Research

Better Decisions in a Time of Scarce Resources

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Executive Summary

Surface transportation investment in the United States has been declining in real terms and faces a future of budgetary stringency. It is essential that any future investments go towards programs and projects that offer the greatest economic returns per dollar. Unfortunately, there is limited strategic allocation of transportation capital funding in the United States, and most investments in transportation are made without the use of economic analysis.

This paper examines two case studies in "capital programming," which is the process used to prioritize and select transportation infrastructure projects. The Kansas Department of Transportation (KDOT) case demonstrates how to overcome substantial barriers in order to implement a project selection method that enables more performance-based capital programming. In the second case, the planning organization for the Chicago metropolitan region, the Chicago Metropolitan Agency for Planning (CMAP), used performance-based analysis to identify projects for inclusion in its long-term investment plan. However, CMAP faced significant barriers to the implementation of this selection process for capital investments.

This paper concludes with a series of recommendations, including:

- In order for the capital programming process in the United States to improve, increased leadership at the federal level is crucial.
- Congress could substantially improve capital programming processes across the country by requiring all implementing agencies to conduct transparent economic analyses as part of state and regional transportation improvement plans. The U.S. Department of Transportation (USDOT) should be empowered to reject plans that do not include sufficient economic analysis.
- Finally, rather than rejecting or accepting state and metropolitan transportation investment programs, Congress could incentivize states and Metropolitan Planning Organizations (MPO) to develop and implement economic analysis of potential capital projects.

Better Decisions in a Time of Scarce Resources

Surface transportation investment in the United States is declining in real terms. A study published by The Pew Charitable Trusts demonstrated that overall spending on surface transportation by all levels of government fell by 12 percent between 2002 and 2011. While the federal program gets most of the attention, this trend is also evident at the state level, where infrastructure investment fell 20 percent in real terms over this time period. With public capital limited at all levels of government, and with funding streams likely to remain constrained for many years, it is even more essential that investments go towards programs and projects that offer the greatest economic returns per dollar.

Strategic and analytically driven allocation of transportation capital funding, however, remains limited in the United States. Agencies that are responsible for investing in and maintaining the country's infrastructure typically do not use data-driven analytical methods to inform the project selection process. Instead, decisions are usually made based on immediate needs and political considerations, and decision-makers are typically not informed about which projects could provide the greatest returns on investment.

International examples show that there are better ways of approaching capital programming that can allow better allocation of scarce resources. In 2006 Sir Rod Eddington, the former Chief Executive Officer of British Airways, was asked by the government of the United Kingdom (UK) to study the links between transportation and economic productivity and growth. His report (colloquially referred to as the Eddington Report) demonstrated that key transportation investments in metropolitan regions have the potential to unlock economic growth and provide significant national benefits. The Eddington Report noted that in developed nations with well-established transportation networks and facilities, incremental improvements to existing assets often provided the highest benefits at the lowest costs.

The Eddington Report was also the foundation for selecting significant investments in new capacity, where rigorous analysis could verify that the construction costs would lead to disproportionately higher economic benefits and other benefits in terms of market and labor accessibility, productivity, and growth. On the basis of such a strong business case, the UK government proceeded with Crossrail, a new subway line from one end of the London region to the other. This project cost an estimated $20 billion- and received support even at a time of fiscal austerity. This enormous investment of scarce public capital was based on an analytically driven conclusion that new transport capacity would be the key to accessing untapped economic growth. The project has survived parliamentary changes due to the basis of sound analysis.

Similar principles were incorporated into the capital programming approach in Australia. In 2007, Infrastructure Australia (IA) was established as an independent statutory body to evaluate and rank infrastructure proposals for transportation. This step fundamentally changed the federal selection process in Australia. While the federal parliament could still choose to invest in projects that were not encouraged through IA's analyses, this approach added a level of transparency to the decision making process and made it more challenging for lawmakers to make purely political investment decisions. The cases of the UK and Australia demonstrate that the United States' peer countries are moving toward greater use of economic analysis as part of the capital decision-making process.

This paper examines "capital programming", the process used to prioritize and select transportation projects for capital investment. According to the National Association of State Budget Officers, the federal government in the United States provides approximately 45 percent of state transportation capital investments, meaning that the federally mandated planning process can potentially drive project selection. This paper analyzes two case studies to illustrate how the planning process functions in the United States, identifies how entities engage in capital programming, and defines the barriers that exist to innovation and improvement. The Kansas Department of Transportation (KDOT) case demonstrates how to overcome substantial challenges in order to

implement a project selection method that can enable more performance-based capital programming. The Chicago Metropolitan Agency for Planning (CMAP), on the other hand, demonstrates the issues at the metropolitan level that can stand in the way of attempts to improve planning.

Building on the principles of the Eddington Report and the pitfalls of the existing process in the United States, this paper concludes with a series of recommendations that can help reinforce positive elements, and revise constraining aspects of the federally mandated planning process. These recommendations have the potential to substantially improve the project selection process for transportation across all levels of government and potentially mitigate the trend towards reduced investment.

Transportation Planning Process for U.S. Capital Projects

States and localities are the primary implementers of capital programming for transportation in the United States. However, they must operate within the federal planning process in order to be eligible for federal surface transportation grants. State departments of transportation (DOTs) are tasked with overseeing transportation planning, programming, and implementation for the entire state. Metropolitan Planning Organizations (MPOs), which are federally required for areas that consist of more than 50,000 people, are the official conduits for transportation planning, programming, and implementation at the metropolitan level.

MPOs are required annually to develop and update transportation improvement programs (TIPs) for their jurisdictions. TIPs contain transportation initiatives, primarily focusing on capital surface transportation projects. Each state DOT then incorporates all the TIPs within the state into the statewide transportation improvement program (STIP). STIPs include projects from the TIPs across the state, as well as projects developed in non-urbanized areas without MPO representation. Projects within the STIP must be “fiscally constrained,” meaning that the state must demonstrate that there are reasonable funding streams for the project’s construction and initial few years of operation. Projects that are included in the STIP are eligible for federal funding, which is apportioned by Congress through formulas and programs administered by USDOT.

This process fails to effectively encourage the use of economic analysis to weigh project costs and benefits. There are no enforced requirements for states or regions to conduct economic analysis on the projects listed in the STIP or TIP. This means that states and localities can make investment decisions regarding federal money, and their entire investment program, without necessarily considering costs and benefits. Moreover, the STIP and TIP projects are selected by government officials in the state legislature or on the board of regional MPOs. These officials have little interest in introducing economic analysis into the process and do not encourage states or localities to do so. As a result, few DOTs and MPOs are currently employing economic analysis in their planning process.

State and Local Case Studies

While the federal planning process does not mandate extensive economic analysis within the capital programming process, some state DOTs and MPOs have developed their own initiatives that incorporate economic analysis into capital programing. The case of KDOT demonstrates one such experience at the state level, illuminating the benefits that can result, including better project selection, increased transparency, and bolstered public support. The case of CMAP, on the other hand, demonstrates the challenges that exist within the MPO structure when it comes to tying analysis to investment decisions. Together these cases provide examples of some of the innovations and challenges that agencies are facing in the United States.

Kansas Department of Transportation

KDOT is responsible for the maintenance and improvement of the surface transportation network in Kansas, which includes 627 cities, 105 counties, and five MPOs. According to KDOT's published project selection criteria fact sheet, they previously relied on engineering-based priority formulas, among other considerations, to make capital investment decisions. Stakeholders and residents voiced that they felt other considerations beyond these formulas were not properly accounted for in the project selection process. This case examines KDOT's new project selection method and how that has influenced the allocation of transportation funding.

KDOT began by rethinking its project selection methods with the aim of expanding beyond engineering-based considerations, such as level of service, that had been dominating the decision making process. Through a set of working groups that were conducted with stakeholder input, it became clear that there was an appetite for economic analysis to be a component of consideration for project selection. Specifically, there was a stated goal to make the process more "adaptable to changing needs and more responsive to economic opportunities and local priorities." In May of 2010, the Kansas Legislature passed an $8 billion, ten-year long range plan called "Transportation Works for Kansas" (T-WORKS), which used new selection methods for expansion and modernization projects.

T-WORKS specifies that state-level system expansion projects must be selected, in part, through a competitive, analytical process. This process uses a weighted formula that considers engineering factors as half of its calculation, with the other half of the calculation split between economic analysis and local consultation. The included economic analysis is conducted with transportation modeling software that estimates the projected congestion relief, travel-time savings, market access expansion, safety, and land development that would result from the project's introduction. The methods for estimating these impacts were published online, inviting public input into the results.

When developing this process, KDOT specifically sought to ensure that the economic analysis included within the project selection was not overly rigid. KDOT identified a number of other factors that may be of greater importance than economic factors, depending on the project or community. For example, in some communities it may be more valuable to select a project that has a low impact in terms of environmental, social, or other factors. Based on this principle, within the designated criteria, KDOT engaged local communities to get their reaction and input on projects.

With input from engineering factors, economic impact analyses, and community engagement, KDOT was able to weigh each factor along with project costs in order to make final selection decisions. The eventual result was a ten-year, $8 billion program for capital investment. This plan, as passed by the legislature, allowed for flexibility as future changes and needs might alter the project list, but the larger investment plan for the state has been outlined through 2020. State-led projects selected for construction were included in the TIPs created by the MPOs, which feed into the statewide STIP and subsequent construction plan for the state. Though the MPOs did

not have direct jurisdiction over selecting these projects, the community engagement aspect of the T-WORKS plan included feedback from localities, and the localities also included locally funded projects in their TIPs.

KDOT Program Results

This new evaluation process for capital expansion has had clear benefits for Kansas, allowing projects that have the greater economic impact to be recognized as such in the project selection process. Each Kansas expansion project in the program clearly lists its construction cost along with the expected economic impacts. Many of the projects listed have economic impacts that are substantially greater than their construction cost. For example, a new freeway segment south of Lawrence is expected to cost $192 million and bring the state $3.7 billion in economic impacts, and an improved interchange in I-35 is expected to cost $14 million and bring approximately $1.0 billion in economic impacts. These powerful numbers gave an order of magnitude to decision makers that helped demonstrate which projects have the greatest impact on the state's economy.

In a state that has several urban areas, but has traditionally spent disproportionately in rural projects, this program allowed a significant amount of capital funding to be shifted toward metropolitan areas that generate more of the state's economic activity. Once economic analysis was introduced into the decision-making process, it became more challenging for legislators to argue for less beneficial pet projects. This shift has helped to highlight T-WORKS success in targeting funding where it is needed most.

In addition, by employing a public formula to select and weigh projects, KDOT has introduced increased transparency, which has in turn helped to bolster political support across the board. The process has not only provided staff with a tool to consistently evaluate projects from a technical, financial, and economic perspective, it has also fostered improved relationships across the state. This is important because it means that even though T-WORKS arguably reduced political influence on the decision-making process, it still improved support for transportation investment from elected officials and the public.

Importantly, the T-WORKS long-range transportation plan feeds the state projects in the STIP. Because KDOT took the initiative to implement economic analysis into the decision making process, the STIP has projects that are based on informed decisions. This is uncommon for most states, which still primarily rely on engineering-based formulas and political considerations to select projects for the STIP. KDOT was able to move in this direction despite the lack of incentives in the federal planning process. However, as the case of Chicago shows, this is much easier for a state DOT to accomplish than for an MPO.

Chicago Metropolitan Region

The Chicago metropolitan region spans the six Illinois counties of Cook, DuPage, Kane, Lake, McHenry, and Will, and is home to a little more than eight million residents. Chicago is the third largest city in the country with about 2.7 million residents. The region has experienced strong population growth in its suburban areas in recent decades, and is expected to add another two million residents over the next 30 years.

The task of visioning and planning for transportation in the region is assigned to the Chicago Metropolitan Agency for Planning (CMAP). CMAP is governed by appointees from across the region, including elected officials, business leaders, and other community members. Due to federal regulations for MPOs, the region has created a separate entity that is housed alongside CMAP, the MPO Planning Committee. The committee is comprised of elected-officials and regional transportation operating agency members who adhere to the federal

planning regulations. The Planning Committee includes state and local elected officials as well as representatives from transportation entities, including the Illinois Department of Transportation (IDOT) and regional transit operators. The MPO Planning Committee has direct control over which projects are included within the region's TIP and their selections do not have to reflect analysis that is conducted within CMAP. The dueling nature of the CMAP and MPO Planning Committee boards creates different agendas and priorities for regional transportation capital programming.

In 2005, CMAP began developing a new comprehensive, 30-year, regional plan, titled GO TO 2040. At the outset of this process, CMAP's leadership articulated its desire to select projects using performance metrics, including estimated economic outcomes. To develop the most effective capital programming selection approach, CMAP teamed up with the Volpe Center for Transportation to explore "best practices" across the country. Based on the results of this research, CMAP decided to conduct economic impact analysis, similar to the KDOT process, on capital expansion projects.

In the GO TO 2040 Plan, the majority of the expected investment is targeted toward maintaining the existing infrastructure for the region's highways and transit networks. The remaining funding is targeted toward the new capital expansion projects. Entities from around the region submitted proposed projects to CMAP for inclusion in the final plan. Employing lessons from these best practices, CMAP calculated the expected economic impacts for the proposed projects. The projects were evaluated on a mode-neutral basis, weighing the regional economic impacts to the projects' costs. These analytical indicators were considered in addition to other factors including geographic equity, effects on disadvantaged residents, modal balance, and the priorities of the implementing agencies.

The final list of "fiscally constrained" projects in the GO TO 2040 plan includes 18 projects, ranging from heavy and commuter rail transit extensions and improvements, new highway interchange and lanes, and new managed highway lanes. The plan also includes dozens of "unconstrained" projects, meaning that they were proposed but there is no sufficient funding source to dedicate to their construction. Several projects that would normally have made it into a long-range plan were placed on the unconstrained list, and therefore not recommended for funding under the plan.

While this analytical process allowed CMAP to better identify the highest performing projects, the inclusion of these projects within the TIP proved to be challenging. CMAP had identified the best potential projects in terms of return on investment, but this did not mean that anyone was going to follow their recommendations. The actual work plan for the region is the federally-mandated TIP, which is incorporated into the state's STIP. CMAP does not have any direct control over funding streams and does not build or operate any infrastructure. CMAP operates as the region's MPO but, per federal regulations, the MPO Planning Committee has jurisdiction over the ultimate selection of projects included within the TIP. The Planning Committee is, in part, comprised of officials from the implementing agencies that directly construct, maintain, and operate roads and transit networks. The members of the MPO Planning Committee are therefore likely to include projects that are in the best interest of specific agencies and that fit within each individual agency's budget and funding streams. As a result, other agencies, specifically the region's implementing agencies, such as transit operators and IDOT, have significantly more influence over which projects are selected for inclusion within the TIP.

The projects that were ultimately included in the TIP did not directly reflect the results of the GO TO 2040 plan. For example, a new tolled freeway in the southern portion of the metro area, called the Illiana Expressway, was not included in the fiscally constrained list of recommended projects in the GO TO 2040 plan. However, the MPO Policy Committee ultimately overrode the plan and included it in the TIP. Since the project made it into the region's work plan, CMAP eventually included the Illiana Expressway in an updated version of GO TO

2040 for consistency. The economic analyses conducted by CMAP had little effect on the implementing agencies decisions to move forward on certain projects. While anecdotal evidence exists that the economic analysis results had some marginal influence over the final TIP, overall the selection process for TIP projects remains far removed from the analysis and performance measures developed by CMAP.

While CMAP's process did not necessarily influence the ultimate investments, the selection technique used for GO TO 2040 is a positive development. CMAP was able to reduce tensions that exist between the City of Chicago and the suburban counties, as well as modal divisions between highways and transit. The ability of this coordination and analysis to penetrate into the MPO decision-making process, however, will likely continue to be challenging under the current structure of the federally-mandated MPO capital programming process.

Conclusions and Recommendations

The process for capital programming for transportation investment in the United States is in need of substantial improvement, and most Americans would likely be surprised and disappointed to discover that most investments in transportation are made without the use of sophisticated economic analysis. This approach to decision making is a relic of an era when major capital projects, such as the Interstate Highway System, were federal-level investments that were made through a 90 percent federally funded program with a clear national purpose. The United States now has a modern transportation system and states and localities bear a greater portion of the burden for most capital projects. In turn, new capital investments that provide substantial benefits are more difficult to properly identify.

When economic analysis is tied to investment decisions, it can allow states and metropolitan areas across the country to unlock untapped economic benefits. **In a time of fiscal constraint, the ability to invest in the wisest projects becomes even more critical.** More effective use of existing resources can help diminish the negative impacts of insufficient funding by ensuring that limited dollars are targeted to the most cost-effective projects.

The principles of the Eddington Report demonstrate that in order to achieved the greatest economic benefits in relation to cost in an advanced economy, transportation spending should generally be directed towards preservation and operation of the existing system. This is the opposite of how the average elected official sees transportation investment. Elected officials are more likely to prefer ribbon-cutting ceremonies for new facilities to the maintenance or rebuilding of an existing structure. This is why introducing economic analysis into the decision making process is so important. Elected officials can still choose to move ahead with ribbon cuttings, but they would often have to do so in the face of clear evidence that this is not the best use of limited funds.

Ideally, the funding that is left for system expansion should be carefully considered and prioritized to target the most beneficial projects. The efforts in Kansas demonstrate the benefits of this type of informed decision-making. Although the economic analysis component of the T-WORKS selection process is only 25 percent of the overall criteria, the program has been instrumental at dissuading elected officials from selecting projects that were not as valuable as others. Unfortunately, KDOT remains an outlier in the national context and most states do not employ such a robust selection process.

At the metropolitan level, good analysis is not always reflected in the actual selection of capital projects to be undertaken. **The case of CMAP in the Chicago metropolitan region demonstrates that there are significant challenges to the implementation of performance-based and analytically driven long-term capital plans by a regionally focused and strategically multi-modal MPO.**

Instead, modally focused implementing entities, such as transit agencies, toll authorities, and highway and road agencies, are in charge of selecting projects. This leads to a disjointed and mode-focused plan that is often not informed by regional performance factors.

Within the federal process, MPOs often do not have a great enough geographic or financial reach, as is demonstrated through the case of CMAP. Most MPOs in the country have little statutory authority, making it challenging to embrace regional, multi-modal goals. **There is a clear federal role in reassessing the role of MPOs within states, allowing them to better facilitate capital programming for regions across the country.**

The capital programming process ought to include economic analysis and community input for all major projects in a state. KDOT, among other states, has made significant steps in recent years to improve the capital programming process and target funds to more valuable projects. States that are already moving in this direction have demonstrated significant benefits. Because the majority of capital spending is on rehabilitation and maintenance, states need to expand their performance-based programs to include this portion of their budget and better target maintenance spending. And, for states that have not begun developing performance based capital planning programs, it is even more important that they begin the process now of building the internal capacity for developing these programs.

The capital programming process in the United States is unlikely to improve without leadership at the federal level. Congress has already taken the first step by articulating national goals and performance measures under MAP-21. States and other federal grantees will be required to set targets for achieving specific performance outcomes. However, as these performance measures are not linked to funding or other incentives, they are unlikely to affect the capital programming process. Moreover, due to the challenging and complex nature of economic analysis, Congress was reluctant to provide specific measures or metrics related to economic goals in MAP-21. The performance measures in the legislation are largely limited to elements such as safety, pavement conditions, and congestion.

Developing specific economic measures for transportation investment is challenging, but as the KDOT and CMAP cases have demonstrated it is achievable. **Congress could substantially improve the capital programming processes across the country by requiring all implementing agencies to conduct transparent economic analyses of all projects included in STIPs and TIPs.** USDOT could play a role in assisting states and localities as they develop these processes. Under the current system, USDOT would also need to be empowered to reject STIPs and TIPs that do not include sufficient economic analysis. This is perhaps the most challenging obstacle that needs to be tackled.

An alternative to having USDOT reject or accept state plans could be for Congress to set aside specific funding both to assist states in developing economic analysis and to reward states for effectively performing economic analysis. The funding to conduct the analysis would not need to be all that substantial and the reward need not be in the form of funding. It could simply be in the form of greater flexibility and a reduction in oversight. These small incentives could go a long way towards improving America's transportation capital programming process.

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