40 Years of Transportation Deregulation

Airlines, Railroads, Trucking, Intercity Buses
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3 INTRODUCTION
Transportation Economic Regulation in Practice
John W. Fischer

The year 2018 marks the 40th anniversary of the passage of the Airline Deregulation Act of 1978. In the four years following the legislation, Congress and the Carter administration also deregulated the railroad, trucking, and intercity bus industries. Although it took a bit longer, both the Civil Aeronautics Board (CAB) and Interstate Commerce Commission (ICC) were sunned. In this theme issue of TR News, experts from various segments of the transportation field examine how deregulation has played out over the intervening 40 years and what this experience portends for the future.

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Robert Peterson

Airline deregulation created the groundswell for additional deregulation in the transportation industry. The changes in aviation regulations and business practices were dramatic, with significant transformations occurring almost from the signing of the Airline Deregulation Act. Impacts included airline bankruptcies, lost jobs, and service realignments—as well as increased service, lower fares, and greater access to air travel for more Americans. In contrast to some views held at the time of deregulation, safety also has improved over time.

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COMING NEXT ISSUE

The July–August issue of TR News examines 20 years of research and TRB activities on alternative contracting methods (ACM) and success stories from implementing research innovations. Explored are pioneering tools and contracting techniques used by state departments of transportation such as Georgia and Colorado, along with tested project delivery methods, selection tools for transit, international alliancing, using ACM for risk sharing and transfer, benefits of early contractor involvement, and risk-based quality management for design–build projects. Success stories also are presented for a variety of different contracting methods, offering insights and guides for future construction projects.

Construction of the Intercounty Connector (ICC), an 18-mile, six-lane toll highway linking two Maryland counties. Its design and construction were managed by the Maryland State Highway Administration, which delivered the $2.6 billion project with separate design–build contracts procured in four phases.
The following articles acknowledge the 40th anniversary of the beginning of the end of economic regulation of transportation industries in the United States. Although moves to deregulate occurred before 1978, most transportation practitioners look to the passage and implementation of the Airline Deregulation Act of 1978 as the starting point. This legislation launched a concentrated effort to roll back nine decades of federal economic regulation of rail, truck, air, and other activities.

Retrospectively, this should have been an easy task—however, that was not the case. Federal regulation of the transportation sector was an embedded part of the American economy. When deregulation first was proposed, the aim was to modify and modernize regulation, not to eliminate it. Instead, over a relatively short period, much of what was a regulatory industry within an industry—including a significant federal bureaucracy—vanished. This is not to say that all regulation is gone, even today. Some economic regulation remains, but in comparison to the pre-1978 situation, it is minimal.

Generally, the reader of these articles will get the impression that deregulation has been a success—without it, today’s economy might look very different. For example, it is hard to imagine an Amazon-like firm operating in an environment in which each of its shipping-related innovations was subject to challenge by competitors and federal review.

Amazon and other companies whose business models rely heavily on shipping and deliveries have flourished in a deregulated freight and transportation environment.
Deregulation did not occur instantly; nor did it occur without economic pain and dislocation. Many transportation firms adjusted to the new, deregulated environment, but many did not—such as Pan Am and Consolidated Freightways, one-time giants of the transportation world. Many other large and small firms, including those that were created because of deregulation, also have come and gone. In each case, the firm’s assets and employees were dispensed with—often with serious consequences for workers and stockholders.

In the early years of deregulation, the pain of business failures resulted in serious calls for Congress to attempt reregulation. These efforts failed, primarily because the new economic freedoms offered to transportation industries unleashed forces of innovation and efficiency made a dramatic, effective case against such a policy retreat.

**History of Deregulation**

Federal economic regulation of transportation industries was an accepted feature of the U.S. economy for more than 80 years. Though transportation is the focus of this issue, economic regulation was employed extensively across a wide range of other economic sectors and often remains in place today.

As late as the early 1970s, students of transportation economics—the author included—were exposed to a large dose of regulatory economics. Two of the most popular textbooks of the time, Philip Locklin’s *Economics of Transportation* and Dudley Pegrum’s *Transportation: Economics and Public Policy*, prepared would-be transportation professionals for a career working in or interacting with a highly regulated industry (1–2). Considerable time was spent deciphering the rationale behind rate-making in surface transportation or fare setting in aviation, with additional time devoted to learning the language of regulatory policy, the underlying legal framework, and how that knowledge could be applied in a professional setting. Instructors often made it clear that, since federal regulatory policy was far from perfect, some efforts to reform economic regulation were desirable. Students would not have guessed that, a decade later, much of this education would be of limited use.

**Origins**

Although the ability of government to regulate economic and other activities has its origins in English common law, it is the Commerce Clause of the U.S. Constitution (Article I, Section 8) that gives the federal government the sole right to regulate interstate commerce. For the first 100 years of the Republic, the Commerce Clause was invoked to control activities among the states, but economic regulation of transportation industries did not occur until passage of the Interstate Commerce Act of 1887 (3). This act gave the newly established Interstate Commerce Commission (ICC) the duty to regulate railroad rates and other business practices in certain circumstances.

ICC was a response to unsuccessful attempts to regulate railroads at the state level, particularly...
in the agricultural regions of the Midwest. The so-called Granger movement and resulting Granger Laws were meant to reign in what many at the time saw as the railroads’ misuse of monopoly powers. The Supreme Court found the Granger Laws to be unconstitutional violations of the Commerce Clause, resulting in a push for congressional action that later became the Interstate Commerce Act.

ICC was charged with ensuring that railroads did not exercise monopoly powers by requiring that they provide and publish “just and reasonable rates”—rates that avoided discrimination and preferences among shippers, including adjustments to long- and short-haul rate inequities. Initially, ICC’s broad investigatory powers were fairly toothless, but just after the turn of the 20th century, Congress enacted legislation that increased ICC’s actual regulatory power.

In its decision making, ICC evaluated a host of factors: the cost and value of service, fully allocated costs, fully distributed costs, and more. Setting rates became a process. Rates were proposed and evaluated; frequently these were challenged by other interested parties. ICC also gained power over such railroad industry activities as acquisitions, mergers, and line abandonments.

**Broadening Powers**

For better or worse, ICC became the model for federal regulatory agencies. As new technologies blossomed into new industries, ICC gained new powers and new regulatory agencies were formed.

Calls emerged for the developing post–World War I trucking industry to be regulated in the same fashion as the rail industry. Although the decision to regulate the motor carrier industry was criticized then and since, Congress and the Roosevelt administration passed the Motor Carrier Act of 1935. This legislation included the trucking industry and the intercity bus industry in the ICC regulatory framework, albeit with features that differed in many ways from railroad regulation. Although nearly all railroads were common carriers—that is, they held their services open to all—the motor carrier industry consisted of common carriers, contract carriers, private carriers, and many intrastate carriers that were subject to state rather than ICC regulation.

In the early 1930s, the emerging airline industry experienced troubling times. Safety was a serious problem. Economic competition was intense, both within the industry and with its major competitor, passenger railroads. Federal airmail subsidies, which had kept the industry afloat economically, became inadequate.

In part to protect the aviation industry from itself, Congress and the Roosevelt administration enacted
Affected by the crippling economic depression of the 1930s, the young aviation industry could not be kept aloft by government airmail subsidies, which themselves were affected by scandals.

Without the ability to control—and compete on—pricing in the regulated era, airlines wooed customers with luxury service.

the Civil Aeronautics Act of 1938. This legislation initially created an agency within the Department of Commerce that was responsible for all federal aviation activities—air traffic control, safety, economic regulation, and more.

In 1940, these functions were divided into the Civil Aeronautics Authority—the precursor to the Federal Aviation Administration (FAA)—and the Civil Aeronautics Board (CAB), which was responsible for a variety of activities, most prominently, economic regulation. Over time, CAB became the independent agency that it was in 1978.

Airline Regulation Evolves
CAB was organized along the lines of ICC but engaged in its regulatory activities in a very different way. CAB regulated airline routes, via city pair markets; airline fares; mergers; acquisitions; and, significantly, market entry. Despite some commonly held beliefs, CAB never regulated levels of service in markets, although it did require air service to markets in certain cases.

After World War II, CAB often was criticized for preventing the entry of new airlines into the air carrier market. In fact, no new carriers were allowed to enter the major airline market for almost 30 years; this was seen as a major barrier to enhanced competition. Because airlines could not compete on fares per se, they competed mostly on the basis of service—better food, nicer seats, and more. By the 1970s, considerable frustration with the high cost of air service in the United States became a major focus of the push toward deregulation.

Industry unto Itself
Regulation was an industry unto itself. Individuals could and did make a career out of regulation. The two major transportation regulatory agencies were themselves significant employers.

In 1975, for example, ICC had 2,115 employees and CAB had 728. Many lawyers, economists, analysts, and other professionals spent their careers filing traffic rate cases and other cases as part of the regulatory process (4); likewise, companies employed many individuals whose sole occupation was interacting with the regulatory agencies. For example, before 1978 United Airlines had a staff
of 150 dealing with regulatory matters; by 2002, the number had shrunk to a “half-dozen” (5).

In retrospect, it is nothing short of amazing that an entrenched Washington bureaucracy and an associated private-sector industry essentially were eliminated over a relatively short period without far more controversy.

**Long March to Deregulation**

Deregulation was a process, not an event. Like the authors of the textbooks cited earlier, most proponents of reduced regulation did not seek full deregulation. Instead, they sought a framework that would allow industry more freedom to compete; in this view, such a framework would result in less need for regulation over time.

The Eisenhower administration held this view and President John F. Kennedy made such a process a centerpiece of his 1962 Message to Congress, “On the Transportation System of Our Nation” (2). In that message, Kennedy sought to move federal transportation policy away from what was viewed as a “chaotic patchwork of inconsistent and often obsolete legislation [that] has evolved from piecemeal development with the result that it has failed to keep pace with the changing structure” of industry (2). Although the message seemed to mark a real break with past practice and represented a great deal of work by the Kennedy administration, it did not result in any specific legislative action.

From this point, the maneuverings necessary to get to deregulation make for interesting reading, as do the personalities of those who drove deregulation from idea to law. Several presidents and members of congress from both parties played major roles in the

Like much of the transportation system in Europe, Network Rail, the owner and manager of most of the rail network in England, Scotland, and Wales, is heavily regulated by the government.
deregulation debate. Transportation industries; shippers; and labor, passenger, and other groups took various positions at different times in the decade leading up to 1978.

For example, all major U.S. airlines—with the notable exception of United Airlines—originally opposed deregulation. Labor was opposed to deregulation unless their specific transitional needs were met. Likewise, shippers in general favored deregulation based solely on their satisfaction or dissatisfaction with the existing environment.

According to Seely and Rose in their well-documented history of transportation in the 20th century, the move to deregulation featured heroes and, perhaps, villains (6). Some individuals likely receive too much credit for pursuing deregulation and others, such as President Gerald R. Ford and his administration, get too little. The outlier role of several individuals, however, is worth noting here in brief.

**Enacting Reform**

By holding a series of hearings on deregulation beginning in 1974, Senator Edward Kennedy, then chairman of the U.S. Senate Committee on the Judiciary, and his special counsel, now Supreme Court Justice Stephen Breyer, jump-started the move to deregulate the airline industry.

The hearings by Kennedy and Breyer received considerable national press coverage and revealed a confusing, inefficient CAB regulatory framework that satisfied no one completely. Enlisting the aid of academics and other subject experts from a variety of backgrounds, the hearings paved the way for needed reform of the regulatory system (7). Most importantly, Kennedy and his ever-expanding group of supporters from within Congress and outside—and from both liberal and conservative policy perspectives—turned deregulation into a significant national issue.

By 1978, the focus of Congress and of the Carter administration had turned entirely toward reform. The economist Alfred Kahn, a renowned expert on public utility regulation, was appointed CAB chairman and began moving the agency to administrative reform. Kahn—who came to be known as the father of deregulation—created a greatly eased administrative environment that had an immediate impact on airline fares and service, and a beneficial one from a consumer standpoint.

The legislative success of the Airline Deregulation Act fostered a climate for further deregulation. Members of Congress in both the House and the Senate took up the cause of deregulation of other transportation industries. In short order, the Motor Carrier Act of 1980 and the Staggers Rail Act of 1980 (named after Rep. Harley Staggers, then chairman of the U.S. House Committee on Interstate Commerce and Transportation) were passed, and the Bus Regulatory Reform Act of 1982 made deregulation more or less complete. Although additional legislation would follow to address residual deregulation, and although CAB and ICC would remain in existence until 1984 and 1995, respectively, more than 90 years of pervasive industry regulation had been undone in four.

**Deregulation Today**

These and other events of the last four decades have greatly diminished economic regulation of transportation within the United States. It is equally important to recognize, however, that transportation industries remain subject to a wide range of safety, labor, environmental, and other regulation, both at the federal and state levels. Likewise, in many ways international transportation is regulated economically or institutionally, though barriers in the aviation sector have loosened as other nations have adopted their own forms of deregulation.

Transportation technologies and practices do not stand still. As one article in this theme issue suggests, cities and states now are dealing with the possible need for regulation of transportation network companies like Uber and Lyft. Similarly, the FAA is considering regulatory requirements for the integration of unmanned aircraft systems, or drones, into the National Airspace System. Whether any of these actions will eventually include economic regulatory elements remains to be seen.

**References**


**Note:** The TR News Editorial Board thanks John Fischer, emeritus member of the TRB Standing Committee on Aviation Economics and Forecasting, for his work in assembling and developing this issue.
The U.S. Department of Transportation (DOT) Act of 1966 was predicated in large part on Congress’s intention to “make easier the development and improvement of coordinated transportation service” and conviction that the country required “general leadership in identifying and solving transportation problems” (1).

There was a small problem with this ambitious mandate, however. At that time—more than a decade before the advent of transportation deregulation—a lot of transportation policy was made by three independent, mode-specific regulatory agencies: the Interstate Commerce Commission (trucking and rail), the Civil Aeronautics Board (aviation), and the Federal Maritime Commission (ocean shipping). Their authority, like that of the Secretary of Transportation, had been delegated by Congress and was not diminished by anything in the legislation creating DOT.

With different agencies regulating different modes of transportation, jurisdictional conflicts were a nettlesome impediment to the coordinated, efficient transportation system Congress had instructed DOT to encourage.

President Lyndon B. Johnson nominated Alan Boyd as America’s first Secretary of Transportation. Upon taking office on April 1, 1967, Boyd immediately began the process of moving federal policy in a new direction. As a past member and chairman of the Civil Aeronautics Board, Boyd had formed strong views about the extent to which traditional economic regulation had begun to outlive its usefulness.

Understanding fully the extent to which the independent regulatory agencies were a problem, he assembled a staff of savvy regulatory attorneys and economists. Boyd directed them to intervene in significant agency proceedings—to advocate, on the record, greater flexibility and a more rational approach to transportation regulation. DOT would respect the statutory mandates of the agencies before which it was appearing, but would advocate positions based on the administration’s reformist policy convictions.

Despite DOT’s deference to the independent agencies’ authority, the strategy was controversial from the start. The agencies believed that they, not DOT, were the appointed repositories of the public interest. Thus it was awkward to have DOT representatives appear before them and purport to instruct them on what the public interest required.

DOT stayed the course, however. The regulatory team at DOT monitored agency proceedings closely and found no dearth of opportunity to advocate change in the interest of a more efficient, coordinated, and rational approach to transportation regulation.

All told, DOT intervened in 72 regulatory proceedings during its first three years of existence. Those interventions cumulatively exerted a profound impact on the regulating agencies and, ultimately, on regulation itself. By the end of the next decade, deregulation of airlines, motor carriers, and railroads seemed less radical, thanks to the flexibility already introduced into many of the agencies’ programs. Unquestionably, DOT’s early advocacy had much to do with paving the way.

Reference

This article is extracted from a longer essay by the author that was included in a series of papers celebrating the 50th anniversary of the creation of the U.S. Department of Transportation. It can be found at https://www.transportation.gov/sites/dot.gov/files/docs/50/308721/regulatory-era.pdf.
Impacts of Airline Deregulation

ROBERT PETERSON

The author is President of RMPAero. Before retirement, he spent 41 years at Boeing as a Technical Fellow and Chief Analyst in Business Development and Strategy.

Commercial aviation was the first transportation mode in the United States to be deregulated. In 1977, air cargo rates and services were deregulated by an act of Congress; the next year—and after simmering debate among industry leaders, economic prognosticators, and government regulators—Congress passed the Airline Deregulation Act of 1978, which deregulated passenger aviation fares and services. Together, this legislation unleashed decades of upheaval and adjustments as the airline industry morphed from a protected, regulated business environment to a largely unregulated marketplace.

Impacts ripped throughout the aviation industry, affecting all stakeholders—airlines, airports, airplane and engine manufacturers, investors, travel agents, shippers, and the traveling public. Winners and losers came and went as the industry responded to the demands of the new marketplace. Seldom has an industry seen its regulations and business practices change so dramatically in such a short period.

The vast experiment in laissez-faire economics
was emulated in rail and in other surface transportation modes long before its results were apparent in the aviation industry. Most analysts and observers declared deregulation in general a success, even though the process left many victims in its wake. Shareholders lost billions of dollars, employees were laid off, small towns lost services, and many old and new companies went bankrupt or were absorbed by others.

In the airline industry, fares and rates decreased significantly, load factors skyrocketed, more people began to travel, seats became smaller and less comfortable, and tightening security created additional burdens for travelers. All these changes occurred as the industry achieved unprecedented levels of safety—surprising many of deregulation’s early detractors.

Because deregulation was and still is an experiment, declaring it a success cannot be done objectively; that is, no one can be sure how the deregulated industries would have evolved in its absence. It is difficult, however, to imagine that the many pricing and service innovations that followed deregulation would have been matched in a regulated structure.

**Expectations of Change**

Historically, U.S. transportation policy emerged from the belief that transportation was necessary to support commerce. The basic regulatory structure that was created for the railroads in the late 19th century eventually was adapted for aviation, resulting in government regulation of virtually every aspect of the airline business. Essentially, that meant that any proposed change in fare level, route structure, or ownership had to be approved by the federal Civil Aeronautics Board (CAB), whose predecessor was created by an act of Congress in 1938 and was the precursor to the Federal Aviation Administration (FAA). The approval process, which required administrative and judicial reviews, could take many months—and sometimes years.

The primary objective of airline deregulation was market-focused. Many economists argued that the regulatory environment created and administered by CAB limited competition to the detriment of travelers, resulting in high prices and unresponsive service.

It still is a matter of debate whether these outcomes were intentional objectives of regulatory policy or merely were the result of the CAB approval process.
process, but the issues were real. Economists also argued that deregulation would bring about a more robust airline industry, whose profitability had been eroded because of the high inflation and oil prices of the 1970s as well as general economic malaise.

**Toward Legislation**

Southwest Airlines’ low fares and rapid growth in the unregulated intrastate Texas market were cited as an example of how interstate deregulation could benefit consumers by unleashing a raft of new airlines with different price and service offerings. To many observers, the contrast between Southwest—a darling of Wall Street and passenger favorite—and the declining mainline interstate carriers was a sufficient argument for deregulation.

Deregulating the entire airline industry, it was argued, would lead to more passenger demand and, eventually, to a more dynamic and profitable industry. By the end of the 1970s, many economists convinced Congress of the benefits of deregulation and garnered bipartisan support.

In his opening statement of congressional hearings on the subject, Senator Edward Kennedy of Massachusetts said, “Regulators all too often encourage or approve unreasonably high prices, inadequate service, and anticompetitive behavior. The cost of this regulation is always passed on to the consumer. And that cost is astronomical” (1).

During these hearings and leading up to deregulation itself, many longtime members of the commercial aviation industry raised concerns about possible adverse effects of deregulation: reduced safety, industry consolidation, the loss of small community services, and harm to airline workers.

Most airlines, airport authorities, and airplane and engine manufacturers opposed deregulation. Robert Crandall, then-president of American Airlines, argued regularly that the result of deregulation would be the dominance of the industry by a few very large airlines with significant pricing power.1

1 The author worked directly with Robert Crandall during this period.
As a result, Congress included several specific requirements in the Airline Deregulation Act that were intended to assuage and mitigate these concerns. In retrospect, the most important of these requirements was that a federal agency—what is now the FAA—continue to oversee all aspects of airline safety.

**Initial Effects**

**New Business Models**

Immediately after the 1978 act was passed, airlines began to adapt to their new world. Within the first two years, many new airlines were formed. Nearly all the new start-ups focused on a low-fare business model, some unashamedly emulating Southwest and others following new business models, exemplifying the predicted market diversity and dynamism.

An example of a new business model was People Express Airlines, founded in 1980 by longtime airline executive Don Burr. Its business strategy focused on a “low-fare with good service” concept. The airline also made every employee an owner, each with the power to make operational decisions. People Express grew rapidly, both organically and through acquisitions; its bubble burst, however, when its debt load got too big and its workforce reached a size that hindered the coordinated decision making needed for efficient operations.

**New Route Systems**

The longstanding incumbent airlines adapted their route systems and aircraft fleets to enhance their survival and profitability in markets that had become highly competitive. The winning adaptation turned out to be the creation of the hub-and-spoke network, pioneered by American Airlines.

American had just moved its headquarters from New York City to Dallas, adjacent to the new but underutilized Dallas–Fort Worth (DFW) airport. American took advantage of DFW’s excess capacity to develop the first truly successful hub. Although it was originally done to lower overhead, American’s relocation fortuitously enabled its hub strategy to succeed with the full support of corporate leadership.

It did not take long for other airlines to emulate American’s strategy. Together they created hubs in Cincinnati; Dulles, near Washington, D.C.; St. Louis, Missouri; Denver; Raleigh; Charlotte; Pittsburgh; Minneapolis; Detroit; Nashville; and Salt Lake City. Existing hubs in Atlanta and Chicago...
also were strengthened. Some airlines attempted to create minihubs—such as in Dayton, Ohio—but eventually only a few major hubs were successful.

**Pricing Concepts**
American also introduced yield management, a variable pricing scheme concept first developed by Boeing to maximize the amount of money collected from passenger ticket sales on each flight. Sophisticated tools allowed American—and, eventually, almost every other airline—to price seats on the same flight at different levels, using fares restrictions to segment passengers. Today, most airlines consider yield management to be a critical core capability.

**Intermediate Effects**
Five to ten years after the Airline Deregulation Act passed, its biggest impact could be seen on airline–labor relations. Although industry leaders and labor groups argued for high wage rates, outsiders generally acknowledged that industry wages were above economically justifiable levels. The root of the high wage rates dated back to the early 1960s, when CAB allowed airlines to raise fares as wages rose. This reduced the incentive for management to negotiate aggressively with labor unions.

By the 1980s, the incumbent carriers had to reduce employee wages or staff levels to stay competitive with new entrants. Outsourcing of services became a main strategy for labor cost reduction, resulting in large-scale layoffs of unionized airline employees. Competition between incumbent airlines and new start-ups gutted many companies’ balance sheets, and shareholders and bondholders suffered as the failing carriers either went into bankruptcy or were absorbed by other carriers. Mergers picked up in the late 1980s and have continued through the present.

Approximately 10 years after deregulation, the advent of RJs, or efficient regional jets with fewer than 75 seats, enabled another strategy. Mainline airlines set up subsidiary airlines that were not covered by their union contracts and ordered a large number of RJs to operate from their hubs. Contracts negotiated with pilots’ unions resulted in two-tier wage structures. Although each contract differed, some common themes emerged: pilots whose careers started before deregulation retained their high wages; newly hired pilots working directly for the mainline carriers generally were paid at lower rates, and the pilots hired to fly the RJs earned even lower wages.

The entrance of the RJs cemented the success of the hubs, as the airplanes’ smaller sizes allowed them to match service with passenger demand more effectively and to provide additional destinations.

**Open Skies Agreements**
During the 1990s and the promulgation of federally negotiated “open skies” agreements with many foreign countries, U.S. airlines deployed three tactics to pursue international markets: 1) route expansion to new international markets, 2) mergers with other airlines, and 3) alliances with foreign airline partners.

Examples of these alliances included the following:

- **OneWorld Alliance**: American acquired TWA and partnered with British Airways, Cathay Pacific, Japan Airlines, and others;
- **SkyTeam Alliance**: Delta Air Lines absorbed Pan Am and partnered with Air France–KLM; and
- **Star Alliance**: United Airlines partnered with Lufthansa, All Nippon Airways, and others.
Each alliance fortified its own hubs and international airfares began to increase, leading many to view the alliances as harmful to international competition. Long-haul business flying became especially pricey as airlines began to compete for the deep pockets of international business travelers by focusing on service (that is, schedules and amenities). This competition continues today.

Unbundling
Several tactics introduced in response to new industry entrants and low-cost carriers would survive to become part of the mainstream airline business model. Among the most significant of these was unbundling, or the introduction of ancillary fees in addition to and separate from the price of an airline ticket.

Some arguments suggest that unbundling is a successful strategy because air travelers tend to buy tickets based on lowest ticket price, ignoring the additional fees associated with such things as checking a bag or selecting a seat. Although there is some truth to this belief, a seldom-mentioned contributor to strategy’s success is that the airlines are able to avoid federal ticket tax on these fees and charges.

Avoiding federal ticket tax puts an incremental 7.5 percent of collected monies into an airline’s profit column instead of into the national Aviation Trust Fund. That fund is primarily made up of federally mandated taxes on airline tickets and is the principal source of money for airport facility expansion and for FAA air traffic operations and modernization.

Industry in Transformation
Throughout this intermediate period, airports often found themselves in one of two camps. Larger airports had sufficient traffic to maintain service levels and were able to grow and improve. Smaller airports that had been supported by regulated cross-subsidization suffered from poor or no service.

The Airline Deregulation Act provided subsidies for smaller airports for a short time; although Congress extended this support at lower funding levels, many communities saw their air service levels dwindle. In the places that kept these services, the fares often were substantially higher than comparable fares on routes between larger cities.

In 1991, as this process was playing out, Alfred Kahn wrote

Airline deregulation has worked. It would be ironic if, by misdiagnosing our present discontents, we were to return to policies of protectionism and centralized planning at the very time when countries as dissimilar as China, the Soviet Union, Chile, Australia, France, Spain, and Poland are all discovering the superiority of the free market (2).
Although services for the general airline passenger have decreased, travelers willing to pay premium fares can still experience luxurious accommodations.

Although his observation has proven to be correct, it is apparent that the airline industry at the time was still in transformation.

**Long-Term Effects**

The dot-com bust in the early 2000s once again caused an economic struggle for airlines. The events of 9/11 accelerated the consolidation of the airlines into the few carriers that dominate today. The surviving carriers, along with their alliance partners, focused on financial survival in the following years. By the time the financial crisis hit in 2008, airlines had restored their balance sheets to profitability, transformed their fleets to a market-appropriate mix, and increased load factors to unanticipated levels.

Deregulation naysayers remained, however. In June 2008, Crandall was asked to comment:

America’s airline system has greatly deteriorated. Our airlines, once world leaders, are now laggards in every category, including fleet age, service quality, and international reputation. Fewer and fewer flights are on time. Airport congestion has become a staple of late-night comedy shows. An ever-higher percentage of bags are lost or sent to the wrong airports. Last-minute seats are harder and harder to find. Passenger complaints have skyrocketed. Airline service, by any standard, has become unacceptable (3).

The U.S. airline industry has morphed into an oligopoly. At this time, further consolidation appears unlikely; even under the current business-friendly presidential administration, concerns are being raised about too much consolidation in the aviation industry. Various air passenger groups have begun to argue for regulation of air services, at least in regard to personal space and amenities on the aircraft.

As the airlines continue to focus on cost reductions, aircraft interiors have become less and less comfortable for the typical traveler, and this has led to a highly segmented consumer market. Business travelers and passengers willing to pay premium airfares still enjoy the creature comforts associated with the early days of jet travel, but passengers in the back of the plane suffer from tight seating, tiny restrooms, packed rows, and minimal service. Inten-
tionally or not, airline pricing and marketing behavior has trained the air traveler to expect discomfort when flying, as well as service charges for any type of ancillary activity.

Interestingly, the airline industry has become consistently profitable—in contrast to much of its history—since recovering from 9/11 and its immediate aftermath. Longtime industry observers scratch their heads as to whether this is the new normal or merely a manifestation of the current long economic recovery since the Great Recession in the late 2000s.

The industry’s financial stability is global, not just domestic, and this has led to large backlogs of new airplanes on order with manufacturers. Boeing, Airbus, Bombardier, and Embraer are experiencing five- to seven-year production backlogs.

**Successful Legacy**

Was deregulation successful? By virtually all measures, the answer is yes; however, today’s system bears little resemblance to the aviation future described by deregulation advocates in the 1970s.

Although Crandall’s prediction of a few large airlines dominating the market was correct, the journey was different than he anticipated. Collectively, air travelers have benefited from substantially lower fares. Passenger volumes have grown considerably, both domestically and internationally. Airlines and aircraft manufacturers are profitable. Major airports have become shopping malls in addition to transportation hubs. The airline industry is the safest mode of transportation by far. After years of layoffs, staff shortages are causing industry wages to go up as airlines strive to continue growth. The remaining aircraft manufacturers are rolling out new aircraft at a record pace.

It is not clear, however, that current levels of market diversity exactly match the vision of early deregulation advocates. Airlines made profits since the beginning of the economic recovery, but airline startups were few and far in between. New marketing ideas were scarce as the airlines continued to hone costs and reduce waste. After consolidation, airlines’ financial power enabled them to compete extremely aggressively with any new entrants to the market.

It appears that a balance may recently have been reached in the domestic marketplace; that is, the market now consists of a small set of operating airlines. Alliances have proliferated across the globe, creating a consistent worldwide marketplace. Does this represent a stable market? Ask that question again in another 20 years.

**References**

Air Service to Small Communities in a Deregulated Industry

Before airline deregulation in 1978, the Civil Aeronautics Board (CAB) controlled domestic interstate market entry and fares. Yields, or prices per seat mile, were set by CAB to provide a reasonable rate of return on invested capital. Without the threat of entry or price competition, airlines competed on service quality; as a result, fares were high and flights were infrequent, but many onboard amenities boosted invested capital and returns. In the intervening 40 years, deregulation has changed the structure and performance of the airline industry—with declines in service to many small communities.

In anticipation of these effects, deregulation legislation contained small-community air service provisions—specifically, the Essential Air Service Program (EAS)—to assure smaller metropolitan areas that they would retain service. The goal of EAS was to maintain air service to small communities, not to develop new services.

EAS initially covered a 10-year period, with the expectation that small community air services would become established and self-supporting. Today, however, EAS still exists—with some pressure to expand it. Congress established a Small Community Air Service Development program, which provides grants to communities for their airports to develop new services in hopes that the services eventually will sustain themselves.

Figure 1 (below, left) shows the early effects of air services at different classes of airports between 1977 and 1982. The smallest class—nonhub airports—is the only one to have experienced a reduction in the number of flights and seats, with a much larger reduction in seats than in flights (16 percent vs. 2 percent).

Services at small- and medium-hub airports grew as prices dropped, stimulating demand. Airlines also emphasized more-frequent operations with smaller aircraft from outstations into connecting hubs. Meanwhile, seats at the largest hubs grew faster than operations because these airports had the largest connecting complexes.

The nonhub Charles M. Shultz Sonoma County Airport in California saw its business decrease dramatically as passengers switched to bus service or drove instead to the large-hub airports in San Francisco and Oakland.
Current State of Small Community Air Service

Changes in service to small-hub and nonhub airports were dominated by hub economics. According to Airport Cooperative Research Program Report (ACRP) 142: Effects of Airline Industry Changes on Small- and Non-Hub Airports, 1 between 2000 and 2017 the number of flights at all airport groups declined (see Figure 2, at right).

As a group, small-hub and nonhub airports have experienced the largest decline, since many communities have lost service to one or more hubs to industry consolidation. Through 2000, smaller communities might have had service to five or six competing connecting hubs—but today these communities have service to three at most. As the industry has consolidated, carriers have enjoyed increased pricing power and have practiced capacity discipline to limit growth in operations.

Figure 3 (at right) shows that the number of seats declined at all airport groups until approximately 2014, when carriers began to operate larger aircraft and the number of seats increased. Smaller, nonhub airports may only have a few flights per day to a nearby hub via a single carrier. Although this offers access to the national air transportation system, the airports may be captive to a single airline; without competition, fares can be higher.

In addition, flights at smaller airports generally are operated by a regional partner of a mainline carrier—and in many communities, these are the first flights canceled when the system experiences long delays. The case studies in ACRP Report 142 show the actions communities have taken to overcome the loss in air service as well as actions that can improve the level of air service to communities.

Paths Forward

ACRP Report 142 offers actions that small communities can take to advance air service—providing incentives to carriers, engaging local communities to support airports’ air service development efforts, managing incentive programs to the specific business models of individual carriers, and more. Although a community cannot always overcome market forces, the report shows that certain strategies differentiate communities that have successfully built air service from those that have not.

Overall, airline deregulation has concentrated more traffic at the largest hubs. 2 And although

FIGURE 2 Percent change in number of flights, 2000–2017. (Source: OAG)

FIGURE 3 Percent change in number of seats, 2000–2017.

the loss in numbers of flights and seats is most pronounced at nonhub airports, small- and medium-hub airports also have seen reduced service. Starting in 2014, however, growth in service resumed at small-hub and nonhub airports. Some of this is due to increased activity from newer carriers and some is due to increased service from larger carriers expanding into areas with the potential for growth.

Perhaps the greatest impact of deregulation is that it created an industry that can better react to external events affecting the demand for air travel.

Reference


2 Many other factors have affected airport service levels over the past 40 years, including economic cycles, fuel prices, the economic downturn that followed 9/11, and the 2008–2009 financial crisis.


1 Available at www.trb.org/Publications/Blurbs/173167.aspx.
Airline Deregulation at 40

Airport Perspective

DAVID BYERS

The Airline Deregulation Act was signed into law on October 24, 1978, initiating the multiyear sunset of the Civil Aeronautics Board (CAB) and its role regulating commercial air travel (1). With deregulation came the onslaught of aviation’s version of the Oklahoma Land Rush—and airlines wasted no time attempting to move into markets that previously had been protected by CAB route awards.

For example, within a year of the legislation, Reno International Airport in Nevada went from three to 13 carriers (2). Reno had undertaken a $60 million terminal project before deregulation and, not willing to turn anyone away, continued to expand beyond the original design (3). Pittsburgh, Seattle, Kansas City, St. Louis, and many other airports also benefited from the airlines’ scramble to add routes to their portfolios.

Open Skies

Deregulation was neither an immediate nor a complete abandonment of federal oversight of the commercial air service market—CAB retained authority over new routes until 1982. Implementation started slowly to maintain stability, with established airlines limited to adding one new route per year for the first three years—1979, 1980, and 1981—under cursory CAB approval (1). Later, airlines were able to add new routes without CAB’s permission.

CAB’s authority over airfares, mergers, and acquisitions expired in 1983; on January 1, 1985, the bureau was abolished. Some remaining functions were transferred to the U.S. Department of Transportation and the Federal Aviation Administration (4).

Although the hub-and-spoke concept predated deregulation, it was limited to a few major cities, like Atlanta and Chicago. In the new free-market environment, airlines began to build up other airports as hubs. Cities like Dallas–Fort Worth, Salt Lake City, Pittsburgh, and Cincinnati became interim destinations for connecting flights. Airport development projects to support the increased traffic included brand-new terminals specifically designed to support transfer passengers and new, parallel runways to handle additional aircraft operations.

Challenges

In 1982, TWA selected St. Louis Lambert International Airport as the new location for their Midwest hub, which previously was sited in Chicago. As traffic increased significantly, the city of St. Louis spent 10 years and $1.1 billion to relocate thousands of people and open a new, 9,000-ft parallel runway in 2006 to handle the growth of TWA as its hometown hub carrier (5).

As one of the legacy airlines that predated deregulation, TWA found itself in serious financial distress. The airline declared Chapter 11 bankruptcy in 1993, 1995, and 2001; when TWA filed for the third time, it sold its assets to American Airlines. Unfortunately, St. Louis was not included in American’s long-term plans for continuing hub operations and, eventually, the airline downsized its presence. By 2006, when the new runway opened, demand had dissipated and the additional capacity was no longer needed.

Opportunities

Airlines seeking to enter major markets suddenly found secondary airports to be an attractive alternative. Many of these airports had terminals that had been abandoned in place or lightly used. Chicago’s Midway; Washington, D.C.’s Dulles International; and Hobby Airports in Houston all experienced significant growth.

Figure 1 (page 21) illustrates the rapid growth of Midway Airport (MDW) as Chicago’s second airport. In 1980, MDW handled less than 1 percent of Chicago passengers, but 10 years later, the airport was serving nearly 14 percent of the market. Eventually a new terminal was built, and today, MDW handles more than 30 percent of aviation passenger traffic.

Funding

Although not connected directly to deregulation, *Northwest v. Kent County* in 1994 was a landmark Supreme Court decision that enabled airports to begin shifting away from residual

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agreements, which forced them to share all of their revenue with airlines, toward compensatory agreements, or ones that allowed airports to charge airlines for what they used and to keep other, nonairline revenue (6).

Residual agreements were popular during the regulatory era because airline revenues were protected by mandated minimum price levels. Virtually guaranteed profitability, many airlines were willing and financially able to underwrite airports’ shortfalls in operational costs and debt service. In return, these airlines were given majority-in-interest (MII) authority for approving proposed projects that they agreed to pay for. Terminal expansion projects often were blocked by MII airlines to prevent competition.

As deregulation removed revenue protections for the airlines, their struggling financial conditions and market strategies—combined with accommodating new, low-cost entrants—left many airports responsible for assuming financial risks of operations and development costs. Although the airports now could charge airlines for the use of airport facilities and keep the rest of the revenue, operational revenues were not always enough to handle the growth and to fund increasingly needed projects for airfield and terminal development.

The Aviation Safety and Capacity Expansion Act of 1990 gave airports another source of revenue to meet their growing needs (7). Airports were allowed to collect a passenger facility charge specifically for airport development projects. These projects included terminal improvements to expand available space for airline operations, thus enhancing competition and, in some cases, circumventing incumbent airlines’ attempts to stifle new entrants.

40 Years Later

In the past 40 years, passenger boardings have increased by more than 200 percent. The domestic airline system is now dominated by four major carriers: American, Delta, United, and Southwest. In 2017, these airlines carried more than 65 percent of all air travelers in the country (8). Several second-tier carriers still thrive in the shadows of these giants, many operating as no-frills, ultra-low-cost, low-fare carriers.

Many airports are barely recognizable from how they appeared in 1978. New runways have been constructed and new or expanded terminals built to meet growing demand in the past 40 years. Meanwhile, airports in Pittsburgh, Cincinnati, and Memphis, Tennessee, have fallen victims to decisions by airlines to consolidate or abandon hub operations—a result of the freedom offered by deregulation (9–11). In recent years, after serious traffic declines because of airline mergers and market decisions, these and other airports are responding by planning major reconfigurations of their terminals.

The future of a deregulated airline industry is not as much of a mystery as it was 40 years ago. In the past, airlines and airports were business partners, but by deciding what development is best for their community and assuming the financial risks, airports increasingly have become masters of their own destinies.

References

The author retired as Director, Transportation Center, and Professor, Kellogg School of Management, Northwestern University, Chicago, Illinois. Previously, he served as Deputy Administrator, Federal Railroad Administration, during the Carter administration and as an executive at Union Pacific Railroad.

In 1977, Jack Sullivan, President Jimmy Carter’s newly appointed Federal Railroad Administrator, was directed to lessen the burden of government and saw the important role that deregulating transportation modes could play in improving economic efficiency. The work of John R. Meyer’s productivity task force on the 1968 Council of Economic Advisers had shown the way, and the Rail Revitalization and Regulatory Reform (4R) Act of 1976 had made initial reforms. Now the task was to draft a comprehensive legislative vehicle for railroad deregulation.

The problem was that public regulation of the railroad industry had been around for a century, either by state railroad commissions or by the Interstate Commerce Commission (ICC). Many experts believed that railroads were “natural monopolies,” that is, entities that could not be held in check by market forces alone because of their economies of scale. Like the old populists and early-20th-century progressives, politicians believed that, if unregulated, railroads would take advantage of their employees and the public, consolidating into giant companies or colluding in cartels to restrict output, raise prices, and exploit small businesses and small towns.

Congress passed the Interstate Commerce Act creating ICC in 1887 and tightened its grip on railroads in at least nine other enactments between 1903 and 1958, before trending the other way with perspective on two-score years of railroad deregulation.

Robert E. Gallamore

In decline for much of the 20th century, railroads increased their productivity in the years after deregulation.

As the names of two new railroads chartered by Congress—Amtrak and Conrail—entered the public discussion, official Washington, Wall Street, and the news media finally awakened to the national financial crises facing both freight and passenger rail service. Amtrak and Conrail both were essentially rescue missions to preserve essential rail services doomed by unfavorable economic trends and dysfunctional regulation.

Between 1970 and 1981, Congress passed five important pieces of legislation dealing with railroad crises, most with bipartisan support:

- **Rail Passenger Service Act of 1970.** Authorized establishment of the National Railroad Passenger Corporation (Amtrak) to operate rail passenger services formerly provided by private-sector railroads, partially relieving freight railroads of the heavy burden of passenger service deficits.
- **3R Act of 1973.** Set up the U.S. Railway Association (USRA) to determine which rail lines should be taken into Conrail and to defend the federal government from claims by bankrupt estates of a “taking” if these estates’ lines were coopted into the Northeast railroad reorganization.
- **4R Act of 1976.** Approved USRA’s Final System Plan for Conrail, authorized limited funding for marginal railroads, established rules for rate flexibility provided competition was adequate, allowed the Federal Railroad Administration (FRA) to assist railroads in rationalizing lines, and expedited timetables for ICC rulings on mergers.
- **Staggers Rail Act of 1980.** Allowed exemption of rail traffic from regulation in many circumstances, permitted rate and service contracts between railroads and shippers, and revamped merger standards to emphasize competition.
- **Northeast Rail Service Act (NERSA) of 1981.** Provided funding for employee buyouts and essential track upgrades, authorized turning Conrail commuter services over to regional authorities, and set expectations for returning a revitalized Conrail to the private sector.

**Origins of Regulatory Reform**

Despite the relative decline of freight and passenger railroads in the half-century after World War I, railroad deregulation did not have a built-in constituency in the 1970s. Similar to the situation facing today’s advocates of duty-free foreign trade, deregulation required a nuanced argument asserting broad, long-range benefits—but opponents could point to immediate injuries or the fear thereof.

Academic experts estimated the annual social cost of resources misallocated because of ICC regulation at several billion dollars annually. Most shippers believed, however, that deregulation would result in higher rates and, perhaps, poorer transport service—for example, less availability of locomotives or freight cars at harvest time or abandoned light-density lines serving rural America.

In Congressional hearings on the Carter admin-
Opponents to railroad deregulation argued that light-density lines in rural areas would become less available and that fewer freight cars would run during peak harvest times.

Opponents to railroad deregulation argued that light-density lines in rural areas would become less available and that fewer freight cars would run during peak harvest times.

Among the deeply embedded sources of resistance to deregulation were industry representatives and ICC itself. Significantly, this insider resistance eventually was overcome by the leadership of federal officials like Darius Gaskins, the Carter administration’s appointed ICC chair. As with the Carter appointees arriving at ICC, FRA, and DOT, leaders of regulatory reform also emerged on Capitol Hill to do the legislative groundwork: holding hearings, building consensus, molding the administration’s draft reform proposal into a finished legislative bill, and carrying it through to passage and signature.

Northeast Railway Crisis

With so many opposed to reform, how was deregulation organized and enacted? Recent experience has shown that it is not so easy to repeal and replace old legislation with new reforms and untested concepts for managing the uncertainty involved in changing social and regulatory structures. Beyond the economic arguments of Meyer’s task force and the high-stakes back-and-forth of self-interested carrier and shipper lobbying groups, the central circumstance that compelled railroad deregulation was the June 1970 bankruptcy of the Penn Central Railroad.

Penn Central was too big—and too important to the Northeastern and national economy at the time—to fail. With strong support from Union Pacific, which did not want its eastern rail connect-
ing traffic to dry up, Congress enacted legislative remedies. In the 3R Act of 1973, Congress set up USRA to plan a reorganized Northeast rail system. Then, in the 4R Act of 1976, Congress approved USRA’s Final System Plan for Conrail and authorized FRA to oversee limited financial assistance for struggling railroads. Congress also tinkered with regulatory changes in the 4R Act, but these reforms were too timid and ICC failed to take advantage of the 4R Act’s deregulatory potential.

Conrail ran up large deficits in its early years—losing a million dollars daily—until broader deregulation was passed in 1980 and more meaningful financial and institutional assistance to Conrail was enacted via NERSA. NERSA legislation simplified abandonment procedures for redundant and unprofitable trackage, transferred commuter service obligations from Conrail to regional authorities, paid for major rehabilitation projects, and helped finance the needed transition to a smaller Conrail workforce. In all, the federal government invested about $8 billion in Northeast reorganization. Of this, approximately $1.8 billion came back to the Treasury when Conrail shares were sold to the public in 1987 in the largest initial public offering at the time.

It deserves emphasis that the great American railway crisis of the 1970s was long in historical making and had deep causal roots, many injured victims, widespread economic effects, and was resistant to simple reforms. It would be folly to attempt to parse all the contributing factors or to evaluate every consequence. It is perhaps enough to say that U.S. transportation policy stumbled through its most
challenging crisis and emerged in functional condition—but not easily nor inexpensively.

More than any other factor, the deeply flawed and failed Penn Central merger triggered the Northeast rail crisis and the establishment of Conrail. It is perhaps ironic that Conrail’s situation (and the lobbying by its management) then became the most powerful voice for deregulation of the entire industry. Conrail needed the Staggers Rail Act to survive, and deregulation needed Conrail to spearhead its enactment.

Core Principles of the Staggers Act

The most important innovation in railroad deregulation under the Staggers Act was to establish definitively that railroads and shippers could enter legally into private-rate and service contracts of any term length. In the old days of the Interstate Commerce Act, by contrast, rates for common carrier transport and ancillary services were required to be published, and there could be no discrimination among persons or places (which contracts would have been considered to be at the time).

Under the Staggers Act, however, most rate and volume contracts were legal. They had to be filed with ICC, but their terms could remain private. This gave carriers and shippers the ability to match supply and demand in specific traffic lanes and for any period. Short-term contracts helped clear market imbalances and long-term contract guarantees permitted both parties to invest in ancillary capital equipment or in developmental marketing plans.

Other principles gave force to deregulation as enacted by the Staggers Act. The law stated that railroads were entitled to earn adequate revenues and could not be forced to perform public services at rates that were not compensatory. It was a tortuous legislative path, with much confusion in the logic, but finally both a lessening of regulation and a fundamental change in government merger policy came about. After the Staggers Act, ICC paid more attention to requiring merger proponents as a condition of merger approvals, to give rivals trackage rights into key markets so that competition would not be lost because of a merger. Such conditions would be agreed to as part of a grant of ICC merger approval, not compelled after the fact to benefit a shipper in what might be an unrelated rate case.

In the 1990s, a change in the Staggers Rail Act explicitly required ICC to consider whether a proposed merger transaction would have an adverse effect on competition among carriers in a region, so several mergers had conditions applied to preserve and enhance competition. Shockingly, it was the first time a provision on the preservation of rail–rail competition had been mandated legislatively to be part of ICC’s merger approval standards, and it seemed be pivotal in leading the ICC to favor end-to-end over parallel mergers. Subsequently, the net result of the realignments of Class I railroads made in previous railroad merger cases resulted in a more competitive rail industry than at any time since 1970 (I).
The Rest Is History

After the Staggers Rail Act, major changes occurred in railroad performance. Economists are reluctant to say the effects were caused by deregulation, but data collected over 20 years shows the remarkable increase in industry productivity—output measured in ton-miles divided by measures of input resource requirements—that took place immediately following passage of the Staggers Act. This increase happened after decades of stagnation.

Accompanying railroads’ rise in productivity were traffic volume increases and pronounced decreases in average rail rates, or revenue per ton-mile. Overall, Class I rail revenue declined a lesser amount—consistent with the lower unit freight rates—for nearly 25 years (1).

By allowing railroads to respond more readily to changes in market supply and demand, deregulation permitted increases in railroad productivity, rail traffic volume, and freight density, measured by ton-miles per mile of track. At the same time, average rates, measured by revenue per ton-mile, fell by approximately 50 percent (Figure 1, above).

Conclusions

For most of the 20th century, American railroads were in long-term secular decline:

They had fallen victim to a downward spiral of declining traffic, leading to loss of profit, deferred maintenance, lower service quality, more traffic erosion, discounted pricing, more losses of earnings, and disinvestment. Now the survivors could imagine the reverse—a virtuous upward spiral of traffic growth, leading to improved pricing and profitability, reinvestment, expansion of capacity, and improved service quality [...] (1, p. 425)

Deregulation changed the course of American railroads in profound and lasting ways. Technology improvements and marketing innovations anchored in deregulation have contributed hugely to the rail renaissance. Long-term contracts facilitated carrier–shipper partnerships that revolutionized intermodal container services moving in double-stack trains. Improvements in railroad cash flows have led to large reinvestments in the industry and these have brought with them technology improvements incorporated into new capital investments—the use of better steel in welded rails, microprocessors in locomotives and signaling systems, digital replacements for analog communications devices, and more.

Today, locomotives pull more ton-miles per gallon and emit fewer pollutants per unit of work performed than two decades ago. Grade crossing upgrades and increased rail traffic density over improved routes have sharply decreased fatalities and injuries per rail ton-mile for both employees and the public. Overall, rail safety continues to improve.

In recent years, remarkable changes in the mix of freight carried by railroads have been recorded, most prominently the decline in coal volumes. Coal occupies a decreasing share of the fuel used in generating electrical power, especially relative to natural gas moved by pipeline. Despite these changes and a less rosy financial outlook than had been forecast only a few years back, deregulated railroads will continue to hold an important place in American freight transportation for many years.

Reference

Surface Transportation Board

*Its Creation and Role in a Deregulated Environment*

**FRANCIS P. MULVEY**

The late 1970s and early 1980s saw an unprecedented wave of transportation deregulation. By 1982, virtually every mode of passenger and freight transportation had been substantially deregulated; moreover, many experts believed that eliminating regulation entirely, except for safety regulations, might benefit the public interest.

Nonetheless, concerns persisted that some forms of regulation should be preserved for specific cases—chiefly the freight railroad industry. Some rail operations had no effective modal substitutes and would need to be regulated to avoid the exercise of monopoly power. With this understanding, Congress created the Surface Transportation Board (STB) when it enacted the Interstate Commerce Commission (ICC) Termination Act of 1995.

A smaller organization, STB replaced ICC but has far fewer powers, effectively only regulating movements of bulk commodities—coal, grains, and chemicals—and retaining some residual regulatory responsibility over other modes of transportation. For example, the Board has authority over water carriage between U.S. ports and territories and over the movement of nonenergy products in pipelines.

**Revenue Adequacy**

STB is charged with the responsibility of balancing the needs of shippers for fair and reasonable rates and service with the railroads’ need to return adequate revenues. The meaning of “revenue adequacy” never has been clearly defined—does it mean that the industry as a whole earns adequate returns or does it mean that revenues must be adequate for several or more years?

STB sets an annual target rate of return and calculates the return on investment for individual Class I
railroads, using the book value of railroad capital to calculate each railroad’s rate of return. The railroads argue, however, that replacement cost would be a more accurate measure to use in calculating requirements for revenue adequacy.

Whichever measure is correct, for most of the period over which STB has estimated revenue adequacy, few railroads were found to be revenue adequate. Recently, more Class I railroads have achieved revenue adequacy—but it remains unclear precisely what this means.

**Rate Adjudication**

If a shipper believes that a railroad has proposed a rate that is unreasonable, it can bring a case before STB. To demonstrate that a rate is unreasonable, the shipper creates a hypothetical railroad that could carry the same traffic at a lower rate and still earn a profit. This hypothetical railroad is called a standalone railroad, or SARR, and also would handle other traffic that the defendant railroad carries.

Because of the complexities involved, shippers usually hire a consultant to design the SARR, generally at great cost. The railroad then counters with its own estimate as to what it would cost to move the traffic. Filing a full-fledged SARR case requires that the monetary amounts at stake are substantial.

STB staff members review the presentations and usually hold hearings on the case. Large rate cases can take years to be decided. STB either can find the railroad’s proposed rate reasonable or can side with the shipper and award reparations. Because of the cost and the resources required for large rate cases, only a handful are brought before the Board each year. In approximately half of the cases, the railroad has prevailed. Even when the shipper is victorious, the award often is less than was originally requested.

Because of the expense and time involved, Congress directed STB to develop simpler, less costly approaches to rate cases. In 2007, the Board created two alternatives to streamline the rate challenge process and reduce time and cost—the Simplified Standalone Cost test and Three Benchmark guidelines.

The Simplified Standalone Cost approach reduced some of the inputs required to present a case, and the Three Benchmark approach compared the proposed rate with the amount charged in comparable markets. Initially, both approaches also placed limits on recovery amounts, but these were lifted later. Shippers have not sought to utilize the Simplified Standalone Cost approach, since it appears to be similar to the full SARR approach; the Three Benchmark approach was employed only once, with decidedly mixed results. In general, shippers are dissatisfied with STB’s resolution of rate complaints and believe that, as long as SARR remains the standard process, they have little chance of prevailing.

**Mergers and More**

In addition to rate case adjudication, STB also inherited authority over railroad mergers, acquisitions, and abandonments. Before STB, a longtime policy of enforced competition made it difficult for railroads to merge or to abandon excess capacity.

STB followed a very liberal policy on rail mergers, however. By the turn of the twentieth century, only seven Class I railroads existed—five headquartered in the United States and two headquartered in Canada, although both of the Canadian railroads had substantial U.S. operations.

**Mergers and Acquisitions**

When a merger application is filed with the Board, the filing is reviewed and STB can set conditions on the proposed transaction. For example, when Union Pacific owns the tracks in the Powder River Basin. A coal-fired electric utility plant in the area appealed to STB for competitive railway service, allowing BNSF access to the rails as well.

Some regulation remained after the wave of transportation deregulation in the 1970s and 1980s—mostly over the movement of bulk commodities—and this is overseen by STB.
Pacific acquired Southern Pacific, STB required Union Pacific to allow Burlington Northern access to the coal-rich Powder River Basin.

Like the U.S. Department of Justice, which exercises merger authority in other industries, STB generally looks more favorably on end-to-end, or vertical, mergers than on horizontal mergers in which carriers could have a number of routes or shippers or both in common. When Canadian National proposed a merger with Burlington Northern–Santa Fe (BNSF) in 1999, however, Congress expressed its concern and asked STB to revisit its policy. Even though the carriers had already filed their application, the chairman of STB at the time suspended the review process for the merger and developed new guidelines for approving such transactions.

STB announced its new merger guidelines that required applicants to not only demonstrate that a merger would not be anticompetitive, but that it would enhance competition—a much higher barrier. The Canadian National–BNSF merger was withdrawn and no Class I mergers have been attempted or completed since the new guidelines went into effect. Some experts believe that only a so-called “failing firm” situation could receive approval.

**Abandonments and Expansions**

STB also has authority over abandonments. After deregulation, the nation’s Class I railroads accelerated their abandonment of track and rights-of-way that carried little to no traffic. Routes that a railroad wishes to abandon can be “rail banked” so that the right-of-way can be returned to service should traffic reemerge later. The railroad can salvage the track and ties and the right-of-way can be converted into a trail for bicycling or hiking. Thousands of miles of former rail lines have been converted, and only a few have reverted to rail use.

In addition to abandonments, STB reviews and sets conditions for any new railroad construction, such as those connecting to new ports and other new facilities requiring rail service. As with abandonments, STB ensures that any line is constructed in an environmentally sound manner.

**Service Issues**

Although STB handles more rate cases than service issues, shippers generally are more concerned about the level and quality of service than about rates. Shippers often complain that cars and locomotives are not available or are not delivered in a timely manner.
For example, grain shippers in the Upper Midwest believed that railroads were diverting resources to meet the needs of the Bakken shale oil fields rather than meeting the long-standing needs of grain elevator operators.

STB has the authority to remove a railroad from a line and direct another carrier to act as a substitute, if conditions warrant. This power has rarely been used, however. In one case, a cottonseed oil producer in Texas complained of extremely poor service from the short-line railroad that served its facility. Cottonseed oil was an exempt commodity, so STB first had to temporarily remove the exemption to examine the complaint. STB then examined the charges, found them to be legitimate, and directed another railroad to serve the shipper.

Shippers served by CSX recently complained about a notable decline in service. Under its new management, CSX is making drastic changes, including operating what it calls a “scheduled railroad.” In response to the complaints, STB held an October 2017 hearing at which the railroad claimed that the problems stem from the many changes being introduced and that the service should return to normal in approximately six months. Hunter Harrison, the architect of many of the changes at CSX, died in December; his successor pledged to continue his program.

**STB Today**

In 2015, Congress reauthorized STB for the first time since the Board’s creation in 1995, and it was expanded from three to five members. Because two members constituted a quorum, STB members could not discuss cases among themselves, so expanding to five members would at least allow pairwise conversations. The legislation also increased STB’s data collection and reporting requirements; the budget has not been increased to reflect STB’s greater responsibilities, however.

Although Congress authorized two additional Board members, as of this writing no appointment nominations for the positions have been brought. STB has been short-handed before: former chairman Roger Nober spent nearly a year as the lone STB member until two new members were confirmed in 2005. Appointed members serve for a maximum of two terms of five years each.
The future of STB and the railroad industry is uncertain. The nation's railroads are in much better condition financially and operationally than before deregulation. Possible causes for concern, however, include a decline in the demand for coal and autonomous freight trucks. Approximately a decade ago, coal accounted for roughly 40 percent of railroad ton-miles and about 20 percent of railroad revenues; by 2016, coal's share of ton-miles had declined to 31.65 percent and its share of Class I freight revenues to just under 14 percent. Although rail coal movements have not declined as precipitously as some have predicted, the long-term prognosis is not good—and much of the rail infrastructure is dedicated to moving coal.

Driverless trucks are another source of concern related to the future of U.S. railroads. Although the introduction of autonomous vehicles likely will take longer than many highway planners initially imagined, it almost certainly will happen and would partly mitigate one of rail's major advantage over trucks: labor cost.

Additionally, growth of Panama Canal water traffic could reduce intercontinental rail traffic, especially intermodal movements. To a lesser extent, the opening of the Northwest Passage because of global warming could affect rail traffic negatively. As the rail industry must refocus its infrastructure because of traffic shifts, the construction of new rail facilities could face strong opposition, greatly affecting the industry's ability to react to change.

The future is difficult to predict, of course, and many scenarios are possible. The rail industry eventually could shrink to just two large carriers that compete everywhere. Rail infrastructure could become similar to the nation's highways, with surviving carriers offering hook-and-haul services. In that environment, there may be no need for an industry regulator.
The author is retired from the U.S. Department of Transportation, Washington, D.C. From 1978 to 1994, he directed truck deregulation efforts at the agency.

In 1971 and 1975, Presidents Richard Nixon and Gerald Ford each made an unsuccessful attempt to deregulate trucking. Faced with heavy opposition from the International Brotherhood of Teamsters; from the major trucking industry association; and, surprisingly, from professional shippers, who liked the certainty of rate regulation, both administrations quickly backed off those attempts.


These actions have produced an annuity of more than a hundred billion dollars per year of dramatically lower fares for air passengers, as well as lower logistics costs to be shared among manufacturers, retailers, and their customers.¹

Regulation 1935–1977

In the midst of the Great Depression, a regulation-friendly Roosevelt administration and Congress passed the Motor Carrier Act of 1935. It empowered the Interstate Commerce Commission (ICC) to regulate the entry, rates, and safety of trucks and buses. The idea was to thwart the “ruinous competition” of too many carriers competing for too little freight, which would drive down freight rates below cost, thereby endangering safety by encouraging truck drivers to drive too many hours a day and reducing carriers’ funds for proper vehicle maintenance. Regulatory parity also was a concern:

¹ This figure was extrapolated from subsequent updates to Robert Delaney’s The Disunited States: A Country in Search of an Efficient Transportation Policy, Cato Policy Analysis No. 84, March 10, 1987.
since railroads were already regulated, it seemed to make sense to regulate their closest competitors.

Entry regulation was not so simple. It was not a case of just saying no to new carriers; rather, it was extreme micromanagement. ICC distinguished carriers by type, exempting private carriers and carriers of agricultural commodities. In a twist of irony, half of the time these carriers ended up empty. ICC further delineated common carriers, or ones that made their services available to any customer, and contract carriers, or ones that served no more than eight shippers under whatever terms they agreed on.

**Common Carriers**

Common carrier authority was not easy to come by. Such authority was carefully restricted as point-to-point or region-to-region, as well as by commodities to be carried. If a new carrier applied to poach another's authority—that is, if a carrier was already serving that area or carrying those commodities—ICC denied the application. The common carrier obligation was to serve any shipper who requested service, fairly and without discrimination.

To broaden their authority to carry additional commodities or serve additional regions, carriers had to merge with other carriers or purchase their authority. Such certificates were bought and sold routinely, often for millions of dollars. Such transactions often led to circuitous routing, with wasted time and fuel.

**Contract Carriers**

Contract carriers preferred to serve the eight largest shippers they could find. Small shippers had to rely on common carriers, and lacked the ability to specify guaranteed rates or other conditions such as timeliness of deliveries, which often were essential to their sales or manufacturing operations. Private carriers were manufacturers or retailers that chose to carry their own products for various reasons, which likely included specialized equipment, guaranteed delivery schedules, or lower costs than regulated carriers.

Although approximately 15,000 to 20,000 ICC-licensed carriers were active by the mid-1970s, micromanaging entry meant little or no competition: each carrier had its own little monopoly.

**Rate Regulation**

ICC began regulating motor carrier rates using the same structure it had established for the railroads. Carriers had to file their tariffs, or rates, with the ICC...
30 days before the tariffs became effective; carriers soon organized into groups, or rate bureaus, for this express purpose.

From the outset, this collective ratemaking raised concerns about its legality and the U.S. Department of Justice attempted to apply antitrust laws to the bureaus. In 1948, however, the Reed–Bulwinkle Act—enacted over President Harry S. Truman’s veto—codified the rate bureaus’ immunity. In practice, ICC received many tariff filings from the rate bureaus and simply rubber-stamped them, making sure they followed the rules.

**Regulatory Reform Initiatives 1977–1980**

President Carter appointed Dan O’Neal as ICC chairman. Noting Alfred Kahn’s success with changes to Civil Aeronautics Board procedures, O’Neal instituted administrative changes in both entry and ratemaking for trucks, including a reversal of the rules that gave advantage to existing carriers. Entry of full-truckload and specialized carriers would be approved automatically and corporate private carriers could backhaul freight from any of their subsidiaries.

Under O’Neal, ICC voted to limit general rate increases proposed by the rate bureaus to a return on equity of 14 percent, rather than the previous 20 percent.

**Government Research**

Meanwhile, a 1979 U.S. Department of Transportation (DOT) study found that what was thought to be a flood of new entrants during this period was merely an increase in new carriers with the same sort of piecemeal authority as before, rather than direct competition. Other research compared ICC-regulated interstate rates with rates in such unregulated sectors as agricultural produce and showed both that the unregulated rates were lower—19–37 percent for produce—and that unregulated rates for intrastate traffic in New Jersey were between 10 and 25 percent. A 1980 Congressional Budget Office study predicted that trucking deregulation would save consumers between $5.3 and $8 billion annually by 1985.

**Truck Safety**

One of the most important arguments against deregulation was that it would lead to a degradation in safety. According to opponents, the surge of new entrants into the industry would bring hordes of unqualified drivers and dilapidated equipment, because contract carriers catered to the largest shippers, many companies used their own private shipping to guarantee delivery schedules at better cost.

Apples travel from an orchard in Washington State to a distribution center. Research showed that unregulated shipping costs, like those for agricultural produce, were significantly lower than regulated rates.
causing truck accidents to soar. The Carter administration proposed to reinforce the safety program whenever deregulation was enacted. This resulted in the Motor Carrier Safety Assistance Program, which offered fiscal assistance to states to boost their own truck safety inspections. In addition, U.S. DOT set new, strict standards for drivers seeking a commercial driver’s license.

Small Community Service
The other major argument against deregulation was that, unburdened by the common carrier obligation, carriers would not serve all shippers fairly, favoring larger shippers in more heavily populated areas over small shippers in out-of-the-way locations.

In 1979, U.S. DOT invited members of the U.S. Senate Commerce Committee and the U.S. House Committee on Public Works to select three small, rural towns in their state or district and to find out the level of service that trucking companies actually provided. The results of shipper interviews were surprising and consistent: in most cases, shippers received service from private carriers (e.g., chain grocery stores, Ace Hardware, Coca Cola, and Texaco) and from UPS. None of these carriers had any legal duty to serve them—it simply was good business. Common carriers met only a minor part of their shipping needs (5).

Motor Carrier Act
Despite continued strong opposition by regulated truckers and the Teamsters, in 1980 enough legislators were convinced to enact near-complete deregulation. Some specific reforms already approved by the ICC were codified by the Motor Carrier Regulatory Reform and Modernization Act, but many new reforms had to be implemented through the formal rulemaking process.

A significant aspect of deregulation legislation was a change in national transportation policy that altered ICC’s mandate from preventing competition at all costs to promoting competition and efficiency. New applicants no longer had to prove that their entry was necessary, only that it was in the public interest.

Under its new authority, ICC was able to eliminate restrictions on what carriers could carry, the areas they could serve, and the routes they could use. Also eliminated were restrictions against private truckers carrying others’ cargo as well as restrictions on trailer-on-rail flatcar, or piggyback, operations; trucking incidental to air freight; and combined common–contract authority.

Rate regulation also was significantly reduced through the creation of a “zone of rate freedom” for common carriers, so that they could raise or lower their rates by up to 15 percent each year without challenge. The Motor Carrier Act did not deal decisively with antitrust immunity. Supporters hoped to eliminate the ability of carriers to get together freely and decide on the rates to be charged as well as the process of classifying freight into classes based on weight, density, and value.

Strong lobbying efforts by the regulated truckers led instead to the formation of a Motor Carrier Ratemaking Study Commission (6), whose 1983 recommendation to end immunity by 1984 was never carried out. The Surface Transportation Board, heir to only a few continuing truck regulations after ICC was sunset in 1997, eventually refused to approve new rate bureau ratemaking proposals in 2007 (7). Although in 1980 antitrust immunity had been con-
sidered extremely important, the ensuing flood of new competition showed that its significance had been overestimated.

Intrastate Trucking Regulation
Once the Motor Carrier Act was enacted, U.S. DOT addressed the problem of state public utility commissions regulating freight traffic that originated and terminated within their borders. Most states did this, with exceptions such as New Jersey and Delaware and others that deregulated on their own after the Motor Carrier Act was passed, such as Florida and Wisconsin. Some state regulation was minimal, but many states—most notably Texas, Pennsylvania, Utah, and Illinois—kept a tight lid on the number of carriers permitted to operate.

The Texas Railroad Commission regulated railroad and trucking traffic within the state. Its trucking entry process was so strict that UPS—which by 1980 had authority to carry interstate small package traffic all over the United States, including into and out of Texas—had to wait almost 20 years to get authority to carry intrastate traffic in Texas. UPS and other Texas businesses such as Mary Kay Cosmetics set up their distribution centers just outside Texas borders so that they could treat all their Texas-bound traffic as deregulated interstate traffic.

A 1988 study for U.S. DOT estimated that state regulation cost almost $3 billion per year (8).

Although it took many years and much lobbying by U.S. DOT, shippers, and both UPS and FedEx, in 1994 all state regulation of trucking unrelated to safety was preempted.

Lasting Effects
The combination of ICC entry, rate regulation, and strong Teamster bargaining power resulted in a sizeable wage premium for union drivers relative to nonunion drivers and to comparable wages elsewhere in the economy. Between 1973 and 1995, that premium fell by approximately 15 percent between driver groups, but only slightly relative to comparable wages elsewhere. Nonunion driver wages increased from slightly below to slightly above comparable wages.

Although overall trucking employment increased from 1.1 to 2.84 million, the share of employees who were unionized fell from 60 to 25 percent in the for-hire segment and from 40 to 17 percent in private trucking. Across the economy, the share of unionized employees fell from between 22 and 25 percent to about 10 percent (9). Although deregulation was not solely responsible for these declines, it was a contributing factor.

Since 1980, the number of carriers has increased from about 19,000 to about 523,000—and almost 95 percent of them have fewer than 20 rigs.2

Truck safety has improved greatly. A 2005 study found no statistical effect of trucking deregulation

Trucking deregulation had a synergistic effect not only on the freight industry but on ports, railroads, and air cargo as well.
on truck accidents (10). In fact, U.S. DOT statistics show that the rate of involvement of combination trucks, or tractor—trailers, in fatal crashes has fallen drastically since deregulation, from 6.3 per 100 million miles traveled in 1976–1980 to 1.2 per 100 million miles traveled in 2011–2015 (11). This is not specifically because of deregulation but is an effect of the concerted effort to ensure fit trucks and drivers directly rather than through entry regulation.

As for service to small communities, there is very little evidence that truck service has suffered. Intermodal piggyback traffic has greatly increased. ICC actively discouraged piggyback service through complex conditions, so rail intermodal loadings increased by only 30 percent from 1970 to 1980 (12). From 1980 to 1990, however, these loadings doubled, and they doubled again by 2015 to 13.7 million trailers and containers. In that period, millions of trailer loads were diverted from highways to the railroads—almost 3.5 million truckloads in 1990 alone—greatly reducing air pollution and wasted diesel fuel.

Monetary Savings
Depending on the methodology used, estimates vary on the monetary savings from trucking deregulation. A 1990 Brookings study used counterfactual analysis to estimate that shippers would have saved $7.8 billion in 1977 if deregulation had already happened: $3.96 billion from lower rates, $3 billion from reduced private truck costs, and $0.82 billion from service improvements (13). A 1999 update estimated that this savings would have been $18 billion in 1996 dollars (14).

An estimate of the savings from trucking deregulation by itself is not particularly relevant today, however. Estimating the effects of deregulation of each of the modes separately—trucking, rail, and air cargo—would be misleading and would ignore the synergistic effects of the entire deregulation movement between 1977 and 1994.

A different methodology, developed by logistics expert Bob Delaney in the 1970s, estimated in 1986 that the total savings in logistics costs due to transportation deregulation as a whole were between $56 and $90 billion (15). Logistics costs are defined as the cost of inventory, whether in motion or at rest, on its way from its raw materials origins to the final consumer. The 1990s Brookings study criticized this methodology and its inflated estimate as it ignores factors other than deregulation, such as real interest rates, that affect inventories and their costs.

In recent years, transportation deregulation—not only trucking and rail but also air cargo, ocean shipping, brokers and freight forwarders, and intrastate trucking deregulation—have had time to work their way synergistically into modern supply chain management. In 1986, the year of Delaney’s estimate, total logistics costs were 11.1 percent of U.S. gross domestic product. Since then, they have fallen by a third, to 7.5 percent in 2016. Had 2016 logistics costs remained 11.1 instead of 7.5 percent, logistics costs would have been higher by more than $100 billion—representing savings to be shared among manufacturers, retailers, and their customers (16).

Special thanks to Rick Blasgen, Chair, Council of Supply Chain Management Professionals, for his assistance on this section. Clifford Winston, Brookings Institution, also reviewed this section and reiterated his 1990 criticisms.

Other Factors
Admittedly, other important factors are excluded from his methodology. For example, communication

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3 Data provided by Todd Spencer, Owner–Operator, Independent Drivers Association, 2017.
deregulation and computer technology advancements now enable planning and real-time tracking of shipments. A new breed of 3PLs—freight brokers and forwarders—has taken over the role of yesterday’s traffic managers, who mostly were interested in lower freight rates.

The goal of supply chain management is certainty of delivery times at all stages of inventory movement. That may mean higher—not lower—freight rates. Truck rates, with certainty of delivery times guaranteed by stiff penalties, may be higher than pre-1980 rates that could not contain guarantees and penalties. For example, one Brookings estimate shows that savings from rail deregulation are derived wholly from reduced service times; rail rates actually increased on all freight except grains.

With its Toyota vehicles and other commodities, Japan was able to deploy just-in-time manufacturing in the early 1970s. In the United States, the just-in-time methodology is used in such products as U.S.-made Toyotas, Dell computers, Harley-Davidson motorcycles, and McDonald’s fast food (17). Again, transportation improved by deregulation played only a partial role in these successes, but it was an extremely important one: the goods still have to get from point A to point B.

References

The transformative effects of regulatory reform on air travel and freight railroading initially eluded the intercity bus industry. Service improvements and technical innovation—hallmarks of the postderegulation air and rail environments—did not occur with the same speed and intensity in the bus and motor coach industry. It was not until technological changes facilitated personal electronic technology and online ticketing that large-scale competitive changes began to reshape this mode of travel.

In the early 1980s, when federal officials considered the potential benefits of easing regulations to foster competition in intercity bus service, the status quo hardly seemed acceptable. Greyhound, various Trailways operators, and other lines were downsizing. The number of local bus stations listed in the Russell’s Official National Motor Coach Guide, a
compendium of schedules, decreased from 23,000 in 1965 to less than 17,000 in 1971—and the drop-off continued to accelerate (1).

Several factors dragged down demand: more and more households with one or more private vehicles meant less dependence on buses from middle- and upper-income travelers. Downtown districts fell on hard times, creating the perception that bus stations were unsafe. Competition with airlines for shorter-haul trips intensified.

Consequently, expectations were modest when President Ronald Reagan signed the Bus Regulatory Reform Act of 1982. Restrictions limiting important aspects of bus service ended: for the first time since 1935, carriers could freely add or cut routes and could raise and lower rates on interstate routes without Interstate Commerce Commission (ICC) approval. Eliminated were restrictions that prohibited bus lines from picking up or letting off passengers at intermediate points, and carriers no longer needed separate authority to carry both packages and passengers (2).

The legislation contained certain protections for potentially affected parties. A public notice had to be issued 30 days before a bus service could be discontinued. Accommodations were made to help displaced workers find new employment. The ICC still had the right to intervene on rates in certain, exceptional circumstances—such as ones involving antitrust issues—and, for three years, to continue oversight of rates jointly set by carriers (2).

Industry Response
Although these provisions were noteworthy, the legislation’s most notable feature was the enormous new pricing and operational freedoms it afforded carriers. The industry’s response was limited, however, and its image continued to suffer. Computer reservation systems (CRSs) remained primitive as bus lines kept a first-come, first-served seating policy. This contrasted sharply with air and rail travel, which became much more sophisticated in developing and using CRSs.

Nevertheless, the industry experienced consolidation and rationalization. Greyhound purchased Continental Trailways and other lines, making it the country’s only coast-to-coast carrier. Major lines also spun off certain low-density routes to “mom and pop” operators with lower costs.

The potentially transformational effect of regulatory reform of interstate bus services was somewhat muted by the persistence of intrastate regulation, which state governments continued to enforce. Even so, states gradually loosened their grip, and by the 1990s intrastate regulation generally had ceased to impede service expansion. Even today, however, some anomalies persist; for example, some bus lines avoid certain intermediate stops because of intrastate regulation.

The decline in intercity bus service was precipitous enough that lawmakers included a provision in the 1991 Intermodal Surface Transportation Efficiency Act requiring that 15 percent of the Federal Transit Administration’s rural program budget funds be set aside for rural intercity bus service. The newly created 5311 Program gave states more power in intercity bus planning, but despite this, mainline bus operators continued to shrink in number. By 2005, bus traffic nationwide had contracted to barely more than a third of what it had been in the 1970s—about 40 million riders, based on federal estimates.

Necessary Conditions
Advances in technology allowed the development of new business models, however. Growing use of smartphones and other personal electronic devices...
Online ticketing has greatly reduced the need for ticket counters and staff. Expanding Internet availability also allowed startups to rely primarily on online ticketing, eliminating the need for ticket counters and other brick-and-mortar facilities—and large staffs to manage them. Curbside services were particularly attractive to college students and other tech-savvy travelers, some of whom had previously avoided bus travel because of their aversion to spending time in bus stations, which they considered undesirable places.

Meanwhile, companies in Europe tested new marketing strategies made possible by technological innovation, including low “teaser” online fares and guaranteed seats for all ticket holders. A sharp rise in the price of gasoline after 2003 also generated optimism in a latent demand for bus travel in the United States.

Industry Expansion
The first large-scale expansion occurred in 2006, when Scotland-based Stagecoach, Ltd., introduced its Megabus brand to the U.S. market. Greyhound—now owned by FirstGroup, another U.K.-based firm—created BoltBus, which had features similar to Megabus. In the Northeast, a bevy of new business-class bus services sought to entice those who otherwise would fly or ride Amtrak’s Acela Express. After a long wait, the industry blossomed (3).

There were concerns, however, that the liberalized regulatory environment had created a “Wild West” of sorts, making it difficult for the Federal Motor Carrier Safety Administration to ensure that carriers were complying with safety regulations such as those governing driver hours, equipment maintenance, and employee training. A major crackdown in 2012 eliminated many rule breakers, particularly certain Chinatown operators in various cities, but concerns persisted.

Local governments also sought to regain control of their curbs as new carriers popped up in residential neighborhoods. New York City established a permit process requiring that community boards be consulted before allowing bus lines to use a curbside stop. Boston and Washington took steps to entice—or compel—intercity operators to use bus terminals connected to major train stations.

A liberalized regulatory environment is now standard for intercity bus service throughout much of the world. Brazil, several Canadian provinces, and the United Kingdom allow relatively free entry into bus markets. The European Union has mandated a phased approach among its member states to allow intercity bus competition. In the United States, technological advances appear to have been a necessary condition for large-scale competitive entry to occur, which came after a lag of more than 20 years following deregulation.

References
mid sectors of the American economy swept by the wave of deregulation four decades ago, taxicabs stand apart. Nearly two dozen cities experimented with eliminating or relaxing controls on taxicab entry, fares, and services in the 1970s and early 1980s, but most soon returned to extensive regulatory systems. Deregulation, therefore, left little imprint on the taxi industry. Taxi service still is highly regulated, usually by city or county governments that oversee relatively small taxi fleets and, often, large pools of independent owner–operators. The exploding popularity of app-based ride services like Uber and Lyft, however, has introduced a new cycle of open entry and minimal regulation that is transforming the for-hire sector in virtually every city across the United States. Users welcome these rapidly growing services as a boon to mobility, but the growth of ride hailing also begets unresolved questions about how to best realize the benefits of open, competitive markets and ensure a safe, equitable, and environmentally sustainable transportation system.
Origins of Taxi Regulation

The current cycle of deregulation is undoing regulatory controls on entry, fares, and service that date from the 1920s and 1930s. These controls were set as a response to problems that arose from an oversupply of drivers and vehicles in a few cities in the 1920s, when vehicle manufacturers unloaded lower-cost sedans to replace expensive, custom-built cabs. Oversupply became pervasive during the Great Depression as unemployed workers flocked to the taxi industry. The results of too many drivers chasing too little business included rate wars, overcharging of passengers, uninsured vehicles, and even physical violence at taxi stands as drivers vied for business.

In response, major cities froze the issuance of new taxi licenses and imposed uniform fares. When demand for taxi service rebounded after World War II, cities continued capping the number of taxicabs under industry pressure to protect profits. These caps led to medallion systems, in which taxi licenses were tradable assets that fluctuated in value, in New York, Chicago, Boston, Philadelphia, and other cities. Controls on entry, industry size, and fares also were adopted in nonmedallion cities such as Los Angeles, San Diego, Houston, Las Vegas, Denver, St. Louis, Atlanta, and many smaller cities.

First Cycle of Deregulation and Re-Regulation

The above regulatory controls remained in place until the 1970s. From then until the early 1980s, 19 cities lifted entry restrictions and allowed greater latitude on rate-setting, among them San Diego, Seattle, Atlanta, Phoenix, Cincinnati, Indianapolis, Kansas City, and Sacramento.

Officials hoped that open entry and competition would yield shorter taxi waits, lower fares, and innovative new services like shared rides. Deterred by high capital costs and a stagnant market for taxi rides, however, few new fleets entered the market. Instead, sharp influxes of individual owner–operators focused on downtown and airport taxi stands—even though these locations were already well served.

As in the 1930s, the proliferation of drivers led to inflated fares and aggressive solicitation of passengers. Airports experienced price gouging, unkempt drivers, and unsafe cabs. Prearranged cab service also was adversely affected, as long waits for passengers at taxi stands undercut the revenues of drivers who served both dispatch trips and taxi stands.

By the mid-1980s, seeing few of the hoped-for...
benefits and many unanticipated costs, most of the cities that had deregulated reimposed entry and fare controls. Notably, a few cities with predominantly dispatch trips—the largest of which was Phoenix—retained fully deregulated systems.

As large U.S. cities revitalized in the 1980s and 1990s, they faced renewed pressure to expand their taxi industries to meet growth in taxi demand. Despite stiff industry resistance, New York, Chicago, Boston, Los Angeles, Minneapolis, Atlanta, San Francisco, Las Vegas, Seattle, and other cities added substantially more cab licenses and saw improved cab availability as a result. Acute shortfalls remained in some cities, however—most fatefully in San Francisco, where a 2013 study found that only 49 percent of residents calling for a cab were picked up within 15 minutes and that 18 percent waited for more than 30 minutes or were not picked up at all (1).

Rise of App-Based Ride Services
This shortfall created fertile opportunities for fledgling companies to experiment with using smartphones to arrange and dispatch trips. Companies like Sidecar, Lyft, and Uber began to offer taxilike, exclusive-ride, curb-to-curb service in San Francisco using part-time, nonprofessional drivers who lacked cab driver licenses and commercial auto insurance coverage. These companies expanded aggressively, at times disregarding cease-and-desist orders initiated by local taxi regulators.

As Uber and Lyft gained popularity with frustrated cab riders, authorities were forced to find a way to authorize the new companies and their novel business model. The California Public Utilities Commission (CPUC) led the way in 2012, creating the lightly regulated category “Transportation Network Companies (TNCs),” which was separate from CPUC regulations for sedan companies and from municipal taxi regulations. Unlike sedan and taxi operators, TNCs were allowed to conduct their own driver background and vehicle checks and to rely primarily on drivers’ personal auto insurance coverage.

Over the next several years, most states followed suit, creating a lightly regulated TNC category that sometimes preempted more restrictive city regulations. By early 2017, statewide regulation was the norm, with only a few cities regulating TNCs—among them New York, Chicago, Seattle, Portland, Minneapolis, and Washington, D.C.

New York City streets, dominated by taxis in 2006 (left) now are dominated by TNC vehicles (right).

![Figure 1 Taxi, TNC, and Local Bus Ridership in the United States. SOURCE: Schaller Consulting, “Estimating Uber and Lyft Ridership in the United States,” May 2018.](image)
Uber and Lyft Gain Preeminence

Offering fast and reliable service, low fares, comfort, and ease of payment, TNCs were a revolution in urban mobility for many users. Rapid TNC growth propelled the for-hire sector (including TNCs and taxis) to become a major provider of urban transportation service that is projected to exceed ridership on local buses in the United States by the end of 2018 (see Figure 1, page 45). By attracting patrons away from taxis, buses, subways, and personally driven autos, TNCs’ popularity also drove down revenues for taxi owners and drivers, transit operators, downtown and airport garage owners, and airport rental car concessions (2–5).

The success of TNCs owes much to a favorable regulatory environment, innovations in technology and business models, and deep wells of venture capital. TNCs are allowed to operate across city and county boundaries, bring on vehicles and drivers quickly, and set their own fares. Smartphone apps allow users to request a ride at the push of a button, map how long the wait will be, and automatically pay.

The arrival of self-driving vehicles in coming years is of paramount importance to the longer-term development of TNCs and TNC regulation. The earliest use of self-driving vehicles will likely be in fleets that mix human-driven TNC vehicles and shared autonomous vehicles (SAVs) in dense urban centers with high trip volumes. These fleets will continue to offer exclusive-ride, curb-to-curb service—as taxis and TNCs do today—but at lower fares. They also will seek to build substantial shared-ride businesses modeled on current pooled services like UberPool and Lyft Line and on jitney-style microtransit services operated by Chariot and Via in San Francisco; New York; Chicago; Washington, D.C.; and a few other cities.

The role of regulation likely will differ across various geographies and travel markets. In markets with dispersed trip volumes, SAV fleets might be able to replace or supplement low-ridership bus routes with on-demand services using smaller vehicles (sedans, vans, or minibuses), thus increasing frequency and reliability at the same or lower subsidies. Government oversight could be achieved through contract processes—assuming these services need continued subsidies. Cities such as Los Angeles and Arlington, Texas, which are experimenting with using microtransit to provide public transit services, and other cities using TNCs to provide paratransit trips, may offer models.

In large urban centers, the prospect of mushrooming growth of low-cost SAV travel probably will heighten concerns about adding vehicles to crowded streets and siphoning riders from bus and rail services. Here, too, the policy response might attempt to harmonize traditional transit services and SAVs through contracting processes, to satisfy customer preferences within an efficient, flexible transportation system.

Alternatively, policy makers could look to taxes, fees, and regulatory mandates to generate revenues for transit and to incentivize the use of larger vehicles and fewer empty seats. They might cap the number of vehicles or drivers—mirroring traditional taxi regulation—as currently proposed in New York City. Municipalities might also exercise their franchise powers, once used to regulate streetcars, to control the extent of SAV operations.
by credit card. Venture capital pay for promotional discounts to attract passengers. Use of part-time drivers and a combination of driver financial incentives and surge pricing help ensure that drivers are available for peaks in demand, particularly at rush hour and when bars close late at night. Smartphone apps eliminate the expense of human call-takers and dispatchers. Treating drivers as independent contractors eliminates the cost of paid leave and health and disability insurance. Requiring that drivers buy and maintain their vehicles and use their personal auto insurance policies also saves costs.

Current trends point to a for-hire industry dominated by a few large, lightly regulated TNCs overseen primarily by state public utility and transportation agencies. A shrunken, more extensively regulated taxi industry will serve telephone orders and flag and cab stand trips. As customers continue to shift from taxis to TNCs and as some taxi regulators loosen regulations to create a more level playing field, the overall level of regulation likely will contract.

Implications of Shared-Service Models

Regulatory needs will depend largely on which service and business models prove feasible. If SAVs convert a large number of riders from public transit to pooled or microtransit services, this will have momentous implications for regulation. This is by no means certain; despite heavy promotion, Uber and Lyft have had limited success with their pooled services, which account for perhaps 10 percent of TNC ridership in the United States.

Chariot and Via, on the other hand, have grown rapidly by routing vehicles along the fastest and generally shortest route with the trade-off that passengers must walk a short distance to pickup points. SAV operations modeled on microtransit might prove highly attractive to bus and rail riders in major urban centers, accelerating the shift from large public transit vehicles to smaller vehicles that is already occurring with TNCs. If this shift occurs at a large scale, it would have profound implications for traffic congestion and transit operations and would demand strong public policy intervention.

Discussions of SAVs have also focused on replacing private car ownership with “mobility as a service,” similar to pooled TNC services. TNC ridership is quite low in car-oriented areas, however, and few trips are pooled. Experience with TNCs, therefore, casts doubt on whether shared autonomous vehicles will attract many people from the convenience and flexibility of their own cars. Moreover, SAVs potentially could increase vehicle mileage because of “dead-head” miles to each passenger’s pickup location.

Regardless of how shared self-driving services evolve, government policy will be subject to many conflicting pressures. Large, well-capitalized companies from GM and Ford to Uber, Lyft, Waymo, and Tesla, will seek to claim market share for shared autonomous services in a highly competitive and rapidly evolving marketplace. Unlike deregulatory processes in which the federal government played a leading role, all three levels of government will be integrally involved, each with their own policy focuses, regulatory tools, and political imperatives. Also unlike deregulation of other industries, the starting point is the lightly regulated TNC industry and a general environment of broad political support for allowing companies maximum latitude to innovate with technology and services—although this is shadowed by growing public doubts about the wisdom of allowing big tech companies unbridled power.

Like when other industries were deregulated, the evolution of for-hire services will be fundamentally customer-driven. Competing companies will seek to gain customers through varied permutations of price, selection, and quality. Decisions about regulation will face the challenge of harnessing the individual benefits of intensive competition and customer choice to serve societal goals for mobility, safety, sustainability, and equity as well.

—Bruce Schaller
from the exclusion of wheelchair users and people without smartphones to TNCs’ impacts on traffic, emissions, and public transit—issues that are likely to be magnified by the next wave of technology: self-driving cars.

Some of these pressures are evident already. Several cities and states have required TNCs to provide wheelchair-accessible service. Governments also have taken steps to make TNCs available to people without smartphones and to unbanked households, usually through partnerships with transit agencies or cities that subsidize rides for seniors and others with limited transportation options, and to provide call-takers to relay trip requests to contracted TNCs.

Rising concerns about impacts on worker rights and welfare are generating tentative steps toward driver representation (as in a Seattle law currently tied up in litigation) and calls for caps on working hours and the number of drivers or vehicles on the street and for minimum wages. These pressures are likely to intensify the next time the economy contracts and unemployed workers flock once again into the industry.

In big cities like New York and San Francisco, growing traffic congestion and declines in transit ridership are raising concerns about the shift of travelers from public transit to TNCs. Responses recently adopted in several cities include fees on TNC trips, with the proceeds channeled to transit agencies, and regulations on where TNCs pick up and drop off passengers.

There are other signs of support for greater regulatory oversight of TNCs as well. TNCs have been found in violation of requirements for driver background checks in several states, leading to proposals for a greater governmental role in reviewing driver qualifications. An administrative law judge recently proposed that Uber be regulated like sedan services in California and that it meet the same requirements as black car and limo operators.

Regulators almost certainly will continue to consider steps to address these issues. The long, slow accretion of regulation that occurred with taxicabs in the 20th century might come to be mirrored with TNCs. More likely, however, is that the task of addressing these issues becomes subsumed within the next big advance in technology: self-driving vehicles (see sidebar, page 46).

References
Although deregulation dismantled the direct controls on prices and market entry in the domestic airline, trucking, and rail industries, it left other economic restrictions in place. In view of the successes of deregulation, additional market-based reforms have been proposed. This article looks at a handful of possible next steps advocated by economists, whose foundational research was essential to the enactment of deregulation 40 years ago.

**Aviation Infrastructure**

Aviation infrastructure—runways and airways—has long been at the top of the deregulatory to-do list for economists. In March 1978, six months before Congress passed the Airline Deregulation Act, Civil Aeronautics Board (CAB) chair Alfred Kahn spoke to senior staff at the Federal Aviation Administration (FAA), which operated the air traffic control system and set policy governing airport rates and operation. He cautioned that deregulation would unleash enormous demand for air travel and urged FAA to free up additional infrastructure supply to limit flight delays.

A charismatic Cornell University professor who literally wrote the book on the economics of regulation, Kahn urged FAA to abandon landing fees based on aircraft weight in favor of congestion pricing of runways. He rejected FAA's counterproposal that the CAB intervene to forestall delays, for example,
by controlling airline scheduling or allowing the carriers to get together to regulate their own schedules.

“At a time when we at the CAB are trying to restore economic rationality to this industry [by placing] increasing reliance on the competitive market to allocate scarce resources, we are not about to embrace nonmarket controls in order to solve the problem of limited airport space inefficiently,” Kahn explained.

FAA did not act on Kahn’s recommendation—which he later expanded to include efficient airways pricing—and flight delays remained a major problem. A rigorous study conducted for FAA found that in 2007, U.S. flight delays imposed $33 billion in direct costs, including added costs to airlines for fuel, crew time, and aircraft utilization; lost passenger time; and lost demand, or welfare loss incurred by passengers who avoided air travel because of delays (I).

**Structural Air Traffic Control Reform**

In recent decades, proposals to address flight delays have focused on structural reform of the air traffic control (ATC) system, a network of radar, navigation aids, and approximately 35,000 controllers and engineers whose job it is to keep planes at a safe distance from one another. FAA operates the system and regulates the safety of all aspects of civil aviation, including the ATC system itself. Reform proposals typically call for 1) moving the operational function out of FAA, and even out of the government, and 2) replacing the existing funding system—largely an ad valorem tax on passenger tickets—with cost-based user fees on commercial aircraft operators.

The argument for structural reform is twofold: first, ATC is not an inherently governmental function. Although keeping planes safely separated is a complex and critical task, it is a purely operational process that, like running an airline or building a Boeing 787, can be performed effectively by a non-governmental entity as long as it is subject to oversight by safety regulators.

Second, precisely because ATC is operational in
nature, the government faces serious challenges running it. Many blue-ribbon commissions and expert panels have concluded that ATC is a 24/7, technology-intensive service business housed in a regulatory agency that is constrained by federal budget rules, burdened by a poorly designed funding mechanism, and micromanaged by Congress and the Office of Management and Budget.

To reform advocates, the clearest evidence of a problem is FAA’s long-running struggle to deploy new technology. Controllers still rely on 1950s-era radar technology to space planes, and they communicate with pilots by voice radio rather than by digital signals like texting. Antiquated technology contributes to flight delays and is part of the reason that the cost for FAA to handle a flight has increased by two-thirds since 1996.

Defenders of the current system point to FAA’s Next Generation modernization program (Next-Gen), which is gradually introducing improved technology. However, a 2015 report by a National Academy of Sciences, Engineering, and Medicine panel criticized the program as being too incremental, concluding that the term “‘NextGen’ has become a misnomer” (2).

Although over the past 30 years many industrial countries have spun off ATC to some type of nonprofit corporate entity, efforts to corporatize have failed repeatedly in the United States. The Clinton administration’s 1995 plan to create a self-supporting government corporation to provide air traffic services failed to attract congressional support. Last year, the U.S. House Transportation and Infrastructure Committee approved legislation to move ATC to a private, nonprofit corporation modeled after Canada’s ATC provider, Nav Canada; however, the bill was ultimately withdrawn from floor consideration.

As in 1995, the main opposition to recent ATC reform came from private pilots (general aviation, or GA) and business jet owners, who pay a de minimis fuel tax to use the system. Private pilots worried they would be subjected to user fees, and the business aviation industry, which accounts for 10–12 percent of air traffic operations, feared that its payments would increase significantly. Many small airports also shared GA’s concern about continued access to national airspace under a more businesslike ATC operator. Although the House bill, like the 1995 Clinton plan, claimed to hold GA and business aviation harmless, the two groups remained staunchly opposed.

Efficient Pricing of Airport Runways
Chronic flight delays also reflect misallocation of scarce airport capacity. To address this problem, economists have long argued that congested airports should adopt marginal cost pricing of runway capacity.¹

Local airports set landing fees based on an aircraft’s weight, subject to guidelines issued by FAA. At most airports, individual airlines decide how many flights to schedule and when and are limited only by airport gate capacity. At a handful of highly congested airports, FAA has capped the number of flights and assigned landing slots to individual carriers. When demand exceeds runway capacity, FAA air traffic controllers generally accommodate flights on a first-come, first-served basis.

Because weight-based fees do not account for delay costs, they offer little incentive for airport users to shift flight activity to off-peak hours or to less-congested airports. In contrast, marginal cost pricing of runways—which can take the form of congestion, or time-variant, pricing or allocation of takeoff and landing slots via auction—ensures that scarce capacity goes to the users who value it most. Steven Morrison and Clifford Winston have estimated that marginal cost pricing of runways alone—even without the construction of any additional runways—would produce $2005 billion in annual net benefits, largely from reduced passenger delays (3). In addition, airports may use the revenue from such a pricing scheme to address underlying capacity shortage.

In 2008, the U.S. Department of Transportation issued new policy guidance that makes it permissible for airports to institute a limited form of congestion pricing, but no airport has taken advantage of the new authority yet. One reason may be that congested airports often are dominated by a single carrier. In theory, the dominant carrier already is

¹ See, for example, Special Report 255: Entry and Competition in the U.S. Airline Industry—Issues and Opportunities, 1999.
internalizing some if not much of the delay cost, thus reducing the beneficial effect of marginal cost pricing on delays.

More importantly, congested airports have not imposed marginal cost pricing because many of their airline customers oppose it. Air carriers currently capture “rents” from scarce runway capacity by charging passengers higher fares to travel at peak periods. Congestion pricing would shift some of those scarcity rents to the airport.

In 2008, with flight delays reaching record levels and new entrant carriers unable to secure slots, the George W. Bush administration worked with the nation’s leading auction experts on a plan to auction slots at the three major airports that serve New York City—John F. Kennedy, LaGuardia, and Newark Liberty. The effort drew fierce opposition from the slot-holding airlines, however, and at the eleventh hour, a federal court blocked the auction on procedural grounds.

FAA Airport Privatization Pilot Program

Although many airports in United States initially were privately owned, because of federal policy almost all U.S. airports now are owned by state and local governments or by public airport authorities. In recent years, many airports in Europe, Asia, Latin America, and elsewhere have been privatized, with the government leasing the facility long term or selling a majority or minority interest to a private entity. In contrast, the United States has seen little interest in airport privatization.

The key reason for this lack of interest in airport privatization is the U.S. municipal bond market: state and local governments can issue tax-exempt bonds for investments in public airports, whereas private airports would have to rely on taxable bonds. In addition, FAA historically made privatization financially unattractive. For example, any FAA grants to the formerly public airport had to be repaid and revenue from the lease reinvested in the airport rather than used to capitalize nonairport infrastructure.

In 1996, Congress created the FAA Airport Privatization Pilot Program (APPP), which removed the major financial disincentives to privatization. The program has had few takers, however, in part because to participate an airport must get the approval of a supermajority of the carriers it serves. The prospect of losing access to tax-exempt bonds also remains a deterrent.

Economists and others are divided as to whether the federal government should do more to promote airport privatization. Supporters argue that U.S. airports often behave more like risk-averse or politicized bureaucracies than customer-oriented businesses. In this view, a commercial operator would have an incentive to price runway capacity more efficiently; make efficient investments in terminals and runways to reduce delays; and allow access to any carrier that is willing to pay the cost of using its facilities, increasing competition in air services.

On the other side of the debate, privatization skeptics worry a private operator could abuse the monopoly power that many local airports possess—a concern that airlines share. Skeptics believe that greater transparency can address the key problems facing publicly run airports by reducing the role of politics in decisions that should be made on business grounds.

One modest step could be for Congress to remove restrictions that undercut APPP. The White House’s infrastructure plan, presented in February, proposes to reduce the approval requirement to a simple majority of airlines and would remove any limitation on the number of airports that can participate in the program (the program is currently limited to 10 airports, only one of which can be a large hub airport).

The changes to tax financing of airports proposed in the White House’s infrastructure plan represent a more controversial step. These changes would 1) allow private airport developers to issue tax-exempt private activity bonds, as now is permissible for highway toll projects, and 2) preserve the tax-exempt status of existing bonds when a private entity buys or leases an airport from a government owner.

Restrictions on Foreign Ownership and Control

By forcing U.S. airlines to become more efficient domestically, deregulation also positioned them to be more competitive internationally. Capitalizing on that advantage, in the late 1970s the U.S. government began negotiating away bilateral restrictions.
on where and how often international carriers can fly, resulting in lower fares and vastly expanded air service. In 2007, the U.S. government and the European Commission agreed to extend “open skies” to all European Union (EU) members—a deal that was worth several billion dollars per year to consumers and that put pressure on other regions to follow suit.

Despite these changes, restrictions remain; most significantly, the combination of U.S. law and the nationality clause in bilateral air services agreements limit the ability of a foreign entity to own or control a U.S. airline. For example, the British entrepreneur Richard Branson had to give up control of Virgin America to operate it in the United States. As evidence of that lack of control, Virgin America now is owned by Alaska Airlines, the result of a merger that Branson did not support.

In the United States, the major objection to proposals relaxing the restrictions on foreign ownership and control has been that it would hurt American workers. Pilots in particular fear that a foreign carrier could seek control to shift lucrative, long-haul international flying to its own operations, thereby eliminating the jobs of the highest-paid U.S. pilots. A 2002 study of an EU–US Open Aviation Area concluded, however, that the potential for direct labor substitution was limited. This was partially because of the extraordinary bargaining leverage that U.S. pilots—who have a monopoly on domestic flying under U.S. immigration law—can exercise regarding international flying (6).

In the past, some officials in the U.S. Department of Defense (DOD) also defended ownership and control restrictions. DOD has legal and economic leverage over U.S.-owned carriers, which is key to its ability to mobilize commercial aircraft in a military emergency. For business and legal reasons, however, a foreign purchaser of a U.S. airline would have no choice but to incorporate in the United States, just like any other foreign entity that engages in U.S. domestic commerce. Therefore, DOD would retain the same legal and economic leverage over a foreign-owned, U.S.-based carrier that it has over a U.S.-owned carrier.

Nor are restrictions on foreign ownership and control necessary to prevent the purchase of a U.S. airline by, say, Russia’s Aeroflot. Under the 1988 Exon–Florio amendment to the U.S. Defense Production Act, the President can block or restrict any foreign acquisition of a U.S. company if the transaction threatens to impair national security (7).

Surface Transportation
As with airlines, trucking deregulation unleashed enormous demand for services, and that growth in truck traffic has contributed to—and been adversely affected by—the significant increase in congestion on this country’s road network over the past 40 years. Traffic congestion imposes large and growing costs on the trucking industry. Winston estimates the cost at nearly $15 billion per year, based on a 2006 study (8).

More broadly, rush-hour congestion is one of the most serious urban problems this country faces. According to a 2008 estimate by Robert W. Crandall, a reduction in the commuting times of one-third of the U.S. population by just 10 percent would be worth $8.7 billion nationwide (9).

Like runways and airways, roads are a scarce resource that economists believe should be rationed by price; that is, a user should pay an amount equal to the marginal cost they impose through damage to the road, environmental damage, increased accident risk, and increased congestion. The government offers most roads at a price of zero, even during peak periods, and this absence of efficient charges represents a form of economic, or price, regulation.

Because foreign entities cannot legally own or control U.S. airlines, Richard Branson of Virgin Airlines was required to give up control of Virgin America.
The country’s highway network is funded largely by a per-gallon fuel tax. Although such a tax, set appropriately, can internalize environmental externalities, it is a less-useful proxy for congestion externalities and the other costs of road use. As cars and trucks become more fuel-efficient and electric vehicles more prevalent, a per-gallon fuel tax is less effective at raising adequate revenue.

Some states have begun to ration capacity on urban highways using toll lanes, some of which incorporate dynamic pricing. New York City is debating the imposition of steep charges on vehicles that enter a designated congestion zone during peak travel periods—an approach that London; Stockholm, Sweden; and Singapore have embraced successfully (10). Although toll roads and congestion pricing no longer are the political third rail they once were—perhaps the use of surge pricing by Uber and Lyft helped to educate consumers—they remain very unpopular.

Many economists favor replacement of the per-gallon fuel tax with a per-mile charge—also known as a vehicle miles traveled (VMT) charge—that reflects the actual cost of driving on all roads. Oregon was the first state to pilot a VMT system. Although technology was a constraint in the past, modern cars are equivalent to smartphones. Robert Atkinson, who cochaired the National Surface Transportation Infrastructure Financing Commission a decade ago, envisions a VMT system in which every road segment is electronically coded to indicate its usage price by time of day and the designated payee. Externalities could be priced on a granular level—for example, gas-guzzling vehicles could pay a higher per-mile rate—and value-added services and apps could be layered onto the VMT platform.

The Reason Foundation’s Robert Poole, who originated the concept of high-occupancy toll lanes and is a longtime advocate of a VMT system, now calls for the additional step of highway privatization. According to Poole, highways are another category of network utility, like electricity, water, telecommunications, and natural gas. He argues that, like those utilities, highways could be organized as companies that sell services to customers, including investor-owned companies, government toll agencies, and nonprofit user cooperatives (11).

Although some of these approaches are more controversial than others, all of them face major implementation challenges. The lively debate over road pricing is certain to continue.

References
Each year the Women’s Transportation Seminar of Washington, D.C. (WTS-DC), a chapter of WTS International, recognizes leading local women who have had a significant impact on transportation, as well as area figures and organizations that support the development, growth, and advancement of women in transportation.

In 2017, Transportation Research Board (TRB) associate program officer Brittney Gick received the WTS-DC Member of the Year Award, along with WSP associate consultant Neela Babu. An Indiana native, Gick coordinates program activities, meetings, and materials for TRB’s marine, freight, rail, finance and economics, and data and information technology standing committees. She also is a major contributor to new database development and implementation with TRB’s Technical Activities Division.

Recently, Gick answered some questions about her transportation career and her work with WTS-DC.

How did you decide to work in transportation research?
Interestingly enough, I have been surrounded by work in the transportation field for my entire life—asphalt paving companies and aggregate producers—so when I finally entered the field full-time, it seemed to be the perfect fit.

I was lucky enough to get a summer internship opportunity right out of college with the Indiana Department of Transportation (DOT), and because I had just graduated, I was placed in the Division of Research and Development testing asphalt and learning skills to work in the industry. After the summer ended, the asphalt lab manager position opened at Indiana DOT. I got the position and stayed at the Division of Research and Development. I would say it was fate and a whole lot of luck.

Describe your educational path.
I received a bachelor’s degree from Manchester University in Indiana (then Manchester College) in political science, with a minor in economics. Initially, I was more focused on international matters—even traveling to Peru, Bolivia, and China as part of my courses—and had a lot of transportation-related, life-changing experiences along the way.

While working for Indiana DOT, I always knew that I wanted to pursue postgraduate education—but was not sure exactly how and what to do. After a few years of working at Indiana DOT, I joined TRB as associate program officer.

After a year at TRB, I decided to pursue a master’s degree at George Mason University in Virginia. I received the degree in transportation policy, operations, and logistics this spring.

When did you join WTS-DC and what was your first role?
In 2016 I joined WTS-DC, which I was introduced to through a mutual friend of a colleague, Anne Stubbs. After seeing a list of the different WTS committees, I decided to join the Program Logistics Committee. It seemed like a really good fit, as I do a lot of event planning in my current position.

When I signed up to be on the committee, I thought I would just be helping other members—little did I know that I was the only person who signed up, so I automatically won the role of committee chair. I was quite shocked and thought I was completely unprepared, but I was excited and ready to accept the challenge. Luckily, other members joined the committee—one of whom was the other 2017 WTS-DC Chapter Member of the Year, Neela Babu. Neela and I both worked tirelessly for two years, planning approximately 15 events per year and building a system that could be more sustainable for others in the future.

What made you want to get into a leadership role in WTS?
My involvement with WTS-DC has allowed me to meet so many great people, and I have a learned a lot from both the other members as well as the speakers and guests at all of the events. In November 2017, I attended WTS Chapter Leadership Training.

Attending that training session taught me how other chapters around the country manage their boards and deal with issues. That experience—and my previous experiences on the Program Logistics Committee—made me want to continue with the board and to look at innovative solutions to issues that arose. This year, I started my term as Secretary of the WTS-DC chapter board.
Robert E. Gallamore
The Gallamore Group

Robert E. Gallamore muses that his 55-year career could be summed up by the phrase “alphabet soup,” or a litany of acronyms for the many federal agencies, transportation associations, corporations, and universities he has worked with, from the U.S. Department of Transportation (DOT) to the Association of American Railroads’ (AAR’s) Transportation Technology Center in Colorado.

An expert in rail policy, economics, mergers, and regulations, Gallamore was present for the creation of Amtrak in 1971, as well as for Midwest rail restructuring in the late 1970s and the Staggers Rail Act of 1980. He served as Director of the Transportation Center at Northwestern University and, with John R. Meyer, coauthored *American Railroads: Decline and Renaissance in the Twentieth Century*, a vast exploration of modern rail history and policy. In 2016, *American Railroads* won the George W. and Constance M. Hilton Award from the Railway and Locomotive Historical Society.

“At 13 chapters, more than 500 pages, many charts and figures, and an afterword and index—and covering the full 20th century, with topics ranging from economic theory to merger analyses to technology trends to hot contemporary policy problems—*American Railroads* with Meyer was a huge endeavor to write,” Gallamore observes. “The best part was thinking through policy issues and historical nuances with my mentor and coauthor, even though he had been slowed by Parkinson’s.”

Gallamore, a Nebraska native, received national and state scholarships to college and graduate school. He received a bachelor’s degree from Wesleyan University in Connecticut and both a master’s in public administration and a Ph.D. in political economy and government from Harvard University. At Harvard, he studied under Meyer and wrote his doctoral dissertation on the wave of railroad mergers that took place in the mid-20th century.

“My research showed the large, complex mergers of the time produced few of the cost savings anticipated of them, and had made the industry less competitive,” Gallamore notes. That research proved durable—the dissertation remained a standard reference for two decades.

After receiving his Ph.D., Gallamore joined the Office of the Secretary of Transportation at U.S DOT as an economist. In 1970, he joined the Washington, D.C., watchdog group Common Cause as director of policy development; after that, he worked for the U.S. Railway Association as system plan coordinator. In 1973, he became associate administrator for planning at what is now the Federal Transit Administration.

Gallamore served as deputy administrator of the Federal Railroad Administration (FRA) from 1977 to 1981, leading FRA’s development of proposals for deregulation of railroads in 1980 with the Staggers Rail Act. He received the Meritorious Presidential Rank Award from President Jimmy Carter.

In transportation policy, Gallamore observes, it is crucial to get the economics right: “Transport policy must rest on fundamentals such as the principles of competitive markets, user charges, best operating practices, and innovative technologies, fed by broad-based scientific research.”

Gallamore spent the 1980s and much of the 1990s in the private rail sector, serving as director of strategic planning and as general director of strategic analysis at Union Pacific. He also helped to guide positive train control (PTC) policy as general manager of the joint-agency PTC development and testing program at the Transportation Technology Center.

“Right-size vehicles for the intended rights-of-ways, speeds, structures, and control systems they will use,” he comments. “Invest in technology to make transportation safer, smarter, more labor-saving, more energy-efficient, and more respectful of the environment.”

Gallamore joined his first Transportation Research Board (TRB) standing committee in 1991—the Freight Transportation Economics and Regulation Committee. “I saw first-hand the value I could contribute to intellectual discourse and public policy decisions with my own economic research,” he recalls. Since then, he has served on the Railroad Operating Technologies Committee and the Transportation Education and Training Committee, as well as a Transit Cooperative Research Program project panel. From 2008 to 2014, Gallamore chaired the Rail Safety IDEA Program.

Gallamore also has served on several major TRB consensus study committees, including the Committee on Climate Change and U.S. Transportation, the Committee for Review of the National Transportation Science and Technology Strategy, and the panel on Science and Technology for Countering Terrorism. He was chair of the Committee for Review of the FRA Research, Development, and Demonstration Programs; the Committee for a Study of the Feasibility of a Hazardous Materials Transportation Cooperative Research Program; and the Committee on Freight Transportation Information Systems Security.
Jonathan Rubin was trained as an economist, though his work as Director of the University of Maine’s Margaret Chase Smith (MCS) Policy Center allows him to work with colleagues across many disciplines. Rubin was one of the first graduates affiliated with the Institute of Transportation Studies at University of California, Davis, after it was established in 1991.

Specializing in the economics of transportation energy and greenhouse gas emissions, Rubin also studies connected and autonomous vehicles, low-carbon transportation fuels, biofuel pathways, and the economic and environmental impacts of trading greenhouse gases and fuel-efficiency credits for automobiles and light-duty trucks. His research has been supported by the U.S. State Department, the National Science Foundation, the U.S. Environmental Protection Agency, and the U.S. Department of Energy.

At the MCS Policy Center, a nonpartisan public policy research unit, Rubin takes pride in managing the center as a trusted source for unbiased information. “The center’s namesake, Maine Senator Margaret Chase Smith, was the first member of the Senate to denounce the tactics used by Joseph McCarthy in his anticommunist crusade,” Rubin notes, referring to Chase Smith’s 1950 speech, “A Declaration of Conscience.”

Rubin’s recent research has focused on the economics of cellulosic biofuels, in particular low-carbon biofuels from woody biomass. Maine is the most heavily forested state in the country, containing approximately 17.6 million acres of forest—nearly 90 percent of the state’s land area. Because 95 percent of that forestland is classified as timberland, Rubin’s research explores how to make cellulosic biofuels more economical by simultaneously producing biochemical coproducts. To do this he works with the Forest Bioproducts Research Institute, a multidisciplinary team of chemical engineers, economists, and forestry faculty and graduate students.

“As researchers, we all want to have an impact that can be universally helpful—but we all come from a particular place,” he points out. “We need a way both to reduce the environmental impact of transportation fuels and to add more value to the forest products industry.”

Rubin also is investigating the environmental impact of autonomous vehicles. The ways in which autonomous vehicles are used will determine their impact on energy use, emissions, and travel demand and congestion, but baseline information about consumer acceptance and intended use generally are un answered or underinvestigated. Although these impacts are difficult to estimate, Rubin comments, they are highly relevant for determining social costs.

“Because autonomous vehicles can change how people assess their time in vehicles—both in terms of quantity and quality—it is important to design robust policies that can allow the market development of autonomous vehicles to take advantage of the vehicles’ private benefits and to establish incentives for beneficial environmental and social outcomes,” Rubin observes.

The growth of vehicle use around the world and the interconnectedness of freight systems have lent an urgency to research on reducing the environmental impact of transportation systems, he adds. Specific, applied research topics can include the types of alternative fuel projects that are beneficial and economically viable as well as basic research on human behavior.

“No single technological fix will both reduce transportation’s environmental footprint and maintain an acceptable mobility of goods and people,” Rubin comments. “This means that we need to be open to learning from and working with a wide range of disciplines and viewpoints.”

Rubin currently serves as chair of the Transportation Research Board’s Environment and Energy Section. He joined the Standing Committee on Alternative Transportation Fuels and Technologies in 1995 and the Standing Committee on Transportation Energy in 1997. He has served on both committees ever since, including as chair for the Transportation Energy Committee. He also has served as a member of project panels for the Airport Cooperative Research Program (ACRP) and National Cooperative Highway Research Program (NCHRP).

“One of the great aspects of being involved with TRB and serving on NCHRP and ACRP panels is that it has given me a lot of exposure to real-world research issues that I can bring back to the classroom,” Rubin notes. “My students want to make a difference in the world. When we discuss the specific ways that airports can reduce fossil fuel energy use and possibly make money, that really resonates with them.”

“What motivates me is learning new things,” he adds. “That is what keeps me going after 25 years.”

“We need to be open to learning from and working with a wide range of disciplines and viewpoints.”
Assessing the Environmental Justice Effects of Toll Implementation or Rate Changes: Guidebook and Toolbox
NCHRP Research Report 860
Provided in this report are tools to analyze and measure the impacts of toll pricing, payment, collection technology, and rate changes on low-income and minority populations. Also included is a guidebook detailing when and how to apply the tools.
2018; 424 pp.; TRB affiliates, $81; nonaffiliates, $108. Subscriber categories: highways, policy.

Seismic Evaluation of Bridge Columns with Energy Dissipating Mechanisms, Volume 1: Research Overview and Volume 2: Guidelines
NCHRP Research Report 864
The two volumes of this report evaluate new materials and techniques for the design and construction of novel bridge columns to improve seismic performance.
2017; 108 pp.; TRB affiliates, $52.50; nonaffiliates, $70. Subscriber category: bridges and other structures.

Guidance for Development and Management of Sustainable Enterprise Information Portals
NCHRP Research Report 865
This report enhances the understanding of the value, uses, design, and maintenance of effective enterprise information portals for state departments of transportation (DOTs) personnel.
2018; 132 pp.; TRB affiliates, $58.50; nonaffiliates, $78. Subscriber categories: administration and management, data and information technology, education and training.

Estimating the Safety Effects of Work Zone Characteristics and Countermeasures: A Guidebook
NCHRP Research Report 869
Practitioners who develop phasing and staging plans for temporary traffic control through work zones will find guidance in this report for evaluating the safety impacts of their plans.
2018; 76 pp.; TRB affiliates, $50.25; nonaffiliates, $67. Subscriber categories: highways, safety and human factors.

Guidebook for Advanced Computerized Maintenance Management System Integration at Airports
ACRP Research Report 155
Authors present guidance on the implementation of a computerized maintenance management system, factors for prioritizing which systems should be included, and steps for integrating data into management and business decision making.
2018; 164 pp.; TRB affiliates, $62.25; nonaffiliates, $83. Subscriber categories: aviation, maintenance and preservation.

Highway Capacity Analysis
A practical, succinct, and logical approach to traffic engineering processes and procedures such as stop control, roundabouts, signalized intersection, interchanges, travel time reliability, and signal-timing optimization, this text prepares students for the traffic engineering profession.

The title in this section is not a TRB publication. To order, contact the publisher listed.
User Guides for Noise Modeling of Commercial Space Operations: RUMBLE and PCBoom
ACRP Research Report 183

This report provides guidance on using RUMBLE 2.0, which predicts rocket noise, and PCBoom, which has been modified to predict sonic booms from commercial space operations. Software accompanies this guide.
2018; 192 pp.; TRB affiliates, $66.75; nonaffiliates, $89. Subscriber category: aviation.

Airport Operator Options for Delivery of FBO Services
ACRP Synthesis 86

Explored in this synthesis are the considerations that fixed base operator airports use in deciding how to provide fueling, flight continuation services, maintenance, and concierge services, as well as tools to help airports make these decisions.
2018; 100 pp.; TRB affiliates, $52.50; nonaffiliates, $70. Subscriber category: aviation.

Public Transportation Guidebook for Small- and Medium-Sized Public–Private Partnerships (P3s)
TCRP Research Report 191

This guidebook addresses why and when to consider P3s for small- and medium-sized projects, what types of initiatives may be undertaken, and how to enact these initiatives effectively.

Battery Electric Buses: State of the Practice
TCRP Synthesis 130

This synthesis documents current practices of transit systems in the planning, procurement, infrastructure installation, operation, and maintenance of battery electric buses.
2018; 198 pp.; TRB affiliates, $68.25; nonaffiliates, $91. Subscriber categories: energy, public transportation, vehicles and equipment.

Information Technology, Geospatial Information, and Advanced Computing
Transportation Research Record 2645

Explored in this volume are technology use in pavement monitoring, parking occupancy evaluation, driving cycle development, variable message sign placement, traffic congestion patterns, and other areas.
2017. Subscriber categories: data and information technology, planning and forecasting, operations and traffic management. For more information, visit https://trrjournalonline.trb.org/toc/trr/2017/2645/+.

Managing Performance and Assets; Freight Data and Visualization
Transportation Research Record 2646

The cost of congestion, guardrail system preservation policies, and the use of GPS data in freight modeling and planning are some of the topics covered in this volume.
2017. Subscriber categories: data and information technology, operations and traffic management, planning and forecasting. For more information, visit https://trrjournalonline.trb.org/toc/trr/2017/2646/+.

Public Transportation, Volumes 1–6
Transportation Research Records 2647–2652

These six volumes provide information, data, methodology, technology, and case studies for bus systems, streetcars, rail service, taxis, bikesharing, ridesharing, fares, and parking, with some emphasis on travelers who are older or who have disabilities.

Planning Applications
Transportation Research Record 2653

The 11 papers in this volume explore urban and rural planning, including transit and pedestrian networks, long-distance passenger travel, shared autonomous vehicle fleets, and more.

The TRR Online website provides electronic access to the full text of more than 15,000 peer-reviewed papers that have been published as part of the Transportation Research Record: Journal of the Transportation Research Board (TRR) series since 1996. The site includes the latest in search technologies and is updated as new TRR papers become available. To explore TRR Online, visit www.TRB.org/TRROnline.
# Calendar

## TRB Meetings

### June

- **1–4** 3rd International Conference on Infrastructure and Materials*  
  Tianjin, China
- **6–8** International Transportation and Economic Development Conference  
  Washington, D.C.
- **10–12** AASHTO Technical Committee on Geometric Design and TRB Committees on Geometric Design and Operational Effects of Geometric Design Joint Summer Meeting*  
  Franklin, TN
- **18–20** 6th National Bus Rapid Transit Conference  
  Los Angeles, California
- **18–21** World Transport Convention*  
  Beijing, China
- **19–21** Transforming the Marine Transportation System through Multimodal Freight Analytics  
  Washington, D.C.
- **24–27** 7th International Conference on Innovations in Travel Modeling  
  Atlanta, Georgia
- **25–27** Transportation-Related Noise and Vibration Committee Summer Conference  
  Washington, D.C.

### July

- **9–12** Automated Vehicles Symposium*  
  San Francisco, California
- **9–13** 9th International Conference on Bridge Maintenance, Safety, and Management*  
  Melbourne, Australia
- **14–17** 12th National Conference on Transportation Asset Management  
  San Diego, California
- **15–18** American Society of Civil Engineers International Conference on Transportation and Development*  
  Pittsburgh, Pennsylvania
- **15–18** 57th Annual Workshop on Transportation Law  
  Boston, Massachusetts
- **17–19** 12th Access Management Conference  
  Madison, Wisconsin
- **22–24** Geospatial Data Acquisition Technologies in Design and Construction  
  Sacramento, CA
- **23–25** GeoChina International Conference*  
  Hangzhou, Zhejiang, China
- **29–Aug. 1** Association for Commuter Transportation International Conference*  
  Anaheim, California

### August

- **7–9** 3rd International Greenshield’s Conference on Traffic Flow Theory  
  Woods Hole, MA
- **8–9** National Household Travel Survey Data for Transportation Applications Workshop  
  Washington, D.C.
- **22–24** 16th National Tools of the Trade Transportation Planning Conference  
  Kansas City, Missouri
- **28–31** National Hydraulic Engineering Conference*  
  Columbus, OH

### September

- **5–6** Implementing a Freight Fluidity Performance Measurement System  
  Washington, D.C.
- **10–13** TRB Workshop at the 69th Highway Geology Symposium*  
  Portland, Maine
- **19–21** Annual Conference of the Florida Association of Environmental Professionals*  
  Orlando, Florida

### October

- **9–10** Transportation Resilience Innovations Summit and Exchange  
  Denver, CO
- **22–24** European Road Congress: Corridors for Shared Prosperity and Sustainable Mobility*  
  Dubrovnik, Croatia

## Upcoming Webinars

### June

- **5** Tools for a Sustainable Transit Agency
- **7** Classifying Fracture-Critical Members
- **13** Legally Defensible Disadvantaged Business Enterprise Disparity Studies
- **18** Nail it or Fail it: How to Build a Successful Mobility as a Service Story
- **21** Field Performance of Corrugated Pipes Manufactured with Recycled Materials

### July

- **10** Using Pavement Management to Set and Analyze Targets for Federal Reporting
- **11** Seismic Design and Accelerated Bridge Construction
- **12** Practices for Establishing Contract Time for Highway Projects
- **16** Water Finance Clearinghouse for Transportation Stormwater Infrastructure
- **17** Structural Design of Porous Asphalt Pavements
- **18** Preparing and Using Airport Design Day Flight Schedules
- **23** Port Data Portals for 21st-Century Shipping

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Additional information on TRB meetings, including calls for abstracts, meeting registration, and hotel reservations, is available at [www.TRB.org/calendar](http://www.TRB.org/calendar), or e-mail [TRBMeetings@nas.edu](mailto:TRBMeetings@nas.edu).

*TRB is cosponsor of the meeting.
INFORMATION FOR CONTRIBUTORS TO

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FEATURES are timely articles of interest to transportation professionals, including administrators, planners, researchers, and practitioners in government, academia, and industry. Articles are encouraged on innovations and state-of-the-art practices pertaining to transportation research and development in all modes (highways and bridges, public transit, aviation, rail, marine, and others, such as pipelines, bicycles, pedestrians, etc.) and in all subject areas (planning and administration, design, materials and construction, facility maintenance, traffic control, safety, security, logistics, geology, law, environmental concerns, energy, etc.). Manuscripts should be no longer than 3,000 words (12 double-spaced, typed pages). Authors also should provide charts or tables and high-quality photographic images with corresponding captions (see Submission Requirements). Prospective authors are encouraged to submit a summary or outline of a proposed article for preliminary review.

RESEARCH PAYS OFF highlights research projects, studies, demonstrations, and improved methods or processes that provide innovative, cost-effective solutions to important transportation-related problems in all modes, whether they pertain to improved transport of people and goods or provision of better facilities and equipment that permits such transport. Articles should describe cases in which the application of project findings has resulted in benefits to transportation agencies or to the public, or in which substantial benefits are expected. Articles (approximately 750 to 1,000 words) should delineate the problem, research, and benefits, and be accompanied by one or two illustrations that may improve a reader’s understanding of the article.

NEWS BRIEFS are short (100- to 750-word) items of interest and usually are not attributed to an author. They may be either text or photographs or a combination of both. Line drawings, charts, or tables may be used where appropriate. Articles may be related to construction, administration, planning, design, operations, maintenance, research, legal matters, or applications of special interest. Articles involving brand names or names of manufacturers may be determined to be inappropriate; however, no endorsement by TRB is implied when such information appears. Foreign news articles should describe projects or methods that have universal instead of local application.

POINT OF VIEW is an occasional series of authored opinions on current transportation issues. Articles (1,000 to 2,000 words) may be submitted with appropriate, high-quality illustrations, and are subject to review and editing.

BOOKSHELF announces publications in the transportation field. Abstracts (100 to 200 words) should include title, author, publisher, address at which publication may be obtained, number of pages, price, and ISBN. Publishers are invited to submit copies of new publications for announcement.

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◆ All manuscripts should be supplied in 12-point type, double-spaced, in Microsoft Word, on a CD or as an e-mail attachment.
◆ Submit original artwork if possible. Glossy, high-quality black-and-white photographs, color photographs, and slides are acceptable. Digital continuous-tone images must be submitted as TIFF or JPEG files and must be at least 3 in. by 5 in. with a resolution of 300 dpi. A caption should be supplied for each graphic element.
◆ Use the units of measurement from the research described and provide conversions in parentheses, as appropriate. The International System of Units (SI), the updated version of the metric system, is preferred. In the text, the SI units should be followed, when appropriate, by the U.S. customary equivalent units in parentheses. In figures and tables, the base unit conversions should be provided in a footnote.

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