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Back to the Future to Improve U.S. Transportation

The philosophy of one century is the common sense of the next.

Henry Ward Beecher

From ocean voyages to flights into outer space, new ways of traveling generate excitement because they expand opportunities for travelers to visit faraway places and to reach their destinations faster. Today, Americans' interest in new travel options has been piqued by the possibility of high-speed rail service that exceeds 300 miles an hour and by supersonic air service that does little damage to the environment. At the same time, most travelers would be ecstatic if they could drive on well-maintained roads at posted speed limits during rush hours, fly on airplanes that arrived at their destinations on time, and commute on buses and subways that provided safe, reliable, and clean service. Instead they are frustrated by a variety of problems with the nation's transportation system and disillusioned with public officials who seem incapable of enacting policies that will improve their travel experiences.

Historically, the private sector developed and operated new modes of commercial passenger and freight transportation in the United States and built transportation equipment and infrastructure. Those accomplishments were brought about by some of the nation's greatest business leaders, who were attracted to the transportation sector. According to the Harvard Business School's compilation of 1,000 *Great American Business Leaders of the Twentieth Century*, encompassing twenty-one industry classifications, 102 were leaders of transportation service companies (airlines and railways) or transportation manufacturing companies (automobiles and aerospace).¹

1. For the complete list, see www.hbs.edu/leadership/database.

Wright and Murphy (2009) compiled data indicating that by 1860 at least 7,000 private U.S. corporations had formed to operate bridges, canals, ferries, railroads, and roads. Total private capital investment in those transportation facilities and services amounted to roughly \$3 billion (in 1860 dollars), a significant share of the gross domestic product (GDP).² Most government investment in transportation was in local bridges, roads, and, in some states, canals. Klein and Majewski (2006) report that cumulative private sector investment in turnpike construction from 1800 to 1830 in New England and Middle Atlantic states amounted to 6.2 percent of those states' 1830 GDP. By comparison, spending between 1956 and 1995 by all levels of government to build the Dwight D. Eisenhower National System of Interstate and Defense Highways amounted to 4.3 percent of 1996 GDP.

Over time, however, all levels of government became increasingly involved in regulating, and in some cases operating and owning, transportation modes and infrastructure. The trend culminated in the post–World War II period with the creation of the federal Interstate Highway System. In the late 1970s, as part of a broader movement away from government intervention in the economy, the pendulum began to swing back when Congress partially deregulated most intercity transportation services. Since then, policymakers have pursued “partnerships” with the private sector in an effort to raise funds to maintain highways and airports and to build new transportation infrastructure. In essence, the United States has been trying to find an optimal mix of public and private sector involvement in transportation since its founding.

Do the current problems with the transportation system suggest that the nation should find a new stable equilibrium that will persist indefinitely? The unequivocal answer in this book is yes—namely, by designing experiments, which if successful, could take the United States back to the future by privatizing and deregulating the vast majority of the transportation system and by reducing the government's primary role in this sector to mitigating externalities, such as emissions, and to enforcing the antitrust laws.

I am not prepared to unconditionally call for privatization and deregulation because such a major change in public policy is likely to create good and bad unintended consequences. Accordingly, I recommend trying the policy in a few places to see what happens before implementing it nationwide.

2. Wright and Murphy (2009) note that \$1 billion was a significant amount of money in the first half of the nineteenth century. As a relative share of GDP, \$1 billion in 1860 was worth approximately \$3.2 trillion in 2007.

Policymakers should select transportation services in certain locales that are provided by the public sector, allow private firms to innovate in those services, and respond according to the results. By producing greater understanding of how market forces could allocate transportation resources, the experiments could guide widespread implementation of and justification for a new approach to transportation policy that could significantly improve the system's performance.

To be sure, it will take time and careful analysis for such a bold proposal to gain support among the public and policymakers and to be properly implemented. But addressing the anticipated political resistance and intellectual challenge to launching experiments will ultimately strengthen their design and improve their long-run chances for success. By developing an initial overview of the economic case for privatizing and deregulating the transportation system, I hope to show that fundamental policy reform is essential for ridding the system of its vast and intractable inefficiencies that have accumulated under decades of public sector management and control.

The Stakes: Transportation in the U.S. Economy

Automobiles and jet aircraft are commonly listed among the greatest human inventions of all time,³ while the U.S. road system represents the nation's largest civilian public investment, valued at \$2.4 trillion in 2006.⁴

These and other transportation inventions and investments have contributed significantly to U.S. economic growth by enabling firms to expand the size and scope of their markets. For example, if a more efficient road system enables a firm to serve regional markets as well as local ones, then the firm can improve its efficiency by realizing greater economies of scale, economies of scope (multiproduct production), and economies of multiplant operations. In addition, the improved road system can enable a firm to reduce its inventories because it receives faster and more reliable shipments of intermediate goods, to reduce its input costs, and to improve labor productivity by expanding its choice of workers and a worker's choice of employers. Households also gain by being better able to optimize their residential and workplace locations. And by reducing the costs of international trade, an improved road system further expands firms' markets and increases consumer welfare.

3. See, for example, www.greatachievements.org.

4. Bureau of Economic Analysis, U.S. Department of Commerce (www.bea.gov/).

In a conventional economic growth model where technological change raises the standard of living, transportation can be characterized as improving the technology firms use to produce and distribute their products and services. Indeed Krugman (2009) argues that the railroads contributed to a fundamental change in the U.S. economy—differentiating it into a farm belt and a manufacturing belt—by decreasing transportation costs. Transportation also promotes agglomeration economies that facilitate pooling labor and transferring information and ideas in metropolitan areas, which are additional sources of economic growth (Glaeser and Gottlieb 2009; Jones and Romer 2010). An inefficient urban transportation system results in sprawl that can limit agglomeration economies.

Unfortunately, a precise estimate of how much the U.S. transportation system contributes to the nation's economic growth is difficult to obtain. Denison (1985) constructed estimates of the determinants of growth and concluded that the gains from economies of scale, which as noted are largely facilitated by transportation, accounted for nearly 11 percent of the annual growth rate of national income in nonresidential business from 1929 to 1982. Some transportation case studies have found that metropolitan employment growth is promoted by greater airport activity (Brueckner 2003; Green 2006) and by additions to the highway capital stock (Duranton and Turner 2008).

Transportation's importance to the U.S. economy is more clearly indicated by its large share of economic activity, as measured by its share of GDP. As shown in table 1-1, in 2006 American consumers spent roughly \$1.1 trillion commuting to work, traveling for pleasure, and buying and operating vehicles. Firms spent roughly \$1 trillion shipping products to distribution centers and retail outlets, sending their employees to meet with customers and suppliers, and buying and operating vehicles (spending by firms on their employees' travel is included with consumers' transportation services). Local, state, and federal government spending on transportation infrastructure and services contributed \$256 billion and upped total spending on transportation to more than \$2.3 trillion, or roughly 17.5 percent of 2006 GDP.

Transportation also requires users to expend their time—a valuable commodity excluded from GDP. Table 1-1 indicates that in 2007 travelers spent roughly 175 billion hours in transit, and commodities shipped by surface and air freight absorbed 25.6 billion ton-days in transit. To convert those transit times into dollar figures, I assume that travelers value time at half their hourly wage (Small and Verhoef 2007 indicate that this is a reasonable assumption) and that shippers attach a cost of 7 percent of their shipments' value for each additional day spent in transit—a figure that is bounded by Winston and

Table 1-1. *Total Expenditures of Money and Time on Transportation in the United States*

<i>Category</i>	<i>Money expenditures (billions of 2006 \$)</i>	<i>Time expenditures (billions of 2007 \$)</i>
<i>Consumers</i>		
Motor vehicles and parts	\$434.2	(175.61 billion hours multiplied by half of the hourly wage, \$8.69)
Gasoline and oil	\$318.6 ^a	
Transportation services	\$340.6	
Total	\$1,093.4 ^b	\$762.8 ^c
<i>Firms</i>		
Shipping goods	\$829.6	(25.6 billion ton-days multiplied by the avg. value per ton of \$1,213 discounted by 7% per day)
Vehicles and maintenance	\$179.7	
Total	\$1,009.3 ^d	
<i>Government</i>		
Federal	\$31.8	None
State and local	\$208.9	
Defense	\$14.8	
Total	\$256.0 ^f	
Grand total	\$2,358.7	\$2,935.1

a. To avoid double counting, gasoline and oil should be net of federal and state taxes, which support government spending on transportation. I could not verify that such taxes were excluded in consumer expenditures on gasoline and oil. If they were not, they amount to roughly \$50 billion based on 2006 federal taxes and a weighted average of state taxes.

b. "Transportation services" includes both purchased urban commuting transportation as well as purchased intercity transportation, which includes business-related travel. Source: Bureau of Economic Analysis, National Income and Product Accounts, Table 2.3.5, *Personal Consumption Expenditures by Major Type of Product* (Q1 2008).

c. The time that people spend in transit is based on calculations of time in transit for short-distance trips and trips of more than fifty miles, both based on National Household Travel Survey (NHTS) 2001 data, the most recent year for which data are available. For short-distance trips, a constant breakdown of travel time per trip in minutes (for example, trips of 0–4 min, 5–9 min, and so forth) between 2001 and 2007 is assumed (based on evidence of this constant relationship between data published in 1995 and 2001). Total annual short-distance person trips for 2007 are estimated based on historical year-on-year percentage increases in these person trips per capita. To estimate the number of hours that travelers spend in single-day travel on short trips, I distribute that number of 2007 person trips by the breakdown (averaged between the 1995 and 2001 NHTS) of travel time per trip. Because the only data collected on long-distance passenger travel were published in 1995 and 2001, and because the 1995 and 2001 numbers are not directly comparable and a projected year-on-year growth rate cannot be calculated, it is necessary to assume that long-distance passenger trips grew at the same rate as short-distance person trips. It is then

(continued)

Table 1-1 (*continued*)

also necessary to assume that the ratio of passenger miles to passenger trips remained constant through 2007 in order to calculate person miles based on projections of growth in person trips. Furthermore, it is also necessary to assume that the same percentage breakdown of these long-distance trips by transportation mode holds from 1995 and 2001. For each of the transportation modes, person hours traveled are calculated assuming constant average speeds for each mode. Mode categories “water” and “other” are disregarded because average speeds are not obvious and their contribution to the total is minimal. Finally, to calculate the value of person hours traveled in total, for both short- and long-distance trips, total hours are multiplied by half of the average hourly wage based on a forty-hour workweek. Sources: National Household Travel Survey (1995 and 2001); Bureau of Transportation Statistics (BTS) Table 1-39, *Long Distance Travel in the U.S.* (2001); BTS American Travel Survey, *Travel in the United States*, Table 1 (1995); U.S. Census, *Average Weekly Wage* (2007).

d. The expenditures of firms on transportation are calculated based on components: expenditures on shipping goods, and expenditures related to vehicles and maintenance. Expenditures on shipping goods are calculated from BTS data on total freight transportation expenditures. The most recent year for which data on these expenditures are available at the time of writing is 2001. Year 2006 numbers are therefore a forward projection based on average historical year-on-year percentage growth rates adjusted for inflation. Expenditures on vehicles and maintenance are calculated from BTS data on total gross private domestic investment for 2006 and confirmed by similar data from BEA. Sources: BTS Table 3-7, *Passenger and Freight Transportation Expenditures* (2001); BTS Table 3-3a, *U.S. Gross Domestic Demand Attributed to Transportation Related Final Demand* (2006); BEA National Income and Product Accounts, Table 5.5.5, *Private Fixed Investment in Equipment and Software by Type* (2008).

e. Time expenditure in transportation for firms is based on calculations made for freight ton-miles by transportation mode from BTS data. Year 2005 is the most recent year for which freight ton-mile data are available; therefore historical average year-on-year percent increases were calculated between 1985 and 2005 in order to project forward to 2007. Average speeds based on freight transportation modes were assumed, taking into account wait times, especially important for rail and waterborne freight. For waterborne freight in particular, average speeds are segmented based on where the travel was conducted (open ocean, Great Lakes, and the like). Furthermore, the total number of hauls is calculated for waterborne freight based on average haul length, to which one additional day per haul is added to reflect wait times at port loading and unloading freight. Again, because data on average haul length were last published in 2005, a projection to 2006 is made using an average historical year-on-year percent increase. Across all modes, total ton-miles per day were calculated based on the assumed average speeds by mode and any added wait times. Using year 1993, 1997, and 2002 freight value data, a projection for total 2007 freight value is again made based on historical year-on-year percent increases. Average ton-value is constructed from this total freight value and total freight tonnage. Finally this average ton-value is discounted by 7 percent for every ton-day in transit. Sources: BTS Table 1-46b, *U.S. Ton Miles of Freight (BTS Special Tabulation)* (2005); BTS *Commercial Freight Activity in the United States by Mode of Transportation: 1993, 1997, 2002* (2002); BTS *Commodity Flow Survey* (1993, 1997, 2002); BTS Table 1-35, *Average Length of Haul, Domestic Freight and Passenger Modes* (2005).

f. Federal and state and local expenditures are a summation of government consumption expenditures for the following component categories; highways, air, water, and transit and railroad. Defense expenditures combine expenditures on transportation of materials and travel of persons. Sources: BTS Table 3-3a, *U.S. Gross Domestic Demand Attributed to Transportation Related Final Demand* (2006); BEA, National Economic Accounts, Table 3.15.5, *Government Consumption Expenditures and Gross Investment by Function* (2006).

Langer's (2006) daily discount rates for shipments of bulk and perishable commodities. The result is that transportation accounts for another \$2.9 trillion in economic activity for a grand total of roughly \$5 trillion!⁵

Finally, transportation's influence extends beyond the nation's borders. In this era of globalization, international trade—whose share of U.S. GDP has grown to more than 15 percent—is facilitated by ocean and Great Lakes transportation and by trucks and railroads that carry freight to and from the nation's ports. International passenger and freight air traffic is intertwined with the domestic system. And as a major source of greenhouse gases, transportation is at the center of the global challenges presented by climate change.⁶ The United States and other countries face the challenge of simultaneously reducing their emissions and improving the efficiency of their transportation systems to facilitate the projected growth in domestic and international trade and travel.

Certain government regulations and expenditures appear to single out transportation as the lifeblood of the U.S. economy. For instance, Congress passed the Railway Labor Act in 1926 and later amended it in 1936 to force airline and railroad workers to resolve labor disputes by engaging in arbitration instead of significantly disrupting interstate commerce by going on strike. The federal government's recent investments in transportation infrastructure and services have been a critical component of the American Recovery and Reinvestment Act of 2009 (popularly known as the stimulus bill) to spur the nation's growth. Against this background, it is useful to understand how the public sector came to manage, regulate, and operate so much of the system.

The Evolution of Public Sector Involvement

A capsule history of the major U.S. transportation modes and infrastructure suggests that all levels of government have tended to expand—and only recently partly withdraw—their control over transportation infrastructure and services in response to major economic problems. In general, government intervention in transportation increased because of exigent circumstances

5. To provide a fair comparison of this estimate with the value of all U.S. economic activity, one would need to estimate the value of time that individuals spend in all of their activities and include that figure in GDP.

6. Jack Short reports that the transport sector accounts for nearly one-quarter of global carbon dioxide emissions from fuel combustion and that this share is growing. See "Transport and Energy: The Challenge of Climate Change," *OECD Observer* (March 2008), pp. 20–21.

created by private firms' financial crises and not because of well-developed conceptual arguments that justified greater public sector involvement. In addition, as I note later, government regulations often contributed to those crises, and public officials made little effort to help private firms survive. In any event, I do not attempt to resolve whether government's greater role following the initial development of each component of the transportation system was justified, but I do develop the case that the system's evolution with greater public sector involvement has caused it to accumulate inefficiencies that will take decades to shed.

Roads

The first roads in the United States were built by private enterprises; the most important of these were turnpike companies that received a franchise from a state to build, operate, and maintain roads and bridges. State charters specified organizing procedures, capitalization, and par value of stock, and state legislatures set toll policies. During the nineteenth century more than 3,000 private companies operated toll roads.⁷ Some of the turnpikes were macadamized or planked and employed grading on steep hills to aid travel for heavier (nonmotorized) vehicles.

States became more involved in roads as private turnpikes failed financially for various reasons, including generous state-granted toll exemptions, rigid toll rates, severe toll evasion problems (Klein and Fielding 1992), and overly optimistic forecasts of how long wooden planks would last (Klein and Majewski 1988). Federal involvement in the nation's roads can be traced to the U.S. Constitution, which gave Congress the power to establish post offices and post roads. The 1916 Rural Post Roads Act authorized federal grants to pay for up to half the costs of constructing rural roads used to deliver the mail. Initially, federal highway programs were financed entirely from general revenues. In 1932 the federal government imposed a tax on gasoline fuel, the revenue from which was formally earmarked for highway programs when the Highway Trust Fund was created in 1956 (Burch 1962). Major federal transportation legislation in later decades significantly increased the size of the trust fund and federal highway expenditures.⁸ With few exceptions, federal funding programs have favored public ownership and operation, while

7. Klein and Majewski (2006) and Klein and Fielding (1992) provide concise histories of private toll roads.

8. Oregon passed the nation's first tax on gasoline, 1 cent a gallon, in 1919. Ten years later, all forty-eight states had imposed gasoline taxes that ranged from 1 to 3 cents a gallon.

interest groups representing state and local officials, such as the National Governors Association and the U.S. Conference of Mayors, have lobbied for increased flexibility in the use of those funds.

Airports

Private airports, some of which were owned by airlines, were the first airports in the United States. By 1912 twenty airports were in use throughout the country (Wells 1996). Municipally owned airports emerged in those communities that were eager to be connected with the rest of the country. During the Great Depression, private commercial airports experienced serious financial problems and were taken over by local or state governments. It is possible that some private commercial airports could have survived with temporary public assistance and that private airport competition could have developed as the demand for air travel grew in subsequent decades, but the Federal Aviation Administration prohibited private airports from offering commercial service after it was established in 1958 (see below).

The Civil Aeronautics Act of 1938 paved the way for federal funding of airports by authorizing funds to build additional airfields (Dilger 2003). Federal funding subsequently evolved and led to the creation of the Airport and Airway Trust Fund. The trust fund is composed of revenues from aviation excise taxes, fuel taxes, and other similar revenue sources and is used to finance the Federal Aviation Administration's Airport Improvement Program, which disburses funds to airports of all sizes.

Air Traffic Control

The first air traffic control system in the United States appears to have been developed in 1935 by the principal airlines using the Chicago, Cleveland, and Newark airports. The airlines agreed to coordinate monitoring of airline traffic between those cities and opened the first Airway Traffic Control Center in Newark, followed by the establishment of centers in Chicago and Cleveland.

Private air traffic control soon ceased because of the financial pressures brought on by the Great Depression. The federal government became involved with air traffic control in 1936, providing en route service, while municipal government authorities operated the towers at airports. In the wake of increasing air traffic and a well-publicized June 1956 midair collision between long-distance United Airlines and TWA flights over the Grand Canyon, Congress passed the Federal Aviation Act in 1958, which gave responsibility for managing the nation's navigable airspace to the new

Federal Aviation Agency (renamed the Federal Aviation Administration in 1967, when it was brought into the newly established U.S. Department of Transportation). Financial support for the air traffic control system comes from airline ticket tax revenues that go into the Airport and Airway Trust Fund and from general revenues.

Urban Transit

The first urban rail systems in the United States—built by private companies in Boston in 1898 and in New York City in 1904—were given charters by those cities' governments to establish rights-of-way. Private companies also operated the first urban motor buses in the nation. Transit fares and routes were subject to regulation by local or state authorities.

The advent of the automobile put many transit operations under bankruptcy court supervision by the late 1920s. During the 1940s and 1950s, city governments gradually took over private intracity bus and rail systems as intense competition from the automobile accelerated the decline in transit ridership. But Pashigian (1976) and Hilton (1985), among others, argued that private operators could have succeeded (as they have in other countries) if regulatory constraints had not seriously hampered their financial performance. Pashigian concluded that regulation was simply an intervening step to facilitate public ownership. By the 1960s city officials called on the federal government to help support urban transit on the grounds that it would stimulate urban renewal. Thus the 1961 Housing Act and the 1964 Urban Mass Transportation Act gave cities money to buy most of the remaining private transit companies and signaled the start of major federal funding of bus and rail capital expenditures.

Taxis and Jitneys

Taxi and jitney service has always been provided by the private sector. Gas-powered taxicabs began operating in eastern U.S. cities at the beginning of the twentieth century. Regulation of taxicabs evolved from setting safety standards to governing fares, entry, routes, and schedules. Such regulations are not uniform throughout the country; in fact, twenty or so urban areas have deregulated taxi operations (Winston and Shirley 1998).

Jitneys occupy a niche between a taxi and a bus. They typically are small-capacity vehicles that follow a rough service route but can go out of their way to pick up and drop off passengers. Jitney service was first offered in the United States in Los Angeles in 1914. But jitneys never blossomed as a mode nationwide because regulations, often demanded by streetcar companies,

compromised service. Today jitneys operate in a handful of mainly inner-city areas, subject to regulations on fares and service.

Intercity Transportation

With the exception of Amtrak and Conrail, commercial U.S. railroads, motor carriers, buses, pipelines, airlines, and water carriers have been owned and operated by private firms, but over time they have been subject to varying degrees of federal and state economic regulation as dictated, in large part, by political forces. With the support of rail carriers and farmers, railroads were first regulated by the 1887 Interstate Commerce Act, ostensibly to prevent “destructive competition.” Hilton (1966) argued that the act, which created the Interstate Commerce Commission (ICC), was in fact an incorrect response to the economic conditions of the time. In 1970 Amtrak was created as a public corporation to relieve freight railroads of unprofitable passenger service. Amtrak was expected to be financially self-sufficient within a few years of its inception and to operate as a private entity without subsidies, but nearly forty years later that expectation has not come close to materializing.

Spurred by strong lobbying by railroads fearful of growing motor carrier competition, Congress enacted the Motor Carrier Act in 1935 and gave the ICC authority to regulate truck rates and entry into markets. The Motor Carrier Act also authorized the ICC to regulate fares, routes, entry, and exit of interstate bus lines. Individual states had begun to regulate intrastate bus and trucking operations at least a decade before the 1935 federal act.

The nation’s petroleum pipelines were subjected to ICC regulation in 1906, as a reaction to John D. Rockefeller’s alleged use of them to monopolize the oil industry. In 1977 interstate regulation of petroleum pipelines was transferred to the Federal Energy Regulatory Commission (FERC). As the ICC’s successor, the Surface Transportation Board regulates pipelines that provide interstate transportation of commodities other than oil, gas, or water, such as anhydrous ammonia and coal slurry.

During the airline industry’s infancy, mail contracts enabled passenger service to be financially feasible; thus in the 1920s the postmaster general became the first regulator of the airlines. The major airlines suffered severe financial losses after President Franklin Roosevelt rescinded their airmail route authority when they were charged with colluding to monopolize the nation’s airways. By the time any carrier started to show a profit, the entire industry had been brought under regulation by the 1938 Civil Aeronautics Act.

Government has intervened in water transportation, including private carriers of inland and ocean freight, port terminals and landside access, and

navigable waterways, as it has in other forms of transportation. The Transportation Act of 1940 gave the ICC regulatory authority over inland waterway carriers' rates and entry, while ocean carriers' rates and service have been determined since 1916 through rate conferences and agreements. Ports were originally developed by private investors—mainly shipping companies—but subject to regulation by local or regional authorities (Stevens 1999). Maintenance and expansion of navigable channels is performed by the Army Corps of Engineers. Expenditures on ports are supported by revenues, placed in a trust fund, that are generated by the Harbor Maintenance Tax.

From its inception, economic regulation compromised the efficiency of the intercity transportation system while producing few, if any, improvements. The 1950s system depicted by Meyer, Peck, Stenason, and Zwick (1959) consisted of railroads that provided poor service and earned a low rate of return, airlines that primarily served affluent travelers despite technological advances that substantially lowered the costs of air travel, and motor carriers that charged rates so high that many shippers found it less costly to operate their own trucking service. Intercity buses virtually disappeared from the transportation system. Scholars argued that the common source of the problems was regulation, and some twenty years later policymakers were persuaded to pass deregulation legislation, including the Airline Deregulation Act of 1978, the Motor Carrier Reform Act of 1980, the Staggers Rail Act of 1980, and the 1982 Bus Regulatory Reform Act. Those acts substantially (but not completely) deregulated the U.S. rail, motor carrier, airline, and bus industries.⁹

9. Air cargo regulations for entry, routes, and rates, which were adopted by the Civil Aeronautics Board in 1947, were dismantled by congressional legislation in November 1977. In 1992 FERC Order No. 636 (referred to as the Final Restructuring Rule) effectively unbundled natural gas pipelines to promote competition, but FERC still regulates rates. Shippers can obtain discounts by obtaining “interruptible” service (that is, a pipeline owner can stop service to a customer when demand is high under conditions specified by a contract). Shippers can also resell surplus pipeline capacity to other entities and negotiate rates for storage, hub, and transportation service. As part of the ICC Termination Act of 1995, the Surface Transportation Board was given authority to regulate inland water carriers subject to a “zone of reasonableness” in which a published tariff rate would be deemed reasonable. (Specifically, a tariff rate can be no more than 7.5 percent higher or 10 percent lower than it was one year earlier, subject to adjustments by the Producer Price Index.) Water carriers may also offer unregulated contract carriage rates. In contrast to the deregulatory actions in domestic transportation, international airline travel between the United States and some other countries is still subject to bilateral negotiations that regulate fares and service. Nearly 100 open-skies agreements have to a varying extent deregulated fares and services on routes between the United States and countries in the European Union and in other parts of the world. Fox and White (1997) point out that U.S. ocean freight vessels were regulated, protected from foreign competition, and subsidized. The 1998 Ocean Shipping Reform Act enables carriers to offer customer-specific shipping services differentiated by price and quality.

Regulation of urban transportation persists because federal deregulatory actions did not affect state or city regulations. But are such regulations justified? Are intercity and urban transportation sufficiently different from each other that the government should continue to be heavily involved with the urban system and its infrastructure? Or should the intercity transportation deregulation experiment be extended to privatize and deregulate more of the U.S. transportation system?

Privatization and Deregulation

Government intervened in a developing urban and intercity transportation system that faced different problems than it does today. Regardless of the justification for that intervention, most policymakers, transportation providers, and users have increasingly concluded that the performance of the current system is generally unsatisfactory and that government's traditional solution (reinforced by classic political pressure from interest groups) of spending our way out of the problems is not a viable option because the federal government and most state governments are facing severe fiscal pressures for the foreseeable future.

Privatization and deregulation may appear to be an extreme approach, especially given past problems with private provision of certain transportation services and infrastructure and current doubts about whether markets can be trusted to deliver essential services. At the same time, government failure in transportation has solidified inefficient practices that must be purged and has slowed technological advance that must be accelerated. Private firms may accomplish those goals if they are not constrained by the kinds of regulatory interventions that undermined their initial efforts to develop the system.

Potential Benefits

The essential goal of privatization and deregulation of the U.S. transportation system is to develop market-based institutions that are stimulated by competition to respond to customers' preferences, expand choices, minimize costs, and introduce innovative services and technologies. Privately owned enterprises selling services directly to the public are dependent on customer goodwill and in contrast to public sector providers less likely to have their operations shaped by special interests that substantially raise the cost of transportation to the general public.

The evidence I synthesize in subsequent chapters indicates that the annual efficiency costs associated with public ownership and (mis)management of

the system clearly exceed \$100 billion, not including the costs of impediments to innovation and slow technological advance. Theoretical and limited empirical arguments suggest that privatization and deregulation could significantly eliminate current inefficiencies and spur innovations that are difficult to envision in the current environment, but the case would be much more persuasive if it were accompanied by evidence obtained from privatization experiments in the United States.

Experiments

Federal regulators obtained credible and ultimately influential advice to significantly withdraw their interventions in intercity transportation from evidence based on unregulated intrastate airline markets in California and Texas and deregulation of truck rates for certain commodities and from empirical studies indicating that intermodal (truck-rail and, in some cases, barge-rail) competition could discipline partially deregulated railroad rates for most commodities. In fact Derthick and Quirk (1985), Breyer (1982), and Levine (1981) argue that intercity transportation deregulation would not have occurred without such evidence.

In contrast, it has been argued that the existence of monopoly elements in urban transportation (public transit and urban highways), intercity highways, and aviation infrastructure (airports and air traffic control) prevents competition from developing and justifies government ownership—or at least regulation. Because evidence in the United States is not available to address this fundamental concern, policymakers and interested stakeholders should not embark on a privatization and deregulation policy without being persuaded that effective competition can develop in those transportation services to assuage concerns that privatization will simply create private monopolies.

Long-term experiments that are carefully conducted by policymakers and that allow the economic effects of privatization to fully develop could provide the essential evidence. Such experiments may be compelling to policymakers in this recessionary climate because they may lead to greater private sector involvement in transportation that could improve government budgets and lead to innovations that spur economic growth. For example, privatization of a major highway would be expected to create a monopoly. But the theory of dynamic monopoly suggests that Coasian bargaining between road users who are represented by a third party and a private highway authority could generate a competitive outcome that enables motorists to benefit from price and service packages that are aligned with their varying preferences for speed

and reliability. In the process government would obtain revenues from selling the highway and would be relieved of capital and maintenance expenses, while the private highway operator would have an economic incentive to introduce new technologies, which the public sector has not introduced, to improve traffic flows and safety.

The notion of privatization experiments is a metaphor because I am not suggesting that they would be controlled experiments; they are more akin to the Schumpeterian notion of creative destruction where private operators are given the opportunity to compete with each other to determine the most efficient production processes and innovative technologies that respond to travelers' and shippers' preferences. Accordingly, in a later chapter I identify the key features of specific locations where such experiments are likely to be feasible and where the benefits from privatization are most likely to be realized, thereby generating credible evidence that could help overcome the remaining political hurdles and contribute to a constructive change in transportation policy.

Political Reality

The deep recession that began in late 2007 has significantly reduced the public's and policymakers' confidence in markets and undoubtedly made it more difficult politically to privatize and deregulate the transportation system. Of course, the U.S. economy will eventually grow again for a sustained period, and memories of the recession's effects will start to fade. In addition several factors suggest it is important to look beyond the current political climate. First, as noted, the problems associated with the transportation system are primarily attributable to government failure, not market failure, and the public has become frustrated with the government's inability to improve the system. Second, the nation has been searching for the optimal mix of public and private participation in transportation for three centuries, and it is not going to accept the status quo as a long-run equilibrium. Third, political winds shift very quickly, as indicated by the public's growing concern that the Obama administration's intervention in the economy may be excessive. Fourth, budgetary pressures have made public officials more receptive to private sector participation in transportation, while the long-term effects of the recession have intensified officials' interest in private sector innovations in transportation and other areas of the economy that could spur the nation's growth.

To be sure, overcoming the status quo will be difficult when the costs of change are concentrated among powerful interest groups and the benefits

are likely to be broadly dispersed. The experiments that I am advocating are intended to build political support carefully by convincing transportation users, a critical interest group that is likely to be skeptical about privatization and deregulation, that they will be better off. For example, Schaller (2010) argues that a key lesson from New York City's failed effort to implement Mayor Michael Bloomberg's congestion pricing plan is that drivers must be convinced that highway tolls would make them better off. Policymakers could then overcome remaining interests, especially labor, by arguing that the status quo is not a viable option because the transportation system will only continue to get worse given the enormous fiscal deficits and that privatization and deregulation could relieve budgetary pressures and spur innovation and economic growth.

A Road Map

Readers may find it useful for me to summarize my theoretical perspective on the privatization debate and the evidence that I use to develop my argument. The public sector's involvement in the U.S. transportation system is often taken for granted, but, as noted, the private sector initially provided much of the nation's transportation services and facilities that promoted economic development and growth. For example, private ferries, railroads, trolleys, and toll roads (such as the Calistoga road) were central to the rapid development of Marin and Sonoma counties in the San Francisco Bay Area.¹⁰ The fact that those operators fell prey to the business cycle or bad luck or planning was not, in itself, justification for a public takeover.

Indeed, the justification for government intervention and takeover of transportation during the past century is far from clear. One cannot make the case by simply pointing to alleged market failures, such as the existence of scale economies in transit operations, and claim that workable competition was not possible. In theory, market failures should be compared with government failures and how the consequences of each will evolve over time. Periodic financial failures by private firms are not necessarily bad if inefficient firms exit and are eventually replaced by firms that use more efficient production methods and up-to-date technologies. Public provision and regulation may cause greater social costs than are caused by private firms that are struggling financially. Moreover, such costs may be concealed from the public, the majority of whom do not realize the extent of increasing public sector

10. I am grateful to Randall Pozdena for this point.

inefficiencies and taxpayer subsidies. Indeed, the strongest justification for privatization may be that it can eliminate dynamic X-inefficiencies—steadily rising production costs and little innovation and technological advance.

Of course, the relative costs and benefits of public and private sector provision of transportation must be resolved empirically. I rely on the available scholarly assessments of the performance of the various components of the U.S. system, retrospective assessments of the effects of U.S. intercity deregulation, and assessments of the hypothetical effects of privatization and deregulation of transportation in the United States and the actual effects of privatization and deregulation of transportation in foreign countries. My focus is primarily on economic efficiency—resource allocation within the transportation system—rather than social efficiency, which considers, for example, the broader effects of the system on the environment. But I do comment on such issues when appropriate. My focus on efficiency implies that I believe that the transportation system *per se* should not be compromised to improve the quality of life for the working or nonworking poor. Instead, the system should be as efficient as possible, and social goals such as improving the mobility of poor citizens should be accomplished efficiently by, for example, instituting a voucher system.

I stress that far more scholarly evidence exists on the performance of the current U.S. transportation system under public management and the effects of partial deregulation than on the hypothetical effects of privatization in the United States and on the actual effects of privatization and deregulation in other countries. In addition, the extent of the evidence varies greatly by mode and the type of infrastructure (for example, airlines and airports have been thoroughly studied, while inland barge transportation and ports have received little scholarly attention).

I round out some of the scholarly evidence with anecdotal and descriptive evidence from the media and government reports. But because the existing empirical evidence is still incomplete, I conclude my journey by calling for experiments to fill in critical gaps in our knowledge of the effects of privatization and deregulation to help resolve the debate.

Along the way my argument is developed in two parts. In the first part, I motivate the case for privatization and deregulation by analyzing the U.S. transportation system's inefficiencies and by arguing that political and institutional constraints on introducing efficient reforms have enabled those inefficiencies to persist and grow. Major inefficiencies arise from residual regulation of intercity transportation and from public ownership and management of urban transportation and aviation infrastructure.

In the second part, I discuss the evidence indicating that privatization and deregulation could raise national welfare and explain the role of experiments. I indicate why deregulation of intercity transportation, despite constraints on private firms, was successful and outline a theoretical framework for assessing the economic effects of privatizing and deregulating the remaining parts of the transportation system. Based on academic simulation studies and transportation privatization experiments in foreign countries, I enrich the theory with the available empirical evidence. Unfortunately, the absence of privatized transportation services and infrastructure in the United States means that researchers have not had a good “laboratory” to develop persuasive evidence on the likely economic effects of privatization and deregulation. Accordingly, I outline political and economic considerations to guide experiments that would generate actual evidence of the effects of the policy on the performance of the U.S. transportation system. Based on the arguments advanced in the preceding chapters, I expect that the evidence will be quite positive and that top-level leadership will use it for outreach and public education to achieve a constructive long-term policy change that places greater reliance on the private sector to provide an essential input into Americans’ work and recreation.