TRANSPORTATION SAFETY IN AN AGE OF DEREGULATION

LEON N. MOSES IAN SAVAGE

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Transportation Safety in an Age of Deregulation

Edited by

LEON N. MOSES

IAN SAVAGE

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Contents

Contributors vii

1. Introduction 3
Leon N. Moses and Ian Savage

2. The Myth of Deregulation's Negative Effect on Safety 8
Thomas Gale Moore

3. Deregulation's Negative Effect on Safety 21
Brock Adams

FRAMEWORK FOR ANALYSIS 29

4. Regulation, Deregulation, and Safety: An Economic Analysis 31
John C. Panzar and Ian Savage

5. Losses in Airline Demand and Value Following Accidents 50
Severin Borenstein and Martin B. Zimmerman

6. The Reign of Ignorance in Road Safety: A Case for Separating Evaluation From Implementation 56
Ezra Hauer

7. The Effect of Transportation Deregulation on Worker Safety 70
W. Kip Viscusi

THE AIRLINE INDUSTRY 91

8. Financial Influences on Airline Safety 93
Nancy L. Rose

9. New Entrants and Safety 115
Adib Kanafani and Theodore E. Keeler

10. Is It Still Safe to Fly? 129
Clinton V. Oster, Jr. and C. Kurt Zorn

11. Can Truth in Airline Scheduling Alleviate the Congestion and Delay Problem? 153
Elizabeth E. Bailey and David M. Kirstein

12. Congestion Pricing to Improve Air Travel Safety 167
Richard J. Arnott and Joseph E. Stiglitz

13. Economic Deregulation's Unintended but Inevitable Impact on Airline Safety 186
John J. Nance

14. Summary of Other Aviation Issues 206
Leon N. Moses and Ian Savage

THE MOTOR CARRIER INDUSTRY 217

15. Deregulation, Financial Distress, and Safety in the General Freight Trucking Industry 219
Garland Chow

16. Effects of New Entrants on Motor Carrier Safety 241
Thomas M. Corsi and Philip Fanara, Jr.

17. The Safety Effects of Mode Shifting Following Deregulation 258
Kenneth D. Boyer

18. A System Perspective on the Effects of Economic Deregulation on Motor Carrier Safety 277
Paul P. Jovanis

AN INTERNATIONAL PERSPECTIVE 287

19. The Regulation of Road Freight Transport in Great Britain 289
Martin Albu and Michael Glover

20. Transportation Safety and Economic Regulatory Reform—The Canadian Perspective 300
Ramsey M. Withers

21. Summary and Policy Implications 308
Leon N. Moses and Ian Savage

Appendix: Background Information 332

References 335

Index 345

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1
Introduction

LEON N. MOSES and IAN SAVAGE

This book is concerned with the implications for safety of two pieces of U. S. legislation—the Airline Deregulation Act of 1978 and the Motor Carrier Regulatory Reform and Modernization Act of 1980. These Acts had the effect of reducing the control of the federal government and of carrier rate associations on the conditions of competition in the airline and trucking industries. In particular, the regulatory reforms embodied in the two Acts allowed (1) greater freedom of entry into the two industries, (2) greater freedom of entry into, and of exit from, particular markets, and (3) greater freedom of individual rate making. The Acts significantly increased the influence of market forces on the prices charged for air and truck service and the profitability of individual firms. Increased rate competition among motor carriers had direct effects on the rates charged by railroads for the movement of high-value goods and had indirect effects on all other tariffs.

The regulatory reform bills were passed because lawmakers felt that increased competition would lead to more efficient operations and lower rates in the two industries while not compromising safety or quality of service. Some changes in quality of airline service were, in fact, hoped for. It was commonly believed that the suppression of price competition by the Civil Aeronautics Board (CAB) fostered competition in service quality variables that was highly uneconomical, such as too early replacement of aircraft and departures at major airports that were excessive in light of existing load factors. It was asserted that such quality competition drove up costs, which led to proposals to the CAB for relief in the form of fare increases. However, the positive effects of such increases (which were almost always granted) on the profitability of airline operations were soon dissipated by another round of quality competition and increases in costs of operation.

Lawmakers expected that the discipline of increased price competition would achieve cost economies by both airlines and motor carriers, because they would have to resist wage demands by unionized labor that exceeded

increases in productivity. It was commonly believed that firms treated union wage demands as a pass-through; that is, they granted wage increases that exceeded productivity gains and clearly also exceeded what comparable labor received in unregulated, competitive industries. The pass-through philosophy grew out of two beliefs: (1) Regulatory bodies would grant increases in rates that would restore average profitability and (2) such rate increases would lead to actual increases in revenues and would restore profitability for the representative firm because demand was growing over time and was relatively price inelastic. In the main, these beliefs proved valid. Generally speaking, rate increases did temporarily improve profits, but at a significant increase in cost to users of airline and motor carrier services.

The framers of the motor carrier and airline bills hoped that a reduction in economic controls by government would increase price competition and bring benefits to users of the transport services provided by these industries. Clearly, that hope has been realized.

The rate benefits to users of airline service are very clear. Between 1977, when the CAB began to allow greater freedom of entry and increased price competition, and 1986, average revenue per passenger mile rose by only 30%, going from 8.3¢ to 10.8¢. In real terms, deflating by the Consumer Price Index, the cost of airline travel to passengers fell by 23%. Passenger miles increased from 226 to 366 billion, and enplanements increased by 52%. Of course, the increase in passenger usage was the result of an 8.5% increase in per capita real income, as well as of the reduction in the real cost of travel. It should be noted that in the nine years prior to the period of regulatory reform, average revenue per passenger mile increased by 17.7% in real terms (Air Transport Association, 1987). Part of the decrease in real air fares that occurred during the years of increased price competition was due to declining fuel prices. It is difficult to determine how much consumers would have benefited from such declines had they occurred in the regulatory era, but taking this into account, it has been estimated that deregulation brought approximately $16 billion annual benefits in current dollar terms (Morrison and Winston, 1986). This estimate of the magnitude of benefits has been questioned (Evans, 1987b); that there have been significant benefits is beyond dispute.

There is clear evidence that open entry and a reduction in the power of motor carrier rate bureaus to control rates led to an increase in competition and to reductions in the real cost of trucking service to shippers. The number of trucking firms increased by some 19,000 in the years since passage of the Motor Carrier Act. Between 1977 and 1980, years in which the effects of increased entry and competition on rates were already evident, revenue per hundredweight for truckload (TL) general freight traffic increased by 15.3% in real terms, whereas the increase was 6% between 1980 and 1984, the last year for which we were able to obtain these data. The figures for contract carriage are even more impressive. Between 1977 and 1980, real average revenue per ton-mile fell by 1.33% per year, whereas

in the period 1980 to 1984 it fell by 3.99% per year (U.S. Department of Transportation, various years). Data obtained from the East/Central Motor Carrier Freight Bureau for less-than-truckload (LTL) freight show that the revenue per hundredweight increased by 4.7% from 1978 to 1980. In the years from 1980 to 1985 it was stable (Tye, 1987), again in part due to declining fuel prices. Nevertheless, it has been estimated that regulatory reform has brought significant logistical benefits to shippers (Delaney, 1987; Evans, 1987a).

Statistics in the above paragraph tend to understate the savings to shippers brought about by increased competition. In part they do so because they do not include data for the smallest class of common carriers, those that specialize in TL carriage. In this part of the motor carrier business the increase in competition has been the greatest. In addition, our use of the published tariffs of a rate bureau understates what has happened to actual rates. Almost all trucking firms offer discounts from such tariffs, which they publish as independent tariffs. The major trucking firms have established pricing strategy groups that evaluate the costs of providing service to different customers and the prices necessary to attract and hold business. Discounts from published tariffs are offered when they are needed to hold onto or acquire business. The practice of discounting has been so widespread that the General Accounting Office (GAO) was asked by Congress to investigate whether it arose from predatory incentives, in which case it might be viewed as anticompetitive. While supporting the finding of widespread discounting, the GAO concluded that it was procompetitive rather than anticompetitive (General Accounting Office, 1987).

There is also evidence that deregulation has reduced the profitability of the largest trucking firms. Data on operating ratios (the ratio of expenses to revenue), provided by *Commercial Car Journal* show that in the years between 1980 and 1985, the average operating ratio for the 20 largest trucking firms rose from 94.0 to 96.4. The squeeze on profits must have come from the revenue side because fuel prices fell over the period and labor cost increases were contained. These two items comprise the major part of total costs. The large carriers lost a great deal of their TL freight to small firms, presumably because the small carriers had lower costs and rates. The large carriers also had to cut LTL rates selectively.

Figures on airline usage and the real cost of airline travel, and comparable figures for the motor carrier industry, make it very clear that if the program of regulatory reform involved no disbenefits, it would have to be considered a tremendous success. However, regulatory reform has involved disbenefits, most clearly in the case of the airlines, because of reductions in many quality aspects of service.

Taken alone, such disbenefits as increases in travel time, in travel uncertainty, and in lost or damaged baggage would not have been enough to create the growing sense of public uneasiness and the increasingly popular opinion that deregulation may have been permitted to go too far; that the nation might be better served if government imposed some limits on the

range within which rates could be changed, on entry of new firms, and on the freedom of carriers to change the markets they serve. The fear that deregulation may bring, or already has brought, significant increases in the hazards of travel to airline passengers and also to automobile users is the source of the uneasiness.

On first inspection there is something of a paradox in this public concern. Dr. Moore in Chapter 2 presents the accident records of both transportation modes in the years leading up to, and the years following, deregulation. It is clear that in both industries the accident rates are lower now than they were 10 years ago. The record stands, but many thoughtful people are concerned that the aggregate figures mask disturbing trends that might result in reduced safety in the future. Senator Adams in Chapter 3 discusses, in relation to the trucking industry, the kinds of concerns that have prompted public uneasiness. In general, these concerns can be summarized as four points.

1. One set of links is seen by many critics of deregulation as resulting from financial pressure on firms. That is, increased competition reduces profit margins and forces firms to reduce (1) wages and the quality of the personnel hired, (2) initial and careerlong training of personnel, (3) investment in maintenance, and (4) the rate of replacement of old, less safe equipment by modern, safer equipment. Financial pressure may also result in the adoption of unsafe procedures. A commonly held view has it that price competition leads to the framing of truck schedules that force drivers to violate speed laws, and also to violate driving and rest regulations in more serious ways than would be the case in a less competitive environment. Similar allegations are made about increased competition and the airline industry. It is held by some that pilots are pressured into making flights even when certain equipment is faulty, when they have not had sufficient and suitable rest, and when takeoffs violate weather limits.
2. A second alleged link involves new entrants. It is thought that new firms have inexperienced managers, tend to hire less well-paid and lower quality staff, and use old equipment that they do not properly maintain.
3. The third link is that deregulation has induced mode shifts that have safety implications. Lower rates by trucking companies for the transport of high-value goods has shifted some freight away from railroads onto the statistically less safe highways. On less traveled air routes, the adoption of hub-and-spoke operating patterns has caused the substitution of small, statistically less safe, aircraft for large jet aircraft. Low air fares may also have brought a safety improvement for those passengers attracted away from their statistically less safe automobiles.
4. The final link concerns congestion. Deregulation in both industries has been successful in increasing patronage. In the aviation industry this increase has been concentrated in the leading hub airports at peak times of day as banks of flights connect with each other. There is little doubt that the airports and the surrounding airspace have become very congested, leading not only to delays but also to air traffic controller errors and increased probability of collision.

This book is the result of a three-day conference, convened by the Transportation Center of Northwestern University in June 1987, that explored

the relationships between the economic, including the regulatory, environment in which airlines and motor carriers operated and the degree of safety with which they operate today and may operate in the future. After the next two chapters, which set the stage for the debate, we adopt the following structure. First we present a group of chapters that explain the meaning of safety in transportation, why it is a public policy issue, and the difficulties in framing and evaluating measures to improve safety. We then have two modally specific sections—airlines and motor carriers—that empirically examine the four concerns just described. Finally, after an international comparison involving the deregulation experiences of Britain and Canada, we present conclusions and identify policy recommendations.

Following the final chapter is a short section designed to familiarize readers, especially those from outside the United States, with some background information on the regulation and subsequent deregulation of the airline and motor carrier industries, and also to describe the various government agencies involved in the safety regulation of the industries.

2

The Myth of Deregulation's Negative Effect on Safety

THOMAS GALE MOORE*

Virtually all studies of transportation deregulation show that the reduction or elimination of federal controls has produced large benefits for consumers, shippers, and the economy. Airfares and motor carrier freight rates have declined in real terms. In the main, service quality has either been maintained or improved, although there is more crowding in air travel. Improvements in freight transportation and reductions in freight rates have significantly reduced logistics costs for the economy. Contrary to predictions that small shippers, small towns, and remote communities would receive less service, the evidence suggests that service is as good as or better than it was before, although rates may have increased.

Deregulation has, however, brought charges that safety has been reduced in the transportation industries. Although theory suggests that safety might be lower in a competitive market than in a regulated one, empirical evidence shows that safety has not declined since the transportation industries were deregulated but has actually continued to improve.

Even though deregulation and partial deregulation have brought great benefits to the economy and to the consumer, some interests have been adversely affected. In the airline industry, organized labor has been the principal loser. To this day, the major airlines are attempting to bring down their inflated labor costs. A number of airlines have established dual pay schemes where new employees are paid less. In the motor carrier industry, both organized labor and the owners of some certificated firms have experienced losses. The value of the operating licenses granted by the Interstate Commerce Commission (ICC) to the owners of trucking firms has been driven toward zero. The Teamsters' Union has seen a fall in

*The views expressed are solely those of the author and do not represent the views of the Reagan Administration, the U. S. Government, or the Council of Economic Advisors.

membership as more trucking firms have become nonunion. Pressure has also mounted to reduce members' wages.

The losers in both the airline and the motor carrier industries have not been able to claim that deregulation has hurt the consumer or shipper; in fact, both have benefited significantly. The losers have asserted that safety has been compromised, although virtually all of their evidence has been anecdotal. Pilots, for example, have asserted that airlines are forcing them to work excessive hours under stressful conditions, thus endangering safety. While pilots are working longer hours, the Federal Aviation Administration (FAA) still restricts the number of flight hours per week. Moreover, anecdotal evidence suggests that prior to deregulation many pilots held second jobs and consequently did not use the time allotted for rest. Airline mechanics have asserted that maintenance is being neglected. Again, the evidence is anecdotal and may easily reflect unhappiness with increased attention to productivity and restrictions on pay.

In the trucking industry, both owners and teamsters have asserted that economic pressures are forcing truckers, especially owner-operators, to drive excessive hours and to neglect vehicle maintenance. Since most owner-operators never were subject to regulation, deregulation of certificated firms could not have reduced safety in their firms.

Analysis of the safety issue is complicated by the fact that the transportation industries continue to be subject to safety regulation. These controls have not been dismantled; in fact there have been efforts to strengthen such regulation. If safety regulation is effective, the question of whether economic deregulation reduces the incentives to provide safety is moot. However, it is reasonable to assume, as many observers do, that safety regulation is quite imperfect. Although such regulation can ensure that some of the most elementary safety precautions are taken, such as requiring that pilots have a minimum of training and experience, these precautions very likely would have been the norm in any competitive environment.

COMPETITIVE LEVELS OF SAFETY

Safety, like comfort, speed, and cleanliness, is a characteristic that most individuals prefer more of to less. However, as with other desirable attributes, consumers are unwilling to pay unlimited amounts to secure additional safety. Given a choice, they would purchase safety (comfort, speed, cleanliness) to the point where the marginal benefits, as they perceive them, are equal to the marginal costs in terms of what they must sacrifice to have more of these desirable attributes.

Economic theory tells us that a perfectly competitive market with perfect information would provide the optimum amount of safety for consumers. Firms would compete by offering more or less safety at differing prices. Consumers would then purchase the degree of safety that they found op-

timal. Multiple levels of safety would be offered, since consumers differ in the value they place on safety.

The optimum level of safety for consumers, of course, may not adequately reflect all social costs because third parties can be affected. Aircraft can fall on people or collide with other aircraft; trucks do run into passenger cars. However, a well-functioning market would force firms, through insurance rates and liability rules, to take third party costs into account.

In the real world we do not have perfect competition or perfect information. However, the importance of the deviation from perfection can be overstated. The airline and trucking industries are highly competitive. A reasonably large number of firms compete in most markets, and barriers to entry and exit in particular markets are low, especially for firms already in the industry. Competition has brought prices down and encouraged firms to compete on the basis of quality.

Information about accidents is widely available for the airline industry. Airplane accidents receive considerable publicity. For the motor carrier industry, regular shippers quickly become familiar with the safety records of motor carriers. A competitive market does not require that all shippers or passengers have knowledge of safety. A minority of passengers with reasonably good information can provide adequate market discipline. Consumers with little information often purchase goods and services from well-established firms that have reputations at stake. Because firms have strong incentives to maintain a good reputation, a traveler or shipper can better ensure safety by utilizing the best known, well-established firms. Consumers with more information on safety will purchase services from less well-established firms that they know to be safe carriers. Thus the market provides mechanisms to ensure a competitive level of safety without each participant having perfect information.

Information about new firms, however, may be costly to obtain. Neither shippers nor passengers can be confident that safety standards are as high as they are for more established carriers. Therefore, it may be cheaper for the government to rigorously enforce safety standards than to depend on consumers to obtain the information. However, market forces will also exert considerable discipline on new entrants. The cost of an accident to a new firm may easily be the failure of the enterprise.

Air Florida's demise soon after the tragic Potomac River accident in 1982 clearly demonstrates the high cost of an accident to the stockholders and managers of an airline. McDonnell Douglas's stock fell $200 million, or 22%, after a series of accidents involving its DC-10 aircraft make (Chalk, 1986). More recently, Arrow Air, whose aircraft crashed in Canada in 1985, filed for bankruptcy. The market exacts a high cost for an accident.

When information on safety is difficult to obtain, a firm can sometimes profit temporarily by underinvesting in safety. The firm can reduce its costs while consumers remain unaware that they are purchasing an inferior package, that is, less safety. At best this strategy can increase profits only in the short run. A firm that follows this policy may soon be out of busi-

ness. Even in the short run, there are a variety of ways the market mitigates the tendency to "cheat" on a difficult-to-measure attribute.

Critics of deregulation claim that competition leads to a greater emphasis on price as a strategic variable. This results in pressure to reduce maintenance and to cut corners on safety. Maintenance and safety, however, are important in a competitive market. A firm that neglects maintenance is more likely to be involved in accidents, which will damage its reputation and drive shippers or passengers away. Moreover, the employees, especially pilots or drivers, have personal incentives to ensure their own safety. Even a firm in bankruptcy proceedings has a strong incentive to maintain safety, since a single accident may lead to the dissolution of the firm.

The claim that poor profits or losses will reduce safety is not plausible. Consumers value safety. They prefer a safer airline to a less safe one. Therefore, an airline can attract more passengers by providing more safety. Any profit-maximizing firm should invest in safety up to the point where the additional revenue generated from being a safer airline is equal to the additional cost of providing safety. The profit-maximizing level of safety is independent of the profitability of the firm. Thus, even if competition reduces profitability, it should not affect safety.

Unless a firm is an undercapitalized company seeking quick profits, it has little incentive to provide too little safety. In the airline industry, for example, if a firm has little equity, it will have to borrow its capital or rent its planes. The lender and the renter each have strong financial interests in ensuring that the firm follows safe practices, otherwise their investments are at risk. Renters, too, are likely to be subject to liability suits. In addition, each airline carries liability insurance. Insurance companies have a very strong profit incentive to monitor the behavior of their insurees. Moreover, pilots, other aircraft personnel, and truck drivers have their lives at stake.

In the motor carrier industry both the shipper and the insurance firm have a strong interest in safety standards. Fly-by-night firms have great difficulty in attracting cargo. Most shippers prefer to deal with carriers with which they have an ongoing relationship. Thus, quality, including safety, becomes well known to the shipper.

However, motor carriers and other users of owner-operators do face a problem. The safety practices of each owner-operator are costly to discover and monitor. Firms prefer, therefore, to use known owner-operators, in whom they have confidence. Nevertheless, an owner-operator who is in financial trouble or who simply wishes to increase the short-run return by taking risks can neglect maintenance, drive excessive hours, speed, or take drugs. Users of owner-operators have every incentive to weed out such people, but some of this behavior will go on. The potential profitability from taking risks is partially offset by the potential harm to the driver and to the equipment. These incentives to take risks exist with or without regulations. Actually, hired drivers are more likely than owner-operators to ignore maintenance and take chances with their equipment. In fact, this is

why motor carrier firms continue to use owner-operators. In case of accident, the hired driver bears only part of the cost, while an owner-operator bears the full cost.

Even prior to deregulation, entry into the owner-operator business was virtually free. Owner-operators either contracted with certificated freight carriers or carried exempt agricultural goods. Since there were no barriers to entry, competition resulted in the elimination of any excess profits and provided carriers with earnings just sufficient to keep them in business. Since deregulation, it has become easier for them to secure their own certificates. This has broadened their market opportunities. It is alleged that increased competition since deregulation has put more financial pressure on owner-operators, but there is little reason to believe that this is the case.

While the market apparently provides incentives for the appropriate level of safety, regulation may have provided incentives for above-optimal levels of safety. Regulation of the transportation industries took the form of promoting a cartel-like fixing of rates and fares. However, the cartels were very imperfect. Capacity was not controlled, nor was quality. With agreement on rates and routes, competition took the form of nonprice competition.

Under regulation, carriers (air or truck) filed rates with their regulator (Civil Aeronautics Board [CAB] or, ICC). After a suitable period for comment, such rates became lawful unless suspended by the regulator. Since the regulator was concerned with the economic conditions of the industry, rates were fixed to provide adequate profits for even weak firms. Bankruptcies, especially in the air carrier industry, were considered undesirable.

With rates being set, ex ante, at very profitable levels (i.e., above marginal cost), carriers had strong incentives to capture more business. Better service, therefore, became the method of competition. Airlines were particularly noted for nonprice competition. Some airlines experimented with seductive costumes; other airlines competed in food quality; frequency of services was an important competitive dimension (U. S. Congress, 1975). As a consequence, profits were in the main competed away. The system created an unprofitable cartel, resulting in higher prices, more service, and lower load factors than in a competitive market.

Safety could have been one of the service dimensions in which airlines competed. At least for the airlines, however, explicit references to safety can be a sensitive issue. One airline cannot claim that it is safer than its competitors without suggesting that flying is dangerous and thus discouraging business. Indeed, safety is never mentioned directly in airline advertising.

Although regulation of the airlines might have increased safety beyond what a competitive market would have produced, individuals differ in their willingness to pay more for increased safety. The higher level of safety offered by the regulated airline industry might have pleased some passengers, whereas others would have preferred to pay less and take slightly greater risks. In this case, deregulation could be expected to result in a

situation where some airlines provide higher levels of quality (safety) at premium prices and other airlines provide lower levels of quality (safety) at lower prices. Air travelers, consequently, would be able to choose the level of quality (safety) they desire at the fares offered. If deregulation resulted in an increased number of passengers who preferred lower levels of safety at lower fares, the socially optimum level of safety actually would be lower than it had been under regulation.

The motor carrier industry also had strong economic incentives to compete in the areas of safety and damage prevention. However, there are fewer inhibitions to advertising safety and damage prevention in this industry.

EMPIRICAL EVIDENCE

The quality of data on safety performance varies considerably among transportation modes. Unfortunately, information on the factors that contribute to safety, such as maintenance and training, is difficult to obtain. For motor carriers, the data on accidents are questionable. We present some of the available information in the following.

Aviation Safety

Air traffic safety apparently has improved in the postderegulation period, notwithstanding the air traffic controllers' strike in 1981, a sharp increase in air travel, and a burgeoning of airlines. Table 2.1 compares the prederegulation period 1971–1978 with the postderegulation period. Total accidents, fatal accidents, fatalities, accident rates, and fatal accident rates have all declined sharply. An exception may be rates for the charter carriers, which, while limited in what they could do by CAB regulation, were largely unregulated in routes and rates. It is impossible to conclude from these data that deregulation has impinged on the safety of the airline industry.

Figures 2.1 and 2.2 show that the improvement in safety is an extension of a trend that predates deregulation. Air travel has been getting safer since its beginnings. This good performance was achieved in spite of the fact that the number of air traffic controllers fell sharply in 1981 after the government fired the strikers. Even as late as July 1985, the number of controllers was 15% less than before the strike (Leyden, 1986). Over the same period the number of departures increased some 26%. Moreover, on average, today's controllers have less experience than the prestrike controllers. To compensate for the fewer number of controllers, the FAA has changed a number of practices to increase safety. There is now more time between takeoffs, planes are routed with more space between them, and airborne holding—that is, circling the destination airport until a landing slot becomes free—has been largely eliminated. These new safety practices

Table 2.1 Aviation Accidents

Category	Before Deregulation (1971–1978)	Transition After Deregulation (1979–1986)	Percent Change
Scheduled large jet air carriers			
Total accidents	257	152	−40.9
Fatal accidents	39	21	−46.2
Total fatalities	1,463	807	−44.8
Total flight hours	45,579,646	57,484,764	+26.1
Rates (per 100,000 flight hours)			
Total accident rate	0.56	0.26	−53.6
Fatal accident rate	0.09	0.04	−55.6
Fatality rate	3.21	1.40	−56.4
Nonscheduled large jet air carriers			
Total accidents	25	28	+12.0
Fatal accidents	5	6	+20.0
Total fatalities	589	334	−43.3
Total flight hours	1,824,337	2,210,624	+21.2
Rates (per 100,000 flight hours)			
Total accident rate	1.37	1.27	−7.3
Fatal accident rate	0.27	0.27	0.0
Fatality rate	32.29	15.11	−53.2
Air taxis and commuter airlines[a]			
Total accidents	1,484	1,399	−5.7
Fatal accidents	343	318	−7.3
Total fatalities	1,031	853	−17.3
Total flight hours	27,919,441	36,241,018	+29.8
Rates (per 100,000 flight hours)			
Total accident rate	5.32	3.86	−27.4
Fatal accident rate	1.27	1.07	−15.7
Fatality rate	3.80	2.44	−35.8

[a]Prior to 1975, commuter airline and air taxi statistics were not recorded separately. Therefore these categories have been grouped together for these 8-year comparisons.

SOURCE: National Transportation Safety Board (various years).

may have compensated for having fewer, less-experienced controllers, but they also have contributed to a dramatic increase in delays.

Delays unambiguously reduce the quality of service and have led to an increase in complaints. However, delays in themselves do not reduce safety. The FAA policy of increasing time between takeoffs is likely to increase safety. Moreover, the delays are, at least in part, a result of the great success of airline deregulation. Since deregulation, the number of passenger miles flown has jumped 62% (U. S. Department of Commerce, various years).

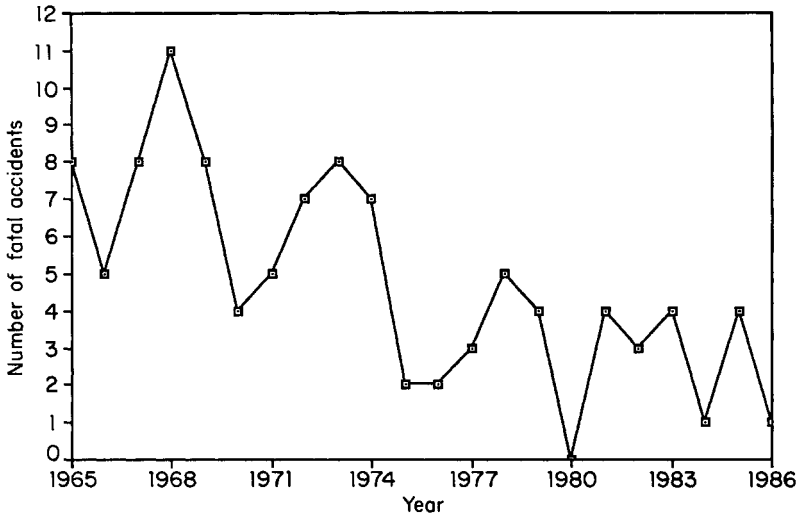


Figure 2.1 Fatal Commercial Aviation Accidents (Excludes Air Taxis and Commuter Planes). SOURCE: National Transportation Safety Board (various years).

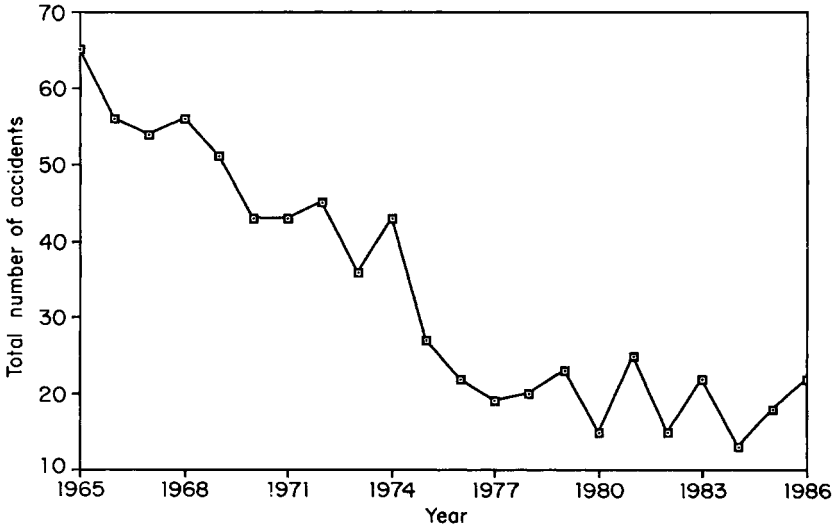


Figure 2.2 Total Scheduled Commercial Aviation Accidents (Excludes Air Taxis and Commuter Planes). SOURCE: National Transportation Safety Board (various years).

As already mentioned, critics of deregulation often argue that increased competition reduces profitability of some carriers to the point that they reduce maintenance expenditures. To examine that possibility we took a sample of 18 carriers, some very large and others very small, and did a regression analysis of their maintenance expenditure per plane on the average age of their fleet, whether they were primarily a cargo carrier, and their operating profits as a percentage of their airline investment. Age and the cargo carrier dummy variables explained half the variance, but the profitability variable, although positive, was not statistically significant.

In summary, there is no evidence in the data to support the hypothesis that deregulation of the airline industry has reduced safety. Safety as measured by number of accidents per departure or per passenger mile has been increasing steadily, probably since the first commercial flight. Whereas deregulation may not have actually increased safety, it certainly seems fair to assert that it has not decreased it either.

Motor Carrier Safety

Motor carrier safety is harder to measure than airline safety and may have been affected by other policy changes. Subsequent to the Motor Carrier Act of 1980, Congress passed the Surface Transportation Assistance Act of 1982, which opened up large portions of the nation's highway system to much larger trucks. Many observers have charged that such vehicles are inherently less safe than smaller trucks. On the other hand, trucking firms assert that since larger vehicles carry substantially more freight, the number of vehicle miles is reduced. Consequently, they claim that any increased tendency for larger trucks to be involved in accidents is more than offset by the fewer vehicle miles needed to move the nation's freight.

The evidence on large truck safety is inconclusive. A study done for the Insurance Institute for Highway Safety concluded that, "despite their greater load-carrying capacity, increasing use of doubles will produce more large truck crashes" (Stein and Jones, 1987). On the other hand, a report by the Transportation Research Board of the National Research Council concluded that "The increased use of twins will have little overall effect on highway safety because a reduction in miles of truck travel will approximately offset the small possible increase in accident involvements per mile traveled" (Transportation Research Board, 1986). A National Highway Traffic Safety Administration (NHTSA) study on large truck accident causation concluded that "Available evidence is conflicting on whether or not the accident rates per mile of travel differ between single-trailer and double-trailer combination trucks." (National Highway Traffic Safety Administration, 1982).

The data that do exist on trucking accidents are not very good. Accidents are typically defined and recorded in terms of the dollar severity of the accident or of bodily harm. As to the former, inflation tends to increase the number of reported accidents. Periodically the standard for reporting

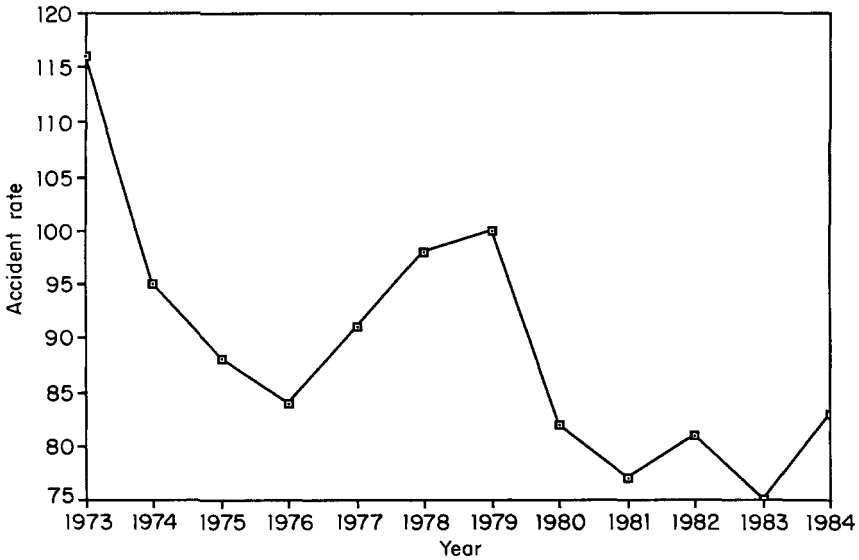


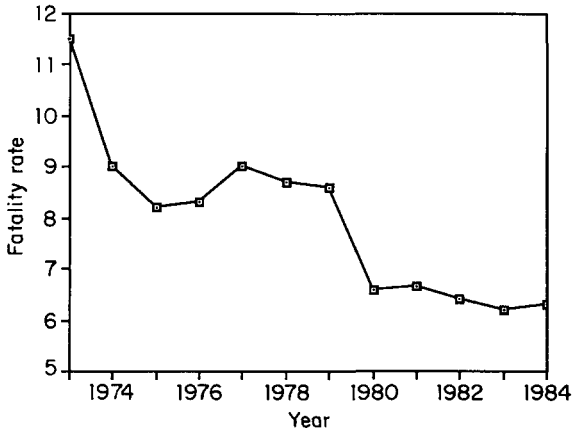
Figure 2.3 Truck Accidents per Billion Truck-Miles. SOURCE: Federal Highway Administration (various years).

accidents is revised upward to take into account the change in the value of the dollar. However, this makes time series data difficult to interpret. Moreover, the data published by the Office of Motor Carriers (OMC) of the Department of Transportation is based on voluntary self-reporting by truckers. Since there is no penalty for failure to report, the accuracy is hard to estimate. Studies indicate that reporting by private carriers is very low. In addition, the OMC data do not include intrastate truckers.

The poor coverage of the OMC accident data is indicated by the difference between the number of fatalities reported by the OMC and those reported by the Fatal Accident Reporting System (FARS), which also is produced by the Department of Transportation. For example, in 1985 OMC reported 2,676 fatalities whereas FARS reported 4,950 from heavy trucks alone. Most observers consider the FARS data to be superior.

The number of trucking accidents should be adjusted for any change in miles being driven. If there are more trucks driving more miles, there will be more accidents. Unfortunately, the data on truck-miles are simply rough estimates made by the Department of Transportation. For what they are worth, the data on truck accidents per 1 billion truck-miles (appearing in Figure 2.3) show a significant fall after 1979. Although 1984 and 1985 did show an increase, the rate was still below any prederegulation year except 1976.

A better indicator of safety is truck fatality rates as reported by FARS. Figure 2.4 shows truck fatality rates per billion truck-miles for both OMC



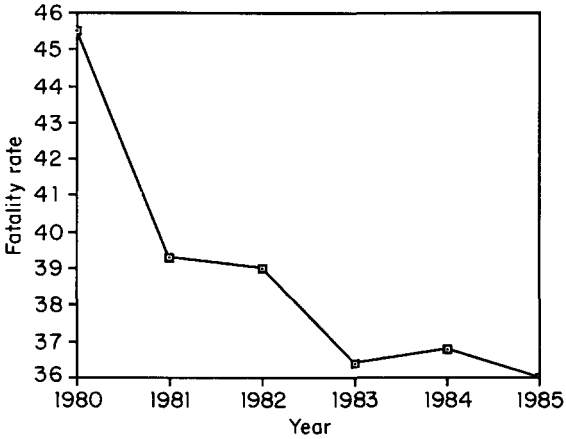


Figure 2.4 Truck Fatalities per Billion Truck-Miles. SOURCE: TOP: Federal Highway Administration (various years); BOTTOM: number of fatalities: National Highway Traffic Safety Administration Fatal Accident Reporting System Data Base, and truck miles: Federal Highway Administration (various years).

and FARS data. As can be seen, since 1977 and especially since 1979, fatality rates have declined. These data do not support a position that deregulation has reduced safety. Figure 2.5 presents the same picture for injury rates, based on data from OMC. Again, the data are inconsistent with the hypothesis that deregulation reduces safety.

It is also argued that because of deregulation, trucks have become older and less safe. The data do show that the average age of trucks in use was 8.1 years in 1986 compared with 7.1 years in 1980 (Motor Vehicle Manufacturers Association, 1986). However, the average age of trucks was also 8.1 years in 1963 and 1964 and was 6.6 years in 1954. In other

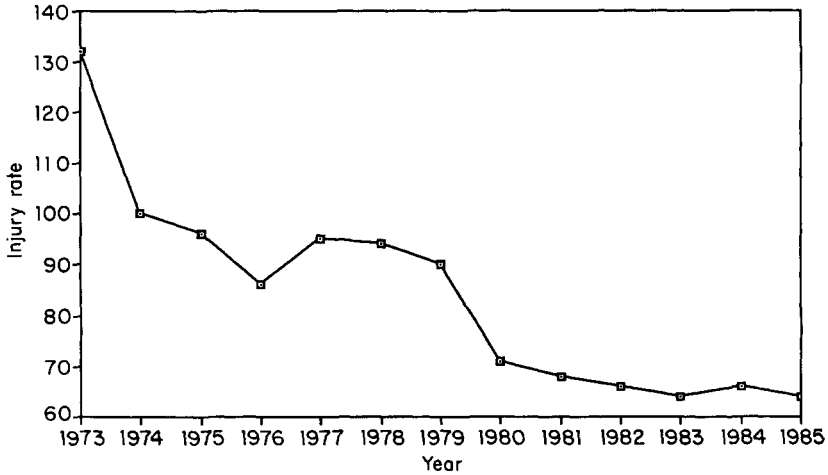


Figure 2.5 Truck-related Injuries per Billion Truck-Miles. SOURCE: Federal Highway Administration (various years).

words, the average age fluctuates considerably, and the 8.1 figure is consistent with the age range found in the regulated period.

As mentioned earlier, critics of deregulation often claim that the additional competition that results from reduced government controls lowers profits. If lower profits tempt firms to skimp on maintenance, the result will be an increase in accidents due to more mechanical failures. The OMC publishes data on accidents due to mechanical failure. These data, unfortunately, also depend on voluntary self-reporting. However, whereas the

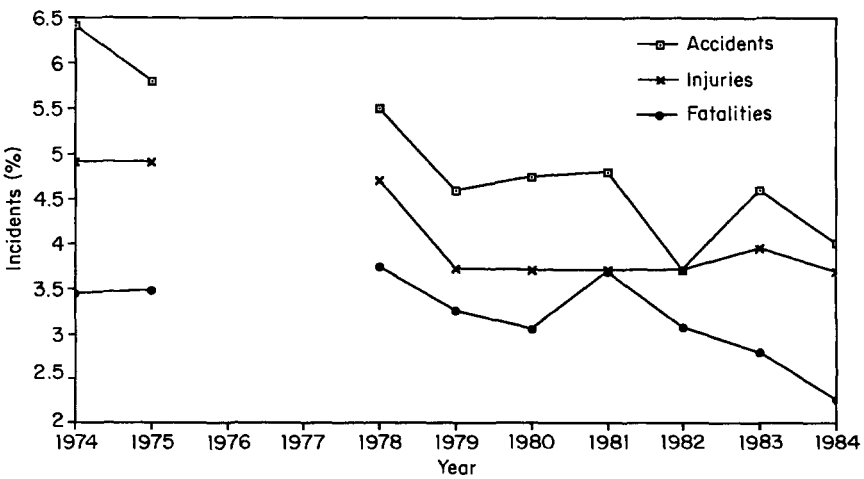


Figure 2.6 Percent of Reportable Incidents Due to Mechanical Defects. SOURCE: Federal Highway Administration (various years).

percent of accidents reported as being due to mechanical defects is undoubtedly understated, the trend over time probably is a reasonable index of the true pattern of accidents due to mechanical failure.

Figure 2.6 presents the percentage of all accidents, accidents that result in injuries, and fatal accidents that are reportedly due to mechanical defects. These data are available for 1974 through 1984, with the exception of 1976 and 1977. As can be seen, while the data do fluctuate, since deregulation in 1980 the general trend has been downward. There certainly is nothing in these data to indicate that mechanical defects have become a more important problem since deregulation.

In summary, although data on accidents and miles driven are poor for motor carriers, the figures that are available do not substantiate any claim that deregulation has reduced safety. The data, if anything, indicate that trucking is safer today than before deregulation.

CONCLUSION

Increased airline and motor carrier safety is simply part of a general trend toward increased safety in transportation and may have little to do with deregulation. For the purposes of this chapter, however, it appears that deregulation has not changed the trend toward greater safety.

Data fail to support the hypothesis that deregulation has reduced safety. Although it could be expected that regulation would increase safety above optimum levels, and thus a move to a competitive market might reduce measured safety, we find that not even this is true. Either safety regulation has been effective or competitive pressures have maintained safety at optimum levels. We have no data to help us choose between these two competing hypotheses. I am skeptical that federal regulation can be and is sufficiently omnipresent and thorough to increase safety significantly. Nevertheless, for the purpose of this chapter, the question as to what has maintained safety does not have to be answered. This book asks whether deregulation has reduced safety. I believe it has not.

3

Deregulation's Negative Effect on Safety

BROCK ADAMS

Wendell Wilkie is not often quoted these days. He once said something, however, that I find very perceptive: "A good catchword can obscure analysis for fifty years." We haven't run the full 50 years yet, but one "catchword," deregulation, certainly has been able to obscure analysis. I hope here to dispel some of that obscurity and demonstrate that deregulation in the trucking industry has not been the panacea that its proponents claimed it would be. In fact, the economic benefits of deregulation have been uneven and the social costs have been underestimated. As I hope to show here, the major cost of deregulation, insufficiently accounted for in weighing the pros and cons of deregulation, has been a marked decrease in transportation safety.

Having been involved in transportation policy for many years from different perspectives, I have seen the deregulation debate from many angles. I first saw "deregulation" as a congressman in the early 1960s. Back then there was much talk about something we called "the iron triangle," which described an incestuous relationship among industry, congressional committees, and regulatory agencies. All three elements of this relationship recognized that the tighter their dealings with each other, the greater their power would be (Ladd, 1985).

Starting in 1935, an iron triangle developed in the trucking industry. For many years it provided safety and stability to a number of companies as the nation shifted to a highway transport system, but it also had a downside. It eliminated competition through rate bureaus, it restricted entry, and it stultified innovation by strictly regulating routes and commodities trucking firms could carry. The net result was that even as highways expanded, costs increased and services to new areas and new businesses were limited.

When President Kennedy assumed office, the economists who surrounded him suggested that he ought to break out of the triangle. He did

try, but in the early 1960s iron proved to be stronger than economic theory. The triangle survived that first brief assault. By the 1970s, however, the iron triangle was facing more than economic theory: Regulatory stagnation was creating tremendous transportation and business pressures that threatened the collapse of the entire system. By the time of the Carter Administration, the nation had shifted much of its transport to the highways, yet every interstate highway seemed to be threatened by regulatory roadblocks. Examples of the nonsensical regulations of the time abound. Frozen dinners were exempt agricultural commodities unless they were chicken or seafood; crab shells were exempt, oyster shells were not. Certificates were approved with narrow restrictions. For example, one certificate permitted transport of paint hauled in 2-gallon cans but not in 5-gallon cans. The Interstate Commerce Commission (ICC) approved certificates with circuitous routing, forcing carriers to travel many extra miles and thus waste time, fuel, and money (Interstate Commerce Commission, 1978).

REFORM POLICY

President Carter decided that the old system of regulation needed to be relaxed. I agreed. Many of us at the Department of Transportation (DOT) believed that regulation should be reformed to meet new challenges. This reform was started with airlines and trucks. The vision was sound, but with the premature departure from the Cabinet of certain officials, the Administration shifted emphasis. Several of the president's economic advisors went much further in their zeal for change. They believed that only pure economic factors should shape transportation business decisions. Regulatory relaxation, reduction, and reform were replaced with "deregulation." The distinction is more than semantic; it is symbolic of a split between those who want to restrain government's role and those who wish to remove it. The victory of the latter group made the 1980s possible.

The Reagan Administration has taken the flexibility of the legislation crafted in the 1970s and created a policy in the 1980s that has turned regulatory agencies into ideologically driven debating societies whose mission is to eliminate themselves rather than eliminate unfair and unsafe practices.

Different people can see things differently—that's what democracy is all about. However, the way the Reagan Administration went about turning its philosophy into policy was wrong. A major motive of our founding fathers in creating the United States was to control interstate and foreign commerce. They knew all too well that a completely unregulated system of commerce would not encourage the development and free flow of goods and services. Despite its rhetorical praise for constitutional principles, the Reagan Administration abandoned a fundamental constitutional precept

when it rejected the federal role in regulating interstate commerce for the good of the nation as a whole.

I am the first to admit that we needed to loosen the bonds of regulation. As I said in the 1970s, and as I say now, I am proud to have contributed to eliminating the sort of rules that once told truckers what routes they had to follow and what cargoes they could carry. There is a great difference between relaxing regulation and rejecting it, however, and the Reagan Administration has rejected regulation. Let me now turn to the effects of deregulation as it has been implemented by the Reagan Administration.

EFFECTS OF DEREGULATION AS CURRENTLY PRACTICED

Certainly the free market can do many things better than the government can do them. A free market, using money as the test, will allocate resources quickly and often efficiently. However, it allocates resources on the basis of the economics of the moment, without considering the broader needs of the nation. The bottom line, in the area of transportation, is a system that looks primarily at short-term gain, the "dollar at the dock," without considering the costs to society of unsafe practices, which add billions of dollars in the form of medical costs, lost personnel hours, and police and court costs. The net result of deregulation is a system that is true to a theory but that, in practice, is not as safe as it should be; that ends up charging more for a short haul than for a long one; and that often creates monopoly power at the management level while adversely affecting employees.

The primary mechanism through which deregulation is translated into a loss of safety is the incessant pressure of competition on truckers to reduce costs. Without the safety net of regulated rates and without stringent entry controls, truckers, particularly owner-operators, compete on the basis of price. There is no doubt that deregulation increased competition, but it did not create more business. Intercity truck tonnage has hovered at around 2 billion tons since 1970. All that grew was the number of carriers trying to carry that tonnage. In fact, the number of ICC-authorized carriers available to shippers jumped from 16,874 in 1978 to approximately 37,000 in 1986 (Interstate Commerce Commission, various years). As new entrants mushroomed, so did bankruptcies. In 1980, there were 382 carrier failures; in 1985 that figure was 1,533 (Glaskowsky, 1986). Using Dun and Bradstreet data, the American Trucking Associations estimate that 714 of the 1,533 trucking failures in 1985 were intercity carriers as opposed to local operations. This figure is approximately 13 times the number of such failures in 1978.

The pressure to reduce prices doesn't come exclusively from truck competitors. It also comes from purchasers, from shippers who use their overwhelming financial advantage to send a simple message: Carry it for half

the price or I'll get one of six other firms to do so. The net result is that truckers without economic leverage have no choice but to lower their prices in an effort to become competitive and to cut their costs in any way they can. Truckers have cut costs in a number of ways. One way is by not buying new equipment. The age of the trucks on the road has increased since deregulation. Current data indicate that the *average age* of owner-operator equipment has increased from 3.5 years in 1979 to 5.7 years in 1984, and is now approaching seven years, the *maximum* age once accepted for highway tractors. Company-owned equipment has seen a similar trend (Baker, 1985; Page, 1987).

Aging equipment is bothersome. What is more disturbing is the fact that even with more and older trucks, and with the increased need for maintenance they create, spending on vehicle maintenance and parts has increased only 17% since 1978. It doesn't take a lot of experience in the industry to know that such a small increase is inadequate, or to see where it leads. When the trucks on the highways have aged and spending on new equipment has gone down, the small rate of growth in parts and maintenance spending means only one thing: We have shifted toward breakdown maintenance rather than preventive maintenance. The trucks on the road aren't as safe as they used to be because now most truckers don't have the money to put into either new equipment or repairs.

Recent data from roadside inspections corroborate the fact that many of the trucks now on our highways lack proper equipment and are inadequately maintained. The Office of Motor Carriers (OMC) indicates that in 1986, 213,700 trucks were placed out of service by federal and state inspectors because of serious safety defects. This figure represents 39.2% of the trucks inspected. In 1984, 48,279 trucks were placed out of service at inspection sites—approximately 30% of the trucks inspected (American Trucking Associations, 1986).

It isn't just that truckers haven't taken care of their physical equipment. It is also the kind of equipment they use. Ever since deregulation and the decline of the ICC, enormous pressure has been put on truckers to haul more and to haul more quickly. One manifestation of this trend is that there are now many more double-trailer trucks on the road. A study done by the Washington State Patrol and the Insurance Institute for Highway Safety has documented that double-trailer trucks are two to three times more likely to be in accidents than tractors pulling only one trailer (Stein and Jones, 1987). The use of longer combination vehicles (LCVs) has accelerated as a result of the Surface Transportation Assistance Act of 1982, which prevented states from barring LCVs from their highways in exchange for higher taxes on the trucking industry.

Equipment is only part of the story. Deregulation pressures have affected people too. The drive to cut costs and increase revenue has heightened the pressures on truckers to violate the hours of service rules, to ignore speed limits, and to haul loads that exceed statutory weight limits. The logbook system used to enforce the hours-of-service rules has become

so permeated with abuse that these logs are now commonly referred to in the trade as "comic books." Nonstop stints of 16 hours at the wheel are not uncommon. The data on trucks hauling freight over the legal weight limit are equally disturbing. It is estimated that as many as half the trucks on the highway are over the weight limit, causing excessive wear on the highways and straining the ability of the equipment to operate safely. Driving was always tough; driving under deregulation is dangerous. And now that firms are having difficulty finding experienced drivers, dangerous is too mild a word (Abruzzese, 1987).

Given all these factors, it really isn't surprising that the number of truck accidents has increased. Unfortunately, it appears that the size of that increase is escalating. OMC figures indicate that in 1980 there were about 31,000 truck accidents reported; by 1985 the number had soared to more than 38,000. Even if one accounts for the increase in the number of miles driven by trucks, the accident rate has increased. The Office of Technology Assessment estimates that the rate of truck accidents increased from 2.34 accidents per million truck miles in 1981 to 2.69 accidents per million miles in 1985. I am concerned that with speed limits going up, both the number and severity of accidents will go up too, unless we increase the role of the federal government in regulation of safety.

While the safety impact of deregulation is acknowledged by many, we need to recognize that deregulation has had some adverse economic impacts. The entire justification for deregulation was free-market competition. To a certain extent, in terms of economic value at least, some shippers have realized very real advantages, but deregulation has been a mixed bag, even in pure economic terms. Competition in the less-than-truckload (LTL) segment of the industry, roughly 60% to 70% of the business for most successful truck lines, has become increasingly concentrated, dominated by large, well-financed, nationwide or regional carriers. These companies often use several subsidiaries to hire underfunded owner-operators. One has to wonder how the economic benefits of deregulation are going to be realized if the bulk of the industry becomes increasingly concentrated. While the LTL sector has remained fiercely competitive since deregulation, the potential for monopolistic rates exists, and we may see an increase in rates sooner rather than later if the economy remains strong. So to those people who claim that deregulation works, and who point to lower prices to prove it, I say that we haven't seen the final bill yet. However, we have seen enough to worry about what the tab ultimately will be.

DANFORTH-ADAMS BILL

There is "Adams on deregulation." There is also "Adams on reregulation." Let me sketch out a couple of areas of action. To begin with, I think we need to start now to address specific problems with targeted legislation. That is why Senator Danforth and I introduced the Truck and Bus Safety

Bill of 1987. This legislation focuses on some of the specific problems I have discussed here: the fatigue of drivers operating more hours than allowed under the federal regulations and the safety of some of the equipment being used. The Danforth-Adams Bill contains three principal provisions.

1. It requires the Secretary of Transportation to initiate rule-making proceedings on the need to improve brake performance standards. The Secretary is directed to investigate technologies such as antilock braking systems and brake compatibility. In a study released in May 1987, DOT concluded that efforts to improve truck brake systems should receive the highest priority of all equipment-related safety issues. The report estimated that brake performance could be involved as a contributing factor in up to one third of all truck accidents (U. S. Department of Transportation, 1987).
2. The bill directs DOT to consider ways to improve truck safety with respect to drivers' hours of service, including the possibility of using on-board monitors to record driving time, speed, and other information.
3. The bill would eliminate the so-called "Commercial Zone exemption." It makes little sense to regulate trucks on the highway but not when they operate in the dense traffic of our nation's metropolitan areas.

These sorts of specific changes will be helpful, but they will not be enough. We also need attitude changes that produce policy changes. We need more people at the ICC who are willing to do what needs to be done. Every president is entitled to nominate people to serve on the ICC or any other regulatory agency who share his basic values and beliefs. But we are entitled to have people in these agencies who abide by the law, understand operating problems, and are at least willing to listen to and try to understand other values and beliefs. That is one of the reasons that I introduced, with several of my colleagues, legislation designed to improve the way we appoint people to regulatory agencies by creating a Transportation Regulatory Commissions Nominating Commission to recommend to the president qualified applicants to fill any vacancies that develop.

We also need more people inspecting companies for proper maintenance, insurance, "fitness," and other safety-related variables. These sorts of inspections, and the punishments that can be imposed for noncompliance, can have a positive effect on safety. With respect to one requirement, insurance, the Department of Transportation estimates that as many as 25% of all carriers, regulated and unregulated, do not have adequate coverage.

I recognize that under the Motor Carrier Safety Assistance Program (MCSAP), established by the 1982 Surface Transportation Assistance Act and expanded by the Commercial Motor Vehicle Safety Act of 1986, roadside inspections and carrier safety audits have risen dramatically. OMC figures indicate that roadside inspections by state and federal officials have risen from 160,000 in 1984 to 524,000 in 1986. This is a noteworthy and positive development, but the MCSAP program alone will not solve our truck safety problem.

I do not advocate a return to a system that would regulate every route and rate, but I would like to see a system that would regularize standards of operation and impose safety and financial responsibility criteria for new entrants.

I began this chapter by quoting Wendell Wilkie. Let me close by paraphrasing another unlikely source, Heather Gradison, chairperson of the ICC. In testimony before the Commerce Committee in June 1987, Gradison indicated that she viewed the role of government in regulation as a "backstop" rather than as an umpire in on every play. I understand her argument, and find it incomplete. We all ought to understand that while an umpire doesn't tell a pitcher what to throw, an umpire *does* determine whether what was thrown was a ball or a strike. An umpire doesn't tell a football team how to line up on the field, but an umpire does determine if it has lined up offsides. And just like an umpire, in the trucking industry, government should not be telling companies how to run their businesses, but it must ensure that those businesses are run in a manner that protects the interests of the rest of the nation.