

Commission Briefing Paper 5A-17

Overview of the Sustainability of Current Revenue Sources for Railroads and Intermodal Facilities

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Introduction

This paper is part of a series of briefing papers to be prepared for the National Surface Transportation Policy and Revenue Study Commission authorized in Section 1909 of SAFETEA-LU. The papers are intended to synthesize the state-of-the-practice consensus on the issues that are relevant to the Commission's charge outlined in Section 1909, and will serve as background material in developing the analyses to be presented in the final report of the Commission.

The purpose of this paper is to provide an overview of the sustainability of existing revenue sources for passenger rail, freight rail, and intermodal facilities. Two possible definitions of sustainability are considered, which we refer to as *financial* sustainability and *social* sustainability. The first of these describes the ability of existing revenue sources under current political conditions to fund the repair, maintenance, and improvement projects needed to maintain current travel conditions on the nation's transportation networks. The second, in turn, focuses on the relative ability of alternate funding strategies to promote social goals related to economic efficiency, equity among users and among income groups, and a healthy environment. Strategies that serve both types of sustainability are highly desirable and it is important to evaluate future policy options in terms of both dimensions of sustainability. After developing a framework to consider funding sources from both of these perspectives, the paper analyzes recent trends and future prospects in financing various modes of transport.

Background and Key Findings

There are two broad approaches to funding transportation infrastructure: the application of user fees levied on those who use the transportation networks and the allocation of general revenues. In many cases the use of general revenues can be more politically feasible – and in turn more financially sustainable – as the costs are divided across a broader pool of taxpayers and thus seem lower on a per-person or per-transaction basis. On the other hand, well-designed user fees promote greater social sustainability by fostering economic efficiency in the use of transportation infrastructure along with greater equity in the allocation of costs among users. Depending on their structure, they may also reduce environmental externalities. Owing to such advantages, transportation finance in the U.S. has historically relied more heavily on user fees such as motor fuel taxes. In recent years, however, there has been a gradual shift away from user fees, with greater reliance being placed on general revenue sources. While in most cases this trend is motivated by the desire to bolster financial sustainability, it nonetheless works counter to the goals of social sustainability. Key mode-specific findings are as follows:

- **Passenger rail revenues:** Most intercity passenger rail service in the U.S. is provided by Amtrak, which covers about two thirds of its operating expenses through ticket receipts and

receives the remainder of its funding from federal and state sources. While political support for the current level of subsidization appears relatively stable, calls to expand high-speed rail in federally-designated corridors would require substantial new capital investments. It is not clear that the public will be willing to shoulder the entirety of this burden, so increased reliance on user fees may be necessary in order to fund this expansion.

- **Freight-rail revenues:** Freight rail is privately owned and to a large extent privately funded. Yet returns on capital within the industry do not permit the level of investment necessary to keep pace with growing freight demands, and this may lead to increased congestion on the highways as well as increased emissions of harmful pollutants should an increased share of freight shift to the trucking industry in future years. It may therefore be beneficial to channel additional public support to the development of rail infrastructure in the short term. Over the longer term, if rational pricing principles were applied to both truck freight and rail freight (such as congestion fees, emissions fees, and weight-distance truck tolls), the relative cost advantages of shipping by rail could increase, thereby enabling greater returns on investment and potentially reducing the need for public support.
- **Intermodal revenues:** Intermodal freight facilities are typically self-supporting through user fees and other sources of operating revenue. Projects to improve access routes and relieve congestion around intermodal facilities, on the other hand, often occur at the intersection of public and private facilities, making it more difficult to ascertain the relative share of public and private benefits and allocate financial responsibilities accordingly. Because of this hurdle, intermodal access improvements around ports, airports, and other cargo hubs have not kept pace with the explosive growth in goods movement, resulting in greater congestion and reduced system-wide efficiency. In the near term, providing greater access to federal funding sources and financing programs not traditionally targeted at goods movement could provide some revenue relief. Over the longer term, it would be helpful to establish a dedicated revenue stream based on user fees to finance such projects, and it may also be beneficial to price the externalities related to goods movement such as congestion and emissions in order to fund important mitigation projects.

Staff Comments

This paper complements the papers, “Trends and Projections of Current Revenue Sources for Highways and Transit” and “Overview of Sustainability of Current Revenue Sources for Highways and Transit.” Space did not permit combining the papers. Also differences in the issues and the amount of data available on revenues for the various modes did not lend themselves to a consolidated discussion of all surface transportation modes.

Defining Financial and Social Sustainability

At the most basic level of analysis, alternative transportation funding mechanisms generate revenues to repair and improve system infrastructure. To the extent that the funds are sufficient to maintain existing travel conditions in the face of increasing demand, they may be judged as *financially sustainable*. Because certain revenue sources must be periodically raised (for instance, to keep pace with inflation) or reauthorized by voters or legislators, the question of political feasibility also has a strong influence on financial sustainability.

Beyond the simple question of whether or not existing revenue sources generate a sufficient level of funding, one may also examine the degree to which various revenue strategies support or

undermine other social goals related to economic efficiency, equity among users and among income groups, and a healthy environment. Depending on how we structure our finance mechanisms for funding transportation, we can send price signals that encourage individuals to select more fuel-efficient vehicles with lower emissions, that encourage truckers to adopt axle-load configurations that reduce pavement wear, and that reduce the demand for travel during the most congested periods – or not. To the extent that transportation finance regimes support such goals, they may be judged as *socially sustainable*. Given the continued growth in urban and suburban congestion, as well as the looming specter of human-induced global climate change, the concept of social sustainability is likely to gain increasing attention in the coming years. Fortunately our system of transportation finance, if thoughtfully constructed, has the opportunity to play a significant role in addressing these pressing social challenges.

Sustainability of Transportation Finance in the U.S.

There are two broad potential sources for transportation funds: general revenues, including income taxes, property taxes, and sales taxes, which are unrelated to use of the transportation system; and user fees, including tolls, fares, motor fuel taxes, vehicle registration fees, container fees, and the like. The recent success of local-option transportation measures (also referred to as "earmarked" or "specialized" taxes), most of which tap general revenue sources such as sales taxes, suggests that the political feasibility of this approach is relatively high. In part, this may result from the fact that the costs are spread across a larger pool of taxpayers such that the per-person or per-transaction costs appear to be lower. While general revenue sources may support financial feasibility in the near term, they do little to encourage other social goals such as reductions in congestion, air pollutants, and greenhouse gases.

In contrast, user fees can be very effective in supporting social sustainability, although the degree of effectiveness depends on the structure of the user fee. First, it should be noted that there are both direct and indirect user fees. Direct user fees, such as tolls and fares, are levied at the time and place of use. In contrast, indirect user fees, including motor fuel taxes, are applied to activities and purchases that depend upon use of the system. It is also helpful to distinguish between marginal-cost, average-cost, and fixed-cost user fees. Marginal-cost user fees, such as congestion tolls, per-mile emissions fees, or axle-weight truck tolls, attempt to capture the marginal social cost incurred by travel at a particular place and time. Average-cost user fees, such as motor fuel taxes, flat tolls, or fares, are structured to reflect the average cost of travel across all users, prorated by the level of use. Finally, fixed-cost user fees, such as vehicle sales taxes or registration fees, are one-time (or periodic) fees that do not vary with the actual amount of travel performed. The potential to achieve the different goals of social sustainability under alternate funding sources based on general revenues and user fees is summarized in Table 1.

Table 1: Potential Relationship Between Revenue Sources and Social Sustainability Goals

Source	Form	Examples	Economic Efficiency	Equity Among Users	Equity Among Income Groups	Environmental Goals
Direct or Indirect User Fees	Marginal cost	Congestion tolls, emissions fees	Strong	Strong		Strong
	Average cost	Motor fuel taxes, flat tolls, fares	Moderate	Moderate		Moderate
	Fixed cost	License and registration fees	Weaker	Weaker		Moderate
General Revenues	General Fund or "Specialized"	Income taxes			Moderate	
		Property taxes				
		Sales taxes				

As the table makes clear, the performance with respect to social sustainability goals can be improved by transitioning, where feasible and sensible, from general revenues to user fees, and

from fixed-cost and average-cost user fees to marginal-cost user fees (the lone exception to this rule is equity among income groups; graduated income taxes are progressive in nature, where as most other revenue sources are income-regressive). In part for this reason, transportation finance regimes in the U.S. have traditionally centered on some form of user fees. Table 2, excerpted from a recent policy study by the Hudson Institute (Grenzeback 2004), provides a picture of the public funding sources for major transportation modes in the U.S. as of the year 2000.

Table 2: Allocation of U.S. Transportation Revenues by Mode in 2000 (\$ Billions)

Source	Highway	Transit	Passenger Rail	Freight Rail	Total	Share
Direct User Fees	\$5.3	\$8.1	\$1.3	\$0.0	\$14.7	10%
Indirect User Fees	\$75.6	\$5.8	\$0.0	\$0.2	\$81.6	53%
Specialized Taxes	\$11.7	\$14.3	\$0.3	\$0.0	\$26.8	17%
General Taxes	\$24.6	\$6.1	\$0.1	\$0.02	\$30.8	20%
Total	\$117.2	\$34.3	\$2.2	\$0.22	\$153.9	100%
Share	76%	23%	1%	< 1%	100%	

As the table data indicate, user fees constitute the dominant source of revenues for all modes save transit, and even for transit user fees are relatively important. However, this picture has been shifting in recent years. Highways and transit account for the majority of all public transportation funding by far (totaling around 99 percent), and both of these modes receive significant revenues from state and federal motor fuel taxes (listed as indirect user fees). Federal and most state motor fuel taxes are levied on a per-gallon basis, and this means that periodic rate hikes are necessary to counteract the effects of inflation and improved fuel economy (TRB 2006). In recent decades, though, the political climate has grown increasingly averse to tax increases in any form, and fuel tax hikes at the federal level and in most states have not kept pace with inflation nor with fuel economy improvements (for example, the federal motor fuels tax was last raised in 1993; since that time, it has lost approximately one third of its value due to inflation alone). As the availability of fuel tax revenues from the federal and state levels has diminished, local governments have attempted to bridge the gap by instituting voter-approved dedicated transportation funds, which usually rely on sales taxes or other forms of general revenue (Goldman and Wachs 2003). But these local measures have proven insufficient to make up for declining fuel tax revenues. As a result, the gap between highway and transit investment needs and available revenues continues to grow. Meanwhile, the slow shift from user fees collected at the federal and state level to general revenues collected at the local level limits the opportunity to foster the goals of social sustainability within our system of transportation finance.

Role of Innovative Finance Options and Public-Private Partnerships

Recent years have also witnessed the introduction and development of several innovative transportation finance mechanisms, such as Grant Anticipation Revenue Vehicles (GARVEEs) for highway projects, Grant Anticipation Notes (GANs) for transit projects, the Transportation Infrastructure and Finance Innovation Act (TIFIA), and state revolving infrastructure banks (SIBs). Such approaches can offer important benefits for certain types of projects, and their use is likely to increase in the future. In considering their role in supporting the sustainability of transportation revenues, though, several points should be highlighted. To begin with, some of these options, such as GARVEE and GANs bonds, make it possible to issue debt against

expected future proceeds from existing federal funding sources like the highway and mass transit trust funds so as to build much-needed projects now and avoid potential cost escalation in future years. However, these options do not expand the overall revenue base over time, and thus do not offer a way to improve the long-term outlook for transportation revenue sustainability.

Other programs, such as TIFIA, are designed to attract private capital in the formation of public-private transportation ventures. Such programs can therefore expand the pool of available funds, and the repayment of private investment is usually structured around user fees such as tolls. They thus offer the potential to enhance both financial and social sustainability.

Sustainability of Passenger-Rail Finance

Almost all intercity passenger rail services in the country are operated by Amtrak, known more formally as the National Railroad Passenger Corporation. Amtrak currently runs more than 250 trains per day across 23,000 miles of track, serving 500 communities in 47 states and providing around 23 million passenger rides annually. Approximately 83 percent of these passenger trips are less than 500 miles, serving corridors between major cities where rail provides a reasonable travel time in comparison with other alternatives. The remaining 17 percent of trips, which are greater than 500 miles in distance, account for about half of total passenger miles (AASHTO 2003a). As of 2005, Amtrak's total operating expenses were around \$2.9 billion, with 64 percent covered by passenger revenues. The remaining revenues were provided by federal and state governments (Amtrak 2005). A total of 13 states subsidize Amtrak operations within their jurisdictions, and at least 36 states have joined with Amtrak in supporting capital improvement projects in key corridors (AASHTO 2003a). Most federal support for Amtrak is appropriated from the general fund and flows through the Federal Railroad Administration (FRA).

Financial and Social Sustainability

The performance of Amtrak with respect to financial sustainability has been less than originally hoped. When the U.S. government first assumed responsibility for passenger rail under the Rail Passenger Service Act of 1970, it was assumed that subsidies would be required for only a short period of time. Yet Amtrak has failed to cover even its operating costs in the intervening years, and has received approximately \$27 billion in cumulative subsidies over this period. Of the 40 primary corridor routes that Amtrak serves, only two – both in the Northeast – earn operating surpluses (Vranich 2004). Even so, despite periodic proposals to cut or trim Amtrak funding at the federal level, intercity passenger rail appears to enjoy a relatively stable coalition of legislative support, and many states seem willing to contribute their share as well. In terms of social sustainability, Amtrak clearly provides key societal benefits, such reductions in automotive and air travel through dense intercity corridors, service to rural communities with little or no air or bus options, and redundancy in the national transportation system (AASHTO 2003a). The main question, however, is whether these benefits justify the current levels of subsidy, and this matter continues to be a subject of intense debate.

Near-term and Long-term Strategies

Over the short run, the funding prospects for Amtrak, including ticket revenues and subsidies, appear to be relatively stable. The next step in the evolution of the system, however, calls for the development of high speed rail facilities in federally-designated corridors. Amtrak has estimated that this will cost around \$50 billion (AASHTO 2003a), clearly out of reach given the current

revenue picture. Unless the public proves willing to devote a much higher level of subsidy to passenger rail, it may be necessary to constrain investment in high speed facilities to those corridors where anticipated increases in ridership could cover most of the cost, and then to bond against future ticket revenues to fund the necessary capital expenses.

Sustainability of Freight-Rail Finance

Freight rail accounted for a major share of goods movement throughout the late 19th and early 20th centuries, but its dominance waned with the rise of trucking and the Interstate Highway System. At its peak in 1920, the system included around 380,000 miles of track; today, that number has declined to just 172,000 miles. Following deregulation in 1980, a series of mergers and acquisitions restructured the industry, with ownership consolidating into seven Class I carriers (complemented by numerous regional and short-line railroads) that collectively originate 84 percent of all freight-rail traffic and generate 91 percent of total revenues. The restructuring led to significant productivity gains, resulting in lower rates and better service. Market share has stabilized at around 28 percent of domestic ton-miles, and freight rail is for the most part self-financing, with returns on investment improving from four percent in 1980 to eight percent today. This level of return is not sufficient, however, to stimulate significant investment in new capacity, in part because rail is an extraordinarily capital-intensive industry. This means that it will be very difficult for freight rail to accommodate its "fair share" of the rapid growth in goods movement in the coming years (AASHTO 2003b). Though there are a few programs under FHWA and FRA that can support rail-related projects, they are insufficient to make a significant difference in the level of new system investment.

Financial and Social Sustainability

Freight rail can operate profitably at present, and this suggests a high degree of financial sustainability. In the face of anticipated growth in goods movement, however, the inability of railroads to finance rapid expansion bodes ill for social sustainability goals. This is because most freight that cannot be carried by rail will shift to the trucking industry, leading to higher shipper costs per ton-mile, higher emissions per ton-mile, and increased congestion on the highway system (AASHTO 2003b). Assuming moderate economic growth of three percent per year, domestic freight tonnage is expected to increase by around 57 percent by 2020, while import-export tonnage is likely to increase by 100 percent. Under this scenario, freight rail would need to carry almost 900 million additional tons each year to maintain its current mode share. Present levels of industry investment, about \$2 billion per year, are only sufficient to capture about half of this growth. To make up the difference, an additional \$2.65 billion per year would be required. Some of this additional investment would almost certainly require public assistance of some sort, whether that be direct public investment or subsidies for private investment. Absent such support, around 450 million tons of freight and 15 billion truck VMT would be shifted onto the highway system each year by 2020, costing shippers an additional \$162 billion, costing highway users an additional \$238 billion (in travel time delays, accidents, etc.), and adding \$10 billion to highway maintenance and improvement costs over this period (AASHTO 2003b).

Near-term and Long-term Strategies

Over the short term, the most expeditious way to bolster increased capacity investment would be to provide greater eligibility for private rail to access existing FHWA and FRA funding sources and finance programs, as well as to increase the level of revenues available under those programs. Over the longer term, an alternate strategy worthy of consideration would be to institute rational pricing principles for both trucking and rail-freight (including, for example, emissions fees, congestion fees, and weight-distance truck tolls). If trucks and rail were both forced to internalize their social costs, the cost of moving goods by truck over long distances could increase relative to the cost of moving goods by rail. This would likely enable rail carriers to raise their rates, thereby providing greater returns on investment and reducing the need for public support in the expansion of rail infrastructure. Pricing externalities in goods movement would also help to promote the goals of social sustainability.

Sustainability of Intermodal Facility Finance

As goods movement in the U.S. continues to expand, and as carriers use larger ships, double-stacked trains, dedicated jumbo cargo airplanes, and larger trucks, intermodal freight facilities are becoming increasingly critical elements of the nation's transportation system. Investments that improve the internal operations of intermodal facilities – such as increased terminal capacity – can often be financed by the private firms or public authorities that operate the facilities through existing user fee arrangements. In contrast, financing projects that improve surface access to intermodal facilities – such as rail-highway grade separations – presents a thornier challenge, for such projects can generate both private and public benefits, can involve multiple jurisdictions, and may not align with existing institutional funding frameworks. Because of these difficulties, investments in improved surface access surrounding intermodal facilities has lagged the recent surge in goods movement, leading to increased congestion around ports, airports, and other freight hubs and reducing system-wide efficiency. Increasing demands for security-related improvements, as well as for the environmental mitigation of harmful emissions surrounding intermodal facilities, add further obstacles to the funding challenge. To date, numerous funding sources – both public and private – have been leveraged to finance intermodal access projects, including FHWA, FRA, and Federal Aviation Administration (FAA) programs at the federal level, SIBs and economic development programs at the state level, port and airport authorities who can bond against future revenues, private terminal operators and railroads, and project-specific user fees applied to the new facilities (Shafran and Straus-Weider 2003). Clearly, however, existing funding arrangements have been insufficient to keep pace with demand.

Financial and Social Sustainability

The fact that surface travel conditions around major intermodal facilities continues to worsen provides compelling evidence that the current funding regime is not financially sustainable as we have defined the term. Nor, for that matter, are the goals of social sustainability being supported. Recent research, for example, demonstrates clear linkages between transport-related emissions – such as diesel particulates – and various forms of cancer, respiratory disease, and other physical ailments (TRB 2002). While the economic benefits generated by goods movement accrue broadly throughout the region, state, and nation, the many of the congestion- and health-related costs are shouldered by the communities surrounding intermodal facilities, which often include many lower-income and minority households.

Near-term and long-term strategies

A frequently discussed option for increasing the level of funding available to improve surface access around intermodal facilities in the near term would be to provide greater eligibility for existing federal transportation funds and innovative finance programs that are not currently targeted at freight-related projects. Over the longer term, it may prove valuable to establish a well-funded revenue stream specifically earmarked for this purpose. Cargo hub access fees could be authorized nationally and collected regionally, for example, or a small fraction of U.S. Customs duties could be dedicated to nationally-important intermodal improvement projects (GAO 2003; Shafran and Strauss-Weider 2003). Another option for consideration would be to develop a broad framework for pricing significant externalities such as congestion and emissions. This could simultaneously provide revenues for mitigation projects and promote various goals related to social sustainability.

Conclusions

There are two broad sources of funding that can be applied to transportation projects: general revenues and user fees. While both are in principle capable of raising sufficient revenue to meet our current and future transportation investment needs, reliance on user fees provides the opportunity to promote other social goals such as economic efficiency, equity among users, and environmental mitigation. The same cannot be said for general revenues. In part for this reason, transportation finance in the U.S. has historically relied heavily upon various forms of user fees, most notably motor fuel taxes. Recently, however, legislators have grown increasingly reluctant to raise per-gallon fuel tax rates at a sufficient pace to keep up with inflation and improved fuel economy, and this has led to a widening gap between investment needs and available revenues. In response, many local governments have instituted voter-approved transportation measures reliant on sales taxes and other forms of general revenue. The increase in local revenues has not been sufficient to offset the decline in state and federal fuel tax funds, however, and as a result the performance of our nation's transportation system declines. This is stimulating a debate on the future of transportation finance in this nation. As one option, we could continue along the current trajectory, placing greater reliance on general revenues as we allow existing user fee programs to decline. At the opposite end of the spectrum, reverse course and place an even greater emphasis on user fees. Over the short term, this would likely involve hikes in current motor fuel levies. Over the longer term, new technology innovations may enable us to develop highly targeted user fees such as congestion tolls, emissions fees, and weight-distance truck tolls. While either of these trajectories – increased reliance on general revenues or renewed emphasis on user fees – could provide a sufficient source of transportation funding, the latter would also be easier to achieve other social goals. On the other hand, relying to a greater extent on rationally-structured user fees could shift the relative allocation of costs among different modes and among different user groups, and this would raise significant political challenges.

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