

## Economic Effects of Transportation: The Freight Story

Freight transportation enhancements that reduce the costs of moving goods to and from markets are critical to economic expansion.

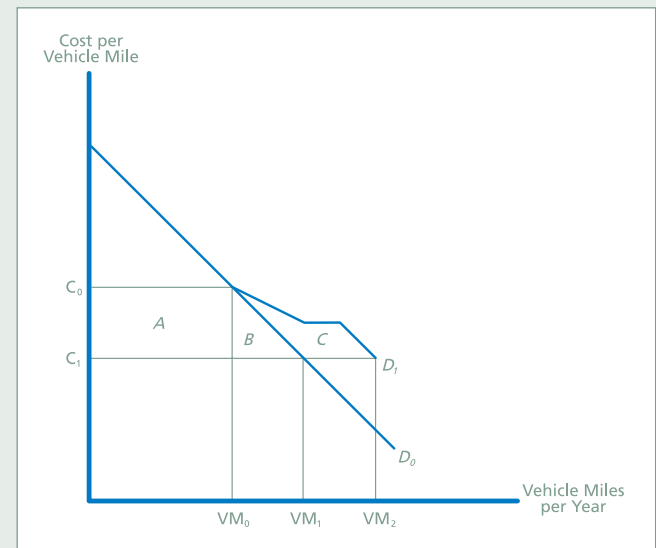
Much like labor and capital, transportation costs directly affect the price of goods and services and the profits of producers. Lower costs or better service, or both, in freight movement have a positive effect on all firms engaged in the production, distribution, trade, and retail sale of physical goods. Reducing the per-mile cost of goods means that any production or distribution facility can serve a wider market area, with potential gains from scale efficiencies. It also means a factory can draw supplies from a wider area with potential gains in terms of the cost and/or quality of parts and materials coming to the factory.

Beyond lower dollar costs to shippers, reductions in transit time and/or increases in schedule reliability can be expected to also have significant impacts. These gains in terms of time allow firms to manage their inventories and supply chains more efficiently. In recent years, trucking costs have fallen and reliability has improved. Businesses have tended to respond by buying more transportation and using it to reduce other components of logistics costs (e.g., through fewer warehouses or lower inventories).

The analytical work to provide definite quantitative information on the link between improved freight transportation and economic performance is just beginning. Benefit-cost models have been developed for evaluation of highway investments, but no model accords proper treatment to the benefits of freight improvements. In particular, previous models do not account for the benefits to the owners of the cargo and all they can mean in terms of more efficient logistics and greater productivity in manufacturing. For example, a major omission of previous models is that they did not account for the effects of road improvement on the owners of the cargo moving over the road.

A shipper's response to the change in freight-movement cost is determined by the conditions of its demand for freight transportation. This demand reflects both the market's demand for the firm's products and the way in which it uses freight transportation as an input to its production and/or distribution processes. As depicted in the graph below, a shipper's reaction to a cost reduction in freight transport can be thought of as occurring in three phases.

### How the Business Reorganization Effect Can Be Captured under a Benefit-Cost Framework



The shipper's demand curve ( $D_0$ ) reflects the benefits the shipper gets from buying freight transportation before an improvement to the system. In the very short term after an improvement, area A reflects the benefit of that cost reduction with an existing volume of freight ( $VM_0$ ). Area B adds to the benefits as the shipper takes advantage of the cost reduction and buys more freight. The change in the demand curve ( $D_1$ ) reflects the greater benefits the shipper can get once the firm has reorganized its logistics set-up following an improvement.

A freight improvement's full benefit is reflected in the sum of areas A, B, and C.

In commenting on the condition of the system, shippers and carriers tend to stress two themes. One is that they are, to a large degree, satisfied with the highway network as it now performs. They have designed their schedules and logistics systems around the current level of performance. Two, many of these people also emphasize that they would have a low level of tolerance for any deterioration in performance. For instance, there are choke points and problem areas where speeds are markedly lower than in the rest of the country.

Challenges to ensuring the efficiency and reliability of the freight system center on squeezing as much efficiency as possible out of available transportation resources and finding scarce resources to implement efficiency-enhancing programs and projects.

In the absence of improvements, the speed and reliability of the freight system can be expected to worsen as vehicle traffic grows and congestion increases. Such a development could force shippers and carriers into costly redesign and restructuring of their systems with higher logistics costs and a consequent drop in productivity.

It is reasonable to suppose that, if such costs are to be minimized, the current level of investment must be, at least, maintained. However, improvement in the performance of the freight system, with concomitant gains in national productivity, will require gains in the battle against congestion.

Transportation agencies at all levels of government can bring about improvement in highway freight-carriage. For instance:

- Targeted capacity expansion projects that alleviate high-frequency bottlenecks in the freight system can improve transit time variability.
- Freight planning can help to ensure that freight movement needs are appropriately considered by decision-makers by providing state and local transportation plan-

ners with the necessary tools to better account for the impacts of alternative investments on the efficiency of the freight system.

- Programs that strive to improve operations planning (or the interaction of planning and operations functions within a transportation agency) can improve system performance.
- The deployment of Intelligent Transportation Systems can enhance the efficiency of the highway system through operational improvements, better user information, and incident management (which is particularly problematic from the perspective of system reliability).
- Federal grant programs that provide financing mechanisms for freight transportation improvements can help to generate the types of investments needed to improve the productivity of the freight system.

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These observations are a result of a Freight Benefit Cost Analysis for the

Federal Highway Administration conducted by ICF Consulting and HLB Decision-Economics under subcontract to AECOM. The study developed a framework to capture the full extent of the economic impact of changes to the freight transportation system.

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