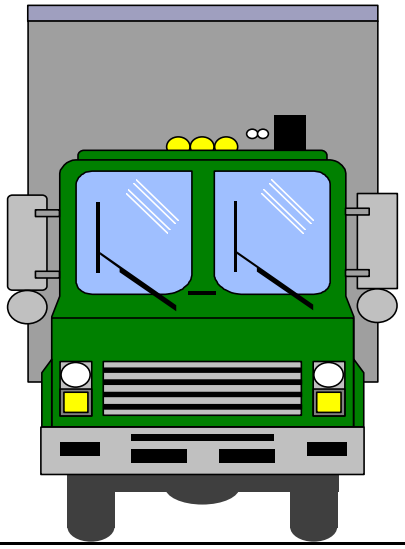
CHAPTER 12

Shipper Costs



INTRODUCTION

Shippers strive to minimize transportation and inventory costs. In the event of a change in truck size and weight (TS&W) regulations the array of available transportation options changes, potentially changing the transportation and inventory costs presented to shippers.

BASIC PRINCIPLES

A change in TS&W regulations may alter a shipper's logistics costs. "Logistics" is defined as that set of activities involving the movement and placement of goods to meet supply and demand. These costs include transportation, inventory, product packaging, plant location, and loading dock labor. Of all of these factors, a shipper's total logistics expense is most directly impacted by transportation and inventory costs.

TRANSPORTATION COST

Transportation cost is the cost of moving a shipment from its origin to its destination. This chapter focuses on the change in cost to rail and truck shippers. In 1994, rail shippers paid $31 billion in transportation expenses (Railroad Facts, 1997) and shippers using heavy commercial trucks paid $216 billion [see Chapter 4, Intermodal Transportation and Inventory Cost (ITIC) Model]. The truck transportation expense excludes light commercial trucks, such as the two-axle single unit truck (SUT) which accounts for over 50 percent of the total truck vehicle-miles-traveled (VMT), because these vehicles are not affected by the Study scenarios.

INVENTORY COSTS

Changes in payload also impact inventory costs. Inventory costs include warehousing, depreciation, taxes, obsolescence, insurance, ordering and interest expenses. The national total inventory carrying cost was estimated to be $272 billion in 1994 (Cass Logistics). This is calculated as a percent of the 1994 value of inventory as reported by the Census Bureau.

TRANSPORTATION COSTS AND CHANGES IN TRUCK SIZES AND WEIGHTS

Changes in truck size and weight (TS&W) regulations impact truck shipper's transportation cost. If TS&W regulations become more restrictive, then the payload-per-truck decreases and the transportation cost per-ton-mile increases. On the other hand, if TS&W regulations become more permissive then the payload-per-truck will increase and the transportation cost per-ton-mile decreases. Changes in TS&W regulations impact rail shipper's transportation cost because some will divert their freight to the new truck configuration(s) or obtain reduced rates from the railroads as the railroads compete with lower truck rates.

INVENTORY COSTS AND CHANGES IN TRUCK SIZES AND WEIGHTS

Inventory costs respond to changes in payloads caused by changes in truck size and weight limits. In a simple example, if a shipper changes from using a single 53-foot trailer to twin 53-foot trailers (as occurs in the Longer Combination Vehicles Nationwide Scenario), then the payload per delivery would double as would the inventory cost. On the other hand, if a shipper changes from using rail boxcars to a new truck configuration then the payload per delivery would decrease as would the inventory cost.

However, this estimate includes more than the inventory costs represented in the ITIC Model. The ITIC Model only includes the ordering, interest, holding (or warehousing) and insurance costs. Costs such as depreciation, taxes, and obsolescence are not directly impacted by changes in TS&W and are not included in the model.

RELATIONSHIP BETWEEN TRANSPORTATION AND INVENTORY COSTS

Commodity attributes will determine the relationship between transportation and inventory costs. For example, a pound of coal is cheap, it is ordered in large quantities, order processing is relatively inexpensive, and it is usually stored in open mounds. These inexpensive transportation and inventory costs result in shippers preferring railroads for large bulk shipments of coal.

Alternatively, the attributes of computer chips lead a shipper to prefer using either truck or air for small shipments because a pound of computer chips is expensive, the annual volume is relatively small, order processing is expensive due to strict specifications, storage is costly since it must be secure, and the shelf life is short due to the speed of innovation.

Many commodities are somewhere between the two extremes of coal and computer chips. For example, paper products are characterized by broad variations in prices, annual volumes, and storage requirements. With such a range of commodity attributes, it is understandable why paper products travel in a variety of modes and truck configurations.

The important commodity attributes are price, annual volume, order cost and inventory carrying cost. In general, as price or carrying cost increases, the optimal size of the shipment decreases. On the other hand, when annual volume or order cost increases the optimal size of the shipment increases.

ANALYTICAL APPROACH

Transportation and inventory impacts are derived from the ITIC Model (see Chapter 4). For a given change in TS&W limits, the model predicts whether changes in transportation and inventory costs will

cause a given shipment to be transported by an alternative mode or truck configuration. If the total cost is lower for a proposed truck configuration, relative to the current configuration, the shipment will divert. If a shipment diverts, the shipper will experience a change in transportation and inventory costs. The transportation and inventory savings (costs) do not include payment for any of the impact costs estimated in Chapter 5-Chapter 11.

Truck shipper transportation cost is computed from the ITIC results by multiplying the predicted VMT for each configuration by the cost-per-mile for that configuration and weight group.

Rail shipper transportation cost is computed using the revenues reported in the Surface Transportation Board's (STB's) Carload Waybill. These revenues were reviewed by the STB to correct for rail contract moves (see "Rail Revenues" box, Chapter 11). As indicated in Chapter 4, the ITIC Model allows a railroad to discount its price down to variable cost before the freight is predicted to shift from rail to truck. Therefore, in addition to the savings to rail shippers that move to new truck configurations, there are rate reductions for some rail shippers.

As noted above, changes in inventory costs (both positive and negative) would be expected to mitigate changes in transportation cost. Inventory costs vary markedly among industries and across firms within each industry. Total changes in inventory costs associated with the various illustrative scenarios could not be estimated. The ITIC Model results and transportation cost changes estimated in this chapter, however, do reflect consideration of inventory costs. An important element on the future TS&W research agenda is improvement of inventory cost data and relationships between inventory costs and transportation decisions.

ASSESSMENT OF SCENARIO IMPACTS

UNIFORMITY SCENARIO

The Uniformity Scenario causes a decrease in payload weight for existing truck configurations. The weight limits in States that have grandfathered weights currently exceeding the Federal limits would be decreased. As Exhibit 12-1 shows, the transportation cost for shippers using trucks increases $6,430 million per year. The impact on rail shippers was not estimated but is believed to be small because most of the potentially affected freight travels relatively short distances.

EXHIBIT 12-1
TRUCK SHIPPER TRANSPORTATION SAVINGS (COSTS) PER YEAR

	Scenarios					
	Uniformity	North American Trade		LCVs Nationwide	H.R.511	Triples Nationwide
		44,000-pound Tridem Axle	51,000-pound Tridem Axle			
Truck-to-Truck						
Dollars (million)	$ (6,430)	$ 10,922	$ 13,277	$ 26,660	$ (22)	$ 19,820
Percent Change	-3.0	5.0	6.1	12.3	0.0	9.2
Rail-to-Truck						
Dollars (million)	n/a	$ 870	$ 1,233	$ 782	n/a	$ 1,122
Percent Change	n/a	2.6	3.7	2.4	n/a	3.0
Rail Discount						
Dollars (million)	n/a	$ 836	$ 2,909	$ 1,098	n/a	$ 644

NORTH AMERICAN TRADE SCENARIO

44,000-POUND TRIDEM AXLE

This scenario would increase the payload weight for the four-axle SUT and the six-axle tractor semitrailer in addition to increasing the payload weight and cubic capacity for the eight-axle double-trailer combination. As Exhibit 12-1 shows, shippers who use these trucks experience significant transportation savings. Truck shippers who change to the newly allowed configurations and GVWs would save $10,922 million per year. Rail shippers who change from rail to truck would save $870 million per year. Rail shippers, who continue to use rail, obtain a $836 million discount due to competitive rate reductions.

51,000-POUND TRIDEM AXLE

This scenario would increase the payload weight for the four-axle SUT and the six-axle tractor semitrailer in addition to increasing the payload weight and cubic capacity for the eight-axle double trailer combination.

As Exhibit 12-1 shows, shippers who use these trucks experience significant transportation savings. Truck shippers who change to the newly allowed configurations and GVWs would save $13,277 million per year. Rail shippers who change from rail to truck would save $1,233 million per year. Rail shippers who

continue to use rail obtain a $2,909 million discount due to competitive rate reductions.

LONGER COMBINATION VEHICLES NATIONWIDE SCENARIO

This scenario allows several new configurations at heavier weights and larger sizes than exist in the current fleet. As Exhibit 12-1 shows, shippers who use these trucks experience significant transportation savings. Truck shippers who change to the newly allowed configurations would save $26,660 million per year. Rail shippers who change from rail to truck save $782 million per year. Rail shippers who continue to use the railroad obtain a $1,098 million discount due to competitive rate reductions.

H.R. 551 SCENARIO

The H.R. 551 Scenario would decrease the cubic capacity for the existing five- and six-axle tractor semi-trailers. As Exhibit 12-1 shows, the transportation costs for shippers using trucks increases $22 million. For this scenario the impact on rail shippers was not estimated but is predicted to be small because only cube limited freight, which typically does not travel by rail, is affected.

TRIPLES NATIONWIDE SCENARIO

This scenario allows triple-trailer combinations to operate nationwide with higher payloads and more cubic capacity than a five-axle tractor semitrailer. Exhibit 12-1 shows an annual transportation cost savings of $19,820 million for truck shippers who divert to the triple-trailer combination and $1,122 million for rail shippers who divert to the triple-trailer combination. Rail shippers who continue to use the railroad obtain a $644 million discount due to competitive rate reductions.