

EFFECTS OF DEREGULATION ON SAFETY

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THREE CASE STUDIES

Historical case study approach:

Literature reviews

Interviews

Deregulation of the U.S. aviation industry

Deregulation of the U.S. rail industry

Privatization of the United Kingdom electricity industry

AVIATION

The U.S. airline industry was economically deregulated with the passage of the Airline Deregulation Act of 1978

Proponents of airline deregulation predicted that:

**“Deregulation would bring low fares...
And great improvements of efficiency”**

With little or no adverse impact on safety

Opponents of deregulation were concerned about:

**Loss of labor earnings
Poor safety records
Loss of service to small communities
General instability in the aviation industry**

Post-deregulation changes:

**Fares dropped sharply
Travel volume increased by 50%
Greater reliance on hub-and-spoke operations
“New entrants” to the aviation industry
Mergers and acquisitions
Bankruptcies**

The period of adjustment continued for over a decade

EQUIPMENT FAILURE AND MAINTENANCE

Mechanics and pilots expressed concern about cuts in equipment maintenance:

“Deregulation has certainly changed things and maintenance is one of them. I mean you just have to think of the economics of the whole thing. Everybody’s trying to cut corners now, and they’re going to cut everywhere in order to compete and stay in business. It’s expensive to keep all those spare parts around, and it’s expensive to keep these maintenance guys all over the place.”

But accidents caused by equipment failure declined!

Airlines reduced engine maintenance—

But did not experience more engine failures!

Airlines may have been doing excess maintenance prior to deregulation, and then optimized their programs—

“Perhaps by improving the quality of service performed but paying less attention to minor problems between scheduled shop visits”

However, some airlines engaged in risky practices:

\$9.5-million fine against Eastern Airlines

“For falsifying maintenance records and allowing improperly maintained aircraft to be used”

HUMAN ERROR

Pilots expressed concern about higher rates of error:

“We’d all like to think there’s never any pilot error, but there is. And I firmly believe that the pressure that’s in the cockpit now, the other concerns that we have about things we were never concerned with before are certainly a contributing factor.”

“Pilots...are flying more hours per month. Ground crews are performing a wider variety of tasks...”

But accidents caused by human error declined!

However, experience levels declined:

“The rapid growth in air travel...caused some jet airlines to reach down into the commuter ranks.”

“Less experienced and perhaps less qualified pilots were moving into the jet carrier ranks as a result.”

The rate of pilot error (although still lower than before deregulation) increased by a factor of 2 in the 1980s

Similar problems were observed among mechanics:

Labor shortages

Inexperience

“Carrier-hopping” and high turnover

Low wages

The rate of ground crew error (although still less than before deregulation) increased by 50% in the 1980s

FINANCIAL PRESSURES

Airline profitability has become far more variable:

“Carriers have shown that it is possible to move from the financial brink to profitability, and...back again, in a relatively short period of time.”

A significant number of airlines (especially new entrants) went out of business:

“Business failure...is now a fact of life.”

This made it difficult for airlines to obtain financing

The greater financial instability of the airline industry has led to concerns about excessive cost cutting:

**“Lower profitability is correlated with higher accident and incident rates—
Particularly for smaller carriers”**

“Smaller firms...may be more responsive to fluctuations in the economic environment”

Therefore, “more intense scrutiny of the safety practices of financially marginal carriers is desirable”

AGING AIRCRAFT

The financial pressures of deregulation might result in longer aircraft service lives:

“Debt-ridden carriers nearing bankruptcy have little alternative but to defer new aircraft purchases.”

REDUCTION OF SUPPORT SERVICES

A number of airlines have cut support departments:

“The U.S. carriers are throwing away their engineering departments, their maintenance expertise, their display flight-following functions, their meteorology departments, their piloting departments...”

Other areas of concern:

Reduced resources for inter-airline benchmarking

**Reduced employee assistance programs
For dealing with alcohol abuse**

NEW ENTRANTS

Airline deregulation permitted the establishment of a number of “new entrant” airlines:

“119 carriers...entered the industry”

Safety performance of new entrants has been a concern:

“Many new carriers have little notion of or experience in how an airline must be run”

New entrants were roughly “12 times as dangerous”:

**Higher rate of fatalities per passenger
Higher rate of fatal accidents per flight
Higher rate of accidents due to pilot error**

MERGERS AND ACQUISITIONS

“An early reaction to deregulation was a succession of mergers and buyouts of existing carriers”:

**Despite the large number of new entrants,
“Nearly 94 percent of the U.S. air market [is] in the hands of eight companies.”**

Mergers and acquisitions can have adverse effects:

“Merging of maintenance operations/procedures”

“Lack of standardization of cockpit design and operating procedures”

**“Merging of seniority lists among airline personnel”
Inexperienced pilots obtaining senior positions**

“Employees become absorbed and preoccupied”

“Clash in corporate cultures”

LABOR RELATIONS

Established carriers had to reduce labor costs:

“Virtually all labor groups ultimately agreed to compensation or work-rule changes or both.”

“Locals of the Air Line Pilots Association accepted wage deferrals or freezes more than forty times.”

Reduced wages may affect safety by:

Increasing turnover

Lowering pilot and ground crew experience

De-unionization could have more direct effects on safety

Unions provide protection to employees who report problems or refuse to use unsafe practices:

“What does the protection of a union contract do for you? I’ll tell you what it does for you... [I]f I do something as a union representative, they cannot...take personal punitive action against me. There’s an insulating layer.”

“Union contracts or initiatives often address issues not covered by Federal policy”:

“Duty-time limits” for pilots

Training and informational materials

Employee assistance programs for alcoholism

Dramatic increase in labor strife after restructuring:

In some cases even resulting in sabotage!

SUMMARY AND CONCLUSIONS

Deregulation adversely affected many of the inputs that are important to aviation safety:

- Decreased maintenance**
- Less experienced personnel**
- Increased pressures for cost cutting**
- Older aircraft**
- New entrant airlines unfamiliar with the industry**
- Reduced investment in support services**
- Poor labor relations**

Some of these changes resulted from the rapid increase in air transport volume observed after deregulation

But others were a direct result of competition

These changes also took place during a time when the FAA work force was being severely cut back

Perhaps surprisingly, such problems appear to have had little adverse impact on overall safety records:

- Large margin of safety (inherent safety of aircraft)**
- “Keen level of vigilance in the cockpit”**
- Historic trend toward improving safety**

Reduced safety margins, in combination with an aging aircraft fleet, may still yield safety problems in the future

Deregulation is not incompatible with safety:

Good management needed to cope with upheaval!

RAIL

Concern about the financial health of the railroads led to economic deregulation of the railroad industry

The U.S. rail industry was economically deregulated with the passage of the Staggers Act of 1980, which:

Gave railroads the freedom to set rates

Enhanced their ability to abandon unprofitable lines

Post-deregulation changes:

Financial performance of the rail industry improved

Labor productivity improved

Share of interstate freight traffic stabilized

Number of small railroads grew

Merger activity increased

EQUIPMENT FAILURE AND MAINTENANCE

Poor financial health of railroads in the 1960s and 1970s resulted in reductions in expenditures on maintenance

Railroads were also switching to larger rail cars

Larger cars and lower-quality track led to derailments:

Track-caused derailments and collisions increased by about 80 percent between 1975 and 1978

After the Staggers Act, expenditures on track increased:

Annual expenditures on track were nearly 5 times higher in 1985 than in 1975

Problems with track maintenance were greatly reduced, but have not disappeared:

Inadequate track maintenance contributed to accidents at the CSX railroad in 1997

HUMAN PERFORMANCE

Employment in the rail industry declined since deregulation

Class I freight railroad employment fell 62 percent between 1976 and 1996:

Mergers

Abandonment of unprofitable lines

Laborsaving technologies

Negotiated crew-size reductions

(Railroads reduced average crew sizes from 4 to 2!)

But accident rates declined:

Railroad deregulation was associated with reduced worker injury and illness rates through 1985

“Both train accident and employee injury rates have declined by 70 percent since 1980”

Railroad employment may have gone too far:

“The train accident rate between 1985 and 1993 was basically flat...”

Class I railroads use fewer people and less equipment to haul heavier loads over fewer miles of track:

“These changes...could lead to more rail collisions and accidents as a result of greater congestion and fewer qualified employees” (GAO, 1997)

Human factors had become the leading cause of train accidents by the mid-1980s

Understaffing, fatigue, insufficient supervision, and dispatching deficiencies were major problems

FINANCIAL PRESSURES

Poor safety performance of the railroads in the 1960s is believed to be associated with poor financial health:

Economic theory predicts that firms in financial difficulty are more likely to engage in risky behavior

Lower expenditures on maintenance of rails

Correlation between financial health and accident rates:

Financial health associated with fewer accidents

Relationship strongest for unprofitable railroads

As financial losses decreased, so did accidents

NEW ENTRANTS

Some financial distress in the rail industry was due to requirements to continue serving unprofitable lines

Once railroads could abandon these unprofitable lines, financial conditions and safety performance improved

Abandonment of small lines led to a proliferation of small railroads to provide service on abandoned lines:

Many of these smaller railroads are non-union and can operate at a profit because of lower labor costs

Small railroads experience more safety problems:

An employee fatality rate about 30 percent higher

A rate of collisions that is about 2 times higher

A rate of derailments about 4 times higher

Safety performance of the small new entrants may not be substantially worse than that of Class I railroads:

Risk of collisions and derailments is larger during switching operations

Small railroads might have started operations with tracks that were at higher risk for derailments

Why have smaller firms been able to maintain safety?

Pool of experienced railroad personnel to hire

Rolling stock must meet safety specifications of the railroads with which it interconnects

Large railroads may exert pressure on small ones

MERGERS AND ACQUISITIONS

Deregulation has led to substantial consolidation:

More than 100 major railroads in 1960

Number decreased to 30 in 1976, and 9 in early 1999

Overall safety performance has not been harmed:

Mergers occurred during a time of improving safety

In at least one merger the results were not favorable:

Purchase of Southern Pacific and Chicago and Northwestern by Union Pacific in the mid-1990s

Problems developed, particularly in Texas:

“Most spectacular merger fiasco of modern times”

Clash of corporate cultures was a major issue:

“Union Pacific’s by-the book culture clashed badly with Southern Pacific’s, ...making do with chewing gum and bailing wire”

In the first 7 months, Union Pacific had 3 fatal accidents:

Special FRA investigation of Union Pacific

Lessons learned:

Proposed regulations governing mergers, consolidations, and acquisitions of control

Shippers put pressure on other mergers to avoid the negative outcomes of Union Pacific merger

LABOR RELATIONS

Labor relations worsened following deregulation:

**Railroads pushed harder for concessions
Congress interrupted numerous strikes**

Deregulation resulted in:

**Weakened bargaining power for unions
Falling employment and union membership**

Barriers to entry prevented influx of nonunion firms:

Rail industry has remained highly unionized

**Percentage of unionized employees fell from 83.2 in
1974 to 70.6 in 1997**

Several factors contributed to safety improvements:

**Work-rule concessions by unions contributed to
financial improvements and improved maintenance**

**Labor turnover remained low following deregulation
(Roughly 20 years of experience on average!)**

**Railroad workers place a high value on safety
(Special programs for unsafe crossings, fatigue)**

SUMMARY AND CONCLUSIONS

Deregulation led to:

**Increased maintenance
Reduced employment
Improved rail safety**

Any negative effects of employment cuts were offset by other factors

Observed safety trends are open to speculation:

Federal Railroad Administration established in 1967

Difficult to determine whether improved safety was due to safety regulation or financial conditions

**Employment cuts may have begun to affect safety:
This effect may grow if rail traffic increases**

UNITED KINGDOM ELECTRICITY INDUSTRY

Goal of restructuring was to improve efficiency through the introduction of competition

U.K. electricity industry privatized in the early 1990s

Distribution system:

Ownership of National Grid Company transferred to 12 regional electric companies

Regional electric companies sold to public in 1990

Nuclear reactors:

All nuclear reactors initially under two government-owned utilities (Nuclear Electric, Scottish Nuclear)

Non-Magnox reactors eventually transferred to a private company (British Electric) in 1996

Magnox Electric (government utility) has all Magnox reactors

Recent merger of Magnox Electric and BNFL (supplier of nuclear fuel products and services)

Conventional power stations:

60% of conventional power stations placed under National Power, remainder went to PowerGen

Ownership of National Power and PowerGen sold to public in 1991-95

NUCLEAR SAFETY TRENDS

Reactor trip rate reduced

Most reactors maintained or improved their safety rating

Radiological safety maintained:

**No annual exposure limits exceeded
98% of workers less than 5% of limit**

Industrial safety improved:

**No fatalities
Rates of lost-time accidents decreased
7 of 8 plants received safety awards**

Environmental safety maintained:

**No discharge limits exceeded
Maximum public doses less than 5% of background**

Number of reported abnormal events increased:

**3.9 per reactor in 1996-97, 5.8 per reactor in 1997-98
Due to better reporting culture?**

POST-DEREGULATION CHANGES

Decline in research and development funding:

Reduced expertise to deal with safety problems?

Decline in employment:

More than 50% reduction in 6 years (1990-95)

Increased use of outsourcing (“contractorisation”)

Safety audit of Dounreay Nuclear Power Station in 1998 found problems with outsourcing:

“Lack of ‘interface management’ between the licensee and major contractors”

“Lack of contractor job profiles and records demonstrating that suitably qualified and experienced staff were employed in key positions”

“Few contractors understood the implications of the site licence”

“Neither were they aware of the licensee’s safety standards and cultures”

SAFETY CONCERNS

“Low morale, overworked operators, and the rush to reduce costs before privatization posed a threat of significant reduction in safety”

Concern that “privatization would erode safety culture”

**Nuclear Installations Inspectorate (NII) concerned with “regulating organisational change on nuclear...sites”:
Particularly reductions in staffing levels**

“NII expects licensees to demonstrate that proposed changes are fully considered before...implementation”:

“Analysis of resource and competence needs”

“Training and competence”

“Operational control and supervision”

“Management controls”

“Staff morale during the change period”

NII expectations with regard to outsourcing:

“Retention of corporate expertise”

“Competence of contractors”

Also concerns about “alliancing and partnering”:

“Companies...mutually assisting each other”

**“You can delegate authority, but not responsibility”
(Admiral Rickover)**

SUMMARY AND CONCLUSIONS

Despite employment cuts, privatization was associated with continued good safety performance in most areas:

- Reactor trip rate**
- Safety rating**
- Radiological safety**
- Industrial safety**
- Environmental safety**

Any negative effects of employment cuts were offset by other factors

Employment cuts may have begun to affect safety

Careful management of outsourcing needed

OVERALL LESSONS LEARNED

Deregulation is not incompatible with maintaining or even improving safety

Upheaval associated with deregulation poses a major management challenge

Reprioritization of efforts is critical:

**Labor vs. capital maintenance
Optimization of maintenance programs
“Work smarter, not harder”**

Safety culture has been a concern in all three industries:

**Use of contractors
Mergers and acquisitions**

Conditions favorable to safety in some case studies:

Multi-decade safety improvement trend (aviation)

Improved financial health coupled with increased safety regulation (rail)

Can't afford to be complacent or take safety for granted!