

EXECUTIVE SUMMARY

This study, “Analyzing the Economic Impacts of Transportation Projects,” was conducted on behalf of the Connecticut Department of Transportation (ConnDOT) by the Connecticut Academy of Science and Engineering (CASE). The main goal of the study is to explore methods, approaches and analytical software tools for analyzing economic activity that results from large-scale transportation investments in Connecticut.

BACKGROUND

Transportation investments are traditionally motivated by transportation-related considerations including the need to improve safety, alleviate congestion, enhance mobility and accessibility, and increase reliability of transportation networks. In addition, transportation investments are also aimed at promoting *economic activity* and bringing about *economic development* in a region.

- Economic activity refers to the production, distribution and consumption of goods and services by businesses and end users.
- Economic development refers to a sustained longer-term change in economic activity leading to an improvement in the jobs, wealth, tax base, and well-being in a neighborhood, city, region or state.

The interactions between transportation investments and economic activity have long been recognized. However, estimating and evaluating the economic impacts of such investments for project selection, programming and prioritization have grown in interest among transportation agencies in recent years for the following reasons, among others:

- A decline in the availability of funding for transportation projects has led to increased competition for limited federal and state resources.
- A paradigm shift in implementing transportation projects from seeking funding to obtaining financing, resulting in an increased need for transportation agencies to justify the economic value of transportation projects in comparison with other priorities for competing bonding or other financing.
- A growing call at the federal and state levels for funding/financing projects based on performance-based criteria, such as the potential for investment in a program or project to result in economic development.
- Investing in transportation to promote economic development of a region.

OBJECTIVES

This study provides a synthesis of the literature on economic impact analysis and includes the following objectives:

- Review the state-of-art and state-of-practice for analyzing the economic impacts of transportation investments.
- Identify methods for analyzing the economic value/benefits of transportation projects and explore approaches that can be adapted for evaluating alternative transportation projects.
- Identify and provide an assessment of candidate software modeling tools for analyzing the economic impacts of transportation investments.

BRIEF STATEMENT OF PRIMARY CONCLUSION

The transportation system and users of transportation infrastructure interact with the economy in complex ways, causing economic impacts. Therefore, in order to effectively analyze the economic impact of transportation projects, ConnDOT should consider the following:

- Establishing the role of economic impact analysis in the state's strategic transportation planning process.
- Adopting an objective, independent and consistent process for conducting economic impact analyses that incorporates the state's regional, economic and political considerations.
- Building capacity of ConnDOT staff including their understanding of economic impact analysis and the tools used to conduct such analyses for use in the strategic planning process and to support and manage analysts that conduct the analyses.
- Utilizing analysts well versed in the principles of transportation planning/engineering and economic theory, and knowledgeable about the interrelations between the two for the purpose of ensuring validity of the results.
- Establishing a partnership with an organization or consultant with the capacity to conduct economic analyses to achieve consistency in analyses over time.
- Selecting an economic analysis software model to analyze the economic impact of transportation projects. Of the models considered in this study, currently REMI TranSight and TREDIS are recommended for ConnDOT's consideration.
- Customizing and communicating the results of the analyses in meaningful terms for various audiences (e.g., decision makers, stakeholders and the public).

SUMMARY OF FINDINGS AND RECOMMENDATIONS

A summary of the study's findings and suggested recommendations follows.

Characterizing Economic Impacts of Transportation Investments

Transportation investments contribute to economic activity in two significant ways:

- Creation of economic activity from the spending of money in the construction of transportation projects. This type of economic activity is short lived and temporary. Economic activity related to project construction needs to be put in the perspective of the state's annual total transportation investment program.
- Improvements in the connectivity, mobility, accessibility, and reliability of the transportation system interact in complex ways also resulting in economic activities. These economic activities are realized in the longer term and are more long-lasting. A subset of these economic activities that positively influence jobs, wealth, tax base and well-being are referred to as economic development impacts.

As noted, all transportation investments bring about economic activity, but not all transportation investments result in economic development of a region. A transportation system facilitates the economic development activity in a region by influencing the movement of people, activities, goods, and services. However, the transportation system is not the only factor causing economic development in a region. There needs to be a confluence of other favorable factors including economy, land use, policy, legal structures such as property rights, labor, education, taxation, quality of life factors and other non-transportation-related infrastructure for the economic development impacts to be realized from a transportation investment.

Analyzing Economic Impacts of Transportation Investments

Two types of interrelated analyses are often conducted to analyze economic impacts from transportation investments. These consist of those for *estimating* economic impacts, and those for *evaluating* economic impacts:

- Regional economic models (REMs) are the most comprehensive for estimation.
- Benefit-cost analyses (BCAs) are the most comprehensive for evaluation.

ESTIMATING ECONOMIC IMPACTS

Analyses aimed at estimating economic impacts attempt to answer the question : What is the overall impact on the regional economy from the proposed transportation project? This type of analysis employs methods and approaches that estimate changes in economic indicators by modeling the economy with and without a transportation investment.

Regional economic models (REMs) are the most comprehensive and most commonly used for analysis of large-scale transportation investments. REMs can accurately capture the flow of goods and services across different industries and sectors. This approach can incorporate a wide range of economic impacts, including the following:

- Direct economic impacts that are realized from the impact of the transportation improvement to the economic efficiency of travel choices of end users (e.g., households and businesses).
- Indirect economic impacts that are needed to support the direct economic impacts to end users affected by the transportation investment.

- Induced economic impacts that result from the additional income afforded by households and wealth accumulated by businesses due to the direct and indirect impacts. They also include additional economic activity resulting from market access changes, including increased competitiveness and attractiveness of the region and changes in the structure of the regional economy.

Therefore, it is recommended that a REM be used to estimate the economic impacts due to transportation investments.

EVALUATING ECONOMIC IMPACTS

Analyses aimed at evaluating economic impacts attempt to answer the question: What are the overall costs compared with the benefits over the life cycle of a transportation project? This type of analysis uses techniques to evaluate the net value/outcome/return of the different economic activities by considering the benefits and costs of a project.

Benefit-cost analysis (BCA) is widely used for evaluating transportation investments because it captures the costs and most direct benefits in evaluating the value of a transportation investment to the society at large. This methodology can also be used to compare alternative transportation investments and to objectively use the analysis results in the transportation planning process. Additionally, BCA can be used to compare alternative staging and implementations schedules for a project.

BCA is an appropriate methodology for evaluating the value or return of a transportation investment. Typically, only direct economic impacts of transportation investments are included in the calculation of benefits of a BCA. The indirect economic impacts are often ignored as manifestations of the direct economic impacts, and induced impacts are not considered due to the difficulty associated with measuring them and uncertainty associated with realizing the impacts. While it may be appropriate to ignore the indirect impacts in a BCA, a comprehensive BCA must include the induced impacts when calculating the benefits. The induced impacts are generally produced as estimates from REMs.

REMs and BCAs offer different insights into a project. Therefore, it is recommended that both of these analytical tools be used so that the potential economic impacts due to a transportation investment can be comprehensively analyzed.

Candidate Tools

Eighteen different analytical tools for analyzing economic impacts of transportation investments were reviewed. This review included models that estimate economic impacts (REMs) and those that are used to evaluate the economic impacts (BCAs). Based on criteria related to functionality, capability, and applicability, REMI TranSight and TREDIS were selected for a detailed review. Several features of these models make them useful for analyzing the economic impacts of transportation investments. Both models incorporate a REM and can be utilized to conduct BCA.

Model selection criteria and general requirements that were used for this study's detailed review of candidate models will be useful to ConnDOT's consideration of models to evaluate for its use. See Section 6.3.4 (Candidate Tools) of this report for the criteria used in this review

and key features of the selected models. In general, it is suggested that the analytical tool accommodate the state of Connecticut including surrounding regions as appropriate, and be designed for use in estimating and evaluating the economic impacts of transportation projects. REMI TranSight and TREDIS modeling tools are recommended for ConnDOT's consideration because both are fully developed and are capable of comprehensively analyzing the economic impacts of transportation investments.

Considerations for Conducting Economic Impact Analysis

It is recommended that analysts who are well versed in the principles of transportation planning/engineering and economic theory, and knowledgeable about the interplay between the two be utilized to conduct the economic impact analyses of transportation projects. It is also noted that economic considerations are only one aspect of the transportation planning process. The other considerations include

- the role and identification of other favorable conditions (e.g., special development zones/zoning regulations) so that appropriate non-transportation-related policy decisions can be made to realize potential economic impacts from transportation investments;
- the local economic and social context and considerations so that appropriate assumptions are made in applying models and interpreting the results; and
- how the measures of economic activity are represented and derived in the model. This will enable the analysts to identify and/or avoid common measurement issues.

Implementation Strategy

Review of the state of the practice in the United States and inputs from the focus group sessions were used to identify key considerations for the selection, adoption and implementation of economic analysis models in Connecticut. The research indicated that economic impact analysis is increasingly incorporated as part of transportation planning efforts in some states. It was also observed that transportation planning efforts in these states have been successful in achieving both transportation and non-transportation objectives, including economic development strategic goals.

Based on this review it is recommended that ConnDOT adopt an objective, independent, and consistent process for conducting economic impact analysis of transportation projects. Further, it is recommended that economic impact analysis be incorporated into the strategic planning, long-range capital investment program planning, and asset management practices at ConnDOT. Transportation-related measures provide the foundation for project selection, prioritization and programming. However, economic analysis that identifies the economic development potential of a project or projects is useful in determining the overall value of a project for the state.

The transportation investment decision making process should incorporate a multi-criteria evaluation procedure that takes into consideration transportation-related criteria, as well as non-transportation-related criteria including economic impacts and land use impacts, among others, when applicable.

ConnDOT should select a statewide economic model that integrates with existing modeling platforms and analytical tools that are used for making transportation investment decisions and evaluating land use impacts. Selection and use of a statewide economic model will ensure consistency and continuity in the application of the model for analyzing economic impacts of transportation projects and/or alternatives and can be applied for the purposes of long-range transportation planning and capital project programming.

The expertise necessary to conduct economic impact analyses requires a working knowledge of economic analysis and modeling. Familiarity with the Connecticut's economy and the region would provide a valuable foundation for assessing the economic development potential for Connecticut's transportation investments. Consideration should be given to partnering with an organization or consultant with the capacity to conduct the analyses to achieve consistency.

Also, ConnDOT staff needs to be familiar with the economic analysis methodology for the purposes of overseeing the work of others and for applying the results of the economic analyses in the overall transportation investment decision making process.

The following additional implementation recommendations are suggested for conducting and reporting results of economic impact analyses for Connecticut's transportation investments:

- Transparency in conducting and applying the results of economic analysis for project selection decision making is necessary.
- Consistency throughout the project analysis and project selection process is critical for successful implementation over time.
- Communication is needed throughout the economic analysis process between ConnDOT staff and economic analysis analysts, as well as with stakeholders and policymakers at all levels, as appropriate, and the general public.
- Performance measures need to be identified for use in project selection. The metrics need to be customized for ConnDOT staff and various audiences (e.g., decision makers, stakeholders and the public). This will help ensure the results of analyses are effectively conveyed in terms that are meaningful for each audience's use in understanding the value of transportation investments for their purposes.
- The economic analysis models and methodologies used must be appropriate for the type and size of project or projects being considered. Projects and alternatives should be evaluated on the basis of the issues they are intended to solve and projected performance metrics as provided in the analyses.