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The Case for Strengthened Motor Carrier Hours of Service Regulations

Abstract

The May 2000 proposal by the U.S. government to change hours of service (HOS) regulations for motor carriers generated considerable controversy. This study, however, finds that an HOS proposal that effectively reduced work hours and stabilized schedules could increase economic efficiency by addressing important market failures in the market for driver labor. The government's preliminary economic analysis of the HOS proposal misclassified redistribution from motor carriers to drivers as a social cost, omitted important benefits to driver health from working shorter and more regular hours, and arguably misclassified the costs of achieving compliance with current HOS regulations (adopted in 1937) as a cost of the May 2000 revisions. Furthermore, U.S. HOS standards lag behind the standards set by other major democracies. Although clearly there are many operational difficulties, the case in favor of strengthening HOS regulations is stronger than the many critics allege.

On May 2, 2000, the Federal Motor Carrier Safety Administration (FMCSA) of the U.S. Department of Transportation (DOT) proposed modifications in hours of service (HOS) regulations governing work hours of interstate truck and bus drivers. This proposal generated considerable controversy. Although Congress normally delegates responsibility for developing detailed regulations to administrative agencies, Congress took the unusual step in October 2000 of prohibiting FMCSA from implementing the proposed rule during fiscal year 2001 (Ghent 2000).

This article assesses the May 2000 proposal and the need for strengthened HOS regulations. We show that the economic analysis in the Notice of Proposed Rulemaking (NPRM) (FMCSA 2000a) substantially overstated some costs and substantially understated the benefits of the HOS proposal.[1] After reviewing current HOS regulations and the proposed amendments, we present several arguments.

- Market failures justify a role for government in regulating HOS.
- Because the costs and benefits of HOS regulations accrue to different parties, those who incur costs may oppose HOS regulations even if they pass a cost/benefit test.
- Most of the costs attributed to the May 2000 HOS proposal actually represent costs of ending violations of HOS regulations that have been in effect since 1938, not incremental costs of new regulations.
- The social cost of labor needed to implement the HOS proposal may be substantially less than the NPRM estimated.
- The NPRM economic analysis omitted important benefits of the HOS proposal, such as improvements in driver health.
- The U.S. lags far behind the European Union in addressing long work hours among truck and bus drivers and in using modern technology to record work hours.

We conclude with a menu of policy options to address weaknesses of existing HOS regulations and the widespread violations of existing limits on driver work hours.

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Current HOS Regulations and How the May 2000 HOS Proposal Would Amend Them

Current HOS regulations limit motor carrier drivers to no more than sixty hours of on-duty time in any seven consecutive days or seventy hours in any eight consecutive days. These weekly limits were adopted in 1937 and took effect in 1938, and they have not changed since then (FMCSA 2000a, 25547-25548).

The 1937 regulations also limited drivers to twelve hours per day of work, including "loading, unloading, driving, handling freight, preparing reports, preparing vehicles for service, or performing any other duty pertaining to the transportation of passengers or property" (quoted in FMCSA 2000a, 25547). A 1938 amendment replaced this with a limit of ten hours of driving in any twenty-four-hour period and a requirement that drivers have at least eight consecutive off-duty hours per day. The remaining six hours per day could be used for work activities other than driving, such as loading, inspecting the vehicle, and completing paperwork, or for meals and breaks (FMCSA 2000a, 25548).

A 1962 amendment led to work schedules inconsistent with humans' natural twenty-four-hour circadian rhythm. This amendment replaced the limit of ten hours of driving per twenty-four-hour period with a requirement that drivers have at least eight consecutive off-duty hours after ten hours of driving. After this off-duty period, the driver could resume driving (FMCSA 2000a, 25548). A driver in a hurry–or a carrier dispatching a driver for maximum production–thus could legally use an eighteen-hour cycle: ten hours of driving, eight hours off-duty, etc. A driver on this cycle would be driving sixteen hours in some twenty-four-hour periods.

The May 2000 proposal would make the first major amendments to HOS regulations since 1962. It establishes five driver categories: long-haul, regional, local split shift, local, and "work vehicle" drivers (such as repair technicians) whose work consists mainly of tasks other than driving. The May 2000 proposal has several major provisions:

- It restores the twenty-four-hour daily cycle in HOS regulations.
- Most drivers may be on duty a maximum of twelve hours within a twenty-four-hour cycle, with no distinction between driving and other work. (Work vehicle drivers may work thirteen hours per day.)
- Long-haul, regional, and local drivers must have at least ten consecutive hours off-duty each day; and local split shift and work vehicle drivers must have at least nine.
- All drivers must have a weekly recovery period of at least thirty-two consecutive hours off-duty per week (including at least two consecutive midnight to 6 a.m. periods).
- Long-haul and regional drivers may use a two-week cycle in which they can work up to seventy-two hours one week if they work no more than forty-eight in the other.
- Long-haul and regional drivers must use electronic on-board recorders (EOBRs) to keep track of work hours automatically (FMCSA 2000a; 25568, 25581, 25604).

The proposed EOBR requirement is an attempt to prevent the widespread falsification of work logs that occurs under the current record of duty status (RODS) system, in which drivers write down their hours in work logs.[2]

Market Failures That May Justify HOS Regulations

An assessment of the HOS proposal must consider a key theorem in economics: Perfectly competitive markets result in economic efficiency. If the benefits from reduced driver hours exceed the costs, then market forces will reduce driver hours. For example, if long work hours have an adverse effect on drivers' health, family life, and sense of well-being, then drivers will demand higher hourly pay for jobs that entail long hours. In this idealized economic model, trucking companies and shippers will be willing to pay the cost of these compensating wage differentials only if the benefit to them of having drivers work long hours is large enough to justify the cost.

Under what circumstances, then, are new government regulations appropriate? In 1996, the Office of Management and Budget (OMB) published "best practice" guidelines for economic analysis of federal regulations, prepared by a working group chaired by Joe Stiglitz of the President's Council of Economic Advisors and DOT General Counsel Steve Kaplan (U.S. Office of Management and Budget 1996).

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These guidelines state:

> In order to establish the need for the proposed action, the analysis should discuss whether the problem constitutes a significant market failure. If the problem does not constitute a market failure, the analysis should provide an alternative demonstration of compelling public need, such as improving governmental processes or addressing distributional concerns.

This statement echoes economist Arthur Okun's (1975) argument that decision makers should consider both economic efficiency and fair treatment for the less advantaged when setting policy.

This moral argument about fairness has some relevance to a debate about legal limits on work hours. For example, the portion of the May 2000 HOS proposal requiring a weekly recovery period of at least thirty-two consecutive off-duty hours has roots in the Ten Commandments, which require people to refrain from work every seventh day in order to get adequate rest. According to the Bible (*Exodus* 23:12), divine commandment requires people to provide this day of rest even to their slaves and to their farm animals. A compelling distributional argument could be made for treating American truck drivers at least as well as the Bible required people to treat their donkeys.

Employment conditions for drivers are often worse than those for other Americans. Drivers generally work long hours for low hourly wages and face relatively high risks of occupational injury or death. Despite their long hours, interstate drivers are not protected by the Fair Labor Standards Act requirement of premium pay for overtime. A 1997 survey found that nonunion truckload drivers earned the equivalent of a job with overtime premium pay that had a base wage of just $8.17 per hour (Belzer 2000, 47). Moreover, only a few other occupations such as commercial fishing and logging have higher rates of occupational fatalities than that for truck drivers (Occupational Safety and Health Administration 1993). A fairness argument could therefore be made for improving employment conditions for drivers.

The efficiency argument for stricter enforcement of existing HOS regulations and for new HOS regulations is that an externality, inadequate information, and cognitive failures in processing data distort the market for driver labor. By addressing these market failures[3] and correcting flaws in previous regulations, new regulations can enhance economic efficiency.

The externality is the benefit to other drivers and pedestrians from improved highway safety. Work hours affect safety. Numerous research studies published in refereed journals have established that long and irregular work hours for drivers lead to fatigue, reduced alertness, and impaired coordination.[4,5,6] Driver fatigue and reduced driver alertness cause highway collisions and near misses (Lyznicki et al. 1998; Dement 1997; Barach et al. 1998; Summala and Mikkola 1994; Hakkanen and Summala 2000; Philip et al. 2001; Feyer 2001; Horne and Reyner 1999; Horne and Reyner 1995). The rate of fatigue-related truck accidents increases significantly after drivers have been driving for more than 9.5 hours (Saccomanno et al. 1995). Restriction of sleep to four to five hours per night–a common experience for truckers (Mitler et al. 1997)–causes significant deterioration in reaction time performance within three nights; and after a week of partial sleep deprivation, it takes two full nights of sleep for reaction time performance to recover (Dinges et al. 1997). After six days of sleeping only four hours per day, sleep-disordered breathing increases significantly (Stoohs et al. 1993). A common problem among long-haul truck drivers (Stoohs et al. 1995), sleep-disordered breathing doubles the accident rate among this group (Stoohs et al. 1994).

The externality arises because these collisions often affect parties other than bus or truck companies, shippers, and commercial motor vehicle drivers; and motor carriers may not fully consider costs borne by third parties when making decisions about driver hours.[7] While bus or trucking companies may have to provide compensation to third parties who have suffered losses, compensation actually paid often does not fully compensate for the losses. Moreover, many trucking companies are small firms whose liability insurance is not fully experience rated, so that much of the compensation may come out of the pockets of other trucking companies or even companies in other industries. (This helps explain why the Insurance Institute for Highway Safety supported a minimum of twelve to fourteen hours off-duty per day [FMCSA 2000a, 25550].) Because part of the damage to third parties caused by driver fatigue is an external cost, an unregulated free market provides less than the economi-

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cally efficient level of highway safety.

Inadequate or asymmetric information often prevents labor markets from providing the economically efficient level of occupational safety and health. Shipyard workers during World War II incurred dangerous exposures to asbestos because major asbestos producers concealed information about its harmful effects (Brodeur 1985, 109-121). Because the shipyard workers were ignorant of these risks, they did not demand proper ventilation in the ship hulls in which they worked, and they did not receive compensating wage differentials. The social benefits of reducing occupational exposure to asbestos would have exceeded the social costs (that is, reducing asbestos exposure would have been economically efficient); but the free market failed to effect this reduction because of imperfect information. Subsequent government asbestos regulations have been criticized for going too far in the other direction, setting exposure limits that were excessively strict and disregarding costs. Still, had the government adopted narrowly tailored asbestos regulations that focused on the highest risk cases (cigarette smokers with massive exposures to loose asbestos fibers), regulation could have been highly cost-effective compared with the alternative of an unregulated free market.

As a later section will demonstrate, long and irregular work hours have adverse health effects on drivers. But drivers may not become aware of some of these effects until years after their strenuous work schedules began because many occupational illnesses have long latent periods. Furthermore, cognitive dissonance often causes workers to underestimate the health risks they face in the workplace, as allowing themselves to recognize these risks would be too stressful (Akerlof and Dickens 1982). The combination of inadequate information and cognitive dissonance means that drivers in an unregulated market do not demand sufficiently large compensating wage differentials to cover the expected costs that they incur from occupational health risks.

Decisions by managers may be distorted when some costs are not explicit. Psychologists have shown that implicit opportunity costs are less salient to decision makers than are explicit costs (Northcraft and Neale 1986). Because long-haul and regional drivers typically are paid only by the mile, with no separate pay for nondriving work (unless they are among the shrinking number of drivers covered by union contracts, who generally receive hourly pay for nondriving work), trucking companies and shippers perceive time that drivers spend waiting for loads or supervising loading and unloading as having a price of zero. This zero price gives shippers and trucking companies little incentive to minimize the waiting or loading time. Furthermore, drivers have no incentive to record waiting or loading time in their RODS; recording such time yields no extra pay and reduces the number of hours they have available under the HOS regulations for paid driving time. The social cost of nonunion drivers' time clearly exceeds zero, however, so that the false perception that waiting or loading time has a zero price leads to an inefficient allocation of resources. Strict enforcement of HOS regulations would make the opportunity costs of loading and waiting time more salient to trucking companies and shippers, thereby prodding them to re-engineer inefficient aspects of their operations.

The economically efficient level of driver work hours depends in part on the strength of driver preferences for time off work. Economists normally assume that preferences are exogenous (determined outside the economic system). This and other standard economic assumptions result in the Coase theorem, which states that the use of resources does not depend on the initial allocation of property rights (Coase 1960). But preferences are often endogenous (determined within the economic system). One example of this is the "endowment effect," whereby people place a greater subjective value on something that they already own than on something that they do not already own (Thaler 1980). Because of the endowment effect, the initial allocation of rights shapes the outcome, contrary to the Coase theorem (Kahneman, Knetsch, and Thaler 1990). "The entitlement will tend to stay where it has initially been allocated. People to whom the entitlement has initially been allocated will value it most, and precisely because of the initial allocation" (Sunstein 1997, 252).

The implication of this for HOS regulation is that the "economically efficient" level of driver hours is a moving target. If the government cannot prevent systematic violations of HOS regulations, then drivers will place a lower

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value on something that they do not have (adequate rest), and long work hours will be economically efficient. But if the government enforces a policy that drivers have a right to adequate rest, then the endowment effect will cause drivers to place a higher subjective value on rest, and shorter work hours will be economically efficient.

Another consideration is that the HOS proposals do not apply to a previously unregulated market. Rather, they revise existing regulations. While economic theory asserts that perfectly competitive markets maximize economic efficiency, there is no theoretical reason to assume the efficiency of existing regulations. Older regulations adopted before government used careful cost/benefit analysis and when knowledge about adverse health effects was less extensive than it is today could have very unfavorable cost/benefit ratios. Furthermore, regulations that were efficient under market conditions existing at the time of adoption (e.g., a regulated industry with strong union protection for workers, or high production costs for EOBRs) might no longer be efficient if those conditions have changed substantially.

The May 2000 proposals may contribute to economic efficiency by revising two previously adopted regulations. First, they effectively reverse the 1962 HOS amendment that allowed many drivers to move to an eighteen-hour daily work/rest cycle. Scientific experts on sleep and circadian rhythm have emphasized the biological need for a twenty-four-hour daily work/rest cycle, which the May 2000 proposals would help restore (although cycles longer than twenty-four hours would still be permitted). Second, the May 2000 proposal for EOBRs represents an efficiency gain when compared with the previous regulatory system, which required drivers to spend time keeping written logs of their work hours (the record of duty status, or RODS). The preliminary cost/benefit analysis in the NPRM found substantial benefits from the associated reduction in truckers' paperwork burden (FMCSA 2000b).

A final efficiency issue concerns whether there are other ways of achieving the same objectives at lower cost. Rather than regulating driver hours directly, the government could indirectly affect driver hours by changing the driver compensation system. One method would be to adopt the European Union regulation effectively banning per-mile pay. Alternatively, the U.S. Department of Labor (DOL) could change the way that it administers the minimum wage law to ensure that no on-duty hours are viewed as having a price of zero. Either method would parallel the approach for environmental regulation of putting a price on pollution, which noted economists have argued is more efficient than directly regulating the quantity of pollution (Baumol and Oates 1971).

By administering the minimum wage provisions of the Fair Labor Standards Act (FLSA) somewhat differently, DOL could change the incentives for shippers, trucking companies, and drivers. In 1940, DOL made an administrative decision to require that the average hourly wage rate over the week at least equal the minimum wage, rather than that the wage rate for each hour at least equal the minimum wage. U.S. Circuit Court Judge Ruth Bader Ginsburg declined in 1985 to overturn this DOL decision (*Dove v. Coupe*, 759 F.2 167 [DC Cir. 1985]), deferring to the precedent set twenty-five years earlier in the Klinghoffer case (*United States v. Klinghoffer Bros. Realty Corp.*, 285 F.2d 487 [2d Cir. 1960]).[8] Nevertheless, Ginsburg ruled that "the minimum wage laws logically could be construed as requiring hour-by-hour compliance" (*Dove v. Coupe* at 171). If DOL chose to exercise its statutory authority to require hour-by-hour compliance, it could end the common practice of treating waiting, loading, and unloading time as unpaid time.

Once shippers and trucking companies stopped perceiving drivers' time as free, they would be more careful not to waste it. Shippers could, for example, arrange for pick-ups only when the load is ready, and consignees could arrange for deliveries only when they are ready to receive the goods. Similarly, shippers, consignees, and trucking companies could make greater use of the "drop and hook" technique, in which the driver detaches the truck tractor from one trailer and immediately attaches it to another trailer, without waiting for the original trailer to be loaded or unloaded. Although drop and hook entails a capital cost from buying additional trailers, savings in driver waiting time in many cases might justify this capital investment if driver waiting time were not improperly assigned a value of zero.

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The impact of requiring hour-by-hour compliance with the minimum wage would be strengthened if Congress also made motor carrier employees subject to the overtime provisions of the FLSA, which require time-and-one-half pay for work in excess of forty hours per week. This requirement for premium pay would give motor carriers an incentive to re-engineer their operations to avoid long work weeks. Currently, Section 13(b)(1) of the FLSA exempts motor carrier employees who are subject to HOS regulations from the overtime provisions of the FLSA. In March 2000, Representative Gerald Kleczka introduced a bill (2000 H.R. 4062) to repeal Section 13(b)(1), but this bill never came to a vote.

Besides changes in the driver compensation system, other alternatives to direct regulation of HOS include (a) subsidizing construction of rest areas for truck drivers, and (b) repealing the ban on secondary boycotts in the Taft-Hartley Act and the ban on "hot cargo" clauses in the Landrum-Griffin Act.[9] The former would directly address the problem of driver fatigue. The latter would enable the Teamsters to extend union contract coverage to more drivers, and Teamster contracts generally provide hourly pay for waiting and loading time.

It is unclear whether requiring hour-by-hour compliance with the FLSA or any of the other alternatives would address problems associated with driver fatigue at lower cost than the proposed HOS regulations.

Why HOS Proposals Face Opposition Regardless of Economic Efficiency

The proposed HOS regulations face considerable opposition from the trucking industry, as indicated by public comments on the NPRM. In large part, this opposition reflects a fight over the distribution of income and the concentration of compliance costs in a small group–issues not addressed in conventional cost/benefit analysis. Even if it could be decisively demonstrated that the proposed HOS regulations pass the test of cost-benefit analysis, these distributional concerns would remain.

These issues arise because of the way that cost/benefit analysis is conventionally practiced. One could avoid many fights over distribution by assessing proposed regulations with the Pareto criterion: A regulation must make at least one person better off without making anyone worse off. A regulation would be Pareto superior to the pre-regulation status quo if those who gained from the regulation provided full compensation to the losers and still had some net gains left over. But most cost/benefit analyses do not require Pareto superior outcomes.

In practice, cost/benefit analyses assess proposed regulations with the Kaldor-Hicks criterion: The benefits of a regulation must exceed the costs. The Kaldor-Hicks criterion requires only that it be *theoretically* possible for the winners to provide full compensation to the losers and still have some net gains left over; the winners need not actually compensate losers. The Kaldor-Hicks criterion ignores distributional issues and just asks: Does the proposed regulation increase adjusted gross domestic product (with the adjustments accounting for goods and services not traded in markets, such as leisure time)?

Even if the total gains to society exceed the total losses, those who lose will oppose a proposed regulation when compensation is not actually paid. No compensation for losses is provided by the HOS proposal. This lack of compensation accounts for much of the opposition.

Objections to proposed HOS regulations are intensified because the costs of these regulations are concentrated in a small group, each member of which has a lot at stake; but benefits are spread among a very large group, each member of which has little at stake. In such a situation, the small group has a greater incentive than the large group to mobilize politically (Olson 1965).

The costs of strengthening HOS regulations fall disproportionately on those trucking companies–generally nonunion companies in the truckload sector–whose drivers now operate their trucks for extremely long hours without breaks. Although these work hours may violate existing HOS regulations, the government usually cannot detect the violations. But the proposed EOBRs, while ineffective in monitoring loading and waiting time, could readily identify companies whose drivers do not have ten continuous hours per day and thirty-two continuous hours per week free from driving duties. To avoid penalties for regulatory violations, these companies would have to hire more drivers (possibly driving up market wage rates for drivers) and buy additional truck tractors and trailers. Their costs would rise substantial-

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ly if the May 2000 HOS proposal were implemented. Because they compete with trucking companies that already comply with existing HOS regulations (who may not have to incur the costs of hiring more drivers or buying additional tractors and trailers merely to maintain their present level of shipping services), the trucking companies that significantly violate existing HOS regulations could not pass on all of their increased costs to shippers. Many of the firms whose competitive advantage was their willingness to violate the law will be forced out of business.

It is important to note that some trucking executives would like to comply with existing HOS regulations but feel unable to do so because of competition from other trucking firms that violate the existing regulations. Effective enforcement procedures would allow these executives to obey the law without fear of losing their customers to law-breaking rivals.

Effective enforcement of the weekly hours limit also would make it harder for some nonunion trucking companies to undermine the labor standards in Teamster contracts. Nonunion firms often treat loading and waiting time as off-duty hours in order to evade the weekly hours limit, whereas union firms typically treat it as on-duty time for which the drivers receive hourly pay. Enforcement measures to reduce this evasion would level the playing field, seemingly to the advantage of the Teamsters and motor carriers with Teamster contracts.

The California Teamsters have supported state legislation to let drivers sue for damages if trucking companies violate HOS regulations.[10] Similarly, a Congressman testified at a June 22, 2000 Congressional hearing in favor of the proposed EOBR requirement, noting that "hours-of-service rules are widely flouted, with many drivers still referring to their hours-of-service logs as 'comic books'" (Oberstar 2000).

The International Brotherhood of Teamsters (IBT), however, has opposed the May 2000 HOS proposal, using two seemingly contradictory arguments. At a June 22, 2000 Congressional hearing, the assistant director of the Safety and Health Department of the IBT objected to the proposed reduction in maximum daily work hours from sixteen to twelve, noting that drivers would have less time with their families if they performed sixty hours of work per week over a five-day period rather than over a four-day period (Abrams 2000). Less than six months later, however, the Director of that IBT department expressed concern that long daily hours were unsafe. In his December 15, 2000 docket comments on the HOS proposal, the IBT safety and health director noted–correctly–that EOBRs would be ineffective in monitoring time spent on non-driving duties. He then added the following statement: "Because non-driving duties can account for several hours per day, and because as little as an hour or two of extra on-duty time can have serious implications for safety, the use of EOBRs does nothing to prevent manipulation of records sufficient to allow a driver illegally to extend his or her workday to the point of becoming unsafe" (International Brotherhood of Teamsters 2000, 5). The IBT safety director also objected to the HOS proposal because it would increase the maximum permissible consecutive driving hours from ten to twelve, asserting that this increase would harm highway safety. The concluding clause in the Teamsters union's docket comments was, "The IBT urges the FMCSA to take no action rather than to proceed with the rules in their proposed form" (International Brotherhood of Teamsters 2000, 6). The perhaps surprising lack of support from the international Teamsters union for the May 2000 HOS proposal diminishes the prospects that the proposal will be adopted.

Those truck drivers who are prevented by HOS regulations from working as many hours as they would like incur losses from reduced work hours, but they may benefit from higher hourly wages and increased leisure. Indeed, it is plausible that the gains to truck drivers would outweigh the losses, at least for the median truck driver. After all, unionized truck drivers have voluntarily chosen a package of higher hourly wages but shorter work hours, suggesting that this package increases the welfare of the median voter in Teamsters union elections. Nonunion drivers don't have this option because of a collective action problem: No one nonunion driver can force the market wage rate to rise by cutting back his work hours. The increase in the market wage rate (the key to making drivers better off) occurs only if many thousands of drivers cut back their work hours. This collective action problem prevents nonunion truck drivers from maximizing their utility in an unregulated free market.

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Persons whose lives are saved because of the new HOS regulations have a great deal to gain. But nobody knows in advance which individuals would die in the absence of the new regulations. Although there are millions of drivers and pedestrians, only a very small fraction of them would die in the absence of new HOS regulations. The expected value of the benefit that each individual receives from improved traffic safety thus is quite small, even though the aggregate total benefit may be large. Groups such as the American Automobile Association represent the interests of potential victims of collisions with fatigued truckers; and the AAA made comments supportive of the proposed revisions in HOS regulations.[11] But because of the collective action problem, car drivers and pedestrians do not mobilize to the extent needed to maximize their utility. Their voices are drowned out by the voices of a smaller number of individuals and firms, each of whom has a lot at stake.

Costs of Achieving Compliance with Existing Regulations vs. Incremental Costs of New Regulations

The OMB guidelines for "Economic Analysis of Federal Regulations" specify that "All costs calculated should be incremental, that is, they should represent changes in costs that would occur if the regulatory option is chosen compared to costs in the base case (ordinarily no regulation or the existing regulation)" (Office of Management and Budget 1996, section III.C.1). A crucial question is, Which of the costs attributed to the May 2000 HOS proposal should be considered incremental costs?

Three costs are unquestionably incremental: (1) costs of reducing maximum daily hours from sixteen to twelve, (2) costs of providing drivers with an off-duty weekly recovery period of at least thirty-two continuous hours, and (3) costs of installing and operating EOBRs. None of these are required by existing regulations, but all would be required under the May 2000 proposal.

Public comments on the HOS proposal, however, emphasized costs associated with drivers working fewer hours per week. Some drivers would lose income and would find it more difficult to make it home for the weekend. Trucking companies would have to hire more drivers, but lower weekly earnings for drivers would make hiring difficult. Trucking companies would also have to buy more truck tractors and trailers, as each one would be used fewer hours per week. Should these costs be considered incremental?

Some truly are incremental because the new twelve-hour daily maximum or the new weekly recovery period could reduce a driver's weekly hours below sixty. A driver could legally work twelve hours per day for five consecutive days. But scheduling a driver to work sixty hours per week could be difficult if a driver works relatively short hours on some days or in weeks with a fifty-six-hour weekly recovery period.

Most of the costs of reduced weekly hours, however, are costs of reducing weekly hours to sixty (rather than below sixty). The May 2000 HOS proposal does not in any way change the sixty-hour-per-week limit for drivers set by the Interstate Commerce Commission in December 1937, which took effect July 1, 1938. Rather, the May 2000 proposal makes the longstanding sixty-hour limit easier to enforce, as the new EOBR requirement would make it harder for trucking companies and drivers to conceal noncompliance.

From the perspective of chronic violators of existing regulations, the cost of reducing weekly hours to sixty is an incremental cost of the May 2000 proposal, as they would continue to violate the sixty-hour limit if there were no EOBRs to provide evidence of their violations. But if existing regulations are the base case against which incremental costs should be measured, then the cost of reducing drivers' weekly hours to achieve compliance with the sixty-hour limit imposed by the December 1937 HOS regulations should not be considered an incremental cost of the May 2000 HOS proposal. FMCSA could consider both perspectives by conducting the economic analysis using two different baselines: first, the existing HOS regulations as written; and second, the current practice, which includes substantial noncompliance with existing regulations. Regardless of which baseline FMCSA finds more convincing, however, it seems clear that much of the cost attributed to the May 2000 HOS proposal properly should be attributed to bringing firms into compliance with existing regulations.

A recent court ruling may have enhanced FMCSA's ability to begin strict enforcement of existing HOS regulations that had previously been violated. In May 2001, the Federal

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Aviation Administration announced its intent to begin strict enforcement of regulations limiting work hours of airplane pilots (Federal Aviation Administration 2001). The airlines sued, alleging that the new enforcement policy constituted a rule change that the FAA could not implement without first soliciting comments from them. In May 2002, the U.S. Court of Appeals for the District of Columbia upheld the FAA enforcement policy, finding that the FAA's action did not constitute a substantive change in the regulation (*Air Transport Association of America v. Federal Aviation Administration*, 2002 U.S. App. LEXIS 10270, May 31, 2002). This ruling may make it easier for FMCSA to adopt existing HOS regulations (rather than current practice) as the baseline for measuring the costs of its HOS proposal.

Overstatement of the Social Cost of Labor in NPRM Preliminary Cost/Benefit Analysis

The NPRM preliminary cost/benefit analysis (FMCSA 2000a, 25573) noted, "The largest cost for motor carriers [of the proposed changes in HOS regulations] will be hiring new drivers." FMCSA estimated that the proposed HOS changes would require approximately 40 percent of long-haul drivers to reduce their work hours, and that motor carriers would have to hire approximately 49,000 new drivers (almost all in the truckload sector) to make up for the resulting loss in labor time (pp. 25572-25573). The reduction in work hours for individual drivers now working in excess of sixty hours per week would save motor carriers money, but these savings would be outweighed by the wages paid to new drivers, for a net payroll increase of approximately $210 million per year. In addition, hiring 49,000 new drivers would increase the market wage rate for drivers, and existing drivers also would receive the higher wage rate, entailing an increase in the wage bill of $175 million per year. Combining these elements, FMCSA estimated the net increase in wage costs for motor carriers to be $384 million per year (p. 25573). This substantially exceeds, for example, the estimated cost of installing and maintaining EOBRs: $492 million over ten years (p. 25575).

The large magnitude of the increase in wages thus strongly influences the outcome of the cost/benefit analysis. FMCSA's efforts to be sensitive to concerns of trucking companies, however, led FMCSA to use the wrong measure of labor costs associated with the HOS proposal. The analysis in the NPRM (p. 25573) expressly states that it presents "the cost *to motor carriers*" (emphasis added) of additional wages. Taking the perspective of motor carriers makes increases in payroll costs a reasonable measure of labor costs of the new regulations. But OMB guidelines require economic analyses of federal regulations to take a broader perspective, considering *social* costs and *social* benefits (those for all persons in society), and not just *private* costs and *private* benefits (those for motor carriers alone).[12] The proposed HOS regulations raise social costs only to the extent that diversion of factors of production (labor, capital, and land) to the motor carrier industry causes society to forego the production of other goods and services. Wages paid should be considered as a social cost only if they measure the value of production foregone as a result of the diversion of labor.

Consider first the $175 million per year from higher hourly wage rates for existing drivers. Paying the existing drivers more for the same work does not cause the motor carrier industry to employ a greater quantity of factors of production, and it therefore does not divert any factors of production from alternative uses. Because an increase in the hourly wage rate for existing drivers does not cause society to sacrifice the production of other goods or services, the opportunity cost to society of this wage increase is zero. From a social perspective, this $175 million per year is not a cost.[13] It is purely a redistribution of income from motor carriers and (to the extent that carriers can raise prices) shippers to drivers. The dollars lost by motor carriers and shippers are gained by existing drivers.

Whether the wages and benefits paid to 49,000 additional drivers entail an opportunity cost depends on labor market conditions. If the economy is at full employment and no foreign labor is available, then employing these 49,000 workers as drivers forces society to forego what they would have produced had they worked in other jobs. This is the standard microeconomic model, which FMCSA adopted in the NPRM. But one must also consider a macroeconomic question: Can employers meet staffing needs by hiring workers who would otherwise be unemployed or underemployed?

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Because of a highly controversial decision made after FMCSA's preliminary economic analysis was completed, Mexico may provide many of the drivers needed to implement new HOS rules. In February 2001, an arbitration panel established under the provisions of the North American Free Trade Agreement (NAFTA) ordered the U.S. to allow Mexican trucks to operate throughout the U.S., and not just in a twenty-mile-wide strip along the border. The Bush administration quickly decided to implement the policy ordered by the arbitrators, rather than exercise the option provided by NAFTA to keep Mexican trucks out and provide Mexico with compensation (Greenhouse 2001). The Teamsters, asserting that Mexican trucks were unsafe, lobbied Congress to restrict the entry of Mexican trucks (Shenon 2001a). Both the House and the Senate approved such restrictions, but President Bush threatened a veto (Shenon 2001b).

President Bush and Congress agreed on a compromise in December 2001, included as Section 350 of the Department of Transportation appropriations law (P. L. 107-87). Section 350 allows Mexican drivers to deliver loads between Mexico and any point in the U.S. once certain safety requirements are met. The requirements include (a) an on-site safety inspection of Mexican carriers seeking to operate in the U.S., (b) electronic verification of the license of each Mexican driver crossing the border who is transporting hazardous materials, and (c) verification that Mexican carriers operating in the U.S. comply with HOS rules. On May 1, 2002, a coalition including the Teamsters, the California Trucking Association, and Public Citizen filed suit in U.S. District Court to block regulations allowing cross-border trucking, on the grounds that Mexican trucks do not meet U.S. air pollution standards (Cleeland 2002). While this pending court case could delay implementation of the NAFTA trucking provisions and require Mexican carriers to use low-pollution diesel trucks, it seems unlikely to stop them from operating in the U.S. using low-paid Mexican drivers.

The Mexican labor market chronically has high levels of unemployment and underemployment, consistent with W. Arthur Lewis' model of developing countries as essentially having horizontal labor supply curves (1954). Furthermore, Mexican labor that is available to drive trucks in the U.S. under the NAFTA provision cannot legally be employed for other purposes in the U.S. From a macroeconomic perspective, then, the opportunity cost (in terms of foregone production) of tapping the Mexican labor market to meet the demand for drivers in the U.S. is zero or close to zero.

Mexican labor is unlikely to meet *all* of the additional demand for drivers created by new HOS regulations. U.S. Immigration and Naturalization Service cabotage rules prohibit Canadian drivers from transporting goods or passengers from one U.S. location to another U.S. location (*Greyhound Lines v. Immigration and Naturalization Service*, 1995 U.S. Dist. LEXIS 16594 [U.S. District Court for the District of Columbia, 1995]), and Mexican drivers presumably would face the same prohibition. Even under the NAFTA provision, the maximum extent to which Mexican drivers can operate in the U.S. is limited to the portion of international shipments between the twenty-mile-wide border zone and origins or destinations farther north in the U.S. or Canada. The number of incoming truck crossings along the U.S.-Mexican border grew from 2.9 million in 1995 to 4.5 million in 2000,[14] and this number is likely to grow further as trade between the U.S. and Mexico increases; but shipments between Mexico and U.S. or Canadian origins or destinations are likely to remain a relatively small fraction of total shipments in the U.S.

Nevertheless, once the NAFTA trucking provision is implemented, low-wage Mexican drivers could displace American drivers for hundreds of millions of miles of trucking shipments per year. Regardless of one's position on the NAFTA provision, one must recognize that this displacement will at least partially offset increased demand for drivers created by the new HOS regulations.

In short, FMCSA's focus on private costs to motor carriers rather than on social costs caused FMCSA to overestimate substantially the costs of implementing the proposed HOS regulations. Redistribution associated with wage increases is not a social cost; and increased employment of Mexican drivers in the U.S. entails little or no opportunity cost in terms of foregone production. Correctly measuring the labor costs of implementing the proposed changes to HOS regulations would make the cost/benefit analysis much more favorable to adoption of these changes.

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One still can debate whether particular instances of redistribution are socially desirable. Economist Milton Friedman (1980), for example, criticized large subsidies by the state of California for elite universities such as Berkeley and UCLA, on the grounds that the students at these elite universities disproportionately came from high-income families who did not merit a subsidy from average-income taxpayers. But long-haul truck drivers–the beneficiaries of the additional employment and any wage increase that would stem from HOS regulations–fall below the median for society in terms of hourly wage rates and many other measures of privilege. Redistribution in favor of long-haul truck drivers may be easier to justify than redistribution in favor of students at elite universities.

FMCSA Needs to Consider Beneficial Effects on Driver Health in the Cost/Benefit Analysis of HOS Regulations

The NPRM preliminary cost/benefit analysis explicitly considered two potential benefits of the proposed revisions to HOS regulations. One was the improvement in highway safety from reducing fatigue-related crashes, and the other was the reduction in paperwork burdens from eliminating the RODS logs. It is fully appropriate that FMCSA considered these potential benefits. The preliminary cost/benefit analysis was distorted, however, by the incorrect exclusion from the analysis of a potentially large benefit from the proposed revisions: improvements in driver health.

Because occupational safety and health falls primarily under the jurisdiction of the Department of Labor rather than of FMCSA, some might argue that FMCSA need not consider driver health in the HOS cost/benefit analysis. This argument does not seem to take into consideration important judicial precedents and OMB guidelines. More important, federal statutes specifically require the U.S. Department of Transportation to protect the health and safety of transportation workers.

Court Precedents Regarding Work Hours, Worker Health, and Motor Carrier Regulation

The U.S. Supreme Court has recognized the importance of improvements in worker health as a justification for limits on work hours. In 1908, the Court upheld the constitutionality of an Oregon statute limiting women's work hours to ten hours per day, citing the argument in Louis Brandeis' brief that longer work hours could injure the health of women workers (*Muller v. Oregon*, 208 US 412 [1908]).[15]

The U.S. Court of Appeals stated that driver safety and health was a valid justification for motor carrier regulations. In a ruling about safety regulations promulgated by the Interstate Commerce Commission under the Motor Carrier Act of 1935, the court stated: "And while the provisions of the Act or of valid regulations promulgated under it with respect to safety of operation of motor vehicles on the highway may be intended primarily for the protection of employees engaged in transportation in interstate commerce for hire, the duties imposed by such provisions or such regulations are secondarily for the protection of others on the highways with right" (*Interstate Motor Lines v. Great Western Railway Company*, 161 F.2d 968 [Tenth Circuit, 1947]).

OMB Guidelines for Cost/Benefit Analysis of Proposed Regulations

OMB guidelines for economic analysis of regulations require FMCSA to consider all potential benefits, even difficult-to-monetize improvements in driver health. The guidelines state: "An attempt should be made to quantify all potential real incremental benefits to society in monetary terms to the maximum extent possible. . . . Any benefits that cannot be monetized, such as an increase in the rate of introducing more productive new technology or a decrease in the risk of extinction of endangered species, should also be presented and explained" (Office of Management and Budget 1996, Section III B).

Statutory Requirements that DOT Protect Driver Health and Physical Condition

Most important of all, statutory language specifically directs the U.S. Department of Transportation to protect the health of drivers. Title 49, Subtitle VI, Part B, Chapter 311, Subchapter III deals with safety regulation of commercial motor vehicles by DOT.

- 49 USCS §31131 states that one of the purposes of that subchapter is "to minimize dan-

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gers to the health of operators of commercial motor vehicles and other employees whose employment directly affects motor carrier safety." It further states that Congress finds "enhanced protection of the health of commercial motor vehicle operators is in the public interest."

• 49 USCS §31136(a) states that "the Secretary of Transportation shall prescribe regulations on commercial motor vehicle safety. . . At a minimum, the regulations shall insure that . . . (3) the physical condition of operators of commercial motor vehicles is adequate to enable them to operate the vehicles safely; and (4) the operation of commercial motor vehicles does not have a deleterious effect on the physical condition of the operators."

The inclusion in §31136(a) of both item (3) and item (4) makes it clear that protecting the physical condition of the operators is a statutory requirement for its own sake, even beyond the extent to which this protection enables them to operate the vehicles safely.

The above court rulings, OMB guidelines, and statutory language indicate that FMCSA is not only permitted but required to consider the impact of HOS regulations on driver health in the cost/benefit analysis of the HOS proposals.

Potential Impact of HOS Regulations on Driver Health

Some of the harmful effects of long work hours and extended periods away from home (both common in some segments of trucking and long-distance bus transportation) are readily apparent to drivers. To the extent that drivers perceive long work hours and extended exposure to harmful substances or conditions as distasteful, an unregulated labor market should, in theory, provide compensating differentials to address the problems. Among these problems are that drivers report feeling lonely,[16] tired, and irritable (Milosevic 1997). They experience anxiety, depression, and musculoskeletal symptoms (Raggatt 1991). They are often cut off from friends and family; and even on days home from work, they may be too tired to help their children with their homework or nourish their marriages. They may enjoy their off-duty hours less if they are spent in the sleeper berth of a truck rather than at home. Many drivers perceive stress during long work shifts–a perception confirmed by physiological measures of heart rate, blood pressure, catecholamines, and cortisol among long-distance bus drivers (Raggatt and Morrissey 1997). This stress response may be aggravated if drivers do not have adequate resting times during trips and a duty-free recovery period between trips (Sluiter et al. 1998). Those who drive gasoline tanker trucks often experience acute headaches, dizziness, or nausea after exposure to gasoline vapors during loading and unloading (Hakkola et al. 1997).[17]

But drivers do not recognize many harmful health effects of their long and irregular work hours until years later, either because they have imperfect information or because cognitive dissonance distorts their perceptions. The market mechanism does not adequately address occupational health problems with long latent periods.

Clearly, drivers disproportionately suffer from certain health problems, many with delayed onset. An epidemiological study of over 450,000 Canadian men found that truck drivers faced higher risk of death than other men did from colon cancer, laryngeal cancer, lung cancer, diabetes, ischemic heart disease, nonalcohol cirrhosis, and motor vehicle accidents (Aronson et al. 1999). A Danish study found that a group of 14,225 truck drivers had higher mortality over a ten-year period from lung cancer and multiple myeloma than did a group of 43,024 unskilled male laborers in other occupations (Hansen 1993). An analysis of virtually all admissions to Danish hospitals over several years found that, compared to the male working age population, both truck and bus drivers had especially high age-standardized hospital admission ratios for lung cancer, ischemic heart disease, cerebrovascular disease, chronic obstructive pulmonary disease, and prolapsed cervical or lumbar discs; and truck but not bus drivers had especially high admission ratios for back injuries (Hannerz and Tuchsen 2001).

Not all adverse health consequences of driving work arise from violations or inadequacies of HOS regulations. For example, package drivers in the U.S. experience high stress, with a mean score on a standard scale of psychological stress at the 91st percentile for the general adult population (Orris et al. 1997). But package truck drivers are less likely than other drivers to have irregular hours or be away from home, and they generally receive pay for non-driving time. Their stress may derive from intense work: a

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combination of many stops per day and pressure to pick up and deliver on time.

Nevertheless, many other driver health problems are related to work hours and work schedules, and these may be alleviated by stricter enforcement of existing HOS regulations and the adoption of new HOS regulations. In particular, HOS regulations may help remedy driver health problems associated with chronic partial sleep deprivation; work schedules that are irregular, entail long hours, or include work/rest cycles shorter than twenty-four hours; and long periods of exposure to harmful substances or conditions.

Many long-haul drivers face chronic partial sleep deprivation. A study of eighty long-haul drivers over a five-day period found that their electrophysiologically verified sleep averaged 4.78 hours per day (and only 3.83 hours of sleep per day for those drivers on a steady night schedule) (Mitler et al. 1997). There are serious adverse health effects of this sleep deprivation that may not be immediately obvious to drivers. A 1999 study in *The Lancet*, for example, found that restricting sleep in healthy young men to four hours per night for a mere six nights "is associated with striking alterations in metabolic and endocrine function." Specifically, sleep debt reduced glucose tolerance and thyrotropin concentrations, and it increased evening cortisol concentrations and activity of the sympathetic nervous system. "The effects are similar to those seen in normal ageing and, therefore, sleep debt may increase the severity of age-related chronic disorders" such as diabetes and hypertension (Spiegel et al. 1999; see also Leproult et al. 1997). This hypertension may account for the high risk of stroke found among both truck and bus drivers in Denmark (Tuchsen 1997).

Other researchers have confirmed the harmful effects of partial sleep deprivation on healthy, working-age men. One study assessed the impact on blood pressure of overtime work that limited sleep. Blood pressure was significantly higher following a day with overtime work and only three to four hours of sleep than it was following an eight-hour workday and approximately eight hours of sleep (Tochikubo et al. 1996). Another study compared immune function after a normal night of sleep to that after a night when subjects were not allowed to sleep between 10 p.m. and 3 a.m. The researchers found that "even a modest disturbance of sleep produces a reduction in natural immune responses," resulting in increased vulnerability to infection (Irwin et al. 1996). A third study measured sympathetic nervous system activity, both on nights when subjects were allowed to sleep and on nights when subjects were awakened at 3 a.m. and kept awake until 6 a.m. They found that partial sleep deprivation raised nocturnal catecholamine levels, which can contribute to cardiovascular disease (Irwin et al. 1999). This laboratory finding was supported by epidemiological evidence: Middle-aged men who suffered sleep loss as a result of rotating shifts had higher risks of coronary heart disease than men working only during the day (Tenkanen et al. 1998).

Working long or irregular hours may have other harmful effects on health in addition to those related to partial sleep deprivation. (For reviews of the literature, see Michie and Cockcroft 1996; Spurgeon et al. 1997; Harrington 2001; Sparks et al. 1997.) An epidemiological study in Sweden examined the impact of long work hours on mortality between 1973 and 1996 among approximately 11,000 men and 9,500 women born between 1926 and 1958. Even controlling for age and for behavioral factors such as smoking, drinking, and use of tranquilizers, regular overtime work of more than five hours a week was associated with higher mortality rates for five years following the overtime (Nylen et al. 2001).

Other studies have examined the impact of long or irregular work hours on specific health problems:

- Extended working periods desynchronize the internal circadian rhythms of long-haul drivers who work many hours per day and have work/rest cycles less than twenty-four hours (Stoynev and Minkova 1997).
- Irregular hours and night work raise the risk of being hospitalized for ischemic heart disease (IHD) (Tuchsen 1993). Professional drivers are at greater risk of IHD if they work long hours (Emdad et al. 1997). This cardiac risk may increase partly because professional drivers who spend long hours behind the wheel tend to have a higher body mass index (Emdad et al. 1998).
- Working over forty hours per week doubled the risk of acute Helicobacter pylori infection (associated with peptic ulcers), even con-

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trolling for age, sex, and marital status (Rosenstock et al. 1996).

• A group of Dutch truck drivers working an average of 11.4 hours per day had insufficient recovery after work from sympathoadrenal activation. Their elevated catecholamine levels were associated with increased psychosomatic health complaints (Kuiper et al. 1998; Allard et al. 1995).

Long hours also intensify problems of truckers' exposure to harmful substances or conditions, particularly since "occupational exposure limits are almost invariably calculated on the basis of an 8 hour day, 5 day week" (Harrington 2001, 71). Drivers are exposed to diesel emissions–found to raise the risk of lung cancer among trucking workers in the U.S. (Steenland et al. 1998); among truck, bus, and taxi drivers in West Germany (Brüske-Hohlfeld et al. 1999); and among truck, bus, and taxi drivers in Denmark (Hansen et al. 1998). A meta-analysis of thirty epidemiological studies in North America and Europe (including ten of truck drivers, two of bus drivers, and four of all professional drivers) similarly concluded that occupational exposure to diesel exhaust raised the risk of lung cancer (Lipsett and Campleman 1999; see also Bhatia et al. 1998). Another meta-analysis of fifteen studies of truck drivers and ten studies of bus drivers found that exposure to diesel exhaust may raise the risk of bladder cancer (Boffetta and Silverman 2001).

Drivers also face extended exposure to highway noise, which can lead to hearing loss (van den Heever and Roets 1996)–a problem exacerbated when drivers sleep in their trucks while their partners drive and thus lack recovery time between exposures (Seshagiri 1998). They are exposed to whole body vibration (Palmer et al. 2000), which can lead to low back pain (Pope et al. 1998; Pietri et al. 1992; Jensen et al. 1996). In addition, some drivers do heavy lifting immediately after spending long hours sitting in a single body posture, which contributes to injuries to the spine and ligaments (Hannerz and Tuchsen 2001; Jensen et al. 1996).

As in the case of asbestos in shipyards, these unrecognized hazards persist at inefficiently high levels in an unregulated free market. Government regulation to reduce these hazards could increase economic efficiency. This important benefit of the proposed changes in the HOS regulations was not included in the cost/benefit analysis in the NPRM. Recognizing this benefit would make the cost/benefit analysis more favorable to adoption of the proposed changes.

Impact of Excessive Driving Speeds on Highway Safety

The FMCSA cost/benefit analysis notes that some highway deaths are due to truck driver fatigue and finds that the HOS proposal will reduce the number of these deaths. FMSCA did not include, however, another possible contribution to highway safety from the HOS proposal: the impact of EOBRs on truck and bus driving speeds. Truck or bus drivers in Europe sometimes receive speeding tickets in cases where no police officer observed them at the time the speeding occurred because the EOBRs kept a record of their driving speeds. The European Union requirement of EOBRs in trucks and buses[18] has probably led to increased compliance with speed limits, at least on expressways. (Drivers still could exceed the posted speed limit on roads with lower speed limits than expressways unless the EOBRs were sophisticated enough to link information on the precise location of the vehicle with the speed of the vehicle at the time it was at this location.)

A comprehensive account of the benefits of EOBRs requires estimates of the following:

(1) The extent to which truck or bus drivers now exceed posted speed limits on expressways

(2) The number of highway fatalities caused by this speeding

(3) The extent to which EOBRs could increase compliance with posted speed limits on expressways

(4) The reduction in the number of highway fatalities stemming from this increased compliance with speed limits

We know that speed kills. The dollar value of the reduction in highway fatalities due to increased compliance with speed limits should therefore be included as a benefit of the proposed HOS regulations when doing the cost/benefit analysis.

Respect for the Rule of Law

Many long-haul drivers in the truckload sector drive more hours than existing HOS regula-

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tions permit (Belzer 2000, 37-38). Even a report that was harshly critical of the FMCSA cost/benefit analysis reported without any critical comment the FMCSA assertion that many drivers falsify their RODS logbook (Berkman and David 2000, 7). Because of the large number of truck drivers, high violation rates suggest that over 500,000 people are routinely and repeatedly violating federal HOS rules–both by working more than the legal limit and by falsifying RODS.

Criminologist James Q. Wilson (1983) explained how acquiescence in seemingly minor violations of the law can have serious social consequences:

> [O]ne unrepaired broken window is a signal that no one cares, and so breaking more windows costs nothing [p. 78] .... Arresting a single drunk or a single vagrant who has harmed no identifiable person seems unjust, and in a sense it is. But failing to do anything about a score of drunks or a hundred vagrants may destroy an entire community....[Turning a blind eye to a drunk or a vagrant] makes no sense because it fails to take into account the connection between one broken window left untended and a thousand broken windows [p. 84].

Wilson's theory of contagion effects has gained acceptance from many criminal justice experts. Past acquiescence in widespread HOS violations may have diminished respect for the rule of law. This diminished respect may have fostered violations of laws and regulations other than HOS standards.

Requiring EOBRs increases compliance with the existing regulations. Therefore, reinforcing respect for the rule of law is a very real benefit of the HOS proposal, even if the dollar value of this benefit is hard to quantify.

Comparisons with the European Union: America Lags Behind

America's regulations concerning truck drivers' hours of work do not meet the norms established by many of our peers among wealthy democracies. The European Union (EU) has set stricter standards than the U.S. for hours of service and made greater use of modern technology to ensure that records of work hours are not falsified.

The EU has issued a number of regulations related to drivers' work hours.

• Council Regulation (EEC) No. 3820/85 of 20 December 1985[19] requires that drivers have a daily rest period of at least eleven consecutive hours in each twenty-four-hour period (although it allows this to be reduced to a minimum of nine consecutive hours not more than three times in any one week if an equivalent period of rest is granted as compensation before the end of the following week). It requires a weekly rest period of a minimum of twenty-four consecutive hours. Article 10 of this regulation provides that "Payments to wage-earning drivers, even in the form of bonuses or wage supplements, related to distances traveled and/or the amount of goods carried shall be prohibited, unless these payments are of such a kind as not to endanger road safety."

• Council Regulation (EEC) No. 3821/85 of 20 December 1985 requires first-generation automatic recording devices on trucks to enforce the restrictions in work hours of Regulation 3820/85.[20] The paper record sheets produced by these devices must separately measure four different periods of time: driving time, other work time, other periods of availability (such as waiting time, time spent beside the driver while the vehicle is in motion, and time spent on a bunk while the vehicle is in motion), and breaks in work. The record sheets also must show the vehicle's speed and distance traveled.

• Council Regulation (EC) No. 2135/98 of 24 September 1998 requires second-generation automatic recording devices on trucks in order to prevent evasion of work hours rules.[21] It also requires each driver to have a personal driver card, which the driver inserts into the recording device on the truck. Each driver is allowed only one valid card. The regulation sets detailed specifications for the second-generation recording devices. They must record electronically, and also be able to display or print, additional information beyond what was required of first-generation devices. For example, the device on the truck must record the times and dates of insertion and removal of each driver card, and each driver card must record the registration number of the vehicle driven as well as the driver's driving time and break time.

The requirement that new trucks be equipped with second-generation recording devices is now expected to take effect by 2003 (European Commission 2000, 5). If FMCSA adopted EOBR specifications very similar to those that

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the EU requires, then American trucking companies would be able to use off-the-shelf technology that has already had extensive field testing in Europe. One major German producer of recorders stated the cost to the truck manufacturers of the second-generation automatic recording devices is $300 per truck.[22]

Eastern Europe is the EU's counterpart to Mexico. Economic crises in some of the formerly Communist nations of Eastern Europe have made many people desperate; in the extreme case of Moldova, poverty has induced some people to sell one of their kidneys for transplants in Turkey (Franchetti 2000). In these circumstances, Eastern European truck drivers may be willing to work extremely long hours at low wages–even on trips where they are taking loads to or from the much more prosperous nations of the EU. The EU can limit how many hours Eastern Europeans drive per day or per week after entering EU territory, but the EU cannot limit how many hours they have driven immediately before crossing the border.

Despite the potential for competition from Eastern Europeans to undermine EU standards, the EU is preparing new legislation that would raise EU standards even higher. Commission proposal 598PC0662(02) of 24 November 1998 would restrict work hours of drivers to forty-eight hours per week, averaged over a four-month period, although it allows drivers to work up to sixty hours in any one week.[23] The EU limits expressly state that work hours include loading and unloading time.

EU member states differed sharply on whether to include self-employed drivers within the scope of this new legislation, and these differences delayed its approval (European Commission 2000, 3). The 1998 EU proposal was amended in 2000 by Commission proposal 500PC0754, which provides that self-employed drivers will not be covered by the forty-eight-hour rule until three years after the regulation takes effect.[24] On March 23, 2001, the European Council formally adopted this compromise proposal.[25]

When the forty-eight-hour regulation takes effect, the maximum work week for drivers in the EU will be substantially less than the sixty hours allowed in the U.S. This is consistent with the general pattern of stricter regulation in the EU than in the U.S. The EU requires a longer minimum daily rest period (nine to eleven consecutive hours, vs. eight in the U.S.), a longer minimum weekly recovery period (twenty-four consecutive hours, vs. none in the U.S.), and harder-to-falsify records of work hours (automatic recording devices, vs. handwritten logs in the U.S.). The EU, unlike the U.S., also prohibits per-mile driver compensation systems, which give drivers an incentive to omit waiting and loading time from their work logs.

Three decades ago, Derek Bok (1971, 1460) noted that American labor law differed substantially from that in other industrial democracies. Bok asserted that the American system of law "permits great flexibility... and provides abundant opportunities for initiative." But the American system, Bok contended, also "is uniquely hard on the weak, the uneducated, the unorganized and the unlucky." The stark contrast between the EU and the U.S. in regulation of truck drivers' work hours suggests that Bok's claim remains valid today.

Conclusion

Important market failures affect the market for driver labor. Among these are external costs of traffic accidents, drivers' imperfect information about the costs to them of long and irregular work hours, and cognitive failures among drivers in recognizing health risks and among motor carriers and shippers in recognizing the opportunity cost of driver time. The existence of these market failures and flaws in the 1962 amendments in HOS regulations suggests that revisions in HOS regulations have the potential to raise economic efficiency.

The preliminary cost/benefit analysis in the NPRM substantially overstated social costs of the proposed HOS revisions by mislabeling redistribution from motor carriers to existing drivers as a social cost and, arguably, by classifying the cost of achieving compliance with 1937 HOS regulations as a cost of the May 2000 proposal. The NAFTA ruling on Mexican trucks (after the NPRM was completed) may further reduce the social cost of implementing the HOS proposal. The preliminary economic analysis also omitted important benefits from improvements in driver health that would occur if the HOS proposal were implemented. Furthermore, U.S. HOS standards lag behind the standards set by other major industrialized democracies.

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Vocal opposition to the May 2000 HOS proposal stems in part from the lack of compensation for losers and the contrast between concentrated losses and diffuse gains. Nevertheless, given the inherent complexity of regulating a diverse industry such as trucking, it may be wise for federal regulators to proceed in small steps. Although the proposed weekly recovery period and the proposed twelve-hour daily on-duty limit have some merit, they also create operational problems for some carriers and drivers. We suggest that the federal government drop those elements of the May 2000 HOS proposal and focus regulatory efforts on the following two issues.

First, FMCSA should address the problems created by the 1962 HOS amendments that permitted eighteen-hour work/rest cycles. A twenty-four-hour cycle is more consistent with humans' natural circadian rhythm and less likely than an eighteen-hour cycle to induce fatigue-related highway safety or driver health problems.

Second, the federal government needs to adopt some mechanism to increase driver compliance with longstanding rules limiting overall work hours to sixty per week, driving hours to ten per work shift, and total driving and non-driving hours to fifteen per work shift. There are a variety of possible mechanisms, all with strengths and drawbacks.

- For single-driver operations, EOBRs could enforce limits on driving time, though overall limits on work time might still be exceeded because it will not record waiting time or other non-driving work time. The effectiveness of the EOBR also is compromised in team operations, where one driver operates the vehicle and another driver sleeps. Even with a coded and password-protected electronic card, two drivers may collude to use each other's card and password to split the driving however they wish.
- Congress could extend the time-and-one-half provision of the FLSA to truck drivers, raising the cost to the firm of overtime work and reducing incentives to assign drivers extended work schedules.
- The Department of Labor could require hour-by-hour compliance with the minimum wage law, at least within the motor carrier industry. This would give drivers an incentive to keep accurate logs of their non-driving time. Explicit pay for every hour worked would also reduce operational inefficiencies arising from the incorrect perception that drivers' non-driving work time has an opportunity cost of zero.
- Congress could require that all shipping contracts contain detention clauses that require additional compensation to carriers in the event of undue delays at the location of the shipper or consignee or delays in when the truck is permitted to enter the shipper's or consignee's premises. Detention clauses would give carriers the resources to provide drivers with additional pay when there are such delays. Enforcement could be difficult, however; if shippers and consignees have more power than carriers and drivers, then carriers and drivers could be pressured to wait outside the customer's premises and not record any detention liability.
- Congress could repeal the Taft-Hartley Act ban on secondary boycotts and the Landrum-Griffin Act ban on hot cargo contracts to enable the Teamsters to extend union coverage to more drivers, giving them hourly pay for waiting and loading time. Union bargaining power would lead to higher driver wages, helping the motor carrier industry retain well qualified drivers; and the union presence would make it harder for those systematically violating federal regulations to escape detection. Non-union carriers, however, would oppose this labor law change most actively.

The federal government should consider industry views when choosing among these mechanisms, including the views of motor carriers, union and non-union drivers, and owner-drivers and their associations. They should also consider the views of other public groups, including those representing other highway users. Continued acceptance of widespread violations of hours of service regulations, however, would be inconsistent with the government's obligation to protect public safety and health.

ENDNOTES

For another analysis of the HOS proposal, see Rothberg 2000. The lack of evidence for some of the assumptions in the NPRM analysis is noted in U.S. General Accounting Office 2000.

[2] This falsification of work logs has been documented by research surveys of drivers. See Belzer 2000, 37-38.

[3] Cognitive failures of the type identified by Kahneman and Tversky (1979) are not included in traditional lists of market failures, but the importance of including them in economic analysis has been recognized by Nobel laureate Daniel McFadden (1999).

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[4] For a review of research studies on this topic and other topics related to the NPRM, see Freund 1999.

[5] The following studies relate specifically to truck or bus drivers: Mitler et al. 1997; Kecklund and Akersted 1993; Braver et al. 1992; Sluiter et al. 1999; Williamson and Feyer 2000; Mello et al. 2000.

[6] The following studies (of railroad engineers, experimental subjects, and car drivers, respectively) also seem relevant to truck or bus drivers: Pilcher and Coplen (2000); Dawson and Reid (1997); Summala et al. (1999).

[7] A study of Germany, the United Kingdom, Switzerland, and Scandinavia found that "passenger cars and motorcycles primarily pose a hazard to the occupants of those vehicles, whereas buses and lorries primarily pose a hazard to the non-occupants, ... for example, pedestrians, cyclists and occupants of those motor vehicles lighter than lorries or buses" (Persson and Odegaard 1995). See also Elvik 1994.

[8] We are grateful to Pat Michael, an Oregon truck driver, for calling our attention to the *Klinghoffer* case and for noting its impact on nondriving work hours.

[9] A secondary boycott is when a union goes on strike against one employer to induce that employer to stop doing business with another employer with whom the union has a dispute. Hot cargo clauses are provisions in union contracts allowing union workers at a trucking company or at a warehouse to refuse to handle cargo from another trucking company whose workers are on strike. Both strategies significantly increase union bargaining power and enhance organizing leverage.

[10] The California Teamsters Public Affairs Council supported a state bill allowing drivers to sue their employers for $250 per day in damages for each day that their employer requires or authorizes them to violate HOS regulations [http://www.teamster.org/01news/hn%5F010321%5F3.htm available online June 25, 2001]. The bill, 2001 CA S.B. 278, was passed by the California Senate on April 19, 2001 and approved by the Assembly Committee on Labor and Employment on June 20, 2001. As amended, it applies to violations of either state or federal HOS rules [Lexis-Nexis State Capital Universe, Statenet information on 2001 CA S.B. 278, available online June 25, 2001].

[11] For example, on July 6, 2000, the AAA Managing Director of Traffic Safety told an FMCSA hearing that the May 2000 revisions "provide a workable framework that takes into account sound science and the best judgments of experts in the areas of sleep research and traffic safety." Quoted in American Automobile Association 2000, p. 1.

[12] The analysis should allow decision makers to determine whether "The proposed action will maximize net benefits to society (including potential economic, environmental, public health and safety, and other advantages; distributional impacts; and equity)" (Office of Management and Budget 1996, Introduction).

[13] "Transfer payments are not social costs but rather are payments that reflect a redistribution of wealth. While transfers should not be included in the EA's estimates of the benefits and costs of a regulation, they may be important for describing the distributional effects of a regulation" (Office of Management and Budget 1996, Section III.C.2).

[14] U.S. Bureau of Transportation Statistics, U.S. Department of Transportation (based on data from U.S. Customs Service), "Incoming Truck Crossings, US-Mexican Border, 1994-2000," personal communication from BTS to one of the authors, October 9, 2001.

[15] Subsequent court rulings rejected the sex-based distinctions in *Muller*, but they did not challenge the validity of worker health as a justification for governmental limits on work hours.

[16] A study of 88 professional drivers in Sweden, for example, found that the drivers rated their loneliness on average at about 4.3 on a scale of 1 to 5 (Gudrun et al. 1998).

[17] The extent of this exposure was reported in Vainiotalo and Ruonakangas 1999. See also Javelaud et al. 1998.

[18] Council Regulation (EEC) No. 3821/85 of 20 December 1985 requires first-generation automatic recording devices on trucks. Council Regulation (EC) No. 2135/98 of 24 September 1998 requires second-generation automatic recording devices (which are harder to falsify) on trucks.

[19] Available online on March 28, 2001 at http://europa.eu.int/eur-lex/en/lif/dat/1985/en_385R3820.html

[20] Available online on March 28, 2001 at http://europe.eu/eur-lex/en/lif/dat/1985/en_385R3821.html

[21] Available online on March 28, 2001 at http://europe.eu/eur-lex/en/lif/dat/1998/en_398R2135.html

[22] Personal communication to one of the authors on May 18, 2001 from Dr. Dieter Plehwe, Social Science Center Berlin.

[23] Available online on April 12, 2001 at http://europa.eu.int/eur-lex/en/com/dat/1998/en_598PC0662.html

[24] Available online on April 12, 2001 at http://europa.eu.int/eur-lex/en/com/dat/2000/en_500PC0754.html

[25] Commission proposal 501PC0584S, available online on May 24, 2001 at http://europa.eu.int/eur-lex/en/com/dat/2001/en_501PC0584S.html

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