

**FEDERAL FINANCING OF INFRASTRUCTURE:
ADVANTAGES AND DISADVANTAGES**

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by

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Abstract

The paper lists economic criteria for public provision of goods and services, and shows that they generally do not justify governmental financing of transportation infrastructure. Using the United States federal Highway Trust Fund as an example, the paper examines federal financing of state transportation infrastructure, and shows that federal financing exacerbates the problems usually associated with public financing, e.g. the power of stakeholders to encourage expenditures without having to bear their costs. The paper concludes that federal financing of state projects increases the disadvantages of governmental provision; and that it offers minimal advantages.

Definition

For the purpose of this paper, “federal financing” means the use of federal funds to finance projects for which lower levels of government — “provinces”, “states”, or “counties” — are responsible. The essence of such financing is that a higher level of government empowers a lower level of government to implement projects which would be financially unaffordable without federal aid. As the experience to be cited is mainly from the USA, the lower level of government will be referred to as a “state”.

The paper is not concerned with federal financing of federal projects.

Does transportation infrastructure have to be publicly financed?

In market economies, most goods and services, including vital services such as the provision of food, water, power and telecommunications, are privately provided and financed. Need transportation infrastructure be an exception?

The economic literature recognizes situations of “market failure”, in which private suppliers cannot be relied upon to provide efficient and appropriate service to consumers.

Inability to provide “public goods”

“Public goods” are items — such as street lighting or wireless radio service — from which everyone can simultaneously obtain benefits. This follows from their characteristics of “nonrivalry” and “nonexcludability”. “Nonrivalry” means that one person's benefit does not reduce the benefit available to others, and “nonexcludability” means that there is no effective way of excluding individuals from the benefit of the good, even if they do not pay, thereby creating the “free-rider” problem. Due to the free-rider problem, a public

good is not profitable to provide. Examples of public goods are said to include national defense, street lighting, and lighthouse services.

However, with the possible exception of local access roads, transportation infrastructure are not “public goods” in the economic sense. When transportation facilities get congested one person’s benefit *does* reduce the benefits to others. And the use of transportation facilities — even of roads — can be charged for, so “free riders” are not an inherent problem.

Natural monopolies

Where a factor of production cannot be duplicated, its private owner would not be subject to competition and customers could be exploited. Such monopolies are not common in transportation infrastructure, except in the case of access roads, as most properties are served by one road only. So there can be a case for local roads to be provided by local governments. On the other hand, long-distance travel facilities are usually not monopolies, as travelers can generally reach their destinations by more than one route.

Even the existence of a monopoly does not necessarily make a case for government provision. Governments can control the prices, and service conditions, of private suppliers. They can also, as in the case of recent British highway concessions, protect consumers by requiring potential suppliers to compete for contracts.

Externalities

Externalities exist when buyers and sellers create costs or benefits to people not directly involved in the transactions. For example, the use of motor vehicles can cause accidents or increase pollution¹. Externalities can justify governmental encouragement or discouragement of relevant activities, and rules to require compensation paid to those adversely affected. But they do not justify direct government provision.

Merit goods

Economists apply the term “merit goods” to goods, or services, which are insufficiently appreciated but so important that private markets would not produce enough of them. Examples are education, health services, school lunches and water fluoridation programmes. Transportation infrastructure is fully appreciated by users, and does not fall into that category.

¹¹ At the time, the advent of motorized transportation was welcomed for eliminating the accidents and pollution associated with horse-drawn vehicles.

Inability to collect payment for road use

There is no special difficulty in charging for the use of aviation, marine and rail infrastructure. However, until the development of electronic charging systems, it was impossible to charge directly for road use without requiring vehicles to stop to pay tolls. Despite this, hundreds of turnpike companies operated thousands of miles of toll roads in the UK and US two hundred years ago. In 1830 there were, in Great Britain, 1,116 turnpike trusts maintaining 22,000 miles of toll roads, which accounted for about one-fifth of the total road system². Those companies were financed almost entirely by private capital and received tolls from road users. Toll road companies in the US followed the British example. By 1845, 1562 companies had been chartered³. The total length of these roads exceeded 30,000 miles, and they comprised a substantial part of the economy at that time. Their comparative magnitude exceeded the public sector investments in the Interstate Highway System after the Second World War⁴.

The advent of petroleum-using automobiles enabled the establishment in 1909 in the UK of a dedicated “Road Improvement Fund”, financed mainly from the proceeds of fuel taxes used for motor vehicles. Sir Edgar Harper, economist and Chief Valuer to the Inland Revenue (the UK tax authority), explained that the Road Improvement Fund

“is not fed by taxation in the strict sense. It provides machinery by which the owners of motor vehicles in combination and under State guidance are enabled to spend money on roads for their mutual benefit”⁵.

The concept of dedicated road funds soon crossed the Atlantic. The first in the US was established in Oregon in 1919, and there are now over thirty states in the US with such dedicated funds. They are, like many instruments, imperfect, but have demonstrated for most of the last century that road users can be made to pay for roads in an acceptable manner.

It seems, then, that, with the exception of local access roads, there is no general justification for the public financing of transportation infrastructure in market economies. There

² Rees Jeffreys, *The King's Highway*, The Batchworth Press, London, 1949.

³ Daniel Klein and John Majewski, “America's Toll Road Heritage: The Achievements of Private Initiative in the Nineteenth Century”, in *Street Smart: Competition, Entrepreneurship and the Future of Roads*, pages 280/81, Gabriel Roth (Editor), Transaction Publishers, New Jersey, 2006.

⁴ Gerald Gunderson, “Privatization and the 19th Century Turnpike”, *Cato Journal*, Vol. 9, No. 1, pp. 191-200, Washington DC, Spring/Summer, 1989.

⁵ *The Times* February 5, 1926.

may be projects for which government financing is economically justified, but, to be convincing, this justification needs to be specifically demonstrated.

Federal financing of transportation infrastructure

The following advantages and disadvantages of federal financing will be discussed in the light of the experience of the federal financing of the US Interstate Highway System, which will first be briefly described.

Advantages of federal financing

1. Large projects, covering more than one state, can be financed and implemented;
2. Federal involvement can ensure nation-wide coordination and standardization; and
3. A federal planning perspective can be superior to state planning perspectives.

Disadvantages of federal financing

1. State responsibility combined with federal financing power weakens accountability;
2. States are empowered to get funding for weak projects;
3. State politicians do not have to confront their own voters with the costs of federally-financed projects;
4. Federal financing inflates road costs;
5. Elected officials are able to misallocate funds between the states; and
6. Federal allocations have been accompanied by onerous conditions.

The US Interstate Highway System

Laws passed in 1916 and 1921 authorized the US federal-aid highway program, and established the federal Bureau of Public Roads (the predecessor of the Federal Highway Administration, the FHWA). They also defined a cooperative relationship between the states and federal governments which remains in effect today:

“The States retained the initiative in constructing roads and highway improvements while the Federal role was to review and approve work done with the assistance of Federal funds”⁶.

In other words, the states bear the responsibility for their roads, but the financing power is shared with the federal government.

⁶ *America on the Move*, FHWA, Washington DC, 1980.

President Eisenhower strongly supported the plans for a network of US “Superhighways” which had been proposed during the Roosevelt administration. Following lengthy debate, the Highway Revenue Act of 1956 created the federal Highway Trust Fund (FHTF) as a source of funding for highway construction. The financial arrangements having been agreed, President Eisenhower signed the Federal-Aid Highway Act of 1956 into law fifty years ago, on June 29th, 1956. It provided for, among other things:

- A national 41,250-mile Interstate and Defense Highways System to be built;
- \$25 billion to be authorized to finance the 90 per cent federal share of the cost;
- The \$25 billion to be expended, and the system completed, in FYs 1957-1969;
- The powers under the 1956 Act to expire in 1972.
- Disbursement to the states to be based on a formula taking into account factors such as the area, length of the road network and the number of motor vehicles.

The powers of the 1956 Act were renewed and changed several times after their 1972 expiry. The length of the designated Interstate Highway System (IHS) was increased to 46,726 miles. Its construction was completed in 1996, but federal financing of state roads was retained for a newly defined 155,000-mile “National Highway System”. The main sources of funds, accounting for about 85 per cent of receipts, were (and still are) taxes on motor fuels. The federal gasoline tax was 3 cents a gallon in 1956 and 4 cents in 1959. It has since been raised to 18.4 cents a gallon — 24.4 cents for diesel fuel.

The federal financing system introduced by the 1956 act supported and thus strengthened the concept of the dedicated road fund, as envisioned in the 1909 British legislation, and in subsequent US state legislation. In the US, there had been a broad understanding that the proceeds of gasoline taxes should be thus dedicated⁷. This understanding was broken in 1982, when one fifth of the proceeds of a gasoline tax increase was dedicated to transit and placed in a new “Mass Transit Account” in the federal Highway Trust Fund.

In 1991, the Intermodal Surface Transportation Efficiency Act (ISTEA), spearheaded by Senator Daniel Patrick Moynihan, and supported by environmental and transit advocacy groups, went further. It substituted “flexibility” and “Intermodalism” for the “dedication” to highway funding of revenues raised from road users. The change from “highway” to “transportation” enabled, from then on, any political group to claim federal highway money for any purpose related to transportation. Since then, the highway financing system no longer constituted “machinery by which the owners of motor vehicles in combination, and under state guidance, are enabled to spend money on roads for their mutual

⁷ The 1934 Haydon Cartwright Act required Congress to deny federal highway funding to any state that “diverted their own highway revenues to non-highway uses”

benefit”, but became a vehicle for financing a variety of surface transportation expenditures.

Advantages of federal infrastructure financing

Large projects, covering more than one state, can be financed and implemented

The main advantage of the 1956 financing arrangements was the virtual completion, at a comparatively small cost to road users, of the 46,726-mile Interstate Highway System, probably the greatest public works achievement since the Roman Empire⁸. Those familiar with the difficulty of getting any government project achieved will be particularly appreciative of the success of the men and women involved in getting this magnificent road network completed.

Federal involvement can ensure nation-wide coordination and standardization

The components of the Interstate Highway System do have uniform signing, and new sections were built to uniform standards, e.g. vertical clearances of 4.9 meters under bridges on rural sections.⁹

A federal planning perspective can be superior to state planning perspectives

US history does not support this claim. America’s first highway planner was Albert Gallatin, secretary of treasury under Thomas Jefferson. An early federally-planned road, financed by the federal government, was the “National Road”, started in 1811 to link Cumberland, Maryland with Wheeling Ohio. Lacking private owners, the National Road was not well maintained, and most travelers preferred the more popular Pittsburgh Pike, financed by the state of Pennsylvania and private investors¹⁰. In more recent years, while the initial ideas and structure of the Interstate Highway System were determined by federal transportation planners in Washington, discussions after its completion seem to be focus on the disposition of Highway Trust Fund revenues.

⁸ The Roman Empire’s road system, which included over 56,000 miles of main roads, was constructed over a period exceeding 500 years.

⁹ This standard is not yet met on some of the older sections. See <http://www.fhwa.dot.gov/bridge/081597.htm>

¹⁰ Daniel Klein and John Majewski, “America’s Toll Road Heritage: The Achievements of Private Initiative in the Nineteenth Century”, in *Street Smart: Competition, Entrepreneurship and the Future of Roads*, pages 290/91, Gabriel Roth (Editor), Transaction Publishers, New Jersey, 2006.

It is not easy to discern other advantages to the federal financing of state roads. Some federal highway activities — research into safety issues, for example, or development of electronic charging systems — could well be beneficial, but they do not necessitate the federal financing of infrastructure.

Disadvantages of federal infrastructure financing

State responsibility combined with federal financing power weakens accountability

At the point at which expenditure decisions are made, nobody — neither road users, nor state officials nor even federal officials — is responsible for paying the costs that arise from their decisions to spend¹¹. Members of the federal Congress, as a group, control:

- the total amounts they appropriate for roads;
- the formula used to allocate the total between the states; and
- the conditions attached these allocations.

But no member stands to gain from a well-performing project or to lose from a poorly performing one.

The states have no control over the amount of federal funds they receive, which they can either spend or lose. In the absence of incentives to economize, it is difficult to see how expenditures can be effectively controlled. And “the Federal role ... to review and approve work done with the assistance of Federal funds” is rarely exercised; federal officials bend over backwards to maintain good relations with state officials, and prefer not to question their decisions. They also tend to support each other’s projects, however poor.

States are empowered to get funding for weak projects

The states retain formal responsibility for their highways but do not have to meet more than a small percentage of the bills. This allows them to implement low-priority projects at the expense of road users in other states. The federal funding of state roads results in excessive demands for expensive facilities, because to the states, which are nominally responsible for expenditure decisions, federal funds are costless, and state officials are accountable to their voters only for state funds. It is as if fifty people dine together and agree to share the restaurant bill: Economizing by an individual has little effect on each person’s share, so why not indulge in the most costly dishes? Thus, the system allows the construction of expensive facilities, such as the Boston “Central Artery/Tunnel” project (popularly known as “The Big Dig”) for which local funding would never have even been considered. Initially estimated at \$3.3 billion, the Big Dig cost more than \$14.6 billion.

¹¹ Few consider power without responsibility to be desirable in government.

Speaker of the House of Representatives “Tip” O’Neill, who represented a Boston district, led the push for the use of federal funds.

State politicians do not have to confront their own voters with the costs of federally-financed projects

Why do many state officials support federal highway funding and do not lobby for the “Turn-back” to them of road tax revenues? The explanation seems to be that life is easier for state officials if the power of taxation and allocation is moved up to the federal level. This reduces the differences between tax levels in different states, differences that could signal inefficiencies and even, heaven forbid, cause resources to move from high-tax to low-tax jurisdictions. Dwight Lee commented:

“In effect, increasing the power of the central government to tax is a way of forming and enforcing a tax cartel allowing government in aggregate to extract more money from the public¹². Having extracted more revenue, the [federal] government can re-allocate the additional money through revenue sharing arrangements so that all governments secure more of the taxpayers’ money. ... With local politicians able to provide projects for constituents who can vote them out of office, projects paid for largely by taxpayers in other jurisdictions who can’t, a constant demand for excessive and inefficient government spending (all of which enhances the power of central authorities) is assured”¹³.

Elizabeth Parker confirmed Dwight Lee’s insight. In describing a Ford administration proposal to repeal one cent of fuel tax in any state that increased its tax by one cent, she wrote that

“The administration’s proposal had little support at the state and local level because it would have required state and local officials in each state to support enacting taxes to substitute for federal taxes”¹⁴.

Federal financing inflates road costs

It does so in three ways:

¹² Europeans who regard themselves as more cultured than the rest of us avoid vulgar expressions such as “cartels”, and refer instead to “tax harmonization”.

¹³ Lee, Dwight R. (1994) “Reverse Revenue Sharing: A Return to Fiscal Federalism,” *The Cato Journal*, Vol. 14, No. 1, pp. 75-85, Washington DC, Spring/Summer 1994.

¹⁴ Elizabeth Parker, “Major Proposals to Restructure the Highway Program”, *Transportation Quarterly*, Vol. 45, No.1, Eno Transportation Foundation, January 1991, page 59.

1. States are required to adopt regulations, such as the Davis-Bacon and 'Buy America' provisions, which can raise highway costs substantially. Davis-Bacon rules, which require road builders to pay unionized wages, can increase project costs by 30 percent or more¹⁵.
2. Federal road specifications can be higher, and therefore more expensive, than state standards.
3. There are significant administrative costs in sending monies from the states to the federal government, and back, with all the parties concerned having to ensure funds are properly spent.

These three factors vary from state to state and are difficult to quantify. Robert Farris, who was Commissioner of the Tennessee DOT (1981-85), and Federal Highway Administrator (1987-89), estimated that federal involvement increased project costs by 20 per cent¹⁶

Elected officials are able to misallocate funds between the states

Some states persistently get more from the federal Highway Trust Fund than they pay into it. There is a tendency for the southern states to subsidize those in the northeast. Since 1982, this has been exacerbated by the diversion of payments by road users to transit programs, many of which are also in the northeast. The biggest US gainers seem to be Alaska (which receives over five times as much as it pays in) and the District of Columbia (over three times as much), neither of which has a significant linkages in the Interstate Highway System.

Federal allocations have been accompanied by onerous conditions

As a condition of allocating funds from the Highway Trust Fund to the states, the US Congress has imposed burdensome regulations such as 55 miles per hour speed limits, and car-pooling and vehicle-testing requirements, which the Congress is unable or unwilling to legislate directly.

Expenditures on new facilities are encouraged. The Interstate Highway System was financed by the "ten cent dollar" — federal grants covering 90 per cent of capital costs. While the Interstate Maintenance Program is also financed at 90 per cent, other non-

¹⁵ Estimates by the Associated Builders and Contractors, a national trade association, indicates the prevailing wage rules mandated by the Davis-Bacon Act inflate the cost of construction by 5 – 15 per cent, and as much as 38 per cent in rural areas. http://www.house.gov/musgrave/108th%20Web/op_0308_Davis_Bacon_reform.htm

¹⁶ In conversation with the author.

capital programs are financed at lower rates, thus encouraging the building of new facilities.

Toll roads and privately provided roads are discouraged. By providing “free” roads, federal financing discourages toll roads and privately financed roads, although users of those facilities have to pay into the Highway Trust Fund all the mandated charges, such as fuel taxes.

Innovation and flexibility in road financing are discouraged. It is difficult – often impossible — to toll roads constructed with federal funds. Even when federal permission is obtained, it often comes with burdensome provisions. For example, the 2005 highway financing act contains a provision that toll roads may only be established if the state retains the right to improve competing “free” facilities. This is like inviting a supermarket company to set up shop, with the local authority retaining the right to give away free food next door. There may be circumstances where such arrangements are justified, for individual states to take appropriate action. But a blanket federal prohibition, which is likely to discourage the private provision of toll roads, seems singularly unhelpful.

Conclusions

In the light of the history of the US federal Highway Trust Fund, it may be concluded that the federal financing of transportation infrastructure for which lower level of government are responsible is undesirable, as the disadvantages seem to dwarf the advantages. States fully responsible for their own infrastructure would have stronger incentives to ensure that funds paid by its users were spent effectively. For example, in the absence of federal grants for new construction, some states could prefer to better manage and maintain their existing roads, rather than build new ones. Others might explore new ways to encourage the private sector to assume more of the burdens of infrastructure provision. Successful improvements could be copied, while failed reforms would be avoided. In time, transportation users would get better value for their money, while their states would have more resources available to spend on activities, such as public safety, which cannot be made commercially viable.

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