

Fix It First, Expand It Second, Reward It Third: A New Strategy for America's Highways

Bridges, roads, and other transportation infrastructure are crucial for facilitating trade within, between, and across states. The development and expansion of the National Highway System has facilitated trade and linked markets: markets that were once only local—from

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manufacturing and wholesale operations to common retail goods—are now national. The impacts of infrastructure extend from the national economy to many aspects of Americans' everyday lives, from the length of commutes, the quality of the air, and the livability of American neighborhoods. However, estimates suggest that our valuable transportation network is degrading—the American Society of Civil Engineers estimates we are currently spending \$110 billion too little each year to maintain the system at current performance levels. This accumulating wear and tear increases travel times, damages vehicles, and can lead to accidents that cause injuries and fatalities. Although the United States currently invests close to \$150 billion annually on infrastructure across all levels of government, a large fraction of that is for new infrastructure projects that appear to be producing fewer results in terms of economic activity and quality-of-life improvements.

The way the federal government allocates money for transportation infrastructure investments is one reason why the United States is experiencing a maintenance shortfall and falling returns on new investment. Federal highway infrastructure spending is allocated based on a series of subjective criteria that typically do not require any stringent analysis of expected benefits versus

costs. Because there is often public pressure to build new projects using scarce funds, adding capacity often comes at the expense of supporting and enhancing existing infrastructure. To continue to enjoy the level of network performance that Americans often take for granted, maintenance, preservation, and enhancement of this existing system is urgently needed.

Meanwhile, a key constraint with the current system is peak-time congestion. Highway drivers impose costs on others in the form of longer commute times and increased pollution, especially during rush hour and other peak driving times. Drivers do not have to take into account these costs when making their driving decisions on most roads in America. This lack of clear price signals leads some roads to be overused, resulting in too much congestion and pollution. While this congestion may indicate that more capacity is needed, it also may indicate that better pricing of the existing infrastructure is necessary to encourage users to take on the broader social costs of their travel during these peak times.

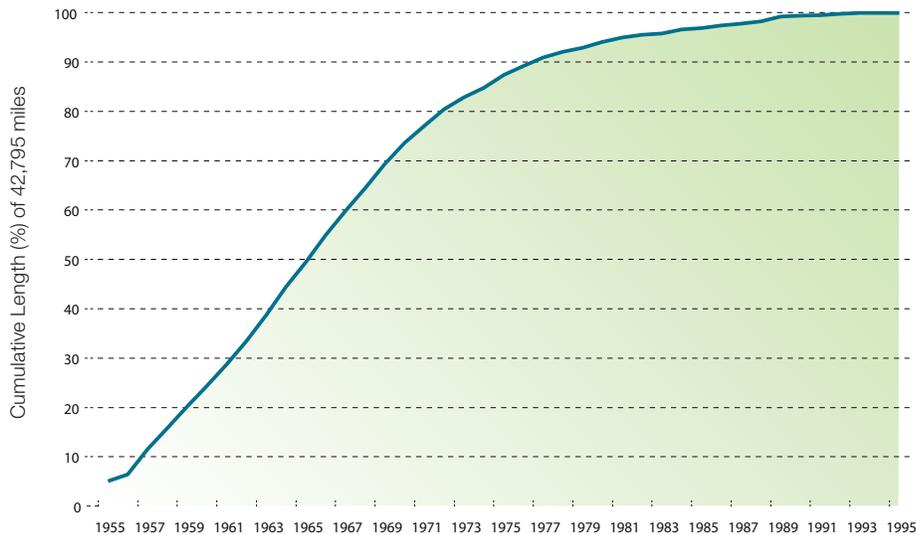
In a discussion paper from The Hamilton Project, “Fix It First, Expand It Second, Reward It Third: A New Strategy for America’s Highways,” Matthew Kahn of the University of California, Los Angeles, and David Levinson of the University of Minnesota propose a new framework to support and improve our nation’s highway infrastructure in order to shift the focus of infrastructure spending toward the maintenance of our existing transportation system, and make certain that new transportation infrastructure is priced more efficiently and fairly. Specifically, Kahn and Levinson would reprioritize

funding from the federal Highway Trust Fund (made up of the collections from highway tolls and the federal gas tax) so that all proceeds would be earmarked for existing infrastructure. This would provide an additional \$12 billion annually for maintenance and improvement. Each state department of transportation would use rigorous analysis, including benefit-cost tests, to allocate funds. New highway infrastructure would be financed from a new, independent institution, the Federal Highway Bank, that would award loans based on performance standards. Projects that meet or exceed their performance goals—from lowering congestion, to decreasing travel times, to lowering pollution—would be rewarded with a generous interest-rate subsidy.

The Challenge

The infrastructure on the U.S. Interstate Highway System is more than forty-five years old (Figure 1). These older highways and bridges were designed with different priorities and technologies than we have today. Although there has been some progress in reducing the number of structurally deficient bridges and in bringing our transportation infrastructure system to modern safety and vehicle-weight standards, there is much to be done. And there is an urgency to this challenge: the problem grows worse and more costly each year as infrastructure continue to age.

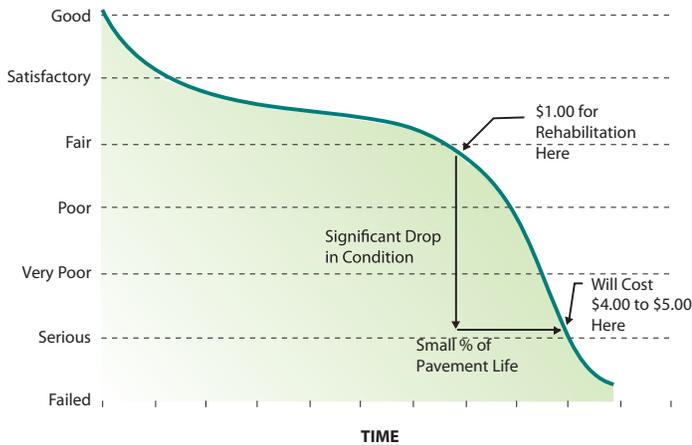
FIGURE 1
The Average Age of Infrastructure on the Interstate Highway System Is Over 45 Years



Source: Federal Highway Administration.

The age of our infrastructure has important implications for maintenance costs. In Figure 2, Kahn and Levinson show that pavement road deterioration begins slowly and accelerates over time. This graph suggests that significant savings can be achieved by beginning repairs before the pavement deteriorates too much. For every \$1 spent on preventive pavement maintenance, between \$4 and \$10 is saved on rehabilitation.

FIGURE 2
Typical Pavement Life Cycle Curve



Source: Federal Aviation Administration.

The authors also provide evidence that current system enhancement, such as safety improvements like guardrails, restriping, and rumble strips, can be some of the most cost-effective ways to use existing resources.

The resources currently allocated in the United States for maintaining and improving existing infrastructure are insufficient. At the same time, existing infrastructure competes with new infrastructure projects for the same pot of funding but without the public relations benefit of a ribbon cutting. As a result, funding to maintain existing infrastructure projects often comes up short—despite strong economic evidence that supports maintenance over expansion. For example, research by John Fernald found that the Interstate Highway System had a significant impact on productivity after it was completed in 1973, but the productivity gains of subsequent expansions have been much smaller. This suggests that maintaining current infrastructure at maximum capacity may have higher returns than expanding capacity.

To continue to enjoy the level of network performance that Americans often take for granted, maintenance, preservation, and enhancement of this existing system is urgently needed.

In addition to the direct impact of disrepair, Kahn and Levinson suggest that users are getting less from our system of infrastructure because of rising congestion. This congestion unnecessarily frustrates travelers, decreases quality of life for commuters, and imposes economic losses on shippers and other businesses that depend on highways. With national annual congestion costs in the ballpark of \$120 billion, states also need to be given the flexibility to experiment with new ways to lower congestion.

A New Approach

Kahn and Levinson propose a three-step approach: “Fix It First, Expand It Second, Reward It Third,” to preserve, develop, and enhance highway infrastructure.

- **Fix It First.** All revenues from the existing federal gasoline tax and tolls would be redirected away from new construction. Instead, it would be used primarily to repair, maintain, rehabilitate, reconstruct, and enhance existing roads and bridges.
- **Expand It Second.** Funding for states to build new and expand existing roads would come from a newly created Federal Highway Bank (FHB), and would be contingent on meeting strict performance criteria such as benefit-cost analysis. States would be required to demonstrate an ability to repay the loan through direct user charges and by capturing some of the increase in land values near transportation improvements.
- **Reward It Third.** New and expanded transportation infrastructure that exceeds performance targets—including targets for an on-time completion date, or congestion and pollution reduction—would receive an interest rate subsidy from a Highway Performance Fund that is financed by net revenues from the FHB.

Fix It First: Restricting Gas Tax Revenue to Support and Enhance Existing Infrastructure

To shift the investment focus to “Fix It First,” the authors propose using funds exclusively for maintaining, preserving, and enhancing existing transportation infrastructure on the National Highway System. This includes making investments in safety enhancements, traffic control facilities, and environmental enhancements. This new prioritization would eliminate spending from the Highway Trust Fund for new projects. (Roughly 30 percent of spending currently goes toward new constructions.)

Under this proposal, each state’s Department of Transportation would use benefit-cost analysis to determine how the Highway Trust Fund money is spent. One percent of Highway Trust Fund revenue—ranging from \$1.5 million to \$33 million per state, depending on each state’s current Highway Trust Fund allocation—would be set aside to build or expand the capacity at each state’s Departments of Transportation to perform benefit-cost analysis, using a uniform standard, as well as to evaluate the project after its construction. The federal

government would develop criteria to estimate benefit-cost tests for different types of projects and provide resources for states to conduct these analyses above a threshold cost (for example, \$1 million). As a condition for receiving federal funds, states also would be required to prioritize its list of projects, starting with those promising the highest return.

Reserving the federal Highway Trust Fund just for highway improvements would mean a boost in federal highway investment for existing facilities of close to \$12 billion per year. The authors suggest that this amount would put America on the right path toward repairing and updating our nation’s aging infrastructure.

Expand It Second: Establishing A Federal Highway Bank To Finance New Infrastructure

Kahn and Levinson propose the creation of a new, independent organization, the Federal Highway Bank (FHB; see Box 2), to finance new infrastructure projects. The FHB would be self-

BOX 1

Federal Funding Formulae and Match Rates Under Two Scenarios

Kahn and Levinson propose two implementation options for their plan:

- 1. A narrower version of the proposal** follows the existing federal-state formula for allocating funds, simply restricting these funds for preservation and enhancement investments that do not add capacity. States would use benefit-cost analysis to prioritize improvement projects with the highest returns. Under the existing system, most states and localities need to supply only 20 percent of the funds for projects involving federal funds; under the proposed plan, this match rate would be left unchanged. This restriction alone would serve to increase the amount of funding used to support existing infrastructure in each state.
- 2. The comprehensive version of the proposal** would reallocate funding across states based on the condition of existing infrastructure. Roads and bridges in the worst condition would be given priority for funding, meaning that more funds could be targeted toward one particular region of the country, depending on existing infrastructure conditions. The authors suggest increasing the state match rate (so that states must cover 50 percent of investment costs, for instance) and expanding the federal match to a broader range of investments in existing infrastructure as one option under a more comprehensive strategy to increase the total amount of funds available. This would further encourage states to price existing roadway accordingly to “recapture” the costs associated with use. One option for implementation would be to unroll this as an “opt-in” scheme. States with the most need would be the most likely to opt in first. Recognizing that this proposal is likely to face more-challenging political hurdles, the authors offer this more-complete solution from the perspective of maintaining and promoting our national economic interests.

financing, and would be initially capitalized by the federal government. State and local governments would apply to the FHB for an infrastructure loan. Like any other loan institution, it will allocate capital based on the best evidence of prospects for repayment subject to projects having benefits in excess of costs. Borrowers will have the opportunity to get a better interest rate than the market provides, and those capitalizing the bank will receive a steady rate of return.

As a condition of the loan, the money would be repaid primarily with a dedicated revenue stream from user charges; in some cases, this revenue stream would be supplemented by “land value capture.” User charges include tolls, gas taxes, and other sources in which the user directly pays for use of the network. Land value capture includes land value tax, special assessments, impact fees, tax increment financing, or other assessment of increased property value based on the benefit gained from or the cost incurred of providing the new infrastructure. An independent bank appraiser would assess whether the stream of revenue is adequate to repay loan and whether the project costs are properly estimated. The federal government would insure loan repayment, but borrowers would have to purchase this insurance proportionate to their risk of failure, as determined by the appraiser.

According to Kahn and Levinson, under these new rules of the game policymakers would have stronger incentives to embrace cost-effective projects. Using user fees as the primary repayment mechanism would encourage more-efficient use of the nation’s roadway network and would reduce congestion costs.

Reward It Third: Rewarding Good Investments With The Highway Performance Fund

The authors’ FHB will introduce market discipline and the third aspect of their proposal, the Highway Performance Fund, will help promote projects that have socially desirable outcomes. The Highway Performance Fund will subsidize loans, offering performance bonuses to states and local governments who exceed performance standards, including getting the project done on time; improving capacity, safety, and equity; and meeting environmental goals.

The money to pay for performance bonuses would come from the profits of the FHB (see Box 2). Performance would be monitored every year following the loan until the loan is paid off, and the bonuses would not be renewed if the project failed to live up to expectations. New organizational capacity developed at each state’s Department of Transportation would be used to effectively monitor performance. Each state’s Department of Transportation would be responsible for providing these data to the administrators of the Highway Performance Fund, under rules drawn by the Fund, and subject to audit and verification.

BOX 2

The Federal Highway Bank

The FHB would borrow money from the federal government and the private sector, and lend it to worthy projects at a higher interest rate. The difference between these rates would generate profits that would be used to reward projects that outperform expectations. Any additional profits would be used to reward more-efficient projects, or returned to taxpayers or bondholders.

Case A: Investment Exceeds Performance Standards

A state borrows to build a new bridge. Subsequent analysis reveals the bridge exceeded predefined performance criteria, such as reducing congestion. If the cost of capital to the FHB is 4 percent and it lends at 5 percent, the FHB earns a profit of 1 percent (minus expenses). Here, the FHB would offer a performance bonus of 1 percent per annum of total loans outstanding, a subsidy of 20 percent.

Case B: Investment Fails to Meet Performance Standards

For projects that are significantly late in terms of time to completion, there would be a borrowing fee increase (e.g., a twenty-five basis point increase). Starting within one year of an opening of a new piece of transportation infrastructure, analysts would evaluate if the use of the infrastructure exceeds initial forecasts. A performance bonus would be offered, in this case. Otherwise, the money would be lent at a market rate. If the market conditions are the same as in Case A, the FHB would earn a profit equal to 1 percent of the loan for that year. Any cost overruns incurred by the borrower would need to be financed without additional federal loans.

Key Highlights

Kahn and Levinson propose using the entire Highway Trust Fund for existing infrastructure and establishing a new Federal Highway Bank to finance new infrastructure that passes a strict performance test. Features of their proposal include the following:

The Proposal

Tying gas tax revenue to maintenance. Reserving the federal Highway Trust Fund to maintain, preserve and enhance existing infrastructure would boost federal highway investment on existing infrastructure of close to \$12 billion per year. Combined with any additional revenues from raising state match rates on projects involving federal funds or from increasing user fees to be used in the corridor in which they are raised, these funds would put America on the right path toward preserving, maintaining, and improving aging infrastructure.

Federal Highway Bank. A new organization would provide loans—not grants—for new transportation infrastructure, contingent on meeting strict performance test criteria and on demonstrating an ability to repay the loan through direct user charges and on capturing some of the increase in land values near the transportation improvement.

Performance objectives. Subsidies for new investment would be financed from Federal Highway Bank profits and would be based on meeting a variety of national performance objectives, including speed, capacity, safety, equity, and environmental goals.

Benefits

Requiring infrastructure investments to undergo benefit-cost analysis would ensure that scarce federal resources are used efficiently. This would produce a variety of benefits:

Safer highways and bridges. Roads and bridges that are in disrepair can be dangerous. In addition, many common safety enhancements, some as simple as restriping, have benefits of millions of dollars per year at very low costs.

Less congestion. National congestion costs currently exceed \$120 billion per year. Requiring users to pay the full cost of their use will lower shipping costs and improve freight reliability, provide greater access to employment, and decrease time commuters are stuck in traffic.

National productivity benefits. More-efficient infrastructure investments will improve American living standards—not only through better industrial organization that promotes trade and competition, but also through investment that is more environmentally friendly.

Price New and Existing Infrastructure Based On Use

Congestion pricing can help governments better allocate the scarce resource of road capacity at peak hours. Both the narrow and the comprehensive versions of the authors' proposal would encourage states to implement electronic road pricing on the Interstate Highway System, provided the funds are used in the corridor in which they are raised. This road pricing, which is currently generally prohibited with a few exceptions, includes both general tolls and congestion pricing.

Such policies would send the correct signals to potential road users and would help to efficiently allocate road use. First, with a higher price at peak times, drivers who are more time-flexible would have the incentive to travel at off-peak hours; drivers who paid the fare would benefit from quicker travel time. Second, road pricing also would promote rapid bus deployment in these cities, which would enable public transit to better compete with the auto. Third, pricing would provide a new source of revenue to these local governments. Finally, many citizens have apprehensions about some road pricing systems. This apprehension is understandable, given the novelty of road pricing in many places. Experiences elsewhere suggest that when the public becomes accustomed to road pricing and learns firsthand about its benefits and costs, they become more comfortable with user fees and pricing schemes.

Questions and Concerns

How does this compare with other infrastructure bank proposals?

The idea for an infrastructure bank is not new; other proposals have been floating around policy circles for several years. Unlike the Obama administration's proposal for a National Infrastructure Bank (NIB) or the 2007 Dodd-Hagel bill, the authors are making the proposal for a Federal Highway Bank rather than a general infrastructure bank. They assert that the needs of transportation differ from those of water and sewerage systems, dams, transit, and so on, and that the specialization required to assess highway projects precludes too broad a mandate. Other infrastructures face similar problems, and similar but separate institutions should be established to address them.

The FHB would be a sound, publicly owned, financial institution aiming to achieve a return on investment, not a government agency for distributing grant funds. After initial capitalization by the federal government, the FHB would sell bonds backed by loans, or combine and repackage loans for pensions, life insurers, and others in the global marketplace seeking low-risk investments. Both the current Transportation

Infrastructure Finance and Innovation Act (TIFIA) program and the proposed NIB conflate loans and grants, and do not include any requirement for direct repayment of loans. This lack of a prespecified payback mechanism detracts from other NIB proposals as well. Requiring user fees as the primary repayment mechanism would improve the efficiency of allocation, help ensure reliable networks, and give travelers the option to avoid congestion.

Does this proposal put additional risk on the taxpayer?

The balance in the federal Highway Trust Fund has shrunk from \$23 billion in the year 2000 to an estimated deficit of \$8.1 billion in 2010, requiring a taxpayer bailout. At the same time that the federal government is budgeting less money for maintenance and repair, state and local governments also are cutting back. Doing nothing imposes billions of dollars in risk on the taxpayer—not only in terms of bailing out the Highway Trust Fund, but also in the billions of dollars in forgone investments in existing infrastructure.

The authors recognize the problems associated with previous loan-repackaging organizations (such as Fannie Mae and Freddie Mac), but the FHB they propose is different in a number of ways. First, the FHB would originate the loans, rather than buy loans from banks. This is an important distinction: unlike bundled home mortgages, the FHB would have full knowledge of the underlying risks associated with the loan. Second, the magnitude of the loans, and the inspections and audits, suggests that the problems of borrowers being unable to repay would be avoided.

Conclusion

Kahn and Levinson assert that restricting the Highway Trust Fund only to support and enhance current infrastructure would improve our existing resources. Imposing performance standards on new infrastructure investments, via a new Federal Highway Bank, would give incentives to states to prioritize the most efficient infrastructure projects.

Infrastructure investment that is more efficient means better industrial organization that promotes trade and competition. It means more reliability when shipping freight and lower shipping costs; it means that more businesses will build next to each other to take advantage of agglomeration effects, and that people will have greater access to employment and spend less time stuck in traffic. Furthermore, it would mean less damage to vehicles from poorly maintained roads, and fewer accidents, injuries, and even fatalities. Finally, properly implemented, this proposal also would mean more environmentally friendly investment. Combined, these benefits suggest that a reformed system of highway investment can be a meaningful step in improving Americans' standard of living.

Learn More About This Proposal

This policy brief is based on The Hamilton Project discussion paper, *Fix It First, Expand It Second, Reward It Third: A New Strategy for America's Highways*, which was authored by:

MATTHEW E. KAHN

Professor of Economics, UCLA Institute of the Environment and Sustainability
University of California at Los Angeles

DAVID M. LEVINSON

Richard P. Braun/CTS Chair in Transportation
University of Minnesota

Additional Hamilton Project Proposals

Lowering Borrowing Costs for States and Municipalities Through CommonMuni

States and municipalities depend on the municipal bond market to raise funds for investments in America's schools, roads and highways, hospitals, utilities, and public buildings. Additionally, many individuals rely on municipal bonds as a dependable investment. Evidence suggests, however, that state and local governments that borrow money by issuing bonds and ordinary investors who buy those bonds may pay billions of dollars each year in unnecessary fees, transactions costs, and interest expense due to the lack of both transparency and liquidity in the municipal bond market. This paper proposes the establishment of CommonMuni, a not-for-profit, independent advisory firm that would reduce borrowing costs for municipalities and increase returns for investors by overcoming the difficulty individual municipalities and investors have in coordinating their actions and sharing market knowledge.

Public-Private Partnerships to Revamp U.S. Infrastructure

Public-private partnerships are often touted as a "best-of-both-worlds" alternative to public provision and privatization. But in practice, they have been dogged by contract design problems, waste, and unrealistic expectations. This paper proposes a series of best practices that communities can undertake to ensure that public-private partnerships provide public value. These include choosing partnerships for the right reasons; relying on flexible-term Present-Value-of-Revenue (PVR) contracts; including partnerships on government balance sheets; and implementing good governance practices. Enacting these reforms will help maximize taxpayer value and reduce risks for each party involved in a public-private partnership.

The Hamilton Project seeks to advance America's promise of opportunity, prosperity, and growth. The Project's economic strategy reflects a judgment that long-term prosperity is best achieved by making economic growth broad-based, by enhancing individual economic security, and by embracing a role for effective government in making needed public investments. Our strategy—strikingly different from the theories driving economic policy in recent years—calls for fiscal discipline and for increased public investment in key growth-enhancing areas. The Project will put forward innovative policy ideas from leading economic thinkers throughout the United States—ideas based on experience and evidence, not ideology and doctrine—to introduce new, sometimes controversial, policy options into the national debate with the goal of improving our country's economic policy.

The Project is named after Alexander Hamilton, the nation's first treasury secretary, who laid the foundation for the modern American economy. Consistent with the guiding principles of the Project, Hamilton stood for sound fiscal policy, believed that broad-based opportunity for advancement would drive American economic growth, and recognized that "prudent aids and encouragements on the part of government" are necessary to enhance and guide market forces.

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Global Management, Haas School of
Business University of California, Berkeley

MICHAEL GREENSTONE
Director



1775 Massachusetts Ave., NW
Washington, DC 20036
(202) 797-6279

BROOKINGS