

**Appendix W**  
**Economic Modeling Methodology**

## Economic Impacts Methodology

This appendix summarizes the methodology used to estimate economic impacts resulting from the completion of I-69 from Evansville to Indianapolis. Direct regional economic impacts, including business cost savings, business attraction benefits, and increased tourism, were estimated using the Major Corridor Investment-Benefit Analysis System (MCIBAS), an economic analysis tool used by the Indiana Department of Transportation (InDOT) to evaluate major corridor investments. One component of the MCIBAS, the Regional Economic Models, Inc. (REMI) simulation model, estimated total economic effects (including indirect and induced) such as changes in business sales, employment, and income due to the direct impacts. In addition to the regional economic analysis, a localized impacts analysis was performed to estimate the potential change in sales for businesses abutting the route of each alternative.

A survey of the existing economic conditions in the I-69 study area was conducted in order to provide context for the economic forecasts that are discussed in the DEIS. To help evaluate the validity of the economic forecasts, local economic development officials and representatives from local businesses were interviewed. The interviews provided an opportunity to consider local perspectives about the potential effects of the I-69 project on the economy of Southwest Indiana, and the information gained from the interviews lends perspective to the estimation and results of the economic impact analysis.

## Regional Economic Impacts

The MCIBAS, developed for the Indiana Department of Transportation (InDOT) to assess the relative costs and benefits of proposed major highway corridor projects, was used to estimate regional economic impacts of the I-69 project. It consists of a travel demand model, model post-processors system, and an economic impact analysis system. The MCIBAS has the following components:

1. **Indiana Statewide Traffic Model (ISTM)** – A statewide traffic network simulation model predicts the direct effects of the highway system improvement on traffic patterns, levels, and speeds, and estimates aggregate measures of systemwide vehicle-miles of travel (VMT) and vehicle-hours of travel (VHT).
2. **Model Post-Processor** – A post-processor program reads ISTM results and translates the predicted traffic changes into estimates of the dollar value of user travel time, travel cost, and safety benefits.
3. **Economic Impact Analysis System** – A series of linked models estimates the economic impacts of the I-69 project. It has four components: 1) business cost savings; 2) business attraction; 3) tourism; and 4) REMI economic simulation and forecasting model.

## **Business Cost Savings Module**

The Business Cost Savings module translates estimates of the dollar value of user travel time, travel cost, and safety benefits from NET\_BC into direct economic impacts on business operating costs. To input business cost savings data into the REMI economic simulation model, it is first necessary to allocate the user benefits to geographic regions based on origin and destination patterns of truck and auto trips. Next, benefits are allocated among various sectors of the economy, including industries and households. This allocation is performed because business sectors differ in terms of size and relative sensitivity to transportation cost changes. The estimates of business cost savings are used as inputs to the REMI economic simulation model.

## **Business Attraction Module**

The Business Attraction module translates estimates of expanded delivery and commuting market areas for businesses along the highway into forecasts of direct business attraction beyond what would be expected due to user benefits alone. To identify potential business attraction prospects associated with the I-69 project, the business attraction analysis uses a quantitative screening process to identify industries that:

- Appear to be underrepresented or lagging in growth within the study area relative to comparable nearby areas;
- Appear to otherwise have a compatible cost structure to perform well in the study area; and
- Appear to be sensitive to highway market area, schedule reliability, and intermodal connection factors.

The primary determinant of business attraction impacts is the change in accessibility to labor, customer, supplier and buyer markets. Accessibility is estimated as the additional population that can be accessed within a 30 minute drive (labor and customer), and the additional employment accessible within a three hour drive. It is assumed that the employment increase in the study area will be, to a large degree offset by an employment decrease in the rest of the state, in the states of Illinois and Kentucky, which are adjacent to the study area, and in the rest of the U.S., as future economic growth is reallocated to the study area. The results of the business attraction calculations are used as inputs to the REMI economic simulation model.

## **Tourism Module**

The *Tourism* module estimates direct impacts on tourist visitor-days based on changes in accessibility to tourism destinations in the study area due to a highway system improvement. Given information about current tourism activity in the study area, the pattern of visitor origination locations for that tourism, and the extent to which highway improvements are expected to reduce travel times from outside origin markets to the study area, the model forecasts the net change in tourism activity. Estimates are made for different kind of visitors (overnight, day trip, etc.) to account for different spending patterns. Additional tourism visitor days to the study area are inputs to REMI.

## **REMI Economic Forecasting and Simulation Model**

The Regional Economic Models, Inc. (REMI) Economic Forecasting and Simulation Model simulates the full economic impacts of the highway project. REMI uses the direct economic impacts as assessed by the preceding three modules to forecast the total (direct and secondary) employment, business output, income, and population changes over time.

The REMI economic simulation model combines four functions:

1. It functions as a forecasting tool, which projects changes in population, employment, business sales, and profits for each of the nine regions within the customized model;
2. It functions as an input-output tool, which accounts for the inter-industry flows of dollars and calculates the associated indirect and induced economic effects;
3. It functions as an economic competitiveness analysis tool, which estimates how public policies and facilities change business costs in each industry by region, and assesses their effects on the competitive position and share of national growth captured by those areas; and
4. It functions as a population migration analysis tool, which estimates changes in population migration in response to changes in demand for labor, wage levels, living costs, and amenities.

For the I-69 study, the study area was split into five separate regions, and three regions outside Indiana—a “State of Kentucky”, a “State of Illinois”, and a “rest of US” region—were added because it was assumed that construction of a major highway extending more than 100 miles and forming a new link in the national highway network would also have measurable economic impacts outside the state. The model is calibrated by REMI using Indiana-specific data.

## **Localized Impacts**

A separate localized impacts analysis considered the effects of two potentially offsetting effects of I-69 construction on business sales. Access to businesses will be reduced when at-grade intersections are replaced with grade separations and local roads with access driveways are converted to controlled-access freeways. However, increases in pass-by traffic volumes will benefit business sales along the proposed highway corridors. It is important to note that this measure does not consider benefits to new businesses locating at new freeway interchanges, and does not consider benefits or impacts to businesses elsewhere in the study area but not directly adjacent to the alignment. Overall, little or no *net* impact on sales in the study region would be expected as a result of traffic changes due to the highway project.

In order to estimate the potential impact on sales of highway improvements on abutting businesses, the following methodology was used. This methodology was developed based on research conducted for National Cooperative Highway Research Program Project 25-4.

- Businesses along each proposed alignment were inventoried and classified into eight establishment types with common characteristics, including similar dependence on pass-by traffic.
- The effect of reduced highway access on business sales was accounted for by adjusting sales for businesses located along each proposed alignment by a designated percentage change that is based on the relative importance of convenience of customer access to each type of business.
- The effect of increased or decreased average daily traffic volume on sales for businesses located along each proposed alignment was based on the percent change in traffic volume, adjusted for the relative dependence of each type of business on pass-by traffic.
- Finally, the percentage increase or decrease in business sales due to access restrictions and the percentage increase or decrease in business sales due to changes in traffic volume were combined to determine an overall percentage impact on sales for each type of business along the proposed alignment.

For all of these analysis steps, data were first analyzed at the county level, and the resulting impacts were then aggregated to produce corridor-level results. The change in business sales is displayed as a percent of the study area total business sales, in order to compare the magnitude of potential impact with total regional sales.