12 M – 4 AM	4	60
Day 6	2 PM – 12 M*	10	70
Day 7	OFF DUTY*	0	
Alternative:			
Day 5	OFF DUTY	0	
Day 6	12 M – 2 PM	14	70
Day 7	OFF DUTY		

* 34-hour restart goes from 4 AM on Day 5 to 2 PM on Day 6. It also assumes carrier does not operate on seventh day. This feature will be subject to interpretation by FMCSA.

Table 6. Working Maximum Hours, New Rules, Drivers on 8-day Work Week [table numbering in original source]

DAY	TIME OF DAY	HOURS	TOTALS
Day 1	12 M – 2 PM	14	14
Day 2	12 M – 2 PM	14	28
Day 3	12 M – 2 PM	14	42
Day 4	12 M – 2 PM	14	56
Day 5	12 M – 2 PM	14	70
Day 6	OFF DUTY*	0	
Day 7	12 M – 2 PM	14	84**

* 34-hour restart goes from 2 PM on Day 5 to 12 M at the beginning of Day 7.

** Obviously the extra day’s work on Day 7 in Table 6 is the intensification of work for one week, but there is nothing in the regulation to prevent drivers from intensifying their subsequent weeks, since this is a rolling calendar. This adds to the accumulation of work and fatigue in ever-intensifying amounts. Theoretically, drivers could work at this pace indefinitely, legally accumulating 365.75 hours of work per month and 4,389 hours of work per year. For purposes of comparison, in December of 2007, the average non-supervisory production worker in the private sector worked 33.8 hours, the average such worker in the goods-producing sector worked 40.5 hours, in the private service-sector worked 32.4 hours, and even in the Transportation and Warehousing sector worked 36.8 hours, so this rule allows drivers to work more than double the average actually worked in any other sector (<http://stats.bls.gov/news.release/empsit.t15.htm>).

Furthermore, since regulations still do not require electronic on-board recorders (EOBRs) and enforcement still relies on cumbersome and difficult- and expensive-to-enforce safety audits that often do not detect violations, drivers likely still engage in creative logbook exercises designed to evade many features of the HOS regulations. Drivers can record the time they want to record, such as trackable driving labor time, loading and unloading times, and other times in which their time can be checked against easily obtained records, and mark off duty for their labor hours, thus saving those hours for later in the week. While they still will run out of hours for the day, they will retain the use of those hours later in the week. Drivers can engage in this exercise even when their employer is using an EOBR because an EOBR cannot record what a driver is doing during the hours he logs as non-driving. Since ample evidence exists to support the contention that drivers pervasively engaged in such creative practices under the previous HOS regulations, and since drivers (especially those engaged in intercity operations) worked an average of approximately 65 hours weekly under the pre-2003 HOS regulation (with a median of more than 60 hours; 25% of all over-the-road drivers worked 75 or more hours) (Franklin and Little 2006; Hanley 2007; 2007; Belman and Monaco 2001; Belman, Monaco, and Brooks 2005; Belzer 2000; 1996; Williams 1996a), there is no

reason to believe that work hours have declined. The effect simply has been to increase compliance by increasing the number of hours drivers can work legally. All drivers need to do is to backfill their working time to fit the schedule.

For clarification, the IFR RIA seems to mischaracterize the size of the industry when it asserts that “there are around 50,000 truckload firms.” “Of these, 40,000 are very small, with five or fewer tractors.” IFR RIA at 9). This was roughly true before deregulation in 1980, but the Motor Carrier Management Information System (MCMIS), maintained by FMCSA, listed 262,000 for-hire motor carriers in 2007 (TRB Committee on Trucking Industry Research; Trucking 101: An Industry Primer, in progress). Including private carriers, the number of registered carriers probably exceeds 500,000. FMCSA on its website cites 692,997 active registered motor carriers with the agency as of 2006.

FMCSA and ICF note on page 13 of the IFR RIA that they use FMCSA's, “field survey” to compare hours of work in random and regular operations, and find no difference. This “survey,” however, is invalid because FMCSA collected it in conjunction with enforcement, and records have been cleaned up by then. In a systematic way, carriers that have drivers in violation likely will conceal those violations, so the data will have systematic error and downward bias, especially by carriers and drivers with the most hours. Furthermore, the FMCSA excluded cases in 2005 in which drivers falsified their logs, and presumably followed the same method in 2007. This further biases the results because drivers who falsify logs probably do so because they are in violation; thus, by excluding falsified logs the FMCSA will find fewer violations. The fact that no carriers apparently have evidence of any drivers in violation of the 14-hour rule has no credibility whatever. The fact that both columns sum to 99.9 is *prime facie* evidence of the flaws in the data. They do not even collect data that shows any drivers are working more than 14 hours.

With regard to teams, the IFR RIA makes the statement that “two drivers means labor cost per mile is higher than solo operations....” (IFR RIA at 13) This simply is false. The drivers split the miles and, if they get an hourly rate for non-driving time, they split that as well. Carriers may pay a very small premium rate over standard pay rates as an incentive (similar to a modest shift premium), but that bonus rate is almost trivial. The drivers may earn more money overall than solo drivers, but this is because there is less down time. Typically, the carrier keeps the truck moving because (1) that is the implicit deal with the drivers, (2) the team becomes very inefficient if it has delays, and (3) the teams typically are on longer haul runs. If the team gets delayed, the sleeping driver often wakes up and sleep becomes more irregular than ever, and driver safety is impaired further. Most important, the value to the carrier is at least a 43% increase in capital productivity (the extra 6 hours of operating time beyond the 14-hour limit for a solo driver and a greater benefit insofar as the solo driver does not accumulate 14 billable hours (IFR RIA at 13).

The FMCSA's statement in the IFR RIA that short-haul work is more like “ordinary” work is oversimplification. This is true for those carriers in local operations –

especially LTL or cartage – in which customers are closed for business or do not accept deliveries on weekends. For a great number of drivers – hauling everything from fuel to groceries – work can be a seven-day-a-week operation (Ouellet 1994). Work often is not at all “regular” in character; these drivers may work at all hours of the day and night and often put in extremely long hours. While local LTL freight and cartage drivers generally are paid by the hour, other drivers, especially in bulk and intermodal operations, earn flat rates of pay (Monaco 2005; Monaco and Grobar 2004), and grocery drivers are among those facing various contingent pay incentive schemes (Lund and Wright 2004).

It is impossible to believe that the FMCSA Field Surveys provide an accurate representation of the drivers’ working time (U.S. Department of Transportation - Federal Motor Carrier Safety Administration 2005, 2007). Good survey research requires that the surveyor carefully not introduce elements in the survey process that might bias the outcomes. When one attempts to use enforcement officers engaged in an enforcement action to conduct a survey of illegal behavior, results will be biased downward, indicating systematically that less illegal behavior is occurring (IFR RIA at 16). The survey report claims that only 3.5% were leased truck and driver to carriers, which means that very few of the drivers were owner-drivers who actually make up about 25% of the entire intercity trucking work force and perhaps a greater fraction of intercity drivers. Owner-drivers leased to carriers and operating under their authority (truck and driver leased to carriers) represent about 75% of all owner-drivers, yet they are about a quarter as many in this nonrandom sample as the independent owner operators (*id.*).

The data reported on average hours, based on the sources cited in the IFR RIA, are unreliable. Note that the report says that while 64.5% of Schneider drivers have more than 59 hours, the field survey shows 42.9% work that much (2007 RIA at 18). This low number of hours suggests that these drivers may be logging their loading and unloading and other delay time as off duty. While they may abide by the 14-hour rule, they may be hiding their labor time as off duty, which generates the low hours for the week (and effectively more labor hours available). These drivers may be under-reporting their labor hours by at least 20%. Extending the number in Exhibit 2-9 (IFR RIA at 18) by that figure, even though the data simply are unreliable, gives very different results. What FMCSA reports from the survey is so crude that it is impossible to estimate the extent of the bias.

In the first paragraph in the section on restarts (07 IFR RIA at 19), the agency draws the conclusion that drivers are using the 34-hour restart rather than the drivers' own calculation of daily and weekly hours of work to determine whether they are approaching the 70-hour limit (IFR RIA at 19). This is not credible since these drivers would have to be out of compliance all the time (not filling out their log books and rolling hours-of-work calculations) for this to be true. This is simply an unsupported statement.

The big difference between Schneider data (which probably are accurate (*see* docket number FMCSA-2004-19608-2557[Schneider]) and the data from the FMCSA compliance “survey” (which probably are not accurate) is the fact that Schneider’s drivers are managed closely and operate under Global Positioning System (GPS) EOBRs,

while that the carriers in the FMCSA sample are not (given the small firm size; FMCSA provided no information; (U.S. Department of Transportation - Federal Motor Carrier Safety Administration 2007)).

From the unsupported guesses in the IFR RIA, the agency comes to the conclusion that one-third of restarts are short enough to lose productivity if the restart was eliminated. IFR RIA at 20. They base this conclusion on unsupported speculation generated by prior speculation based on a series of unproven assumptions, making the conclusions invalid.

They also build many of their arguments out of the incomplete data provided by Schneider (filename "FMCSA-2004-19608-2557[Schneider]" on the docket). These are just graphs indicating operational activity that have been attenuated for some reason at the legal limit; by themselves they provide insufficient information for interpretation. Inexplicably, however, the x-axis is labeled "on_duty_hours" and the y-axis is "percent," but the charts are titled "Driving Time." In almost all charts, however, the modal measure is at the legal limit, and the trend line leads upward to that modal point (which also is the end point of the chart).

The report also confounds the notion of the restart itself with the simple notion of running out of working time. The concept of the restart applies particularly to the drivers who exhaust their 70 hours while away from home or while still under load. One would need to know whether the drivers with shorter restarts remain under load (are just waiting to get their hours back) or whether they either unload or give their load to someone else when they run out of hours, and then become available after 34 hours off-duty to restart, but the company doesn't have loads immediately ready for them. The real question is: how many hours are they actually working during any seven-day period?

The chart "Average Driver Delay Time per Stop" is very revealing (filename "FMCSA-2004-19608-2557[Schneider]" at 6). Since Schneider's average length of haul is between 450 and 550 miles, drivers most likely complete this in 10 hours or so (on average) and spend 1.5 hours/day loading and unloading. Add in half an hour for pre- and post-trip inspections, and these drivers are at about 12 hours a tour. If they are under load or can be re-dispatched immediately after 10 hours, they may get their 14 hours/day of work, but this is uncertain. Therefore, while they may be using the 34-hour restart, it may only be a technical interlude because they probably are averaging no more than 12-13 hours/day of work.

In the section on motor carrier operations (IFR RIA, Chap. 3), FMCSA claims that it has already discussed the notion that TL will be most affected by the extended driving and 34-hour restart, but there is nothing in their discussion of LTL that analyzes this. In fact, the agency repeatedly refers to differences between LTL and TL and emphasizes the affect on TL but never actually analyzes LTL. The analysis of LTL is in Section 5.1.2 of the 2002 RIA. The 2002 RIA is correct to say that the "LTL sector is set up to operate in compliance with current rules." However, this is not simply because the terminal locations ensure that the drivers may "comfortably" complete their runs within

the legal time limits. Predictably, when weather and traffic problems slow drivers down, the trips cannot be completed comfortably. Furthermore, drivers frequently must stop at two or more terminals, as suggested in Case 5 (2002 RIA at 5-2) in a single shift. Many carriers refer to these as “vias”; e.g., “leave Chicago and haul a load to Louisville via Ft. Wayne and Indianapolis” or, for a shorter run, “haul a load from Chicago to Toledo via South Bend and Ft. Wayne.” In contrast to the claim, *Id.*, at the top of p. 5-3 (2002 RIA at 5-2), many of these runs are very tightly scheduled so that not only does the driver use his full driving time but may easily use an hour or two making intermediate stops. Whether carriers are unionized or not, a carrier will want to optimize its use of the driver’s time to get the most productivity, and when the rules change, the successful carrier will fit the work within the rules. The extension of driving time to 11 hours provided by the HOS regulations may therefore produce substantial changes in the LTL carrier’s use of driver time. For these reasons, the following statement is inaccurate:

Except for the circuit-of-terminals case, line-haul drivers with a union company will generally not have work shifts in excess of nine-and-one-half hours. As we just noted, a driver making a circuit of terminals ordinarily does so within 12 hours. Non-union companies do not plan shifts in excess of 12 hours.

2002 RIA at 5-3.

Incidentally, in cases in which carriers actually have 9.5-hour shifts, one should expect them to dispatch the drivers on another trip (which may be a return trip) as soon as they have the available hours. In the case indicated in this paragraph, carriers would dispatch the drivers 10 hours after completing this “work shift,” causing their schedule to rotate backwards 4.5 hours, resulting in an additional safety hazard.

There is plenty of anecdotal evidence that motor carriers have changed routings to take advantage of the 10% more driving time that they can use. In fact, LTL drivers working for most LTL carriers on intercity runs spend very little time loading and unloading, so they would be less likely generally to work up to the 14-hour daily limit. If drivers take an hour of breaks associated with their 11 hours of driving, and assuming that they spend as much as one hour with pre- and post-trip inspections and in some cases also hooking and dropping, they still will not reach the 14-hour limit. Only drivers working for LTL carriers whose drivers do dock work may run out of clock time before running out of driving time. Therefore, contrary to the claims made in Chapter 5 of the 2002 IFR RIA, the new regulations most likely have had an important effect on LTL drivers and LTL operations; the most competitively successful firms will determine how to use every available hour.

Chapter 4 of the 2002 IFR RIA addresses the “cost of changes in operations.” The 2007 IFR RIA refers upfront to FMCSA’s measurement of cost as “employment cost for hiring new drivers due to the loss in productivity for the existing drivers, and costs for purchasing new tractor-trailers...” for newly hired drivers (2007 IFR RIA at 31). The

assumption here is the *status quo* of the new regulation, rather than what cost would be involved simply because of alternative options.

Analysis for the 2007 RIA is built on the 2002 RIA for the 2003 regulatory proposal making it necessary to review the 2002 RIA. Looking back at the regression using the Current Population Survey (CPS) variables in Chapter 6 of the 2002 RIA⁶, although the R² is relatively low (27%), the coefficients are significant and in the proper direction. The regression predicts annual earnings of \$35,907 based on a 65-hour workweek – almost the exact same earnings and labor time that the UMTIP survey finds for non-union drivers (Belzer 2000; Belzer, Rodriguez, and Sedo 2002). Note, however, that these are average earnings and average hours at a time when those average hours exceeded the legal limit by about 10%. This is consistent with the argument that FMCSA secured compliance with their new HOS regulations simply by increasing the number of hours available for work under the regulation. The agency increased compliance by making legal what formerly were illegal working and driving hours.

While FMCSA is correct that there is little unionization in the TL sector (Belzer 1993, 1994a, 1994b, 1995, 2000), which is consistent with similar information found in subsequent studies (Belzer 2002; Belzer, Rodriguez, and Sedo 2002; Belman and Monaco 2001; Belman, Monaco, and Brooks 2005), the agency incorrectly infers from this information that there will be little impact on LTL from changes in the HOS regulations. 2002 RIA at 6-7. These factors are entirely unrelated, as indicated above. Furthermore, the 2002 RIA goes on to pose some explanations for the fact that even though drivers earn a flat mileage or percentage-of-revenue rate (they do not earn premium pay for overtime because “the maximum hour (overtime) provision of the Fair Labor Standards Act of 1938 exempts them from coverage (Belzer 2000)), their compensation rate declines the more hours they work. We have argued elsewhere that this apparent declining pay rate is not due to actual declining compensation but rather because drivers with superior human resource characteristics are able to earn a higher wage (receive a superior labor-leisure package from their employers, allowing them to choose not to work the extended hours) but their employers likely respect the quality of workers they have hired and do not ask them to work more hours (Belzer *et al.* 1999; Belzer *et al.* 2002).

One assumption used in the 2002 RIA analysis on which the IFR RIA analysis is based, is articulated in a footnote:

For purposes of this analysis, we assume a 100 percent compliance with the current rules as the baseline. We also, however, look at the cost implications from a base line consistent with the current state of the world — we call this the “Status Quo” [sic].

2002 RIA at 6-6, fn 38.

⁶ The abbreviated economic analysis that appears in Chapter 4 of the IFR RIA was based on the analysis in Chapter 6 of the 2002 RIA.

In fact, it is notable that by assuming 100% compliance with current rules, a situation for which there is ample contrary evidence (reported above by Belman, Belzer, and colleagues, *op. cit.*), the 2002 RIA actually confirms the charge that the effect of the new regulation, that provides for 10% more driving hours and provides legal justification for working as much as 84 hours per week, simply moves the goal posts such that the current economic *status quo* – the 65-hour work week at approximately \$36,000 per year – has become legal.

The 2002 RIA “assumes” the elasticity of supply of labor is 5 (2002 RIA at 6-6 through 6-10, see esp. at 6-10). This assumption appears to be a guess based on a range of elasticities used in previous studies for FMCSA, ranging from 1.5 to 10 (*id.*). In an analysis of the likely macroeconomic consequence of implementing the 2000 proposed HOS regulations (U.S. Department of Transportation - Federal Motor Carrier Safety Administration 2000) based on FMCSA’s initial assumption regarding the need for additional drivers, microeconomists and macroeconomists at the University of Michigan analyzed the effect using a macroeconomic model from Regional Economic Models, Inc. (REMI) using a relatively liberal wage elasticity of supply for trucking of 1.5 (Belzer *et al.* 2002). The 2002 RIA assumes that shippers and consignees do not adjust their practices to save the cost associated with a reduced labor supply – something they appear to have done following the 2004 regulatory change. We verified this elasticity of supply empirically by calculating a classic backward-bending labor supply curve calculated using regression models from the University of Michigan Trucking Industry Program truck driver survey (Belzer *et al.* 2002). The elasticity of supply in this study, therefore, was calculated from survey data and not assumed.

However, in an important review article casting doubt on many such calculations, Fuchs, Krueger, and Poterba cite much lower elasticities of demand estimated by economists for male labor generally, as follows:

Hicksian (compensated) labor supply elasticity for men: mean is .22 and s.d. is .28
Marshallian (uncompensated) labor supply elasticity for men: mean is .10 and s.d. is .27

(Fuchs, Krueger, and Poterba 1998); Table 2, pg. 1392)

Furthermore, in an article on tax policy, Entin suggests that higher wage occupations have a higher elasticity of demand for labor; truck driving assuredly is not one of those occupations.

One should expect higher elasticities for upper-income workers, whose income and wealth give them added flexibility to alter their hours while maintaining a high living standard. Modern consensus estimates of labor force elasticity, while still low, are generally non-zero. For example, a survey of 65 labor economists produced estimates of the labor supply elasticity for men of 0.1 (mean estimate) and zero (median estimate).

(Entin 2004).

Finally, after praising deregulation of trucking for reducing “labor rents,” Hirsch returns to the issue and subsequently comes to the conclusion that the lower compensation in trucking substantially reflects lower human capital quality (Hirsch 1993). If this is true, then what had appeared to be elastic labor supply was instead trucking employers in particular and the trucking industry in general substantially reducing standards to find drivers to “seat the trucks.” In other words, the market for the specific quality of labor previously employed in trucking only remained in the unionized (and high paying) sector, while the non-union truckload sector labor market– the very sector most affected by the new regulations increasing hours worked – must be satisfied with lower quality labor (Belzer 1993). It cannot be merely a question of human resource practices (Griffin and Rodriguez 1990), because trucking has plenty of smart and sophisticated human resource managers, but rather a question of compensation sufficient to attract qualified and stable workers who want to have personal and family lives in addition to their work (Rodriguez *et al.* 2003; Rodriguez, Targa, and Belzer 2006). It also explains the apparent increase in hours worked in trucking and the apparently increasing violation of HOS regulations. This is not a question of supply elasticity but rather of moving down-market for labor. The increasing – rather than decreasing – requirement to work many more hours for the same pay compared with others in competitive labor markets exacerbates the move down-market, and it contributes to the churning and chronic labor shortages that plague the industry. In sum, the FMCSA regulation issued in April 2003 and which became effective in January 2004 that increases driver working time, and the 2002 and subsequent RIAs on which the IFR RIA is based do not control either for the declining quality of the labor force in trucking that is caused in part by the regulations allowing more labor time, or the continuing labor market churning and “labor shortage” to which it contributes.

Bibliography

1992. Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs. In Memorandum for Heads of Executive Departments and Establishments: Executive Office of the President - Office of Management and Budget. Circular No. A-94 Revised. Available at <http://www.whitehouse.gov/omb/circulars/a094/a094.html>
1996. "Company Kept False Logs on Driver's Hours". New York Times, October 13, 1996.
2004. Lack of Sleep May Lead to Excess Weight: Study Finds Link Between Hours of Sleep and Risk of Obesity. Las Vegas, NV: The North American Association for the Study of Obesity.
- Beilock, Richard. 1995. "Schedule-Induced Hours-of-Service and Speed Limit Violations Among Tractor Trailer Drivers." *Accident Analysis and Prevention* Vol.27, No.1:pp 33-42.
- Béjean, Sophie, and Hélène Sultan-Taïeb. 2005. "Modeling the economic burden of diseases imputable to stress at work." *European Journal of Health Economics* Vol.6, No.1:pp 16-23.
- Belman, Dale L., and Kristen A. Monaco. 2001. "The Effects of Deregulation, De-Unionization, Technology, and Human Capital on the Work and Work Lives of Truck Drivers." *Industrial and Labor Relations Review* Vol.54, No.2A:pp 502-24.
- Belman, Dale L., Kristen A. Monaco, and Taggart J. Brooks. 1997. *Let It Be Palletized: A Portrait of Truck Drivers' Work and Lives From the 1997 Survey of Truck Drivers* University of Michigan Trucking Industry Program. Ann Arbor, MI: University of Michigan Trucking Industry Program.
- . 2005. *Sailors of the Concrete Sea: A portrait of truck drivers' work and lives.* East Lansing, Mich.: Michigan State University Press.
- Belzer, Michael H. 1993. "Collective Bargaining in the Trucking Industry: The Effects of Institutional and Economic Restructuring", Cornell University; 0058, Ithaca, NY.
- . 1994a. *Paying the Toll: Economic Deregulation of the Trucking Industry.* Washington, DC: Economic Policy Institute.
- . 1994b. "The Motor Carrier Industry: Truckers and Teamsters Under Siege". In *Contemporary Collective Bargaining in the Private Sector*, edited by P. B. Voos. Madison, Wisconsin: Industrial Relations Research Association.
- . 1995. "Collective Bargaining After Deregulation: Do the Teamsters Still Count?" *Industrial and Labor Relations Review* Vol.48, No.4:pp 636-55.
- . 2000. *Sweatshops on Wheels: Winners and Losers in Trucking Deregulation.* Oxford, UK and New York, NY: Oxford University Press.
- . 2002. "Trucking: Collective Bargaining Takes a Rocky Road". In *Collective Bargaining in the Private Sector*, edited by P. F. Clark, J. T. Delaney and A. C. Frost. Champaign, IL: Industrial Relations Research Association.
- . 2006. *OOIDA 2003-2004 Cost of Operations Survey: Report of Results.* Detroit, MI: Wayne State University.

- Belzer, Michael H., Kenneth L. Campbell, Stephen V. Burks, Dale Ballou, George Fulton, Donald Grimes, and Kristen A. Monaco. 1999. Hours of Service Impact Assessment. Ann Arbor, MI: University of Michigan Transportation Research Institute and Federal Highway Administration, Office of Motor Carriers and Highway Safety.
- Belzer, Michael H., George A. Fulton, Donald R. Grimes, Gregory M. Saltzman, Stanley Sedo, and Lucie G. Schmidt. 2002. Proposed Changes in Motor Carrier Hours of Service Regulations: An Assessment. Ann Arbor, MI: University of Michigan Trucking Industry Program.
- 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.
- Blower, Daniel, and Kenneth L. Campbell. 2005. Methodology of the Large Truck Crash Causation Study. In Large Truck Crash Causation Study Analysis Series. Washington, DC: Federal Motor Carrier Safety Administration.
- Braver, Elisa R., C. W. Preusser, D. F. Preusser, H. M. Baum, Richard Beilock, and R. Ulmer. 1992. "Long hours and fatigue: a survey of tractor-trailer drivers." *Journal of Public Health Policy*:pp 341-66.
- Broomhall, David. 1993. The Use of Multipliers in Economic Impact Estimates. West Lafayette, IN: Cooperative Extension work in Agriculture and Home Economics, State of Indiana, Purdue University and U.S. Department of Agriculture.
- Committee for Study of Public Policy for Surface Freight Transportation. 1996. Paying Our Way: Estimating Marginal Social Costs of Freight Transportation. Washington, DC: Transportation Research Board of the National Research Council; National Academies Press.
- Council, Forrest M., Michael H. Belzer, John R. Billing, Kenneth L. Campbell, James W. Dally, Anne T. McCartt, Hugh W. McGee, A. James McKnight, Jack Stuster, Steven J. Vaughn, and Frank R. Wilson. 2003. Letter Report to Federal Motor Carrier Safety Administration Administrator Annette M. Sandberg. Washington, DC: Transportation Research Board.
- DeLeire, Thomas, and Willard Manning. 2004. "Labor market costs of illness: prevalence matters." *Health Economics* Vol.13:pp 239-50.
- Dembe, Allard E., Rachel Delbos, J. Bianca Erickson, and Steven M. Banks. 2005. "The impact of overtime and long work hours on occupational injuries and illnesses: new evidence from the United States." *Occupational and Environmental Medicine* Vol.62:pp 588-97.
- Entin, Stephen J. 2004. Tax Incidence, Tax Burden, and Tax Shifting: Who Really Pays the Tax? Washington: The Heritage Center for Data Analysis.
- Franklin, Stephen, and Darnell Little. 2006. "Bone-weary haulers raise risks on road: As truckers struggle to make ends meet, they push the limits of endurance and highway safety". *Chicago Tribune* (chicagotribune.com), December 10, 2006.
- Freund, Deborah M. 1999. An Annotated Literature Review Relating to Proposed Revisions to the Hours-of-Service Regulation for Commercial Motor Vehicle

- Drivers. Washington, DC: U.S. Department of Transportation - Federal Highway Administration - Office of Motor Carrier Safety,.
- Fuchs, Victor R., Alan B. Krueger, and James M. Poterba. 1998. "Economists' Views about Parameters, Values, and Policies: Survey Results in Labor and Public Economics." *Journal of Economic Literature* Vol.36, No.3:pp 1387-425.
- Gramlich, Edward M. 1981. *Benefit-Cost Analysis of Government Programs*.
- Griffin, Gene C., and Julene M. Rodriguez. 1990. "The Determinants of Job Satisfaction of Professional Drivers." *Journal of the Transportation Research Forum* Vol.2:pp 453-64.
- Hanley, Christine. 2007. "Trucking company faces 15 safety violations: Inspection finds a failure to keep proper records, properly handle drug tests by company involved in fatal Mission Viejo crash". *Los Angeles Times*, July 21, 2007.
- Herzenberg, Stephen A., John A. Alic, and Howard Wial. 1998. *New Rules for a New Economy: Employment and Opportunity in Postindustrial America*. Ithaca and London: ILR Press, an Imprint of Cornell University Press.
- Hirsch, Barry T. 1993. "Trucking Deregulation and Labor Earnings: Is the Union Premium a Compensating Differential?" *Journal of Labor Economics* Vol.11, No.2:pp 279-301.
- Hitt, Emma. 2006. "Large, Prospective Analysis Links Lack of Sleep to Weight Gain." *Medscape*.
- Jovanis, Paul P., Park Sang-Woo, Ko-Yu Chen, Frank Gross, and Aviroop Mukherjee. 2005. *Factors Affecting Motor Carrier Crash Risk - Final Report*. University Park, PA: The Pennsylvania Transportation Institute of The Pennsylvania State University and Federal Motor Carrier Safety Administration.
- Liu, Y., and H. Tanaka. 2002. "Overtime Work, Insufficient Sleep, and Risk of Non-Fatal Acute Myocardial Infarction in Japanese Men." *Occupational and Environmental Medicine* Vol.59:pp 447-51.
- Lumeng, Julie C., Deepak Somashekar, Danielle Appugliese, Niko Kaciroti, Robert F. Corwyn, and Robert H. Bradley. 2007. "Shorter Sleep Duration Is Associated With Increased Risk for Being Overweight at Ages 9 to 12 Years." *Pediatrics* Vol.120, No.5:pp 1020-29.
- Lund, John, and Christopher Wright. 2004. "More Pain, Less Gain: New Compensation Systems for Grocery Truck Drivers." *Labor Studies Journal* Vol.29, No.2:pp 1-21.
- Massie, Dawn L., Daniel Blower, and Kenneth L. Campbell. 1997. *Short-haul trucks and driver fatigue*. Ann Arbor, MI: University of Michigan Transportation Research Institute, Center for National Truck Statistics.
- Monaco, Kristen. 2005. "Wages and Working Conditions of Truck Drivers at the Port of Long Beach". Paper read at Proceedings of the 2005 Annual Meeting of the Transportation Research Board, January 10-13, 2005, at Washington, DC.
- Monaco, Kristen, and Lisa Grobar. 2004. *A Study of Drayage at the Ports of Los Angeles and Long Beach*. METRANS Available from http://www.metrans.org/research/final/AR%2004-01_final_draft.pdf.
- Norbridge. 2003. *The Indirect Impact of Hours-of-Service on the LTL Industry*. Deerfield, IL: Norbridge, Inc.

- Ouellet, Lawrence J. 1994. *Pedal to the Metal: The Work Lives of Truckers*. Philadelphia: Temple University Press.
- Pear, Robert. 2008. "Gap in Life Expectancy Widens for the Nation". *New York Times*, March 23, 2008.
- Portney, Paul R. 2002. Benefit-Cost Analysis. In *The Concise Encyclopedia of Economics*, ed D. R. Henderson. Place Published: Liberty Fund, Inc. <http://www.econlib.org/library/Enc/BenefitCostAnalysis.html> (accessed 29 February 2008).
- 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 Vol. Freight Policy, Economics, and Logistics; Truck Transportation*, No.1833:pp 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* Vol.59, No.2:pp 205-25.
- Saltzman, Gregory M., and Michael H. Belzer. 2007. *Truck Driver Occupational Safety and Health: 2003 Conference Report and Selective Literature Review*. Washington, DC: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health (NIOSH).
- Siebert, John H. 2005. Informal Data That Led to Scientific Study. In *2005 International Truck & Bus Safety & Security Symposium*, edited by R. O. Marshall. Alexandria, VA, USA.
- Singh, Gopal K., and Mohammad Siahpush. 2006. "Widening socioeconomic inequalities in US life expectancy, 1980–2000." *International Journal of Epidemiology* Vol.35:pp 969–79.
- U.S. Department of Transportation - Federal Motor Carrier Safety Administration. 2000. "Hours of Service of Drivers; Driver Rest and Sleep for Safe Operations (49 CFR Parts 350, 390, 394, 395, and 398); Notice of proposed rulemaking (NPRM)." *Federal Register* Vol.65, No.85:pp 25540-611.
- . 2005. *FMCSA Field HOS Survey: Motor Carrier Industry Implementation & Use of the April 2003 Hours of Service Regulations*. Washington, DC: U.S. Department of Transportation - Federal Motor Carrier Safety Administration.
- . 2007. *2007 Hours of Service Study*. Washington, DC: U.S. Department of Transportation - Federal Motor Carrier Safety Administration.
- Williams, Monte. 1996a. "Company is charged in a crash". *New York Times*, August 10, 1996.
- . 1996b. "Faked Driver Logs Cited in Propane Truck Crash". *New York Times*, August 20, 1996, Section 1; Page 28; Column 1.